UNIVERSITY OF ZAGREB

FACULTY OF VETERINARY MEDICINE

DETAILED PROPOSAL OF THE STUDY PROGRAMME VETERINARY MEDICINE IN ENGLISH FOR THE 2026-2027 ACADEMIC YEAR

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GENERAL INFORMATION ABOUT UNIVERSITY OF ZAGREB

UNIVERSITY OF ZAGREB

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The University of Zagreb (Universitas Studiorum Zagrabiensis) is the biggest and the oldest university in Croatia as well as in South-East Europe. The university was founded in 1669 by King Leopold I who issued a decree granting the status and privileges of a university to the Jesuit Academy. The university now consists of 30 faculties, three art academies and the University Centre “Croatian Studies”. Over 50.000 students attend study programmes in fields of Biotechnology, Biomedicine, Social and Humanistic Sciences, Natural Sciences, Engineering and Arts. Complete information can be gotten at the University web site **www.unizg.hr** (Source: **www.unizg.hr/homepage**)

University profile at the University website Past, Present & Future - University Leadership - Vision & Mission - Basic Statistical Data - Academies & Faculties of the University of Zagreb - Organisational Units & Other Supporting Institutions

GENERAL FACTS ON FACULTY OF VETERINARY MEDICINE – ZAGREB

Source: Bregeš

Faculty of Veterinary Medicine, University of Zagreb was founded in 1919 as a four year college. On 7 December 1924 the school was renamed into the Faculty of Veterinary Medicine and it became a part of the University of Zagreb. Since then it has been the only faculty of that kind in the Republic of Croatia. The Faculty comprises a number of premises; lecture and teaching rooms, computer laboratories and laboratories and facilities where large and small animals are kept. Well equipped infrastructure provides conditions for scientific research, teaching as well as cooperation with the economic sector (agriculture, biotechnology, animal origin food production). Striving to achieve international high teaching standards the Faculty has been successfully evaluated by EAEVE (European Association for the Establishment of the Veterinary Education) since 2002. The changes appointed by the EAEVE expert team are included in the new curriculum. Study programme is aligned with the Bologna structure.

Also, all the ISO 9001 Bureau Veritas criteria concerning the quality control are met and Faculty possess its valid certificate.

Teaching, scientific and highly skilled activities of the Faculty are based on the work of departments and clinics integrated since academic year 2005/06 into four departments: Basic and Pre-clinical Sciences Division, Animal Production and Biotechnology Division, Clinical Division and Veterinary Public Health and Food Safety Division. The

fifth department, Management, Chairs and Technical Services besides an office manager and accounting, also include IT section, Central library as well as Chair of Foreign Languages and Chair of Physical Training.

Since the beginning of the academic year 2005/06 the Faculty of Veterinary Medicine of the University of Zagreb has been implementing the new curriculum entitled University study of Veterinary medicine. The study lasts for six years (12 semesters) – 360 ECTS points.
Experiences at and recommendations by a number of leading veterinary institutions of higher education in the world, particularly of the European Association of Establishments for Veterinary Education (EAEVE), were acknowledged in drafting the new curriculum. Most teaching such as lessons, seminars, practical work and other forms of consultations are performed within the Faculty tract situated in the south east Zagreb.

The premises include 12 buildings with teaching rooms, student practicum, laboratories and computer laboratories. Completely refurbished large lecture room with the most sophisticate equipment offers an opportunity for multimedia and teleconference presentations. Moreover, better working conditions have been achieved due to involment in a framework of IVSA-Croatia (International Veterinary Students Association) and Equus (Veterinary Medicine Student Association) activities by recently remade student premises.

European Association of Establishments for Veterinary Education (EAEVE)
http://www.eaeve.org

GENERAL INFORMATION ABOUT THE PROPOSED STUDY PROGRAM

NAME OF THE STUDY PROGRAM

INTEGRATED UNDERGRADUATE AND GRADUATE UNIVERSITY STUDY OF VETERINARY MEDICINE IN ENGLISH

PROVIDER OF THE STUDY PROGRAM

FACULTY OF VETERINARY MEDICINE
UNIVERSITY OF ZAGREB

TYPE OF THE STUDY PROGRAM

University study program

LEVEL OF THE STUDY PROGRAM

Integrated undergraduate and graduate study

ACADEMIC/PROFESSIONAL TITLE UPON COMPLETION OF THE STUDY

Doctor of veterinary medicine

SCIENTIFIC AREA OF THE STUDY PROGRAM

Area: Biomedicine and health, field: Veterinary medicine

DURATION OF THE STUDY PROGRAM AND MINIMUM NUMBER OF ECTS CREDITS

The study lasts 6 years or 12 semesters. For each completed year, a student earns 60 ECTS credits. Upon completion of the study, minimum of 360 ECTS credits are earned.

REASONS FOR STUDY IN ENGLISH

The fundamental reason for the promotion of organization and conduct of the study program in English lies in the need to provide a university study in veterinary medicine in English within the University of Zagreb and the Republic of Croatia. Initiation of the first university study of veterinary medicine in the English language in the Republic of Croatia occurs as response to a recognized need, and as preparation for global work environment, for the education of doctors of veterinary medicine in English. We believe that the establishment of the study in English is yet another contribution to the international recognition of the University and our Faculty and that it will prepare students for work in an open international market. Additional interest for enrolment in the study program at the Faculty of Veterinary Medicine in Zagreb comes from

students from the non-EU countries and this interest rose especially after Croatia joined the EU.

The importance of starting the study program in English is also found in the regional integration with the European area of higher education (EHEA) since the Veterinary faculties in the region do not have studies in English. The realization of this set goal would position our Faculty as the leading institution of higher education in the region in the field of veterinary medicine. Establishment of the study in English in Croatia would ensure the competitiveness and distinctiveness of the program and a greater mobility of students and lecturers. The objective of the establishment of the aforementioned study is that its scientific and teaching activity primarily contributes to the development of Croatia, but also the region as a whole. The study is designed in a way that it meets the criteria of the curricula of the veterinary faculties which are carried out within the European Union and which are accredited by EAEVE.

The idea to initiate the study of veterinary medicine at the Faculty of Veterinary Medicine, Zagreb has matured for a number of years. Also, one of the reasons for starting the study in English is to encourage parallel conduct of studies in Croatian and English language in order to offer equal opportunities to local students to attend studies in Croatian and English, but also to attract foreign students from the Europe and other continents. The Faculty of Veterinary Medicine, University of Zagreb recognizes the fact that a large number of Croatian citizens and people of Croatian origin live abroad, and it therefore sees a great potential of academic involvement and launch of powerful mechanisms of international exchange and cooperation.

By establishing the study in English, the Faculty of Veterinary Medicine will respond to the needs of Croatian citizens from the region and the world, who have in the last few years shown a steady interest in education at the Faculty of Veterinary Medicine in Zagreb. In addition to Croatian citizens who would like to study from the very beginning in the English language, there are a number of other interested groups.

Thus, the proposed program of study in English could be enrolled by:

1. Candidates who are BSc in natural or biomedical sciences;
2. Candidates who completed at least four years of secondary education abroad, in a country that has an *established* system of external evaluation of secondary education;
3. Candidates who passed internationally recognized SAT Reasoning Test;
4. High school graduates from the Republic of Croatia and Diaspora / international students with a high school diploma;
5. Foreign students using EU mobility program and other exchange programs (e.g. ERASMUS, CEEPUS, AUF and the like)
6. Students who wish to attend courses only in part of the academic year or who would like to attend an elective course.

Today, the Faculty is a public institution of higher education which, as a constituent part of the University of Zagreb (hereinafter: the University), organizes and implements university and vocational studies and develops scientific and professional work in the educational and scientific field of biomedicine and health care, the field of veterinary medicine. The Faculty is a legal entity entered into the Register of Higher Education Institutions and the Register of Scientific Research Legal Entities, kept by the Ministry of Science, Education and Sports of the Republic of Croatia.

The current program of study is the fundamental in education in the field of veterinary medicine. We have formed the new program of study in English as a faithful copy of the program in the Croatian language. The number of core and elective courses and three study tracks are completely identical in both study programs.

The diploma is equivalent to the diploma received by students who complete the current Croatian degree program. The program in English has clearly expressed learning outcomes and described qualifications that are stated in the Diploma Supplement (DS).

The program is designed as a combination of basic courses, preclinical and clinical veterinary subjects, which provide a broad education to every doctor of veterinary medicine. During lectures, seminars/tutorials and practicals, students receive the necessary skills and techniques related to the selected studies in English, especially during seminars and practicals in which they acquire practical knowledge directly with the help of university teachers and prominent experts in veterinary practice. In order to easily master the work techniques and get quickly involved in the business practice and professional performance of tasks for which they have been preparing during the study, attention has been given to mandatory practical training of participants during the two final years of the study, which is carried out in appropriate facilities and institutions. This allows employers to meet potential employees while students can have easier insight into their own knowledge, skills and the actual preparation for entry into the world of modern veterinary practice. Upon enrolment in the fifth year of study, students have the option to choose between one of the three study tracks:

1. Small Companion Animals (SCA)
2. Farm Animals and Horses (FAH)
3. Veterinary Public Health (VPH)

The course content in the existing three study tracks within the study program covers numerous current gains and follows developmental dynamics that are distributed in the framework of various academic sub-disciplines. They are designed to encourage the real interest of students for one of the selected fields of veterinary profession as well as their creativity. The selected study track provides them with essential theoretical knowledge and all the essential practical applications and skills in each of the selected segments of veterinary activity, as well as activities that are associated with it. Particular emphasis is placed on building students' competencies through teamwork in small groups. Students thus actively learn how to solve problems, gain experience in team work and conduct of business.

Clinical teaching for all the assigned students starts from the 3rd year of study. Practical training in food hygiene and public health is ensured in slaughterhouses, markets, meat processing factories, dairies as well as laboratories. Laboratory skills, as well as principles of work safety in laboratories are taught from the first year onwards.

Continuous modernization of working and teaching spaces, laboratories and clinics resulted in an increased interest of foreign students, participants in postgraduate specialist studies and in the owners' selection of the Faculty as the location for the treatment of their companion animals and farm animals. The Faculty has so far become well-defined as a regionally recognizable institution in the field of education and professional-clinical work.

The current program of study which is now conducted in Croatian, received Accreditation for the conduct at the Faculty of Veterinary Medicine by the Ministry of Science, Education and Sports of the Republic of Croatia based on the prior positive opinion of the National Council for Higher Education.

Upon completion of the study at least 360 ECTS credits are earned. The study is conducted at the seat of the higher education institution in Vjekoslava Heinzela Street 55, 10 000 Zagreb. Academic degree is stated as: doctor of veterinary medicine. The occupation doctor of veterinary medicine in the Republic of Croatia belongs to the group of regulated professions, therefore the study program is largely harmonized with the provisions of Directive 2005/36/ EC, as well as the Law on regulated professions and recognition of foreign professional

qualifications (OG124/09). Pursuant to the above mentioned, the Faculty determined that the study shall be carried out as integrated study, in one educational cycle of six years.

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Vice deans:

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- Assoc. Prof. Hrvoje Capak, Vice Dean for Financial Operations and Investments
- Prof. Nino Maćešić, Vice Dean for Vice Dean for International Cooperation and Science
- Assoc. Prof. Marko Pećin, Vice Dean Veterinary Studies in English
- Prof. Gordana Gregurić Gračner, Vice Dean for Quality Assurance

COURSE CATALOGUE – OBLIGATORY AND ELECTIVE COURSE LIST

2026/2027 COURSE CATALOGUE – OBLIGATORY AND ELECTIVE COURSE LIST
(L-lecture, S-seminar, P-practical, F-fieldwork)

1st year

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
I semester						
Obligatory Subject	Physics and Biomedical Physics	16	0	38	0	5
	Medical Chemistry	18	0	36	0	5
	Zoology	15	20	30	10	5,5
	Plant Biology	10	0	10	0	1,5
	Anatomy with Embryology of Domestic Animals I	18	0	64	0	7,0
	Basic Statistics in Veterinary Medicine	14	0	16	0	2,5
	Introduction to Veterinary	2	6	0	12	1,5
	Environment, Animal Behaviour and Welfare	8	8	24	0	3,0
	Physical Education I	0	0	30	0	1
	Total hours of obligatory courses:	101	34	248	22	32

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
II semester						
Obligatory Subject	Anatomy with Embryology of Domestic Animals II	20	0	100	0	8,0
	Biochemistry in Veterinary Medicine	31	14	27	0	7,5
	Animal Breeds Characteristics	14	10	30	6	4,5
	Introduction to English Veterinary Medical Terminology I	0	10	5	0	1
	Physical Education II	0	0	30	0	1
	Total hours of obligatory courses:	65	34	192	6	22
Elective Subject 6 ECTS (MIN 6, MAX 8 ECTS)	Natural Compounds in Veterinary Medicine	12	12	6	0	2
	Positive Impact of Animals on Human Health	5	5	5	0	1
	Conservation and Management of Endangered Species	0	0	15	0	1
	English for Academic purposes I (35)	8	40	12	0	4
	Selected Chapters in Biomedical Physics for Veterinarians	20	10	0	0	2
	Veterinary Ethics	15	15	0	0	2
	Specific Anatomical Structures of the Locomotor Apparatus of the Horse (20)	0	0	15	0	1

2nd year

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
III semester						
Obligatory Subject	Physiology of Domestic Animals I	30	0	50	0	6
	General and Molecular Genetics in Veterinary Medicine	5	10	30	0	3,5
	Basic Animal Nutrition	15	0	22	8	3,5
	Introduction to English Veterinary Medical Terminology II	0	10	5	0	1,0
	Anatomy with Embryology of Domestic Animals III	15	0	63	0	5,5
	Animal Breeding and Production	20	8	16	0	3,5
	Hygiene and Housing of Animals	16	0	24	0	3,0
	Veterinary Immunology	16	0	14	0	2,5
	Physical Education III	0	0	30	0	1
	Total hours of obligatory courses:	117	28	254	8	29,5
Elective Subject 2 ECTS (MIN 2, MAX 4)	Reptile Morphology (36)	4	15	11	0	2
	English for Academic purposes II (35)	8	40	12	0	4
	Comparative Anatomy of Skeletal System (20)	10	0	20	0	2
	Structure and Function of Cell	10	7	8	0	2

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
IV semester						
	Physiology of Domestic Animals II	48	22	60	0	10
	Applied Animal Nutrition	25	0	26	24	5,5
	Animal Breeding and Production	14	6	14	12	3,5
	Hygiene and Housing of Animals	13	22	0	20	3,0
	General Microbiology	12	12	30	0	3,5
	Histology with General Embryology	30	0	60		7,0
	Physical Education IV	0	0	30	0	1
	Total hours of obligatory courses:	142	62	220	56	33,5
Elective Subjects 2 ECTS (MIN 2, MAX 4 ECTS)	Game Zoology	4	0	26	0	2
	Anatomy of Laboratory Animals (30)	6	8	16	0	2
	Archaeozoology (20)	10	5	15	0	2
	Cytometry in Clinical Veterinary Medicine	0	15	15	0	2
	Physiology of Birds	12	0	3	0	1
	Physiology of Amphibians and Reptiles	10	0	5	0	1

3rd year

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
V semester						
Obligatory Subject	Parasitology and Parasitic Diseases	18	0	24	0	4,0
	General Veterinary Pathology	30	0	60	0	7,0
	Pathophysiology I	12	4	9	0	2,5
	Special Microbiology	15	15	30	0	4,5
	Pharmacology	45	5	35	0	6,5
	Radiation Hygiene	16	0	14	0	2,5
	Total hours of obligatory courses:	136	24	172	0	27
Elective Subject 2 ECTS (MIN 2, MAX 4 ECTS)	Biology and Ecology of Predators	8	4	18	0	2
	Agricultural Economics and Rural Development	*10*	*0*	*20*	*0*	*2*
	Clinical Anatomy (30)	10	0	20	0	2

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
VI semester						
Obligatory Subject	Parasitology and Parasitic Diseases	16	0	32	0	3,0
	Special Veterinary Pathology	60	0	75	0	10,5
	Pathophysiology II	39	6	50	0	6,5
	Clinical Propedeutics	45	0	54	6	8,0
	Communication Skills in Veterinary Medicine	16	0	12	0	1,0
	Total hours of obligatory courses:	176	6	223	6	29
Elective Subject 4 ECTS (MIN 4, MAX 6 ECTS)	Fundamentals of Physics for Diagnostics Methods	20	10	0	0	2
	Comparative Mucosal Immunology	15	5	10	0	2
	Veterinary Clinical Microbiology (10)	8	0	22	0	2
	Feed Additives - Health Modulators	3	2	10	0	1
	Pigeon Keeping and Breeding (3)	0	15	15	0	2
	Breeding and Husbandry of Rabbits and Cage Pets	3	25	2	0	2
	Fundamentals of Holistic Medicine	15	0	15	0	2
	The Role of Veterinarians at Organic Farms	15	15	0	0	2

4th year

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
VII semester						
Obligatory Subject	Internal Medicine	60	0	64	0	10,0
	Surgery, Orthopaedics and Ophthalmology I	30	0	60	0	7,0
	Veterinary Diagnostic Imaging	15	0	30	0	3,5
	Game Breeding and Management	4	0	18	8	2,5
	Total hours of obligatory courses:	109	0	172	8	23
Elective Subject 2 ECTS (MIN 2, MAX 5 ECTS)	Clinical Physiology	*15*	*0*	*15*	*0*	*2*
	Comparative Nutrition	*5*	*6*	*4*	*0*	*1*
	Fundamentals of Scientific Research	*8*	*4*	*18*	*0*	*2*
	Parasitic Zoonotic Diseases (30)	*10*	*20*	*0*	*0*	*2*

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
VIII semester						
Obligatory Subject	Internal Medicine	30	9	42+5*	0	6,0
	Surgery, Orthopaedics and Ophthalmology II	30	0	40+5*	0	5,5
	Obstetrics and Reproduction I	60	0	100+5*	0	12,5
	Veterinary Physical Therapy, Diagnostics and Rehabilitation	15	0	15	0	2,5
	Biology and Pathology of Beneficial Insects	11	0	16	9	2,5
	Biology and Pathology of Aquatic Organisms	11	0	20	5	2,5
	Toxicology	24	6	24 (20PK+4L	0	3,5
	Total hours of obligatory courses:	181	15	272	14	35
Elective Subject 1 ECTS (MIN 1, MAX 3 ECTS)	Hunting and Nature Protection	4	0	26	0	2
	Veterinary Nuclear Medicine	12	0	3	0	1
	Fundamentals of Agronomy (3)	12	11	7	0	2,5
	Cynology and Felinology	10	20	0	0	2

*Clinic night shift hours

5th year

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
IX semester						
Obligatory Subject	Surgery, Orthopaedics and Ophthalmology III	30	0	45	0	5,5
	Obstetrics and Reproduction II	30	0	45	0	5,5
	Hygiene, Technology and Food Safety	30	0	32	28	7
	Infectious Diseases of Domestic Animals	25	0	75	0	6
	Veterinary Epidemiology	4	0	26	0	2,5
	Total hours of obligatory courses:	119	0	223	28	26.5
Elective Subject 4 ECTS (MIN 4, MAX 6 ECTS)	Comparative Odontology	10	0	5	0	1
	Fish Morphology (30)	0	10	20	0	2
	Tumors of Domestic Animals: Molecular Basics and Specificities of Selected Tumor Types	10	0	20	0	2
	Wildlife Diseases	4	0	26	0	2

X – SEMESTER - Study Track - Small Companion Animals (SCA)

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
X semester – STUDY TRACK Small Companion Animals (SCA)						
Obligatory Subject	State Veterinary Medicine	15	24	6 (RA)	0	3,5
	Infectious Diseases of Domestic Animals	50	0	30	0	7,5
	Hygiene, Technology and Food Safety	30	0	25	20	5,5
	Field Service Clinic	0	0	60	0	3,5
	Diseases and Treatment of Dogs and Cats I	0	0	45	0	3,5
	Total hours of obligatory courses:	95	24	166	20	23.5
Elective Subject 7 ECTS (MIN 7, MAX 8.5 ECTS)	Animal Dietetics	5	5	20	0	2
	Diseases of Honeybees in Contemporary Production (25)	6	2	2	5	1
	Fishery (5)	3	4	0	8	1
	Fundamentals of Ecologic Livestock Breeding	10	10	10	0	2
	Biology and Conservation of Marine Mammals (30)	10	14	16	0	2,5

X – SEMESTER - Study Track - Veterinary Public Health (VPH)

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
X semester – STUDY TRACK Veterinary Public Health (VPH)						
Obligatory Subject	State Veterinary Medicine	15	24	6 (RA)	0	3,5
	Infectious Diseases of Domestic Animals	50	0	30	0	7,5
	Hygiene, Technology and Food Safety	30	0	25	20	5,5
	Field Service Clinic	0	0	60	0	3,5
	Food Hygiene and Quality Control	11	4	24	6	3,5
	Veterinary Legislation and Food Safety Control	28	17	0	0	3,5
	Total hours of obligatory courses:	134	45	145	26	27
Elective Subject 3 ECTS (MIN 3, MAX 6 ECTS)	Autochthonous Meat Products	5	15	6	0	2
	Autochthonous Dairy Products	6	13	5	6	2
	Hygienic Quality of Game Meat	11	10	5	0	2
	Hygiene and Quality of Poultry Meat	4	8	14	0	2
	Carcass Quality at the Slaughter Line	8	10	8	0	2
	Hygiene and Quality of Fish Meat	9	12	6	0	2
	Diseases of Honeybees in Contemporary Production	6	2	2	5	1
	Fishery (5)	3	4	0	8	1

X – SEMESTER - Study Track - Farm Animals and Horses (FAH)

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
X semester – STUDY TRACK Farm Animals and Horses (FAH)						
Obligatory Subject	State Veterinary Medicine	15	24	6	0	3,5
	Infectious Diseases of Domestic Animals	50	0	30	0	7,5
	Hygiene, Technology and Food Safety	30	0	25	20	5,5
	Field Service Clinic	0	0	60	0	3,5
	Equine Medicine	13	32	45	0	7
	Total hours of obligatory courses:	108	56	166	20	27
Elective Subject MIN 3, MAX 6 ECTS	Animal Dietetics	5	5	20	0	2
	Diseases of Honeybees in Contemporary Production	6	2	2	5	1
	Fishery (5)	3	4	0	8	1
	Sport and Working Animals	10	6	14	0	2

6th year

XI – SEMESTER - Study Track - Small Companion Animals (SCA)

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
XI semester – STUDY TRACK Small Companion Animals (SCA)						
Obligatory Subject	Forensic Veterinary Medicine	10	0	35	0	3,5
	Poultry Diseases	25	20	21	9	5,5
	Herd Health	1	0	14	0	1
	Veterinary Economics	10	0	20	0	2,5
	Field Service Clinic	0	0	60	0	6
	Diseases and Treatment of Dogs and Cats II	0	15	30	0	3,5
	Diseases of Pet Birds, Exotic and Laboratory Animals	50	10	30	0	7
	Total hours of obligatory courses:	96	45	210	9	29
Elective Subject MIN 2, MAX 4 ECTS	Technology in Poultry Production	6	4	5	0	1
	Management and Marketing in Veterinary Practice	10	0	20	0	2
	Emerging Infectious Diseases	28	0	2	0	2
	Zoonoses	24	4	2	0	2
	Veterinary Cytology (35)	10	0	20	0	2
	Selected Chapters in Aquaculture (5)	5	14	4	7	2

XI – SEMESTER - Study Track - Veterinary Public Health (VPH)

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
XI semester – STUDY TRACK Veterinary Public Health (VPH)						
Obligatory Subject	Forensic Veterinary Medicine	10	0	35	0	3,5
	Poultry Diseases	25	20	21	9	5,5
	Herd Health	1	0	14	0	1
	Veterinary Economics	10	0	20	0	2,5
	Field Service Clinic	0	0	60	0	6
	Veterinary Public Health	42	16	26	6	7
	Total hours of obligatory courses:	88	36	176	15	25,5
Elective Subject 5 ECTS	Technology in Poultry Production	6	4	5	0	1
	Management and Marketing in Veterinary Practice	10	0	20	0	2
	Veterinary Cytology (35)	10	0	20	0	2

XI – SEMESTER - Study Track - Farm Animals and Horses (FAH)

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
XI semester – STUDY TRACK Farm Animals and Horses (FAH)						
Obligatory Subject	Forensic Veterinary Medicine	10	0	35	0	3,5
	Poultry Diseases	25	20	21	9	5,5
	Herd Health	1	0	14	0	1
	Veterinary Economics	10	0	20	0	2,5
	Field Service Clinic	0	0	60	0	6
	Farm Animal Medicine	13	30	47	0	7
	Total hours of obligatory courses:	59	50	197	9	25,5
Elective Subject MIN 5, MAX 6 ECTS	Technology in Poultry Production	6	4	5	0	1
	Management and Marketing in Veterinary Practice	10	0	20	0	2
	Emerging Infectious Diseases	28	0	2	0	2
	Zoonoses	24	4	2	0	2
	Veterinary Cytology (35)	10	0	20	0	2
	Assisted Reproduction in Veterinary Medicine	5	10	15	0	2

XII – SEMESTER

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
XII semester						
Obligatory Subject	Professional Clinical Work	0	0	120	0	8
	Professional Field Work	0	0	0	180	10
	Writing a Master's Thesis	0	0	60	0	10
	Total hours of obligatory courses:	0	0	180	180	28
Elective Subject MIN 2, MAX 5 ECTS	Biological Traces and Evidences in Forensic Veterinary Medicine	2	7+2	4	0	1
	Advanced Diagnostics and Therapy of the Diseases of the Digestive System of Dogs and Cats (35)	10	11	4	0	2
	Veterinary Emergency and Critical Care Medicine (35)	23	0	2	0	2
	Diseases of Honeybees in Contemporary Production	6	2	2	5	1
	Fishery (5)	3	4	0	8	1
	Organic Production of Poultry and Game Birds	10	10	4	6	2

REGISTRATION AND EXAMINATION REQUIREMENTS SCHEME

I SEMESTER

SUBJECT	Registration requirements for partial-year enrolees	Examination requirements for full-year and partial-year enrolees
PHYSICS AND BIOMEDICAL PHYSICS	-	
MEDICAL CHEMISTRY	-	
ZOOLOGY	-	
PLANT BIOLOGY	-	
ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I	-	
ENVIRONMENT, ANIMAL BEHAVIOUR AND WELFARE	-	
BASIC STATISTICS IN VETERINARY MEDICINE	-	
INTRODUCTION TO VETERINARY	-	
PHYSICAL EDUCATION I.	-	

II SEMESTER

SUBJECT	Registration requirements for partial-year enrolees	Examination requirements for full-year and partial-year enrolees
ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS II	-	ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I must be completed
BIOCHEMISTRY IN VETERINARY MEDICINE	Pending completion of the course MEDICAL CHEMISTRY*	Pending completion of the course MEDICAL CHEMISTRY*
ANIMAL BREEDS CHARACTERISTICS	-	
INTRODUCTION TO ENGLISH VETERINARY MEDICAL TERMINOLOGY I.	-	
PHYSICAL EDUCATION II.	-	

***All classes attended, but final exam(s) yet to be taken**

III SEMESTER

SUBJECT	Registration requirements for partial-year enrolees	Examination requirements for full-year and partial-year enrolees
PHYSIOLOGY OF DOMESTIC ANIMALS I	MEDICAL CHEMISTRY must be completed	PHYSICS AND BIOMEDICAL PHYSICS, BIOCHEMISTRY IN VETERINARY MEDICINE, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS II must be completed
GENERAL AND MOLECULAR GENETICS IN VETERINARY MEDICINE	Pending completion of PLANT BIOLOGY, MEDICAL CHEMISTRY, BIOCHEMISTRY IN VETERINARY MEDICINE and ZOOLOGY.	PLANT BIOLOGY, MEDICAL CHEMISTRY, and BIOCHEMISTRY IN VETERINARY MEDICINE and ZOOLOGY must be completed.
BASIC ANIMAL NUTRITION	MEDICAL CHEMISTRY must be completed.	MEDICAL CHEMISTRY must be completed.
ANIMAL BREEDING AND PRODUCTION	Pending completion of BASIC STATISTICS IN VETERINARY MEDICINE and ANIMAL BREEDS CHARACTERISTICS	
HYGIENE AND HOUSING OF ANIMALS	-	
VETERINARY IMMUNOLOGY	-	
ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS III	-	ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I and ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS II must be completed.
INTRODUCTION TO ENGLISH VETERINARY MEDICAL TERMINOLOGY II	–	INTRODUCTION TO ENGLISH VETERINARY MEDICAL TERMINOLOGY I must be completed.

IV SEMESTER

SUBJECT	Registration requirements for partial-year enrolees	Examination requirements for full-year and partial-year enrolees
HISTOLOGY WITH GENERAL EMBRYOLOGY	Pending completion of ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS II, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS III.	ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS II must be completed. Pending completion of ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS III.
PHYSIOLOGY OF DOMESTIC ANIMALS II	Pending completion of PHYSIOLOGY OF DOMESTIC ANIMALS I*	PHYSIOLOGY OF DOMESTIC ANIMALS I and HISTOLOGY WITH GENERAL EMBRYOLOGY must be completed.
APPLIED ANIMAL NUTRITION	Pending completion of BASIC ANIMAL NUTRITION* and BIOCHEMISTRY IN VETERINARY MEDICINE.*	BASIC ANIMAL NUTRITION and BIOCHEMISTRY IN VETERINARY MEDICINE must be completed.

ANIMAL BREEDING AND PRODUCTION	Pending completion of the course ANIMAL BREEDING AND PRODUCTION from the 3rd semester*	ANIMAL BREEDS CHARACTERISTICS and BASIC STATISTICS IN VETERINARY MEDICINE must be completed.
HYGIENE AND HOUSING OF ANIMALS	Pending completion of HYGIENE AND HOUSING OF ANIMALS from the 3rd semester*	ENVIRONMENT, ANIMAL BEHAVIOUR AND WELFARE must be completed.
GENERAL MICROBIOLOGY	Pending completion of the course VETERINARY IMMUNOLOGY*	

***All classes attended, but final exam(s) yet to be taken**

V SEMESTER

SUBJECT	**Registration requirements for partial-year enrolees**	**Examination requirements for full-year and partial-year enrolees**
PARASITOLOGY AND PARASITIC DISEASES	Pending completion of PHYSIOLOGY OF DOMESTIC ANIMALS I., PHYSIOLOGY OF DOMESTIC ANIMALS II., and HISTOLOGY WITH GENERAL EMBRYOLOGY.	
GENERAL VETERINARY PATHOLOGY	ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS II, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS III, PHYSIOLOGY OF DOMESTIC ANIMALS I., and PHYSIOLOGY OF DOMESTIC ANIMALS II must be completed.	ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS II, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS III, PHYSIOLOGY OF DOMESTIC ANIMALS I., and PHYSIOLOGY OF DOMESTIC ANIMALS II must be completed.
RADIATION HYGIENE	PHYSICS AND BIOMEDICAL PHYSICS and PHYSIOLOGY OF DOMESTIC ANIMALS I must be completed.	PHYSICS AND BIOMEDICAL PHYSICS and PHYSIOLOGY OF DOMESTIC ANIMALS I must be completed.
PATHOPHYSIOLOGY I	All first year courses must be completed and pending completion of the courses PHYSIOLOGY OF DOMESTIC ANIMALS I and PHYSIOLOGY OF DOMESTIC ANIMALS II*	PHYSIOLOGY OF DOMESTIC ANIMALS I and PHYSIOLOGY OF DOMESTIC ANIMALS II must be completed.
PHARMACOLOGY	All first year courses must be completed and pending completion of the courses PHYSIOLOGY OF DOMESTIC ANIMALS I. and PHYSIOLOGY OF DOMESTIC ANIMALS II.*	PHYSIOLOGY OF DOMESTIC ANIMALS I. and PHYSIOLOGY OF DOMESTIC ANIMALS II must be completed.
SPECIAL MICROBIOLOGY	VETERINARY IMMUNOLOGY and GENERAL MICROBIOLOGY must be completed.	VETERINARY IMMUNOLOGY and GENERAL MICROBIOLOGY must be completed.

***All classes attended, but final exam(s) yet to be taken**

VI SEMESTER

SUBJECT	Registration requirements for partial-year enrolees	Examination requirements for full-year and partial-year enrolees
PARASITOLOGY AND PARASITIC DISEASES	Pending completion of PATHOPHYSIOLOGY I, GENERAL VETERINARY PATHOLOGY and PHARMACOLOGY.	Pending completion of SPECIAL VETERINARY PATHOLOGY, PATHOPHYSIOLOGY II, CLINICAL PROPEDEUTICS and all compulsory and elective courses from 1st – 4th semester must be completed.
SPECIAL VETERINARY PATHOLOGY	ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS II, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS III, PHYSIOLOGY OF DOMESTIC ANIMALS I, PHYSIOLOGY OF DOMESTIC ANIMALS II and HISTOLOGY WITH GENERAL EMBRYOLOGY must be completed. Pending completion of GENERAL VETERINARY PATHOLOGY	ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS II, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS III, PHYSIOLOGY OF DOMESTIC ANIMALS I., PHYSIOLOGY OF DOMESTIC ANIMALS II, HISTOLOGY WITH GENERAL EMBRYOLOGY and GENERAL VETERINARY PATHOLOGY must be completed.
PATHOPHYSIOLOGY II	Pending completion of the course PATHOPHYSIOLOGY I*	PATHOPHYSIOLOGY I must be completed.
CLINICAL PROPEDEUTICS	ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS II, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS III and HISTOLOGY WITH GENERAL EMBRYOLOGY must be completed.	ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS II, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS III, and HISTOLOGY WITH GENERAL EMBRYOLOGY must be completed.

***All classes attended, but final exam(s) yet to be taken**

VII SEMESTER

SUBJECT	Registration requirements for partial-year enrolees	Examination requirements for full-year and partial-year enrolees
INTERNAL MEDICINE	CLINICAL PROPEDEUTICS, SPECIAL VETERINARY PATHOLOGY must be completed. Pending completion of the course PHARMACOLOGY.	
SURGERY, ORTHOPAEDICS AND OPHTHALMOLOGY I.	GENERAL VETERINARY PATHOLOGY, SPECIAL VETERINARY PATHOLOGY and PHARMACOLOGY must be completed.	GENERAL VETERINARY PATHOLOGY, SPECIAL VETERINARY PATHOLOGY and PHARMACOLOGY must be completed.

VETERINARY DIAGNOSTIC IMAGING	Pending completion of the course CLINICAL PROPAEDEUTIC, GENERAL VETERINARY PATHOLOGY and SPECIAL VETERINARY PATHOLOGY*.	GENERAL VETERINARY PATHOLOGY, SPECIAL VETERINARY PATHOLOGY must be completed.
GAME BREEDING AND MANAGEMENT	GENERAL VETERINARY PATHOLOGY must be completed. Pending completion of the course SPECIAL VETERINARY PATHOLOGY.	GENERAL VETERINARY PATHOLOGY must be completed. Pending completion of the course SPECIAL VETERINARY PATHOLOGY,

***All classes attended, but final exam(s) yet to be taken**

VIII SEMESTER

SUBJECT	**Registration requirements for partial-year enrolees**	**Examination requirements for full-year and partial-year enrolees**
SURGERY, ORTHOPAEDICS AND OPHTHALMOLOGY II	Pending completion of the course SURGERY, ORTHOPAEDICS AND OPHTHALMOLOGY I from the 7th semester.*	SURGERY, ORTHOPAEDICS AND OPHTHALMOLOGY I must be completed.
OBSTETRICS AND REPRODUCTION I	SPECIAL VETERINARY PATHOLOGY and CLINICAL PROPAEDEUTIC must be completed.	SPECIAL VETERINARY PATHOLOGY and CLINICAL PROPAEDEUTIC must be completed.
BIOLOGY AND PATHOLOGY OF BENEFICIAL INSECTS	GENERAL VETERINARY PATHOLOGY, PHARMACOLOGY, SPECIAL MICROBIOLOGY must be completed.	GENERAL VETERINARY PATHOLOGY, PHARMACOLOGY, SPECIAL MICROBIOLOGY must be completed.
BIOLOGY AND PATHOLOGY OF AQUATIC ORGANISMS	GENERAL VETERINARY PATHOLOGY, PHARMACOLOGY, SPECIAL MICROBIOLOGY must be completed.	GENERAL VETERINARY PATHOLOGY, PHARMACOLOGY, SPECIAL MICROBIOLOGY must be completed.
TOXICOLOGY	GENERAL VETERINARY PATHOLOGY, SPECIAL VETERINARY PATHOLOGY, PATHOPHYSIOLOGY I, PATHOPHYSIOLOGY II, PHARMACOLOGY must be completed.	GENERAL VETERINARY PATHOLOGY, SPECIAL VETERINARY PATHOLOGY, PATHOPHYSIOLOGY I, PATHOPHYSIOLOGY II, PHARMACOLOGY must be completed.
VETERINARY PHYSICAL THERAPY, DIAGNOSTICS AND REHABILITATION	Pending completion of the course VETERINARY DIAGNOSTIC IMAGING, GENERAL VETERINARY PATHOLOGY, SPECIAL VETERINARY PATHOLOGY.*	GENERAL VETERINARY PATHOLOGY, SPECIAL VETERINARY PATHOLOGY must be completed.
INTERNAL MEDICINE	Passed the compulsory Internal Medicine midterm exam at the end of the winter semester.	SPECIAL VETERINARY PATHOLOGY and CLINICAL PROPAEDEUTIC must be completed.

***All classes attended, but final exam(s) yet to be taken**

IX SEMESTER

SUBJECT	**Registration requirements for partial-year enrolees**	**Examination requirements for full-year and partial-year enrolees**

INFECTIOUS DISEASES OF DOMESTIC ANIMALS	All courses from years 1 to 3 must be completed, with attendance of the 4th year courses.	-
SURGERY, ORTHOPAEDICS AND OPHTHALMOLOGY III	Pending completion of the course SURGERY, ORTHOPAEDICS AND OPHTHALMOLOGY II in the 8th semester.*	SURGERY, ORTHOPAEDICS AND OPHTHALMOLOGY II must be completed.
OBSTETRICS AND REPRODUCTION II	Pending completion of the course OBSTETRICS AND REPRODUCTION I in the 8th semester.*	OBSTETRICS AND REPRODUCTION I must be completed.
HYGIENE, TECHNOLOGY AND FOOD SAFETY	All courses from years 1 to 3 must be completed, with attendance of the 4th year courses and examinations passed in the following subjects: INTERNAL MEDICINE (8th semester) AND GAME BREEDING AND MANAGEMENT (7th semester)	-
VETERINARY EPIDEMIOLOGY	Pending completion of the course INTERNAL MEDICINE and OBSTETRICS AND REPRODUCTION I.*	-

***All classes attended, but final exam(s) yet to be taken**

X SEMESTER

SUBJECT	**Registration requirements for partial-year enrolees**	**Examination requirements for full-year and partial-year enrolees**
INFECTIOUS DISEASES OF DOMESTIC ANIMALS	Pending completion of the course INFECTIOUS DISEASES OF DOMESTIC ANIMALS in the 9th semester	INTERNAL MEDICINE must be completed.
STATE VETERINARY MEDICINE	Pending completion of the course INFECTIOUS DISEASES OF DOMESTIC ANIMALS in the 9th semester	Passed and completed all subjects until/from IX semester.
HYGIENE, TECHNOLOGY AND FOOD SAFETY	Pending completion of the course HYGIENE, TECHNOLOGY AND FOOD SAFETY in the 9th semester	All courses in years 1-4 must be completed.
FIELD SERVICE CLINIC	All subjects in 1st to 9th semester must have been attended, and the examinations passed in the following subjects: OBSTETRICS AND REPRODUCTION I and SURGERY, ORTHOPAEDICS AND OPHTHALMOLOGY II	-

XI SEMESTER

SUBJECT	**Registration requirements for partial-year enrolees**	**Examination requirements for full-year and partial-year enrolees**
FORENSIC VETERINARY MEDICINE	Pending completion of the course STATE VETERINARY MEDICINE.*	**Completed and passed all subjects before the applying for final exam from FORENSIC VETERINARY MEDICINE.**

		Prequisition for applying for exam does not include finished EPT.
POULTRY DISEASES	Pending completion of the course INFECTIOUS DISEASES OF DOMESTIC ANIMALS.*	INFECTIOUS DISEASES OF DOMESTIC ANIMALS must be completed.
HERD HEALTH	All courses from years 1 through 5 must be completed.	-
VETERINARY ECONOMICS	Pending completion of the course VETERINARY EPIDEMIOLOGY.*	VETERINARY EPIDEMIOLOGY must be completed.
FIELD SERVICE CLINIC	Positive grade of the course Field Service Clinic must be obtained; pending completion of all clinical courses.	-

XII SEMESTER

SUBJECT	**Registration requirements for partial-year enrolees**	**Examination requirements for full-year and partial-year enrolees**
PROFESSIONAL CLINICAL WORK	Pending completion of all courses.	
PROFESSIONAL FIELD WORK	Pending completion of all courses.	
WRITING A MASTER'S THESIS	Pending completion of all courses.	

REGISTRATION AND EXAMINATION REQUIREMENTS FOR STUDY TRACK RELATED ELECTIVE COURSES AND ELECTIVE COURSES

SUBJECT	**Registration requirements**	**Examination requirements**
ADVANCED DIAGNOSTICS AND THERAPY OF THE DISEASES OF THE DIGESTIVE SYSTEM OF DOGS AND CATS	Maximum number of students: 35	
ANATOMY OF LABORATORY ANIMALS	ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS II, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS III must be completed. Maximum number of students: 30	
AUTOCHTHONOUS DAIRY PRODUCTS	Enrolled in the Veterinary Public Health Study Track	Pending completion of FOOD HYGIENE AND TECHNOLOGY
ARCHAEOZOOLOGY	ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS II must be completed.	ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I, ANATOMY WITH

	Pending completion of ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS III. Priority will be given to students who have passed their pre-qualification exams with a grade od very good or excellent when enrolling into a course. Maximum number of students: 20	EMBRYOLOGY OF DOMESTIC ANIMALS II must be completed.
BIOLOGY AND CONSERVATION OF MARINE MAMMALS	Maximum number of students: 30	
CARCASS QUALITY AT THE SLAUGHTER LINE	Enrolled in the Veterinary Public Health Study Track	Pending completion of FOOD HYGIENE AND TECHNOLOGY
CLINICAL ANATOMY	ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS II, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS III must be completed. Maximum number of students: 30	ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS II, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS III and HISTOLOGY WITH GENERAL EMBRYOLOGY must be completed.
COMPARATIVE ANATOMY OF SKELETAL SYSTEM	ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS II must be completed. Maximum number of students: 20	ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS II must be completed.
DISEASES OF HONEYBEES IN CONTEMPORARY PRODUCTION	BIOLOGY AND PATHOLOGY OF BENEFICIAL INSECTS must be completed. Maximum number of students: 25	BIOLOGY AND PATHOLOGY OF BENEFICIAL INSECTS must be completed.
DISEASES AND TREATMENT OF DOGS AND CATS I	INTERNAL MEDICINE, SURGERY, ORTHOPAEDICS AND OPHTHALMOLOGY II, GENERAL AND CLINICAL RADIOLOGY, TOXICOLOGY, OBSTETRICS AND REPRODUCTION I must be completed.	SURGERY, ORTHOPAEDICS AND OPHTHALMOLOGY III must be completed.
DISEASES AND TREATMENT OF DOGS AND CATS II	Pending completion of DISEASES AND TREATMENT OF DOGS AND CATS I. OBSTETRICS AND REPRODUCTION II must be completed.	DISEASES AND TREATMENT OF DOGS AND CATS I must be completed.
EMERGING INFECTIOUS DISEASES		INFECTIOUS DISEASES OF DOMESTIC ANIMALS must be completed.
ENGLISH FOR ACADEMIC PURPOSES I	Maximum number of students: 35	
ENGLISH FOR ACADEMIC PURPOSES II	Maximum number of students: 35	

FISH MORPHOLOGY	Pending completion of the course BIOLOGY AND PATHOLOGY OF AQUATIC ORGANISMS. Maximum number of students: 30	BIOLOGY AND PATHOLOGY OF AQUATIC ORGANISMS must be completed.
FISHERY	BIOLOGY AND PATHOLOGY OF AQUATIC ORGANISMS must be completed. Maximum number of students: 5	BIOLOGY AND PATHOLOGY OF AQUATIC ORGANISMS must be completed.
FOOD HYGIENE AND QUALITY CONTROL	All courses in years 1 to 3 must be completed, and all 4th year courses attended	HYGIENE, TECHNOLOGY AND FOOD SAFETY must be completed.
FUNDAMENTALS OF AGRONOMY	ENVIRONMENT, ANIMAL BEHAVIOUR AND WELFARE must be completed with a minimal grade of very good (4). Maximum number of students: 3	
HYGIENE AND QUALITY OF FISH MEAT	Enrolled in the Veterinary Public Health Study Track	Pending completion of HYGIENE, TECHNOLOGY AND FOOD SAFETY
HYGIENE AND QUALITY OF POULTRY MEAT	Enrolled in the Veterinary Public Health Study Track	Pending completion of HYGIENE, TECHNOLOGY AND FOOD SAFETY
PARASITIC ZOONOTIC DISEASES	Examination requirements: all courses in years 1 to 2 must be completed; fulfilled criteria for signature in the grade book and completed progress tests. Maximum number of students: 30	PARASITOLOGY AND PARASITIC DISEASES must be completed.
REPTILE MORPHOLOGY	Pending completion of the course ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I, ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS II. Maximum number of students :36	
PIGEON KEEPING AND BREEDING	ENVIRONMENT, ANIMAL BEHAVIOUR AND WELFARE AND HYGIENE AND HOUSING OF ANIMALS must be completed with an average grade which is higher than 3.5 in the above mentioned subjects. Maximum number of students :3	
SELECTED CHAPTERS IN AQUACULTURE	Maximum number of students :5	BIOLOGY AND PATHOLOGY OF AQUATIC ORGANISMS must be completed.
SPECIFIC ANATOMICAL STRUCTURES OF THE LOCOMOTOR APPARATUS OF THE HORSE	Pending completion of the course ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I Maximum number of students: 20	
VETERINARY CYTOLOGY	Requirement for enrolment in this subject: a grade average of 4 or higher in subjects already passed at the time of enrolment. Maximum number of students: 35	
VETERINARY CLINICAL MICROBIOLOGY	GENERAL MICROBIOLOGY, SPECIAL MICROBIOLOGY and VETERINARY	GENERAL MICROBIOLOGY, SPECIAL MICROBIOLOGY and

	IMMUNOLOGY must be completed with an average grade which is higher than 3.5 in the above mentioned subjects. Maximum number of students: 10	VETERINARY IMMUNOLOGY must be completed.
VETERINARY EMERGENCY AND CRITICAL CARE MEDICINE	Maximum number of students: 35	
VETERINARY PUBLIC HEALTH	All courses from years 1 to 4 must be completed, with attendance of the 5th year courses.	HYGIENE, TECHNOLOGY AND FOOD SAFETY, FOOD HYGIENE AND QUALITY CONTROL, VETERINARY LEGISLATION AND FOOD SAFETY CONTROL must be completed.
VETERINARY LEGISLATION AND FOOD SAFETY CONTROL	All courses from years 1 to 3 must be completed, with attendance of the 4th year courses.	HYGIENE, TECHNOLOGY AND FOOD SAFETY must be completed.
ZOONOSES		INFECTIOUS DISEASES OF DOMESTIC ANIMALS must be completed.

***All classes attended, but final exam(s) yet to be taken**

LIST OF OBLIGATORY SUBJECTS - 1st STUDY YEAR

Obligatory Subjects - 1st study year

Anatomy with Embryology of Domestic Animals I

Anatomy with Embryology of Domestic Animals II

Animal Breeds' Characteristics

Basic Statistics in Veterinary Medicine

Biochemistry in Veterinary Medicine

Environment, Animal Behaviour and Welfare

Introduction to English Veterinary Medical Terminology I

Introduction to Veterinary

Medical Chemistry

Physical Education I

Physical Education II

Physics and Biomedical Physics

Plant Biology

Zoology

ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS I

1. GENERAL INFORMATION			
1.1. Course teacher	Assistant Prof. Ivan Alić; Deputy: Full Prof. Martina Đuras	1.6. Year of the study programme	1st year, 1st semester
1.2. Name of the course	**Anatomy with embryology of domestic animals I**	1.7. Credits (ECTS)	7
1.3. Associate teachers	Full Prof. Martina Đuras; Full Prof. Srebrenka Nejedli; Full Prof. Tajana Trbojević Vukičević; Associate Prof. Mirela Pavić Vulinović; teaching assistant Magdalena Kolenc, PhD, DVM; teaching assistant Kim Korpes, PhD, DVM; teaching assistant Ante Plećaš, PhD, DVM; teaching assistant Mirna Mandić Čukman, DVM; teaching assistant Iva Matijević, DVM	1.8. Type of instruction (number of hours L + S + P + e-learning)	18 L + 64 P
1.4. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	1.9. Expected enrolment in the course	
1.5. Status of the course	Compulsory	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	Merlin
2. COURSE DESCRIPTION			
2.1. Course objectives	The course presents the gross anatomy of domestic animals with embryonic development of organs and organic systems to veterinary medicine students in order to ensure basic knowledge for other disciplines such as physiology, pathology and clinical courses.		
2.2. Course enrolment requirements and entry competences required for the course	The course is taught to first-year veterinary medicine students during the first semester. Non enrolment requirements or entry competences are required.		

<table>
<tr><td>2.3. Learning outcomes at the level of the programme to which the course contributes</td><td colspan="3">Following successful completion of the course, students will be able to apply acquired knowledge on gross anatomy and development of the thoracic and pelvic limbs of domestic mammals during preclinical and clinical courses.</td></tr>
<tr><td>2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="3">Following successful completion of the course, students will be able to:
1. describe and interpret the organization of the anatomical structures of the thoracic and pelvic limb as a basis for clinical and public health assessment;
2. recognize the differences in the anatomical structures of the thoracic and pelvic limb in various domestic mammal species as a basis for clinical and public health assessment;
3. distinguish the normal anatomical structure of the thoracic and pelvic limb in order to recognize pathological changes;
4. explain the principles of embryonic development of the anatomical structures of the thoracic and pelvic limb in order to understand and assess congenital malformations;
5. explain the mutual topographical and functional relationships of the anatomical structures of the thoracic and pelvic limb as a basis for application in clinical work.</td></tr>
<tr><td>2.5. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="3">Lectures:
1. Introduction and anatomical nomenclature (2 hours), 2. General anatomy of the cardiovascular system (1 hour), 3. General anatomy of the nervous system (1 hour), 4. General anatomy of the locomotor apparatus (2 hours), 5. Skeleton and joints of the thoracic limb (2 hours), 6. Muscles of the thoracic limb (1 hour), 7. Blood vessels, nerves and lymph nodes of the thoracic limb (2 hours), 8. Skeleton and joints of the pelvic limb (2 hours), 9. Muscles of the pelvic limb (1 hour), 10. Blood vessels, nerves and lymph nodes of the pelvic limb (2 hours), 11. Digital organ (2 hours)
Practicals:
1. Planes of the animal body and anatomical nomenclature (2 hours), 2. Skeleton of the thoracic limb (8 hours), 3. Muscles of the thoracic limb (10 hours), 4. Blood vessels, lymph nodes and nerves of the thoracic limb (4 hours), 5. Regions and dissection of the thoracic limb (8 hours), 6. Skeleton of the pelvic limb (8 hours), 7. Muscles of the pelvic limb (8 hours), 8. Blood vessels, lymph nodes and nerves of the pelvic limb (4 hours), 9. Regions and dissection of the pelvic limb (8 hours), 10. Hoof (4 hours).</td></tr>
<tr><td rowspan="2">2.6. Format of instruction:</td><td>☒ lectures
☐ seminars and workshops
☒ practicals
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td>☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>2.7. Comments:</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="3">Students are expected to attend lectures and dissection exercises and prepare cadavers according to course instructions.</td></tr>
</table>

2.9. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	**1.26**	Research		Practical training	**0.7**
	Experimental work		Report		(other)	
	Essay		Seminar essay		(other)	
	Tests	**2.24**	Oral exam	2.8	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam

Type of activity	Minimum number of points	Maximum number of points
Lecture attendance	3	6
Practical training attendance	8	12
Active participation in the practical training	5	10
Tests	20	32
Oral exam	24	40
Total	60	100

2.11. Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
KÖNIG, H. E., H.-G. LIEBICH (2007): Veterinary anatomy of domestic mammals, Textbook and color atlas. 3rd Ed. Schattauer, Stuttgart, New York		
DYCE, K. M., W. O. SACK, C. J. G. WENSING (2010): Textbook of veterinary anatomy. 4th Ed. Saunders Elsevier, Philadelphia.		
DONE, S. H., P. C. GOODY, S. A. EVANS, N. C. STICKLAND (2009): Color atlas of veterinary anatomy. Volume 3. The dog and cat. 2nd Ed. Mosby Elsevier, Edinburgh, London, New York.	1	
EVANS, H. E., A. de LAHUNTA (2010): Guide to the dissection of the dog. 7th Ed. Saunders Elsevier. Philadelphia.	4	
McGEADY, T. A., P. J. QUINN, E. S. FITZPATRICK, M. T. RYAN (2006): Veterinary embryology. Blackwell Publising, Dublin.		

2.12. Optional literature (at the time of submission of study programme proposal)

NICKEL, R., A. SCHUMMER, E. SEIFERLE (1986): The locomotor system of the domestic mammals. Volume I. Verlag Paul Parey, Berlin, Hamburg.
NICKEL, R., A. SCHUMMER, E. SEIFERLE (1981): The circulatory system, the skin, and the cutaneous organs of the domestic mammals. Volume III. Verlag Paul Parey, Berlin, Hamburg.
EVANS H. E., A. De LAHUNTA (2012): Miller's anatomy of the dog. 4th Ed. WB Saunders Company, Philadelphia, London.

SCHALLER, O. (2007): Illustrated veterinary anatomical nomenclature. 2nd Ed. Ferdinand Enke Verlag, Stuttgart.

	HYTTEL, P., F. SINOWATZ, M. VEJLSTED (2010): Essentials of domestic animal embryology. Saunders Elsevier, Philadelphia. SADLER, T. W. (2006): Langman's medical embryology, Lippincott Williams & Wilkins a Wolters Kluwer business. 10th Ed. Philadelphia, Baltimore, New York.
2.13. Quality assurance methods that ensure the acquisition of exit competences	Grading of active participation in the practical training, two written tests, final oral exam
2.14. Other (as the proposer wishes to add)	

ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS II

1. GENERAL INFORMATION			
1.1 Course teacher	Assistant Prof. Ivan Alić; Deputy: Full Prof. Martina Đuras	1.11. Year of the study programme	1st year, 2nd semester
1.2 Name of the course	**Anatomy with embryology of domestic animals II**	1.12. Credits (ECTS)	8
1.4. Associate teachers	Full Prof. Martina Đuras; Full Prof. Srebrenka Nejedli; Full Prof. Tajana Trbojević Vukičević; Associate Prof. Mirela Pavić Vulinović;, teaching assistant Magdalena Kolenc, PhD, DVM; teaching assistant Kim Korpes, PhD, DVM; teaching assistant Ante Plećaš, PhD, DVM; teaching assistant Mirna Mandić Čukman, DVM; teaching assistant Iva Matijević, DVM	1.13. Type of instruction (number of hours L + S + P + e-learning)	20 L + 100 P
1.5. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	1.14. Expected enrolment in the course	
1.6. Status of the course	Compulsory	1.15. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	Merlin
2. COURSE DESCRIPTION			
2.10. Course objectives	The course presents the gross anatomy of domestic animals with embryonic development of organs and organic systems to veterinary medicine students in order to ensure basic knowledge for other disciplines such as physiology, pathology and clinical courses.		

2.11. Course enrolment requirements and entry competences required for the course			
2.12. Learning outcomes at the level of the programme to which the course contributes	Following successful completion of the course, students will be able to apply acquired knowledge on gross anatomy and development of the trunk including the viscera during preclinical and clinical courses.		
2.13. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Following successful completion of the course, students will be able to: 6. describe and interpret the organization of the anatomical structures of the internal organs, body wall and body cavities of the trunk as a basis for clinical and public health assessment; 7. recognize the differences in the anatomical structures of the internal organs, body wall and body cavities of the trunk in various domestic mammal species as a basis for clinical and public health assessment 8. distinguish the normal anatomical structure of the internal organs, body wall and body cavities of the trunk in order to recognize pathological changes; 9. explain the principles of embryonic development of the anatomical structures of the internal organs, body wall and body cavities of the trunk in order to understand and assess congenital malformations; 10. explain the mutual topographical and functional relationships of the anatomical structures of the internal organs, body wall and body cavities of the trunk as a basis for application in clinical work.		
2.14. Course content broken down in detail by weekly class schedule (syllabus)	Lectures: 1. Structure and development of the trunk skeleton (1 hour), 2. Structure and development of the mammary gland (1 hour), 3. Body wall, body cavities and their serous lining (2 hours), 4. Structure and development of the trachea and lungs (2 hours), 5. Structure and development of the heart (2 hours), 6. Autonomic nervous system of the trunk (1 hour), 7. Lymphatic system and endocrine tissue of the trunk (1 hour), 8. Blood vessels of the trunk (1 hour), 9. Structure and development of the digestive system (4 hours), 10. Structure and development of the urinary system (2 hours), 11. Structure and development of genital organs (4 hours). Practicals: 1. Skeleton of the trunk (thoracic, lumbar and caudal vertebrae, ribs, sternum) (6 hours), 2. Regions of the trunk (2 hours), 3. Mammary gland (2 hours), 4. Respiratory muscles (except diaphragm) (4 hours), 5. Thoracic and pectoral cavities, pleurae and pleural cavities (6 hours), 6. Trachea and lungs (6 hours), 7. Mediastinum, pericardium , heart and blood vessels (14 hours), 8. Autonomic nerves (2 hours), 9. Abdominal muscles and abdominal cavity (2 hours), 9. Digestive system (18 hours), 10. Urinary system (4 hours), 11. Genital system (6 hours), 12. Abdominal and pelvic blood vessels and nerves (4 hours), 13. Muscles of the back (2 hours), 14. Spine and spinal cord (2 hours), 14. Dissection of the carnivores, pigs, ruminants, thoracal organs and abdominal organs (20 hours).		
	☒ lectures	☐ independent assignments	2.16. Comments:

2.15. Format of instruction:	☐ seminars and workshops ☒ practicals ☐ on line in entirety ☐ partial e-learning ☐ field work		☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)			
2.17. Student responsibilities	Students are expected to attend lectures and dissection exercises and prepare cadavers according to course instructions.					
2.18. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	1.44	Research		Practical training	0.8
	Experimental work		Report		(other)	
	Essay		Seminar essay		(other)	
	Tests	2.56	Oral exam	3.2	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam

Type of activity	Minimum number of points	Maximum number of points
Lecture attendance	3	6
Practical training attendance	8	12
Active participation in the practical training	5	10
Tests	20	32
Oral exam	24	40
Total	60	100

2.11. Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
KÖNIG, H. E., H.-G. LIEBICH (2007): Veterinary anatomy of domestic mammals, Textbook and color atlas. 3rd Ed. Schattauer, Stuttgart, New York		
DYCE, K. M., W. O. SACK, C. J. G. WENSING (2010): Textbook of veterinary anatomy. 4th Ed. Saunders Elsevier, Philadelphia.	4	
DONE, S. H., P. C. GOODY, S. A. EVANS, N. C. STICKLAND (2009): Color atlas of veterinary anatomy. Volume 3. The dog and cat. 2nd Ed. Mosby Elsevier, Edinburgh, London, New York.	1	
EVANS, H. E., A. de LAHUNTA (2010): Guide to the dissection of the dog. 7th Ed. Saunders Elsevier. Philadelphia.		
McGEADY, T. A., P. J. QUINN, E. S. FITZPATRICK, M. T. RYAN (2006): Veterinary embryology. Blackwell Publising, Dublin.		

2.15. Optional literature (at the time of submission of study programme proposal)	NICKEL, R., A. SCHUMMER, E. SEIFERLE (1986): The locomotor system of the domestic mammals. Volume I. Verlag Paul Parey, Berlin, Hamburg. NICKEL, R., A. SCHUMMER, E. SEIFERLE (1979): The viscera of the domestic Mammals. Volume II. 2nd revised Ed. Verlag Paul Parey, Berlin, Hamburg. NICKEL, R., A. SCHUMMER, E. SEIFERLE (1981): The circulatory system, the skin, and the cutaneous organs of the domestic mammals. Volume III. Verlag Paul Parey, Berlin, Hamburg. EVANS H. E., A. De LAHUNTA (2012): Miller's anatomy of the dog. 4th Ed. WB Saunders Company, Philadelphia, London. SCHALLER, O. (2007): Illustrated veterinary anatomical nomenclature. 2nd Ed. Ferdinand Enke Verlag, Stuttgart. HYTTEL, P., F. SINOWATZ, M. VEJLSTED (2010): Essentials of domestic animal embryology. Saunders Elsevier, Philadelphia. SADLER, T. W. (2006): Langman's medical embryology, Lippincott Williams & Wilkins a Wolters Kluwer business. 10th Ed. Philadelphia, Baltimore, New York.
2.16. Quality assurance methods that ensure the acquisition of exit competences	Grading of active participation in the practical training, two written tests, final oral exam
2.17. Other (as the proposer wishes to add)	

ANIMAL BREEDS' CHARACTERISTICS

1. GENERAL INFORMATION			
1.3. Course teacher	Full Prof. (permanent) Anamaria Ekert Kabalin, PhD Deputy course leader: Assoc. Prof. Sven Menčik, PhD	1.16. Year of the study programme	1st year
1.4. Name of the course	**Animal Breeds' Characteristics**	1.17. Credits (ECTS)	4.5
1.5. Associate teachers	Full Prof. (permanent) Anamaria Ekert Kabalin, PhD, Assoc. Prof. Sven Menčik, PhD, Assoc. Prof. Maja Maurić Maljković, PhD, Assis. Prof. Ivan Vlahek, PhD, postdoctoral assistant Aneta Piplica, PhD, Niko Popović, DVM	1.18. Type of instruction (number of hours + e-learning) L + S + E	12 (L) + 2 (L e-learning) + 8 (S) + 2 (S e-learning) + 34 (E)+ 2 (E e-learning)
1.6. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	1.19. Expected enrolment in the course	
1.7. Status of the course	Compulsory	1.20. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	2 20%
2. COUSE DESCRIPTION			
2.19. Course objectives	The course topics provide the student with knowledge about general animal breed characteristics and animal breeds which are a reflection of genetically specific quality in animals of certain species. Students will be able to evaluate particular animal breed which is important for proper use of animals in different production systems.		
2.20. Course enrolment requirements and entry competences required for the course			

2.21. Learning outcomes at the level of the programme to which the course contributes	Upon finishing the course, student is able to recognize particular breed/type/subtype and understand general characteristics which are important for proper use of animals and maintaining their health.			
2.22. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After successfully finishing the course, student will be able to: •judge the morphological, physiological and psychological changes of animals after domestication and selection directed to certain characteristics as well as animal breed characteristics (general and special) •differentiate the species, breed, category and / or production type of domestic animals (cattle, horses, pigs, sheep, goats, donkeys, poultry, dogs, cats and the most important breeds of rabbits, laboratory animals and cage pets) •judge the exterior of certain domestic animals •compare the production type or breeding group based on individual phenotypic characteristics •differentiate the gained knowledge in judging the exterior, condition, constitution, temperament and age as well as measuring and marking of animals •diferentiate basic administrative books, forms and computer programs used in the registration of domestic animals			
2.23. Course content broken down in detail by weekly class schedule (syllabus)	Methological unit / course content with the number of hours (lectures, seminars, exercises and e-learning) 1. Introduction to breeding of most important animal species for production, companion and laboratory animals (domestication, different usage of animals, breed as base for breeding of animals) Number of hours: 2 L + 0 S + 2 E 2. The role of breed in livestock production. General and specific biological characteristics of animals (reproduction; growth; constitution; condition; temperament and temper; exterior-age, body measures, evidention and registration) Number of hours: 2 L + 0 S + 4 E 3. Breeds and hybrids of pigs and poultry in the world Number of hours: 2 L + 2 S + 6 E 4. Breeds of cattle in the world Number of hours: 1 L + 2 S + 6 E 5. Breeds of horses in the world Number of hours 1 L + 2 S + 6 E 5. Breeds of sheep and goats Number of hours 2 L + 2 S + 6 E 6. Breeds of dogs and cats in the world Number of hours 2 L + 2 S (e-learning) + 4 E 7. Most important species of laboratory animals. Rabbits, fur animals, cage pets Number of hours 2 L (e-learning) +0 S+2 E			
	☒ **lectures**	☒ **independent assignments**	2.25.	Comments:

2.24. Format of instruction:	☒ **seminars and workshops** ☒ **exercises** ☐ on line in entirety ☒ **partial e-learning** ☒ **field work**	☒ **multimedia and the internet** ☐ laboratory ☐ work with mentor ☐ (other)	
2.7.Student responsibilities	Student obligations are defined with the Regulations on the integrated undergraduate and graduate study of veterinary medicine. From total 100 points, student must acquire a minimum number of points from all elements of assessment in order to pass the subject. The final grade is based on the sum of points (scores). The scoring of individual elements of assessment: <u>Lecture attendance</u>: Out of the total number of lecture hours in the course **Animal Breeds Characteristics** (14 hours), the student must attend at least 7 hours in order to obtain the minimum of 3 points. The maximum number of points awarded for this assessment component is 6. <u>Seminars attendance:</u> The student must attend at least 3 seminars in order to obtain the minimum of 4 points. The maximum number of points awarded for this assessment component is 6 (4 seminars). <u>Practicals attendance:</u> During the course the student must attend at least 10 practicals held at the Faculty and 1 practical held outside the Faculty in order to obtain the minimum of 4 points. If a student does not attend the practical held outside the Faculty, they are required to write an essay on the topic of that practical session. The maximum number of points awarded for this assessment component is 6. <u>Active participation in seminars and practicals:</u> During the practicals, student is required to complete the prescribed tasks from 12 practical exercises. Each successfully completed exercise is worth 0.25 points. During practicals 2–4, 6–9, and 11–13, self-assessment quizzes (self-check) will be conducted in the Merlin system, in accordance with the thematic unit of the exercise. Each successfully completed self-assessment with more than 50% correct answers is worth 0.5 points. Practical exercise no. 14 will be conducted as e-learning in the Merlin system, in real time, in accordance with previously provided instructions. During seminars 1–5, self-assessment quizzes will be available in the Merlin system, in accordance with the thematic unit of the seminar. Each successfully completed self-assessment with more than 50% correct answers is worth 0.5 points. Students may earn an additional 0.5 points per practical class through active oral participation.		

<table>
<tr><td></td><td colspan="6">From this category, the student must obtain a minimum of 5 points (through various combinations of completed self-assessments in practical classes and seminars, oral answers, etc.). The maximum number of points awarded for this assessment component is 10.
Continuous knowledge-checking (mid-terms):
During the course 3 colloquia will be organised. The minimum number of credits that a student should gain from this element is 20 points. The first has a total of 12 points and a student should gain at least 58% (7 points), while the other two have 10 points and a student should gain at least 65% (6.5 points). If students do not achieve the minimum required number of points in a colloquium, they are entitled to retake the colloquium up to three times, after the completion of classes. A total of 32 points is possible in this category.

Final exam: Written test - a total of 40 points (the lowest number of points that a student should gain from this element is 24 points)</td></tr>
<tr><td rowspan="5">2.26. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0.81</td><td>Practical training</td><td></td><td></td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Activity</td><td>0.45</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>1.44</td><td>Oral exam</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>1.8</td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td>2.9. Grading and evaluating student work in class and at the final exam</td><td colspan="6">The final grade is based on the total sum of the points from all of elements of assessment (attendance of lectures, seminars, exercises and e-learning; practical / individual work on tasks, colloquia and final exam). The evaluation is carried out according to the distribution below. The final score is expressed quantitatively, with points and adequate grade, from 1 to 5. Students who have not passed the item shall be rated as unsatisfactory (with grade one - F).
<table>
<tr><th>Points</th><th>Grade</th></tr>
<tr><td>do 59</td><td>1 (F)</td></tr>
<tr><td>60-68</td><td>2 (E)</td></tr>
<tr><td>69-76</td><td>2 (D)</td></tr>
</table></td></tr>
</table>

	77-84	3 (C)	
	85-92	4 (B)	
	93-100	5 (A)	
2.10. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Mason, I. L.: World dictionary of livestock breeds,types and varieties. 5th Edition. CABI Publishing, 2002.	1 in the library of the Department	no
	Fogle, B.: The new encyclopedia of the dog. Dorling Kindersley Publishing, Inc.,2000.		
	Helgren, A.J.: Encyclopedia of cat breeds. Barrons Educational Series, Inc.,2013.		
	Ward, J.D.:A Manual for laboratory animal management. World Scientific Publishing, 2008.		
2.11.Optional literature (at the time of submission of study programme proposal)	On-line basis with data about breeds of animals available on LMS platform VEF-LMS.		
2.18. Quality assurance methods that ensure the acquisition of exit competences	Students' work will be monitored on tasks that are performed during the seminars and exercises, through conversations (on lectures, seminars, exercises, on-line via LMS), as well as through the results of the self check work during the exercise and seminars and results obtain on colloquia. At the end of teaching the knowledge of students and independence in work will be verified by a final examination.		
2.19. Other (as the proposer wishes to add)			

BASIC STATISTICS IN VETERINARY MEDICINE

1. GENERAL INFORMATION			
1.5. Course teacher	Associate Professor Maja Maurić Maljković, DVM, PhD	1.21. Year of the study programme	1st
1.6. Name of the course	**Basic statistics in veterinary medicine**	1.22. Credits (ECTS)	2,5
1.6. Associate teachers	Full Professor Anamaria Ekert Kabalin, DVM, PhD Associate Professor Sven Menčik, DVM, PhD Assistant Professor Ivan Vlahek, DVM, PhD Aneta Piplica, DVM, PhD Niko Popović, DVM	1.23. Type of instruction (number of hours L + S + E + e-learning)	8 (L) + 0 (S) + 16 (E) + 6 (e-learning)
1.7. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	1.24. Expected enrolment in the course	-
1.8. Status of the course	Compulsory	1.25. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	20%
2. COUSE DESCRIPTION			
2.27. Course objectives	Adoption of facts about the significance of statistics for the veterinary profession, getting theoretical and practical skills necessary for optimal planning and performing statistical observation, as well as data analysis and concluding about principles of events in veterinary medicine. Students will learn about different software systems to achieve new skills related to different program environments during the statistical analysis.		
2.28. Course enrolment requirements and entry competences required for the course	-		
2.29. Learning outcomes at the level of the programme to which the course contributes	Acquiring knowledge about collecting, processing and presenting statistical data sets and their analysis and interpretation. Hypothesis, their evaluation and testing in veterinary medicine. Criteria for the selection of individual tests. Interdependence of characteristics and the possibility of their application in veterinary medicine.		

2.30. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After successful completion of the course, the student will be able to: - identify the types of variables, - assess the results of basic statistical data processing and analysis, - determine the normality of variables for the purpose of further analyses, - select the test to verify the hypothesis in differently designed veterinary research, - determine the correlation between two or more variables - solve statistical analysis in different programming environments
2.31. Course content broken down in detail by weekly class schedule (syllabus)	

Methodological unit/course content	class schedule (lectures + exercises + e-learning)
Statistics – definition, development, application in veterinary, biomedical and animal science, use of computers in statistics and data analysis. Variables – the nature of expression and scales of measurement. Data collection – definition and size (population and sample). Statistical observation and collecting the data.	2 L
Meaning and using of representative values of statistic data collection - arithmetic mean, geometric mean, harmonic mean, median, mode. Learning objectives and calculation of the indicators of variability in a statistical data set. Measures of dispersion (spread) - variance, standard deviation, range, interquartile range, coefficient of variation. Measures of layout - measures of asymmetry and kurtosis. Data entry and processing in Statistica v.14 program (Cloud Software Group, Inc., 2025).	1 L + 4 E + 1e-learning
The concept and expression of probability. Relevance and definition of probability. Continuous probability distributions – normal (Gaussian), Student's *t*-, Chi-squared and *F*-distribution. Single result status in distribution and errors while working with samples.	1 L + 2 E + 1e-learning
The representativeness of the sample according to population - the type and size of the sample, the standard error of the sample. Determination of the confidence interval for the mean. An introduction to statistical hypothesis-definition, acceptance and rejection. Introduction to hypothesis testing-parametric and non-parametric tests; test choosing criteria.	1 L + 2 E + 1e-learning
Hypothesis testing. Parametric test for analyses (Student's t-test for independent samples, t-test for dependent samples, One-way ANOVA and Repeated Measure ANOVA) and Non – parametric test for analyses (Mann-Whitney U-test, Wilcoxon rank sum test, Kruskall-Wallis analysis of variance, Friedman two way ANOVA and Chi-squared test).	1 L + 6 E +1e-learning
Introduction to linear correlation and regression analysis. Introduction to further regression analysis. Introduction to the basic of R program.	1L + 2 E + 1e-learning
Introduction to further hypothesis testing in specifically designed veterinary research.	1L + 1e-learning

<table>
<tr><td>2.32. Format of instruction:</td><td>☒ lectures
☐ seminars and workshops
☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td>☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>2.33. Comments:
-</td></tr>
<tr><td>2.34. Student responsibilities</td><td colspan="3">Student obligations are defined with the Regulations on the integrated undergraduate and graduate study of veterinary medicine.
Given the above, the student must acquire a minimum number of points from all elements of the assessment to pass the subject. The final grade is based on the sum of points (scores).
The scoring of individual elements of assessment:
- Attending lectures and e-learning: a total of 6 points. The lowest number of points that a student should gain from this element is 3 points.
- Attendance exercises: a total of 12 points. The lowest number of points a student should gain from this element is 8 points = 6 exercises (2 hours each).
- Active participation in exercises (solving and interpreting tasks): a total of 10 points (the minimum number of credits a student should gain from this element is 5 points).
- During the term, students have to fulfil the given assignments in eight programme exercises regarding the input, analysis and saving data. Each successful exercise or task earns them 0.5 points, except on the 8th exercises where students can earn one point for successful task completion and independent data analysis using Microsoft Excel.
- During the periods of second (2nd), third (3rd) and fifth (5th) to seventh (7th) exercise, the students will have to do a self-check exam based on five questions in the Merlin System, according to the given exercise topic. Each successful self-check exercise with more than 50% of correct answers earns them 0.5 points.
- During oral examination revision periods, as well as after every finished exercise, students can interpret the given results and get another extra point there.
- During the term, students need to achieve a minimum of 5 points (different combinations in solving programme exercises, self-checks, oral results interpretations / oral exams). The maximum number of points here is 10.
- Continuous knowledge checking (colloquia): a total of 32 points (the minimum number of credits that a student should gain from this element is 20 points). During the term, during the regular exercise hours, two (2) colloquia will be organised as a written assessment of knowledge. The first colloquium carries 12 points and the second 20 points. The student should gain at least 7.5 points from the first colloquium and 12.5 from the second.
- Final exam: a total of 40 points (the lowest number of points that a student should gain from this element is 24 points)</td></tr>
<tr><td>2.35. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is</td><td colspan="3"><table>
<tr><td>Class attendance</td><td>0,45</td><td>Research</td><td></td><td>Activity</td><td>0,25</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td></td><td></td></tr>
<tr><td>Tests</td><td>0,8</td><td>Oral exam</td><td></td><td></td><td></td></tr>
<tr><td>Written exam</td><td>1</td><td>Project</td><td></td><td></td><td></td></tr>
</table></td></tr>
</table>

equal to the ECTS value of the course)						

2.10. Grading and evaluating student work in class and at the final exam

The final grade is based on the total sum of the points from all of these elements of assessment (attendance of lectures, exercises and e-learning; practical / individual work on tasks, colloquia and final exam). The evaluation is carried out according to the distribution below. The final score is expressed quantitatively, with points and adequate grade, from 1 to 5. Students who have not passed the item shall be rated as unsatisfactory (with grade one - F).

Points	*Grade*
do 59	1 (F)
60-68	2 (E)
69-76	2 (D)
77-84	3 (C)
85-92	4 (B)
93-100	5 (A)

2.11. Required literature (available in the library and via other media)

Title	**Number of copies in the library**	**Availability via other media**
Petrie i Watson: Statistics for Veterinary and Animal Science. Blackwell Publishing, 3rd Edition, 2013.	2 books in Deparment library	no

2.20. Optional literature (at the time of submission of study programme proposal)

Ennos, R: Statistical and Data Handling Skills in Biology. 3rd edition. Pearson, 2011
Manuals of statistical software (SAS, Statistica, Excel). Prepared written materials of lectures and exercises.

2.21. Quality assurance methods that ensure the acquisition of exit competences

During teaching students' work will be monitored on tasks that are performed during the exercises, through conversations (on lectures, exercises, online via Merlin), as well as through the results of colloquia. At the end of teaching, the knowledge of students and independence in work with computer programs will be verified by a final (written) examination.

2.22. Other (as the proposer wishes to add)

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BIOCHEMISTRY IN VETERINARY MEDICINE

1. GENERAL INFORMATION			
1.7. Course teacher	Asst. Prof. Josipa Kuleš	1.26. Year of the study programme	first
1.8. Name of the course	Biochemistry in Veterinary Medicine	1.27. Credits (ECTS)	7.5
1.7. Associate teachers	Full Prof. Renata Barić Rafaj	1.28. Type of instruction (number of hours L + S + E + e-learning)	31 + 14 + 27
1.8. Study programme (undergraduate, graduate, integrated)	integrated	1.29. Expected enrolment in the course	
1.9. Status of the course	obligatory	1.30. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
2.36. Course objectives	The objective of studying biochemistry is to explore the structure and function of living organisms. Modern biochemistry is closely integrated with medicine, and acquiring knowledge of the biochemical and energy-related changes, as well as the regulation of metabolic processes in healthy animals, provides the biochemical foundation for understanding physiological processes and the consequences of metabolic pathway disorders. The ability to manage metabolic processes or modify their course to achieve specific needs and goals depends on a thorough understanding of the underlying biochemical pathways. During practical laboratory sessions, students will become familiar with the principles of the individual techniques used in biochemical laboratories.
2.37. Course enrolment requirements and entry competences required for the course	Attendance in Medical Chemistry
2.38. Learning outcomes at the level of the programme to which the course contributes	General understanding of the biochemical principles, the major metabolic pathways, as well as their regulation.
2.39. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After successfully passing the course student will be able to: 1. formulate the structure of most proteins, carbohydrates and fats in the body, 2. explain the correlation of structure and function of the most important components of metabolism,

<table>
<tr><td></td><td colspan="6">3. generate the sequence of biochemical changes in the major metabolic pathways,
4. interpret the ways of regulation of biological activity,
5. to apply a simple biochemical methods for measuring analytes in biological samples using biosafety measures,
6. assess the connection of metabolic pathways as a basis for the selection and evaluation of the results of various laboratory measurements,
7. explain the modulation of metabolic pathways using various treatment procedures.</td></tr>
<tr><td>2.40. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Lectures: 1 Aminoacids, 2. Protein structure, 3 Enzymes, 4. Hemoglobin, 5. Collagen, Basics of cell signaling, 6. Metabolism, ATP 7. Glycolysis, 8. Gluconeogenesis, Glycogen 9. Citric acid cycle 10. Oxidative Phosphorylation 11. Pentose phosphate pathway, 12. Lipids, 13. Urea cycle, 14. Integration of metabolism
Seminars: 1 Posttranslational modification of amino acids, 2. Plasma proteins, 3. Michaelis-Menten kinetics, 4. Metabolism of hemoglobin,
5. Cellular signalization, 6. Anaerobic glycolysis, 7. Control enzymes in glycolysis and CAC, 8. Inhibitors of oxidative phosphorylation,9. Antioxidants and glutathione, 10. cAMP, 11. Ketone bodies, 12. Urea cycle 13. Specific derivats of aminoacids, 14. Integration of metabolism.
Exercises: 1. Isolation methods, 2. Proteins, 3. Enzymes, 4. Hemoglobin, 5. Carbohydrates, 6. Glycogen, 7. Lipids, 8. Urea, 9. Urinalysis, 10. Integration, ATP calculation</td></tr>
<tr><td>2.41. Format of instruction:</td><td colspan="2">■ lectures
■ seminars and workshops
■ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">■ independent assignments
■ multimedia and the internet
■ laboratory
☐ work with mentor
☐ (other)</td><td colspan="2">2.42. Comments:</td></tr>
<tr><td>2.43. Student responsibilities</td><td colspan="6">Regular attendance at lectures, seminars, and practical exercises; active participation in seminars; successful completion of practical exercises; successful completion of colloquia; and passing of the final exam.</td></tr>
<tr><td rowspan="4">2.44. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>class attendance</td><td>1,35</td><td>research</td><td></td><td>activity</td><td>0,75</td></tr>
<tr><td>experimental work</td><td></td><td>report</td><td></td><td>knowledge verification - seminars</td><td></td></tr>
<tr><td>essay</td><td></td><td>seminar essay</td><td></td><td>knowledge verification - exercises</td><td></td></tr>
<tr><td>tests</td><td>2,4</td><td>oral exam</td><td></td><td>(other)</td><td></td></tr>
</table>

	written exam	3	project		(other)	
2.10. Grading and evaluating student work in class and at the final exam	attending classes lectures: 0.19 x 31h lectures = max 6, min 3 points attending classes seminars: 0.42 x 14 seminars = max 6, min 4 points (9 seminars) attending classes exercises: 0.22 x 27 exercises = max 6, min 4 points (18h practicals) activity seminars: 1,25 point (short questions) x 4 seminars = max 5, min 2,5 points activity exercises: 0.5 (0.2 successful practical, 0.3 point short questions) x 10 exercises = max 5, min 2,5 points continuous knowledge testing: 3 colloquiums max 32, min 20 points (the fixed terms, required for the exam) Final exam=max 40, min 24 points. Final grade is based on total points.					

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and via other media)	J. M.Berg, J. L.Tymoczko, L. Stryer: Biochemistry, New York: W H Freeman; 2002. Seminars – script Exercises - script	150	web web
2.23. Optional literature (at the time of submission of study programme proposal)	M. Devlin - Textbook of Biochemistry with Clinical Correlations, A.J.Willey, New York,2006.		
2.24. Quality assurance methods that ensure the acquisition of exit competences	Continuous knowledge verification, scoring active participation in class, the final exam		
2.25. Other (as the proposer wishes to add)			

ENVIRONMENT, ANIMAL BEHAVIOUR AND WELFARE

1. GENERAL INFORMATION			
1.9. Course teacher	Kristina Matković, DVM, PhD, Full Professor	1.31. Year of the study programme	1th
1.10. Name of the course	Environment, animal behaviour and welfare	1.32. Credits (ECTS)	3
1.8. Associate teachers	Gordana Gregurić Gračner, DVM, PhD, Full Professor; Mario Ostović, DVM, PhD, Full Professor; Postdoctoral assistant Ivana Sabolek	1.33. Type of instruction (number of hours L + S + E + e-learning)	L8+ S8+E24
1.9. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	1.34. Expected enrolment in the course	
1.10. Status of the course	Compulsory	1.35. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
2.45. Course objectives	The course is one of the basic subjects in preventive veterinary medicine, in which students will acquire due knowledge on the concept of animal behaviour and welfare, to ensure such conditions in practice in which the animal will express the behaviour characteristic of its species while feeling well itself. In addition, knowledge about the impact of ground and water on animal health condition, production and reproduction as well as about the influence of animals upon these environmental factors will be acquired in order to preserve proper bio ecologic relationships in the environment. This approach in presentation of particular topics meets the conditions necessary for full understanding and acquisition of knowledge in other courses in preventive veterinary medicine, primarily in the course “Hygiene and Housing of animals”, included in further studies in semesters 3rd and 4th.		
2.46. Course enrolment requirements and entry competences required for the course			

<table>
<tr><td>2.47. Learning outcomes at the level of the programme to which the course contributes</td><td colspan="6"></td></tr>
<tr><td>2.48. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">After successful completion of the course the student will be able to:
- discuss the effect of soil and water on health, production and reproduction of animals, as well as the animal impact on the environment in order to preserve the biological and ecological relationships in it
- value results of soil and water examinations
- organize grazing systems for animals on the basis of climate-specificity, depending of their species, number and health
- differentiate physiological and abnormal behaviour in domestic animals.
- independently assess the welfare of (farm) animals in the context of their behaviour.</td></tr>
<tr><td>2.49. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">1 Animal behaviour (Introduction in animal behaviour; Evolution of behaviour; Mechanisms of behaviour; Understanding behaviour complex; Specific behavioural features of particular domestic animals, Abnormal behaviours); 2 Animal welfare (Health in the context of animal welfare; Role of veterinarian in animal welfare; Welfare of different animal species; Legislative regulations on animal welfare, animal welfare assessment); 3 Soil hygiene (Ecosystem – soil – plant – animal; Soil as a hygiene factor: relief, colour, texture, porosity, water regimen, temperature, telluric diseases; Hygienic evaluation of soil); 4 Drinking water hygiene (Origin and types of water; Water conditioning; Water-borne diseases; Animal need of water); 5 Hygiene of surface water (Water quality in salmonid and cyprinid fish-farms; Quality of surface water and its biologic assessment); 6 Pasture hygiene (Types of pasture; Pasture as a mediator in disease transmission; Animal preparation for pasture; Organization of pasture for particular animal species; Pasture load; Pasture management).</td></tr>
<tr><td rowspan="2">2.50. Format of instruction:</td><td colspan="3">X lectures
X seminars and workshops
X exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
X multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>2.51. Comments:</td></tr>
<tr><td colspan="5"></td><td></td></tr>
<tr><td>2.52. Student responsibilities</td><td colspan="6">Student requirements are defined in the Regulations on the Integrated Undergraduate and Graduate Study of Veterinary Medicine (2024). Given the above, the student must acquire a minimum number of points from all assessment elements in order to take the final exam. A student can justifiably be absent from up to 50% of the lectures, 30% of the seminars and 30% of the practicals.</td></tr>
<tr><td>2.53. Screening student work (name the proportion of</td><td>Attending lectures</td><td>0,18</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
</table>

ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)	Experimental work		Report		Attending seminars	0,18
	Essay		Seminar essay		Attending excersises	0,18
	Continuous knowledg checking	0,96	Written exam (final	1,2	Participation at exercises and seminars	0,30
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam

Types of activities	Minimal number of points	Maximal number of points
Attending lectures (8 hours)	**3** 3/0.75 = 4 lectures hours (min.)	6
Attending seminars (8 hours) 30% absences= 2 hours	**4** (student must be on minimum 6 hours of seminars to gain 4 min points)	**6**
Attending exercises (24 hours) 30% absences= 8 hours	**4** (student must be on minimum 16 hours of seminars to gain 4 min points)	6
Participation at seminars and exercises (7 points[1]) coefficient 10:7=1.43	**5** 5/1.43 = 4 (a student must earn 4 points in order to gain minimal 5 points)	10
Continuous knowledge checking (16 points[2]) coefficient 32:16=2	**20** 20/2 = 10 (a student must earn 10 points in order to gain minimal 20 points)	32
Final exam (40 points[3])	**24** 24/1 = 24 (coefficient 1) (a student must earn 24 points in order to have minimal 24 points)	40
Total	**60**	**100**

[1] – 7 points (three correct answers during the exercises (each answer is worth 1 point = 3 points) + preparation of seminar work during the semester (2 points, in case of PP additional 2 points))
[2] – 16 points (2 colloquiums, each 8 question, each correct answer is worth 1 point)
[3] – 40 max points (written exam - 8 questions / each question have max points that can be achieved)

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	1. Appleby, M. C., B. O. Huges (2004): Poultry Behaviour and Welfare. CABI Publishing, London, UK.		online
	2.Fraser, A., D. M. Broom (1996): Farm animal behaviour and welfare (3rd Edition). CABI Publishing, London, UK.	1	
	3. Harrison, R. M. (1995): Polution: Causes Effects and Control (2nd Edition). The Royal Society of Chemistry, Cambridge, UK		online
	4. Keeling, L., H. Gonyou (2001): Social Behaviour in Farm Animals. CABI Publishing, London, UK.		online
	5. McFarland, D. (1999): Animal behaviour: Psychobiology, Ethology and Evolution (3rd Edition). Pearson Education Limited, Essex, UK.		online
	6. Methling, V., J. Unshelm (Hrsg.) (2002): Umwelt – und tier – gerechte Haltung von Nutz, Heim und Begleitteren. Parey Buchverlag, Berlin, Deutschland	1	
	7. Rollin, B. R. (2003): Farm Animal Welfare: Social, Bioethical, and Research Issue, Iowa State Press, USA.	1	
	8. The Ethology of Domestic Animals (2009): An Introductory Text / edited by Per Jensen-2nd ed.	1	
2.26. Optional literature (at the time of submission of study programme proposal)			
2.27. Quality assurance methods that ensure the acquisition of exit competences	Student questionnaire		
2.28. Other (as the proposer wishes to add)			

INTRODUCTION TO ENGLISH VETERINARY MEDICAL TERMINOLOGY I

1. GENERAL INFORMATION			
1.11. Course teacher	Dubravka Vilke-Pinter, Ph.D.	1.36. Year of the study programme	I
1.12. Name of the course	Introduction to English Veterinary Medical Terminology I	1.37. Credits (ECTS)	1
1.9. Associate teachers		1.38. Type of instruction (number of hours L + S + E + e-learning)	10 hours S + 5 hours E (of which 2 hours e-learning)
1.10. Study programme (undergraduate, graduate, integrated)	University Integrated Undergraduate and Graduate Study Programme Veterinary Medicine	1.39. Expected enrolment in the course	25
1.11. Status of the course	obligatory	1.40. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
2.54. Course objectives	The aim of the course Introduction to English Medical Veterinary Terminology 1 is to introduce students to the specific language register used in the field of veterinary medicine and to develop students' competences to use this language register. The course is designed to introduce the students to principles of word formation in veterinary medical English in order to develop participants' understanding, and ability to use a wide range of technical terms. Besides providing training in reading scientific and professional literature the course also aims to enable students to achieve general progress in verbal understanding and Information literacy.		
2.55. Course enrolment requirements and entry competences required for the course			

2.56. Learning outcomes at the level of the programme to which the course contributes	By studying the principles of word formation in technical terminology and by gaining understanding of terms used in various fields of veterinary medicine students develop competence to identify, ***acquire*** and use ***information*** provided in scientific and technical literature from the field. Besides focusing on specific language register of veterinary medical English, the course also aims to develop students oral and written overall anguage skills as well.		
2.57. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Having successfully completed the course student will/will be able to: • recognise veterinary medicine language registar • understand principles of scientific terms formation • recognise technical terms from various fields of veterinary medicine • independetly use a considerable number of scientific terms in a given context • reach basic understanding of the structure of technical and scientific text		
2.58. Course content broken down in detail by weekly class schedule (syllabus)	Introduction to veterinary terminology. English as a means of global communication. Different language registers. General English/professional English (English for Specific Purposes - ESP). Basic features of English in veterinary medicine (specific terminology, specific grammatical structures). Analysis of terms pertaining to veterinary profession: Branches of veterinary medicine; Veterinary education worldwide; Career opportunities (veterinary practice, public health, industries). Dictionaries and vocabulary building: Types of dictionaries; Dictionary skills; Key words. Collocations and idioms. Word formation in specialised veterinary medical terminology: Word elements. Prefixation and suffixation. Compound words. Analysis of the specialized terminology in technical texts. Basic features of scientific text. Topic: Characteristics of living beings. Analysis of the specialized terminology in technical texts. Topic: Organisation of living beings: Cells. Analysis of specialized terminology in technical texts. Topic: Tissues; Organs; Organ systems; Organism.		
2.59. Format of instruction:	☐ lectures ☐ seminars and workshops	☐ independent assignments ☐ multimedia and the internet	2.60. omments:

	☐ exercises X ☐ on line in entirety ☐ partial e-learning ☐ field work	☐ laboratory ☐ work with mentor ☐ (other)	
2.61. Student responsibilities			

2.62. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
	Class attendance	18%	Research		Practical training	
	Experimental work		Report		Class participation	10%
	Essay		Seminar essay		(other)	
	Tests	32**%**	Oral exam		(other)	
	Written exam	40**%**	Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam

	Assessment elements		
Overall grade elements	1. class attendance 2. class participation 3. continual assessment 4. final exam		
Class attendance	15 hourly classes	Minimum number of points	Maximum number of points

			11 Students are required to attend at least 7 out of 10 S hours and 3 out of 5 E hours to receive of the minimum number of points	18
	Class participation		Minimum number of points	Maximum number of points
			5 coefficient 10/15 = 0,67 Students must earn at least 5 out of 10 points through in-class assignments.	10
	Continual assessment		Minimum number of points	Maximum number of points
			20 Students are required to take a midterm test. The minimum passing score is 20 points.	32
	Final exam		Minimum number of points	Maximum number of points
			24 Minimum passing score on the final test is 24 points.	40

<table>
<tr><td></td><td>
<table>
<tr><td>Final grade</td><td>The overall course grade is based on student's performance in four assessed elements. Students are entitled to take final exam in case they have earned the minimum required points in each element.</td></tr>
</table>
</td></tr>
<tr><td>2.11. Required literature (available in the library and via other media)</td><td>
<table>
<tr><th>Title</th><th>Number of copies in the library</th><th>Availability via other media</th></tr>
<tr><td>• Vilke-Pinter, D. (2024): Course materials: Introduction to English veterinary medical terminology I. Veterinary faculty, University of Zagreb, Zagreb. (Each student receives his/her individual copy of the class materials.)</td><td>3</td><td></td></tr>
</table>
</td></tr>
<tr><td>2.29. Optional literature (at the time of submission of study programme proposal)</td><td>• Cochran P. (1991): Student's guide to Veterinary Medical Terminology. Mosby, St. Louis, Missouri.
• Cox, K., D.Hill (2007): Preliminary English for Academic Purposes. Longman, London, United Kingdom.
• McBride, D.E. (2002): Learning Veterinary Terminology. Mosby, St. Louis, Missouri.
• McCarthy, M., F. O'Dell (2008): Academic Vocabulary in Use. Vocabulary Reference and Practice. Self-study and Classroom Use. CUP, Cambridge, United Kingdom.
• McCormack, J. (2005): English for Academic Study. Garnet Publishing Ltd. Garnet Education. Reading, United Kingdom.
• Porter. D & C Black (2007): Check your Vocabulary for Academic English. A & C Black Publishers Ltd., London, United Kingdom.</td></tr>
<tr><td>2.30. Quality assurance methods that ensure the acquisition of exit competences</td><td>Continual asssesment: in-class writing activities, homework</td></tr>
<tr><td>2.31. Other (as the proposer wishes to add)</td><td></td></tr>
</table>

INTRODUCTION TO VETERINARY

1. GENERAL INFORMATION			
1.13. Course teacher	Prof Dean Konjević	1.41. Year of the study program	1
1.14. Name of the course	Introduction to veterinary	1.42. Credits (ECTS)	1.5
1.10. Associate teachers	Prof Gordana Gregurić Gračner, Prof Krešimir Severin, Magdalena Palić, DVM, PhD, Univ. Mag. Med. Vet. Nikola Serdar, DVM	1.43. Type of instruction (number of hours L + S + E + e-learning)	2+6+12+0
1.11. Study programme (undergraduate, graduate, integrated)	Integrated	1.44. Expected enrolment in the course	10-35
1.12. Status of the course	Compulsory	1.45. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1, 10%
2. COUSE DESCRIPTION			
2.63. Course objectives	The course Introduction to Veterinary Medicine provides students with a foundational overview of the structural, historical, and professional dimensions of the veterinary field. Its primary objective is to familiarize students with the organization of veterinary medicine, examining how national and international regulatory bodies and administrative systems govern animal health and public health. Alongside this institutional framework, the course contextualizes the historical evolution of the profession, tracing how key scientific milestones and the development of distinct disciplines have shaped modern evidence-based practice and professional ethics. Furthermore, the course is designed to map out diverse career opportunities, introducing students to various pathways within private clinical practice, state veterinary medicine, public health, corporate sectors, and research. Finally, it outlines the trajectory of veterinary education and the critical role of continuous professional development (CPD). By exploring postgraduate specialist and doctoral pathways, as well as lifelong learning requirements, the course fosters an early commitment to maintaining professional competence and advancing veterinary science throughout their future careers.		
2.64. Course enrolment requirements and entry competences required for the course	Terms not specified.		
2.65. Learning outcomes at the level of	**Professional Ethics and Societal Role of Veterinary Medicine** **Scope and Multidisciplinary Nature of Veterinary Activity**		

the programme to which the course contributes	**Continuous Professional Development and Lifelong Learning** **Scientific Principles and Professional Evolution**		
2.66. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. Define the concept, subject, and role of veterinary medicine in contemporary society, and describe and interpret the fundamental principles of veterinary ethics. 2. Recognize all aspects of veterinary activity and the scope of the veterinary profession. 3. Interpret the development of science and the profession. 4. Connect the acquisition of knowledge and professionalization with the development of veterinary disciplines. 5. Plan postgraduate specialist and doctoral studies, and professional development through courses.		
2.67. Course content broken down in detail by weekly class schedule (syllabus)	**Seminars (1) 1. Definition of the term veterinary medicine**; meaning and function (Veterinary medicine – definition, function of veterinary medicine in modern society, veterinary medicine as a profession); Development of medicine and veterinary medicine (Pre-ancient times - taming of animals, the beginnings of medicine and veterinary medicine, archaeological and arch zoological findings from the pre-ancient times. The ancient world- preserved findings about medicine and veterinary medicine, Egyptian veterinary papyrus, snake as a symbol of medicine and veterinary medicine, Hamurabi law and regulations, diagnostics, ethics, treatment, Hippocrates and Hippocrates oat, origin of the term veterinarian; Middle ages - animal husbandry and veterinary medicine, hypiatrics and marescals and their findings on animal treatment, Arabic medicine (Avicena) and Arab veterinary medicine (Abu Behr ibn Bedar). **Seminars (1) 2. Development of veterinary school system** (Influence of animal husbandry and veterinary medicine on veterinary education and legislation, first veterinary school founded in 18th ct, founding of veterinary journals and associations, veterinary medicine achievements in 19th and 20th ct.); Development of veterinary medicine in Croatia (First legislative acts, first veterinary literature from Middle Ages, veterinary legislation and veterinary literature from 18th to 20th ct, establishment of veterinary associations important for veterinary medicine development in 19th ct, founding of veterinary high school (20th ct); **Seminars (2), Exercises (16) 3. Contemporary student education** – integrated undergraduate and graduate study (name of the study, lasting, enrolment conditions, study lasting and organisation, academic degree of doctor of veterinary medicine awarded (VMD); (training for following fields of work: work in primary veterinary medicine, veterinary public health problems solving, protection of human environment, field, clinical and laboratory diagnostics, prevention of animal infectious diseases and zoonoses, programs for developing and improving products of animal origin, improving all kinds of protection of animals and environment, care for ethics and human relations to animals), postgraduate specialist and doctor studies at the Veterinary faculty of Zagreb, veterinary institutions and employment possibilities.		
2.68. Format of instruction:	☒ lectures ☒ seminars and workshops ☒ exercises ☐ on line in entirety ☐ partial e-learning ☒ field work	☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	2.69. Comments:

2.70. Student responsibilities	Attendance at seminars, exercises and writing seminar essay

2.71. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
Class attendance	0.27	Research		Practical training		
Experimental work		Report		(other)		
Essay		Seminar essay	0.15	(other)		
Tests	0.48	Oral exam		(other)		
Written exam	0.6	Project		(other)		

2.10. Grading and evaluating student work in class and at the final exam

Types of activities	Minimal number of points	Maximal number of po
Attending lectures	**3**	**6**
6% of grade	A student must attend at least 1 lecture lessons to collect the minimum numbe points. Coefficient = 3.	
Attending seminars	**4**	**6**
6 % of grade	A student must attend at least 4 seminars to obtain the minimal number of poi points. Coefficient = 1.	
Attending field exercises	**4**	**6**
6 % of grade	Student must attend at least 8 hours of field exercises in order to gain the min of points – 4 points. Coefficient = 0.5.	
Participation at seminars	**5**	**10**
10% of grade	Each student is obliged to create and present the seminar work that will be ev	
Continuous knowledge checking	**20**	**32**

	32% of grade	Colloquium will be organized upon completion of the field exercises. Colloquium consists of 16 questions each referring to seminar topics. Colloquium must results in a minimum of 20 points for 10 correct answers. Coefficient = 2.	
	Final exam	**24**	**40**
	40% of grade	A student must gain minimal 36 points from all 5 evaluation elements in order to take the final exam. The final exam consists of written part (17 questions each referring to seminar topics. Answers to questions 1 to 15 are valued by a maximum of 2 points each, while questions number 16-17 with a maximum of 5 points each). At final exam student must achieve at least 24 points.	

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and via other media)	Swope R. E. (2001): Opportunities in Veterinary Medicine Careers. VGM Career Books.	1	
	Hunter, P. (2004): Veterinary Medicine: A Guide to Historical Sources. Ashgate Publishing.	1	
2.32. Optional literature (at the time of submission of study programme proposal)	Riddle, J., E. G. Riggs, R. Simons, C.Gholar (2002.): Veterinarian. Mason Crest Publishers.		
2.33. Quality assurance methods that ensure the acquisition of exit competences	Anonymous student survey about all aspects of teaching.		
2.34. Other (as the proposer wishes to add)			

MEDICAL CHEMISTRY

1. GENERAL INFORMATION			
1.15. Course teacher	Associate professor Kristina Starčević	1.46. Year of the study programme	first
1.16. Name of the course	Medical chemistry	1.47. Credits (ECTS)	5
1.11. Associate teachers	Assistant professor Luka Krstulović	1.48. Type of instruction (number of hours + e-learning)	L + S + E	L-18+E-36
1.12. Study programme (undergraduate, graduate, integrated)	integrated	1.49. Expected enrolment in the course	35
1.13. Status of the course	compulsory	1.50. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
2.72. Course objectives	The objective of this course is that students acquire knowledge of: matter structure, basic inorganic chemical reactions, structures and reactions of organic compounds, main groups of natural compounds and practical knowledge of chemical calculation, qualitative and quantitative analysis. Knowledge acquired by the following syllabus is going to be a base for attending and understanding of courses during the Veterinary medicine studies.
2.73. Course enrolment requirements and entry competences required for the course	
2.74. Learning outcomes at the level of the programme to which the course contributes	Learning outcomes at the level of the programme: 1. Understanding the basic science on which veterinary medicine is based 2. The ability to search the literature, databases and other information sources 3. The ability to design and conduct experiments in the field of veterinary medicine, to interpret results and draw conclusions 4. The ability of use laboratory equipment and make critical analysis of test results 5. The ability of consolidation of the theoretical knowledge and practical skills within the fields of veterinary medicine 6. The ability of conduct independent research and work in team 7. The ability of presenting the results – oral and in writing

2.75. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Learning outcomes at the level of the course: Ater successful completion of the course the student will be able to: 1. Differentiate basic chemical reactions and physical-chemical processes 2. Match the structure and properties of simple organic compounds and complex biologically important molecules 3. Predict the relationship between the chemical structure of a molecule and its physical and chemical properties 4. Propose basic methods of analytical chemistry for quantitative and qualitative analysis 5. Solve tasks by applying chemical calculations.
2.76. Course content broken down in detail by weekly class schedule (syllabus)	Lectures 1. Introduction lecture: role of chemistry and biochemistry in veterinary medicine, matter structure; atoms, molecules, electronegativity, ionic and covalent bonds. 2. Dispersed systems: suspensions, colloids, solutions, aqueous solutions, hydrogen bonds, electrolytes, diffusion, osmosis, colligative properties); 3. Acids and bases: pH, buffer solutions, biological buffers, reaction energy: activation energy, endothermic and exothermic reactions, catalysts. 4. Alkanes, alkenes, alkynes, isomers and isomerism: structural and stereiosomers 5. Oxygen-containing organic compounds: alcohols, ethers, aldehydes, ketones, carboxylic acids and derivatives. 6. Nitrogen-containing organic compounds: amines, heterocyclic compounds, alkaloids. 7. Carbohydrates: classification and stereoisomerism, monosaccharides, oligosaccharides and polysaccharides. 8. Lipids: structure, classification, saponification, amino acids: structure and properties. 9. Proteins: structure, enzymes, coenzymes, nucleic acids: purine and pyrimidine bases, nucleosides, nucleotides. Laboratory exercices: 1. Qualitative chemical analysis: cations and anions 2. Solution preparation and optical methods 3. Quantitative chemical analysis: acidimetry and alkalimetry: 4. Experimental pH determination 5. Quantitative chemical analysis, redox reactions: iodometry 6. Qualitative and quantitative chemical analysis: determination of organic compounds Exercices in the lecture room: 1. Chemical calculations- Basis of chemical calculations

<table>
<tr><td></td><td colspan="6">2. Chemical calculations- Composition of solutions I
3. Chemical calculations- Composition of solutions II
4. Chemical calculations- Neutralisation reactions
5. Chemical calculations- Dissociation, pH, buffer I
6. Chemical calculations- Dissociation, pH, buffer II
7. Chemical calculations- Redox reactions I
8. Chemical calculations- Redox reactions II
9. Reactions in organic chemistry - problems</td></tr>
<tr><td>2.77. Format of instruction:</td><td colspan="2">■ lectures
☐ seminars and workshops
■ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td colspan="2">2.78. Comments:</td></tr>
<tr><td>2.79. Student responsibilities</td><td colspan="6">1. attending lectures
2. attending exercises
3. participation at exercises</td></tr>
<tr><td rowspan="6">2.80. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0.9</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td>0.5</td><td>Report</td><td></td><td>Activity</td><td>1.6</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>2</td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">Lecture attendance
There are 18 lecture lessons. A student must attend 1 lesson to gain 0.33 points. The maximum number of points is 6 (18 lessons) and the minimum number of points is 3 (9 lessons).

Exercise attendance
Exercises in the lecture room: there are 18 exercise lessons in the lecture-room (9 programmes). Each programme (two exercise lessons), is worth 0.66 points.Student must attend 6 programmes (12 lessons) in order to gain minimum of 4 points. Maximum number of points: 6 (18 lessons – 9 programmes).
Laboratory exercise: there are 18 exercise lessons in the lab (6 programmes). A student must attend 4 programmes (12 lessons) in order to gain minimal number of 4 points. Maximum number of points: 6 (6 programmes).</td></tr>
</table>

	Exercise activity Lab exercises: a student must solve a task from an exercise (programme) and present a report in order to get a signature for the exercise. Each correctly done and signed exercise is worth 1.67 points. A student must gain minimal 5 points. The maximum number of points: 10 points (6 programmes – coefficient 1.67). The minimal number of points: 5 (3 programmes). Continuos knowledge assessment Through out the semester there will be two preliminary exams. First preliminary exam consists of 6 questions with coefficient 2 (total of 12 points). Second preliminary exam consists of 5 questions with coefficient 4 (total of 20 points). Cumulative maximum number of points is 32. Student has to achive a minimum of 20 points. Final exam In order to take the final exam a student must gain the minimal points from each evaluation element, i.e. the total of minimal 36 points from the first four evaluation elements. The final exam is in written form and it consists of 25 questions. 10 questions worth 1 point and 15 questions worth 2 points. A student can gain 40 points max. The minimal number of points a student must gain at the final exam is 24. The maximum number of points: 40. The minimum number of points: 24.

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	1. F. A. Bettelheim, W. H. Brown, J. March (2004): Introduction to General, Organic, and Biochemistry, Thomson.	1	No
	2. M. S. Silberberg (2000): Chemistry, The Molecular Nature of Matter and Change, McGraw Hill.	1	No
	3. F. A. Carey (2003): Organic chemistry, McGrawHill, New York	5	Yes
	4. J. G. Smith (2006): Organic chemistry, McGrawHill, New York	5	No
	L. Krstulović and K. Starčević (2019): Chemical Calculation, Veterinary faculty, Zagreb	10	Yes
	6. L. Krstulović and K. Starčević (2019): Laboratory exercises in Medical Chemistry, Veterinary faculty, Zagreb	10	Yes
2.			
2.35. Optional literature (at the time of submission of study programme proposal)			

2.36. Quality assurance methods that ensure the acquisition of exit competences	Student survey
2.37. Other (as the proposer wishes to add)	

PHYSICAL EDUCATION I

1. GENERAL INFORMATION			
1.17. Course teacher	Saša Čuić, B.A. – Senior Lecturer	1.51. Year of the study programme	First year
1.18. Name of the course	PHYSICAL EDUCATION I	1.52. Credits (ECTS)	1
1.12. Associate teachers		1.53. Type of instruction (number of hours L + S + E + e-learning)	30 hours per semester of practical work
1.13. Study programme (undergraduate, graduate, integrated)	Integrated	1.54. Expected enrolment in the course	150
1.14. Status of the course	compulsory	1.55. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
2.81. Course objectives	Aims of PHYSICAL EDUCATION AND COLLEGIATE SPORT: (1) learning new conventional motor knowledge, (2) improve basics theoretical and practical kinesiology knowledge, (3) fortifity interest, antropologicalcharacteristics and motor informations, (4) prevent earlier tumble characteristics, abilities and motor knowledge, couse for want of physical exercises, (5) promote sports culture and (6) promote social comunications. Knowledge of structures, rules, training process, specific select kinesiology activities: athletics, swimming, basketball, football, volleyball, handball, yoga, badminton, skating, skiing, fencing, horseriding.
2.82. Course enrolment requirements and entry competences required for the course	Full-time inscription semester.
2.83. Learning outcomes at the level of the programme to which the course contributes	Possibility changes morphological characteristics, motor and functional abilities; training students for independent physical exercises; laws of medical culture; qualitiy nutrition.
2.84. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	-learning new conventional motor knowledge, -improve basics theoretical and practical kinesiology knowledge, -fortifity interest, antropologicalcharacteristics and motor informations -promote sports culture

2.85. Course content broken down in detail by weekly class schedule (syllabus)	Swimming, basketball, football, volleyball, handball, yoga, badminton, skating, horseriding.					
2.86. Format of instruction:	☐ lectures ☐ seminars and workshops xx ☐exercises ☐ on line in entirety ☐ partial e-learning ☐ field work		☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)		2.87. Comments:	
2.88. Student responsibilities	Compulsory full-time appearance and active participate. Possibility of writing seminar work of interest area (kinesiology science) students, in case incomblete work of compulsory programme. Possibility participate at University Championships in 23 male and female sports, cross competition and visiting sport events.					
2.89. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	**xx**	Research		Practical training	
	Experimental work		Report		(other)	
	Essay		Seminar essay		(other)	
	Tests		Oral exam		(other)	
	Written exam		Project		(other)	
2.10. Grading and evaluating student work in class and at the final exam	Initially knowledge students check over interest for some programme, there is no examination, by questionnaire students pursue quality of work course instructors. Accomplishment min. 80% of whole education in semester, students acquire right for signature of professor.					

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and via other media)	Literature is not obliged. Recommendation: Heimer, S. (2003). Promotion medical-preventive physical activity in Croatia. Sport for all, 21 (35), 3-4. Mišigoj-Duraković, M.,Z. Duraković, S. Xiukun, L. Petrinović (2003). Physical exercise in prevent of chronicle aninfection diseases. Sport for all. 21 (33-34), 25-28. Bartoluci, M., D. Omrčen (2003). Promotion as an element of marketing mix in sport and sport tourism: The Croatian Experience. Kinesiology, 35(1), 72-84.		

2.38. Optional literature (at the time of submission of study programme proposal)	Depending on interest area of students: e.g. VOLLEYBALL: Janković, V., N. Marelić (2003).Volleyball for all. Zagreb, authors edition. Officially regulations of volleyball (2004). Croatian volleyball Union, Zagreb. Marelić, N., V. Janković (1996). Vooleyball technics. Zadar, Cesar press. e.g. SWIMMING: Volčanšek, B. (1996). Sportive swimming (Manual). Faculty of Kinesiology, Zagreb. Fina-regulations of swimming (2002). Assembly judges Croatian swimming Union, Zagreb. Volčanšek, B. (2002). Essence of swimming Manual). Faculty of kinesiology, Zagreb. Szabo, I. (2002). Method exercises for development of swimming technics (Master's thesis). Faculty of kinesiology, Zagreb.		
2.39. Quality assurance methods that ensure the acquisition of exit competences	Verification knowledge and skills and participate on education pursues at pedagogic work with students, evidence active sports and medical status pursues at consultations with students, evidence and valuing results on University Championships in 23 male and female sports pursues at consultation with students and on the sport arenas, where competition are preserve.		
2.40. Other (as the proposer wishes to add)			

PHYSICAL EDUCATION II

1. GENERAL INFORMATION			
1.19. Course teacher	Saša Čuić, B.A. – Senior Lecturer	1.56. Year of the study programme	Second year
1.20. Name of the course	PHYSICAL EDUCATION II	1.57. Credits (ECTS)	1
1.13. Associate teachers		1.58. Type of instruction (number of hours L + S + E + e-learning)	30 hours per semester of practical work
1.14. Study programme (undergraduate, graduate, integrated)	Integrated	1.59. Expected enrolment in the course	150
1.15. Status of the course	compulsory	1.60. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
2.90. Course objectives	Aims of PHYSICAL EDUCATION AND COLLEGIATE SPORT: (1) learning new conventional motor knowledge, (2) improve basics theoretical and practical kinesiology knowledge, (3) fortifity interest, antropologicalcharacteristics and motor informations, (4) prevent earlier tumble characteristics, abilities and motor knowledge, couse for want of physical exercises, (5) promote sports culture and (6) promote social comunications. Knowledge of structures, rules, training process, specific select kinesiology activities: athletics, swimming, basketball, football, volleyball, handball, yoga, badminton, skating, skiing, fencing, horseriding.
2.91. Course enrolment requirements and entry competences required for the course	Full-time inscription semester.
2.92. Learning outcomes at the level of the programme to which the course contributes	Possibility changes morphological characteristics, motor and functional abilities; training students for independent physical exercises; laws of medical culture; qualitiy nutrition.
2.93. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	-learning new conventional motor knowledge, -improve basics theoretical and practical kinesiology knowledge, -fortifity interest, antropologicalcharacteristics and motor informations -promote sports culture

<table>
<tr><td>2.94. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Swimming, basketball, football, volleyball, handball, yoga, badminton, skating, horseriding.</td></tr>
<tr><td>2.95. Format of instruction:</td><td colspan="2">☐ lectures
☐ seminars and workshops
xx ☐exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>2.96. Comments:</td></tr>
<tr><td>2.97. Student responsibilities</td><td colspan="5">Compulsory full-time appearance and active participate. Possibility of writing seminar work of interest area (kinesiology science) students, in case incomblete work of compulsory programme. Possibility participate at University Championships in 23 male and female sports, cross competition and visiting sport events.</td></tr>
<tr><td rowspan="6">2.98. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>xx</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td></td><td colspan="5"></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="5">Initially knowledge students check over interest for some programme, there is no examination, by questionnaire students pursue quality of work course instructors. Accomplishment min. 80% of whole education in semester, students acquire right for signature of professor.</td></tr>
<tr><td rowspan="2">2.11. Required literature (available in the library and via other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="3">Literature is not obliged.
Recommendation:
Heimer, S. (2003). Promotion medical-preventive physical activity in Croatia. Sport for all, 21 (35), 3-4.
Mišigoj-Duraković, M.,Z. Duraković, S. Xiukun, L. Petrinović (2003). Physical exercise in prevent of chronicle aninfection diseases. Sport for all. 21 (33-34), 25-28.
Bartoluci, M., D. Omrčen (2003). Promotion as an element of marketing mix in sport and sport tourism: The Croatian Experience. Kinesiology, 35(1), 72-84.</td><td></td><td></td></tr>
</table>

2.41. Optional literature (at the time of submission of study programme proposal)	Depending on interest area of students: e.g. VOLLEYBALL: Janković, V., N. Marelić (2003).Volleyball for all. Zagreb, authors edition. Officially regulations of volleyball (2004). Croatian volleyball Union, Zagreb. Marelić, N., V. Janković (1996). Vooleyball technics. Zadar, Cesar press. e.g. SWIMMING: Volčanšek, B. (1996). Sportive swimming (Manual). Faculty of Kinesiology, Zagreb. Fina-regulations of swimming (2002). Assembly judges Croatian swimming Union, Zagreb. Volčanšek, B. (2002). Essence of swimming Manual). Faculty of kinesiology, Zagreb. Szabo, I. (2002). Method exercises for development of swimming technics (Master's thesis). Faculty of kinesiology, Zagreb.		
2.42. Quality assurance methods that ensure the acquisition of exit competences	Verification knowledge and skills and participate on education pursues at pedagogic work with students, evidence active sports and medical status pursues at consultations with students, evidence and valuing results on University Championships in 23 male and female sports pursues at consultation with students and on the sport arenas, where competition are preserve.		
2.43. Other (as the proposer wishes to add)			

PHYSICS AND BIOMEDICAL PHYSICS

1. GENERAL INFORMATION			
1.21. Course teacher	Assoc. prof. Pašić Selim	1.61. Year of the study programme	1.
1.22. Name of the course	Physics and biomedical physics	1.62. Credits (ECTS)	5
1.14. Associate teachers	Dr. sc. Nato Popara	1.63. Type of instruction (number of hours L + S + E + e-learning)	16 + 0 + 38
1.15. Study programme (undergraduate, graduate, integrated)	Integrated	1.64. Expected enrolment in the course	
1.16. Status of the course	Compulsory	1.65. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1

2. COUSE DESCRIPTION	
2.99. Course objectives	The aim of the course is to provide and explain biological processes on molecular level on the basis of the same fundamental physical laws.
3. Course enrolment requirements and entry competences required for the course	
3.1. Learning outcomes at the level of the programme to which the course contributes	1. Apply, analyze and interpret the knowledge of the sciences on which veterinary medicine is based in order to make evidence-based decisions 2. Independently use appropriate laboratory equipment and conducts critical analyzes of laboratory test results, with an understanding of applied techniques and diagnostic procedures in veterinary medicine. 3. Independently search literature, databases and other sources of information in order to improve theoretical knowledge and practical skills in solving professional and scientific problems in the field of veterinary medicine
3.2. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. Know how to convert units of measurement and apply dimensional analysis in clinical veterinary medicine 2. Apply the laws of mechanics to analyze the biomechanics of animal bodies and understand the mechanical properties of tissues 3. Apply the laws of hydromechanics to the circulatory system, blood pressure measurement and the operation of a stethoscope

	4. Apply the basic laws of thermodynamics and electricity to the transport of substances through cell membranes 5. Explain the concepts of vibrations and waves and apply them to ultrasound and Doppler diagnostics 6. Understand the response and interaction of living beings with sound, electromagnetic waves and charged particles 7. Use laboratory equipment, statistically process and present the results obtained
3.3. Course content broken down in detail by weekly class schedule (syllabus)	**Introduction** (Introduction. International Systems of Units (SI) and units. Errors in measurements. Scalars and vectors, Importance of physics in veterinary medicine.) **(2 hours of lectures)** **Mechanics** (Velocity and acceleration (linear and angular). Newton's laws. Centripetal and centrifugal force. (Ultra)centrifuge. Gravitational force. Friction. Work. Power. Energy. Conservation of energy law. The momentum. Lever. Elasticity, plasticity and viscoelasticity) **(2 hours of lectures)** **Fluids** (Surface tension. Density of matter. Hydrostatic and hydraulic pressure. Lift. Archimedes Principle. Viscometers. Bernoulli's Equation. Law of conservation of volume flow. Application of the law of ideal fluid flow to the blood and circulatory system. Real fluid. Viscosity and viscometers. Hydraulic resistance. Real fluid flow. Blood as a real fluid. Humidity) **(2 hours of lectures)** **Heat** (Temperature and thermal motion. Thermal expansion of solids and liquids. Anomalous thermal expansion of water and living world. Internal energy and warmth. Laws of thermodynamics. Stationary and thermodynamic equilibrium state. Entropy and the time arrow. Heat capacity. Aggregate states. Caloric value of food. Heat transfer.) **(2 hours of lectures)** **Oscillations and Waves** (Free oscillator vibration and energy. Damped and forced oscillator. Damped oscillator energy. Resonance. Definition of wave and basic concepts (wavelength, wave velocity, intensity, wave types)) **Acoustics** (Sound as longitudinal wave. Connection of physical quantity and their physiological effects: Intensity of sound wave - volume of the sound, frequency of sound wave - height of the sound. Ultrasound echo effect and its use in ultrasound diagnostic.Doppler effect and speed measurement) **(2 hours of lectures)** **Optics** (Electromagnetic radiation spectrum. Light as an electromagnetic wave. Law of reflection and types of reflection. Refraction of light. Light dispersion. Lenses and its characteristic points. Lens image construction. Spherical lens errors. Microscope. Distinction. Creating an image in the eye. Visual cells of the eye and their spectral properties) **(2 hours of lectures)** **Electricity** (The law of the electric charge conservation. Conductors and insulators. Coulomb law. Electric field. Electric potential. Capacity. Electric current. Ohm's Law. Kirchhoff's rules. Resistance law. Joule's Law. Electrolytes and their conductivity. Sources of the electromotive force. Model of biological membrane and potential of living cells. Resistivity of animal body. Biological potential (Nerst equation). Model of biological membrane. Conduction of the electric pulse along nerves. Electric resistance of human body.) **Magnetism** (Magnetic field. Magnetic flux. Magnetic inductivity and permeability. Lorentz's Law. Electromagnetic induction.). **(2 hours of lectures)** **Structure of the matter** (The structure of the atomic nucleus. Isotopes. Atom structure. Absorption, spontaneous and stimulated emission of radiation. Laser. Molecules and molecular bonds. Ionizing radiation. Radioactivity (α, β, γ radiation). Law of radioactive decay (half-life, half-life of radioactivity from the organism), x

	radiation, interaction of ionizing radiation with matter, absorption of x and γ radiation. Radioactivity and living beings. Ionizing radiation detectors) **(2 hours of lectures)** **Qualitative and numerical exercises (14 hours of exercises)** **Laboratory exercises (24 hours of exercises)**					
3.4. Format of instruction:	☒ lectures ☐ seminars and workshops ☒ exercises ☐ on line in entirety ☐ partial e-learning ☐ field work		☐ independent assignments ☐ multimedia and the internet ☒ laboratory ☐ work with mentor ☐ (other)		3.5. Comments:	
3.6. Student responsibilities						
3.7. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	**0,8**	Research		Practical training	**0,5**
	Experimental work		Report		(other)	
	Essay		Seminar essay		(other)	
	Tests	**1,7**	Oral exam		(other)	
	Written exam	2,0	Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam

Activity	Minimum Credit	Maxima credits
Attending lectures **(16 hours)**	3.00 **3/0.375≈8** **(coefficient 0.375)** **Students have to attend minimum 8 hours of lecture to gain minimum of 3 credits.**	6.00 **6/16≈0.375** **(coefficient 0.375)** **Maximum 6 credits from 16 hours of lecture**
Attending exercises **(38 hours)**	8.00 **8/0.316≈26** **(coefficient 0.316)** **Students have to attend minimum 26 hours of exercise to gain minimum 8 credits.**	12.00 **12/38≈0.316** **(coefficient 0.316)** **Maximum 12 credits from 38 hours of exercises**

	Activity on laboratory exercises	5.00 **(coefficient 0.833)** **Minimum 5.00 credits from 12 exercise**	10.00 **10/12=0,833 (coefficient 0.833)** **Maximum 10 credits from 12 exercises**
	Continues exams	20.00 **a) Measure units' continuous exam. The minimum credits is 4.00 or 8 correctly solved tasks of 12 tasks** **4/0.5=8** **(coefficient 0.5)** **b) Preliminary exam. Minimum of credits is 16.00 from 13 colloquiums x 5 tasks/colloq.=65 tasks** **16/0.4=40** **(coefficient 0.4)**	32.00 **a) Measure units' continuous exam. The maximum of credits is 6.00 from 12 tasks.** **6/12=0.5** **(coefficient 0.5)** **c) Preliminary exam. Maximum of credits is 26.00 from 13 colloquiums x 5 tasks/colloq.=65 tasks** **26/65=0.4** **(coefficient 0.4)**
	Final exam	24.00 **(coefficient 2)** **Minimum 24.00 credits or 12 correctly solved tasks from 20 tasks**	40.00 **20/40=2** **(coefficient 2)** **Maximum 40 credits from 20 tasks**
	TOTAL:	**60.00**	**100.00**

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	PAŠIĆ, S: *Laboratory exercises manual for students of veterinary medicine,* Web page https://moodle.srce.hr/	0	Internet
	PAŠIĆ, S*: Forms for laboratory exercises with short instruction for processing of the data,* Web page https://moodle.srce.hr/	0	Internet
	Lecture, Introduction in measurements, Measure units calculus, Scalars and vectors, Internal script (lms.vef.hr)	0	Internet
	PAŠIĆ, S., N. POPARA (2023): *Osmosis-fatal dehydration of a cell surrounded by water*, Matematičko-fizički list, 73, 188-189.	0	Internet
	PAŠIĆ, S., N. POPARA (2023): *Hydrostatics and blood pressures*, Matematičko-fizički list, 73, 247-249.	0	Internet
	POPARA, N, S. PAŠIĆ, L. BAJIĆ(2025): *Velocity measurement using the classic Doppler effect and its application in medicine*, Matematičko-Fizički list, LXXIV 2, 7-11.	0	Internet
2.44. Optional literature (at the time of submission of study programme proposal)	RUSSELL K. HOBBIE, BRADLEY J. ROTH: *Intermediate Physics for Medicine and Biology*, Springer, 2006. PAŠIĆ, S., A. KLOBUČAR (2023): *How does an ultrasound diagnostic device measure distances in tissue?* Matematičko-fizički list, 74, 82-85.		
2.45. Quality assurance methods that ensure the acquisition of exit competences	Grading and evaluating student work in class and at the final exam		
2.46. Other (as the proposer wishes to add)			

PLANT BIOLOGY

1. GENERAL INFORMATION			
1.23. Course teacher	Full prof. Maja Popović Nikolić Džolan, PhD	1.66. Year of the study programme	1st (first)
1.24. Name of the course	**Plant Biology**	1.67. Credits (ECTS)	1,5 ECTS
1.15. Associate teachers	Full prof. Ksenija Vlahović, PhD Full prof. Maja Popović Nikolić Džolan, PhD; Prof. Josip Kusak, PhD; Prof. Tomislav Gomerčić, PhD; Prof. Hrvoje Valpotić, PhD; Assistant prof. Daniel Špoljarić, PhD; Assistant prof. Andreja Prevendar Crnić, PhD; Ira Topličanec, PhD;	1.68. Type of instruction (number of hours L + S + E + e-learning)	10+0+10
1.16. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	1.69. Expected enrolment in the course	
1.17. Status of the course	Compulsory	1.70. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
3.8. Course objectives	Students will be able to distinguish basic systematic categories of plants important for veterinary medicine. They will be able to recognise mutual dependence of pants and animals within the whole ecosystem. They will get acquainted with morphologic basis of fodder plants from plough-fields and grasslands. They will be aware of medicine plants groups as well of plants poisonous for animals. They could get required information on plants important in veterinary medicine using botanic literature and data basis.		
3.9. Course enrolment requirements and entry competences required for the course			

3.10. L earning outcomes at the level of the programme to which the course contributes	The course contributes to higher competences in the field of animal breeding. Assisted reproductive technologies like Artificial insemination, Superovulation, In vitro Fertilization, Embryo Transfer have been introduced to overcome reproductive problems, to increase the offspring from selected female's and to reduce the generation intervals in farm animals. This advanced reproductive technologies provides a powerful tool for rapid change in animal population, genetically. As this technologies will play an important role in future perspective for efficient reproductive performance in livestock, this course presents an important part in education of new generation of students.		
3.11. L earning outcomes expected at the level of the course (4 to 10 learning outcomes)	The expected outcomes are: After successful completion of the course the student will be able to: 1. Compare the structure of prokaryotic and eukaryotic cells and enumerate groups of prokaryotes and explain their significance for animal health as well as the role and application of bacteria in the biosphere and life of humans and animals 2. Distinguish basic systematic categories of plants important for veterinary medicine 3. Differentiate morphology group of plants important in animal nutrition and identify groups of medicinal and honey plants and groups of plants poisonous to animals 4. Describe the life cycle of a cell and cell division (mitosis) and explain their role in the life cycle of multicellular organisms. 5. Match the structure of the eukaryotic plant cell with its functional organization and connect the structure and role of the DNA molecule with the structure of chromosomes. 6. Demonstrate their knowledge in the process of separating molecules of DNA from plant cells 7. Explain the processes that arise from inorganic organic matter and light energy is converted to chemical (division reaction, photolysis of water and the respiratory chain) 8. Use various tools and techniques of the content search system to find relevant information related to a particular topic or problem relevant to botany.		
3.12. C ourse content broken down in detail by weekly class schedule (syllabus)	Basic principles in life organisation of plants; Systematics, evolution and phylogenetic relations among plants; Plant cell; Biogenetics and metabolism of plan cell; DNA molecule isolation from plants; Review of the kingdom of the plants with acknowledging of most important plant families for veterinary medicine; Floristic kingdoms and their floristic and vegetation resources; Photosynthesis; Medicinal plants in veterinary medicine; Poisonous plants in veterinary medicine; Fodder plants and important honey plants in Croatia. Field classes: Getting acquainted with basic ecological patterns of ecosystem functioning in hilly forests; Basic flora and fauna species; Natural resources conservation and problems; Nature conservation principles; Functioning of flood ecosystems; Traditional agronomy and stock breeding; 2. Park Maksimir: Forest community; Meadow association		
	X lectures	☐ independent assignments	3.14. Comments:

<table>
<tr><td>3.13. Format of instruction:</td><td colspan="2">X exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ multimedia and the internet
X laboratory
☐ work with mentor
☐ (other)</td><td colspan="2"></td></tr>
<tr><td>3.15. Student responsibilities</td><td colspan="6">Students are obliged to participate lectures, seminars and exercise.</td></tr>
<tr><td rowspan="5">3.16. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0,27</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Participation in the training (other)</td><td>0,15</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>0,48</td><td>Oral exam</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>0,6</td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">The total students' obligations at the course:

Start and finish times of lessons, time-table and location of lessons will be announced on the Institute and Veterinary faculty notice board as well as on thier web pages. Lecturers and assistants which will hold the lessons, the way of taking the exam and examination standards for the course, in autumn semester are being defined as follows:

1 attending lectures
2 attending exercises
3.participation at exercises and seminars
4 continuous knowledge checking
5 final exam

During the session for the course the student must attend 5 lecture lessons in order to gain 3 minimal points. The maximum gained number of points from this evaluation element is 6 points.

During the session student must attend 7 exercise lessons in order to gain 8 minimal points during the semester. The maximum gained number of points from this evaluation element is 12 points.

During the session at the time of exercises student must do provided tasks from 5 programming exercises and for a completed task she/he gets a signature from the lecturer. Each well done and signed programming exercise is worth 1.4 points. For programming exercises in practicum a student can gain total of 7 points for 5 programme exercises. After a field work lesson (there are 2 field work lessons planned) a student gains 1.5 points if she/he wrote and /or collected predetermined materials. For two positive oral answers during the exercises student gains additional 1.5 points. During</td></tr>
</table>

	the session student must gain total of 5 points in order to have the minimal number of 5 points. Maximal number of points gained from this evaluation element is 10. During the session 4 preliminary exams will be organized at the time of exercises each of them consisting 5 tasks or questions. Each correctly done task or well answered question is worth 1 point. In context of this evaluation element it is possible to gain the maximum of 20 points. Student must gain total of 12,5 points from the preliminary exams in order to gain minimum of 20 points. The total gained number of points from this evaluation element is 32 points. Student who does not gain minimum of 12,5 points during the session has right to take a makeup preliminary exam which will comprise material from all programming exercises and will be organized upon completion of the teaching in the session. Total number of points at the preliminary exam is 20. Student who does the makeup exam with better-than 50% results has right to take the final exam. The final exam starts with a student's short analysis of results gained from the first four types of activities of attending lecture. Questions in the final exam will be put in a way that a student can answer in writing. The maximum number of points that can be gained from the final exam is 60 points, where 1 point = 1 correct answer (60 questions = 60 points). Student must show at least a sufficient knowledge at the final exam, with no regard to gained number of points from the first four evaluation elements, which could be higher than 36. The minimal number of points a student must gain at the final exam is 36 in order to gain minimal number of 24 points. In case a student does not satisfy at the final part of the exam, the lecturer determines time for reexamination. Regardless of a fact that a student gained the number of points from the first four evaluation elements on the basis of makeup preliminary exam or not, the same rules are valid for forming the final mark. The final mark is formed on the basis of total sum from all five evaluation elements, according the following table:

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	1. Moore, R., W. D. Clark, K. R. Stern, D. Vodopich (1995): Botany. Wm. C. Brouwn Publischers.	5	
	2. Wynn, S.G., Fougere (2007): Veterinary herbal medicine. Mosby Elsevier.	5	
	3. Vlahović, K., M. Popović, D. Špoljarić (2023): Manual for the course.		Merlin
	4. Vlahović, K. (2014): Overview of the plant kingdom with an introduction into plant groups important in veterinary medicine.		Merlin

2.47. Optional literature (at the time of submission of study programme proposal)	
2.48. Quality assurance methods that ensure the acquisition of exit competences	Final written exam.
2.49. Other (as the proposer wishes to add)	

ZOOLOGY

1.25. Course coordinator	Associate professor Daniel Špoljarić	1.71. Year of the study programme	The first year
1.26. ame of the course	Zoology	1.72. Credits (ECTS)	5.5
1.16. ourse teachers	Full professor Ksenija Vlahović, DVM Full professor Josip Kusak, DVM, PhD Full professor Maja Popović Nikolić Džolan, DVM, PhD Full professor Tomislav Gomerčić, DVM, PhD Associate professor Daniel Špoljarić, DVM, PhD Ira Topličanec, PhD	1.73. Type of instruction (number of hours L + S + E + e-learning)	L=15; S=20; E=40
1.17. tudy programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate studies	1.74. Expected enrolment in the course	30
1.18. tatus of the course	Compulsory	1.75. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	2 i.e.10%
2. COUSE DESCRIPTION			
3.17. ourse objectives	Through the course, students do acquire crucial knowledge and understanding about animal kingdom, which is per se the essence of the study of veterinary medicine. The goal of teaching this course is to acquaint the students of Veterinary medicine with the basic rules of functioning of living world and its relation to the non-living environment. It enables understanding of the wide range of processes from the transport of matter and energy from the level of cell and organism to the populations of all taxonomic groups of fauna and flora, and their relations on the level of ecosystem and entire biosphere. This is the precondition for any logical understanding of other courses from morphology and physiology to pathology, therapy and prevention of diseases. Additional needs for this knowledge emerge from the ever broadening of spectrum of species treated in the veterinary medicine, an either as patients, husbandry, hunting, collection, or human consumption in any form.		

	Regulations on environmental matters (like various waste disposal) and on international trade with living organisms are also getting more complex and stricter.
3.18. ourse enrolment requirements and entry competences required for the course	The subject Zoology is at the beginning of the Veterinary medicine study and the only precondition is that a student can understand, speak and write in English.
3.19. earning outcomes at the level of the programme to which the course contributes	Apply, analyze and interpret the knowledge of the sciences on which veterinary medicine is based in order to make evidence-based decisions.
3.20. earning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. Taxonomically classify every animal to the phylum level and mammals to the order level. 2. Interpret basics of evolutionary processes. 3. Explain the structure and role of cell parts during cell divisions. 4. Compare types of reproduction, ways and processes of fertilization. 5. Explain abiotic and biotic ecological factors and mechanisms of their interactions. 6. Explain biomes and phases of community successions. 7. Classify types of pollutants and basic mechanism of their interactions in ecosystems.
3.21. ourse content broken down in detail by weekly class schedule (syllabus)	Definitions (systematics, taxonomy, classification), Systematic categories and binary nomenclature (Linne), Phylogeny and evolution (Darwinism); Phylogenetic tree (6 Kingdoms of living organisms: Prokaryotes, Archea, Protista, Animalia, Plantae, Fungi); Eukaryotes, Cell biology: Features of eukaryote cell. Comparison with prokaryotic cell. Nucleus and nucleus membrane importance. Cell organelles evolution, structure and function: cell membrane, nucleus, endoplasmic reticulum, mitochondrion, lysosomes, microtubule, ribosomes, nucleolus, centrosome. Animal and plant cell distinctions. Chromosomes: structure and cycle. Protozoa: Sarcodina, Mastigophora, Ciliata, Eusporozoae, Cnidosporidia. Evolution of metazoa: Multicellular animals' appearance and development. Parazoa (Porifera, Placozoa). Cell organelles and whole cells specialization. Acelomata: Cnidaria, Platyhelminthes, Nemathelminthes. Non vertebrate Celomata and coelom: coelom evolution, structure and function. Pisces: Cyclostomata, Placodermi, Chondorichthyes, Osteichthyes, Amphibia, Reptilia, Aves, Mammalia: Characteristics and division. Mammalia: Orders: Insectivora, Dermotoptera, Chiroptera, Edentata, Pholidota, Primates, Rodentia, Lagomorphea, Cetacea, Carnivora, Tubuliedentata, Hyracoidea, Proboscidea, Sirenia, Perissodactyla, Artiodactyla. Cell divisions: Cell division types – somatic cells division - mitotic division – reductive division: meiosis I and II, (Crossing-over, oogenesis - spermatogenesis, spermiogenesis) – endomitotic division. Chromosome cycle in u mitosis and meiosis. Polykariontia, polyploidy, polyteny – gigantic chromosomes. Description and role of each cell division type. Phases analysis. Division result. Sex cells: Gametes or sex cells (evolution of sex cells), Spermatozoa and egg (structure and function). Eggs classification by quantity and location of yolk content at all animals by groups). Reproduction, types and purpose. Nonsexual and sexual reproduction (hermaphrodite, diecic animals). Advantages of sexual reproduction.

	Parthenogenesis, androgenises. Fertilization (internal, external), monospermy, polyspermy (fertilization duration), Phases of fertilization: singamy, cariogamy, activation of egg. Embryogenesis, ontogenesis, phylogenies. Comparative developmental embryology: Cleavage or segmentation. Embryonic development phases. Germ layers. Metamorphosis. Neotenia. Prostomia, deuterostomia. Cleavage types: Total (holoblastic) equal or adequal. Partial (meroblastic), discoidal and superficial. Gastrulation: invagination, involution, epiboly, delamination. Chordo-mesodermal roof. Neurula, Tubulation. Embryonal sheets (birds and reptiles): yolk sac, chorion, amnion, allantois and allanto-chorion (evolution, structure and function). Germ layers derivates. Ecology, Living and non living matter relations. World strategy of nature conservation. Basic ecologic terminology: biosphere, bio-cycle, biomes, ecosystem, biotope (habitat, microhabitat), biocenosis, ecological niche, ecological spectrum, ecosystem homeostasis, Ecological pyramids of numbers, biomass and energy (plants, herbivores and carnivore); Energy in ecosystem. Abiotic factors: Geochemical mineral cycles, light, heat, water, pH, pressure. Biotic factors: Abundance, sociability, dominancy, activity range, fertility, mortality, biotic potential, age structure, population dynamics. Intra- and inter-specific relations (neutralism, competition, predation, parasitism, mutualism). Successions and climax of biocenoses, Order of population replacement, Dependences and final population types. Biomes: Aquatic and terrestrial: rain forests, deciduous forests, taiga, tundra, grasslands, chaparral, deserts, ecotone. Biodiversity: Definition, evolution and importance. Methods of ecological research: Qualitative and quantitative methods. Influences of man on ecological equilibrium: Direct (resource exploitation and constructional changes) and indirect – pollution (types: organic, un-organic, dust, radioactive, thermal pollution /water, global warming/, acid rains, ozone holes, light pollution, noise), genetically modified organisms, monocultures. Field exercises in Zoological Garden, National park Risnjak, solid waste dump Jakuševec, and Maksimir park. Laboratory exercises in systematics and cell and evolution biology.					
3.22. ormat of instruction:	☒ lectures ☒ seminars and workshops ☒ exercises ☐ on line in entirety ☒ partial e-learning ☒ field work		☐ independent assignments ☐ multimedia and the internet ☒ laboratory ☒ work with mentor (in the case of having less than ten students enrolled) ☐ (other)		3.23. Comments:	
3.24. tudent responsibilities	Attending lectures, seminar, field work and lab exercises. Preparing for lab and field work from materials on Merlin. Preparing, presenting and defending one seminar.					
3.25. creening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits*	Class attendance	0.99	Research		Practical training	
	Experimental work		Report		Activity	0.55
	Essay		Seminar essay		(other)	
	Tests	1.76	Oral exam	2.2	(other)	
	Written exam	2.2	Project		(other)	

is equal to the ECTS value of the course)						

2.10. Grading and evaluating student work in class and at the final exam

According to Bologna approach of study process, the work of a student will be evaluated by the following means:
For attending a total of 15 lecture hours a student can gain 3 to 6 points, thereby each lesson is worth 0.4 point.
For attending a minimum of 14 seminar hours a student can gain 4 minimal points. A condition is to write one seminar work.
For attending a minimum of 28 exercise hours a student can gain 4 minimal points.
A student can be asked, or she/he can answer on her/his own at least 6 times. Each correct answer is worth 1.67 points. The student can gain 5 to 10 points.
There will be twelve short tests each containing 10 questions, at the beginning of lab exercises. In case a student does not attend the lesson and does not gain 120 units (e.g. she/he gained only 100 or 110 units), the unit value will be recalculated from the number he gained. A student can gain 20 to 32 points, and the unit value for each correct answer is 0.27 (for all 12 tests).
The final written exam consist of 50 questions, where a student can gain 15 to 20 points. Each question is worth 0.5 accounting units. The oral exam contains three questions for 9 to 15 points. Each question is worth 5 accounting units.
The final student's score is calculated according to the following:

Points	Grade
up to 59	1 (F)
60-68	2 (E)
69-76	2 (D)
77-84	3 (C)
85-92	4 (B)
93-100	5 (A)

2.11. Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
All study materials are available in form of Power point presentations		Files on Merlin
Đuro Huber, Tomislav Gomerčić, Josip Kusak, FUNDAMENTALS OF ECOLOGY, University textbook for students of veterinary medicine		Available as PDF on Merlin

2.50. Optional literature (at the time of submission of study programme proposal)

Mader, S. M., (2004) Biology. McGraw-Hill, USA, 952 pp.
Pimac, R. B. (1995): A primer of conservation biology. Sinauer Associates Inc, Massachusetts, USA

2.51. Quality assurance methods that ensure the acquisition of exit competences	Continuous oral and written checking of acquired knowledge
2.52. Other (as the proposer wishes to add)	

LIST OF OBLIGATORY SUBJECTS - 2nd STUDY YEAR

Obligatory Subjects - 2nd study year

Anatomy with Embryology of Domestic Animals III

Animal Breeding and Production

Applied Animal Nutrition

Basic Animal Nutrition

General Microbiology

General and Molecular Genetics in Veterinary Medicine

Histology with General Embryology

Hygiene and Housing of Animals

Introduction to English Veterinary Medical Terminology II

Physical Education III

Physical Education IV

Physiology of Domestic Animals I

Physiology of Domestic Animals II

Veterinary Immunology

ANATOMY WITH EMBRYOLOGY OF DOMESTIC ANIMALS III

1. GENERAL INFORMATION			
1.27. Course teacher	Assoc. Prof. Mirela Pavić Vulinović Deputy: Assist. Prof. Ivan Alić	1.76. Year of the study programme	2nd year, 3rd semester
1.28. Name of the course	**Anatomy with embryology of domestic animals III**	1.77. Credits (ECTS)	5.5
1.17. Associate teachers	Full Prof. Martina Đuras, Full Prof. Srebrenka Nejedli; Full Prof. Tajana Trbojević Vukičević; teaching assistant Magdalena Kolenc, PhD, DVM,; teaching assistant Kim Korpes, PhD, DVM; teaching assistant Ante Plećaš, PhD, DVM; teaching assistant Mirna Mandić Čukman, DVM; teaching assistant Iva Matijević, DVM	1.78. Type of instruction (number of hours L + S + E + e-learning)	15 L + 63 E
1.18. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	1.79. Expected enrolment in the course	
1.19. Status of the course	Compulsory	1.80. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	Merlin
2. COURSE DESCRIPTION			
3.26. Course objectives	The course presents the gross anatomy of domestic animals with embryonic development of organs and organic systems to veterinary medicine students in order to ensure basic knowledge for other disciplines such as physiology, pathology and clinical courses.		
3.27. Course enrolment requirements and entry competences required for the course	Completed courses "Anatomy with organogenesis of domestic animals I" and "Anatomy with organogenesis of domestic animals II".		

<table>
<tr><td>3.28. Learning outcomes at the level of the programme to which the course contributes</td><td colspan="3">Following successful completion of the course, students will be able to apply acquired knowledge on gross anatomy and development of the head and neck of domestic mammals and basic gross anatomy of domestic birds during preclinical and clinical courses.</td></tr>
<tr><td>3.29. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="3">Following successful completion of the course, students will be able to:
11. describe and interpret the organization of the anatomical structures of the head and neck as a basis for clinical and public health assessment;
12. recognize the differences in the anatomical structures of the head and neck in various domestic mammal species as a basis for clinical and public health assessment;
13. distinguish the normal anatomical structure of the head and neck structures in order to recognize pathological changes;
14. explain the principles of embryonic development of the anatomical structures of the head and neck in order to understand and assess congenital malformations;
15. explain the mutual topographical and functional relationship of the anatomical structures of the head and neck as a basis for application in clinical work;
16. identify and interpret anatomical structures of domestic poultry as a basis for clinical and public health assessment.</td></tr>
<tr><td>3.30. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="3">Lectures:
1. Principles of the skeleton of the head and cervical spine (1 hour), 2. Muscles of the head and neck (2 hours), 3. Mouth, salivary glands, pharynx and the esophagus: structure and development (3 hours), 4. Upper respiratory tract, larynx and trachea: structure and development (2 hours), 5. Development of the nervous system (1 hour), 6. Brain, spinal cord and cranial nerves (2 hours), 7. Eye: structure and development (1 hour), 8. Ear: structure and development (1 hour), 9. Basic gross anatomy of domestic birds (2 hours)
Practicals:
1. Cervical vertebrae (2 hours), 2. Skeleton of the head (8 hours), 3. Regions, fasciae and skin muscles of the head and neck (3 hours), 4. Muscles of the head (4 hours), 5. Muscles of the neck and nuchal ligament (6 hours), 6. Ventral neck region and parotid region (3 hours), 7. Buccal region (3 hours), 8. Masseteric region and temporomandibular joint (3 hours), 9. Mouth (3 hours), 10. Pharynx (3 hours), 11. A. carotis externa (2 hours), 12. Intermandibular region (3 hours), 13. External nose and nasal cavity (3 hours), 14. Larynx (3 hours), 15. Eye (4 hours), 16. Vestibulocochlear organ (3 hours), 17. Brain (3 h), 18. Basic gross anatomy of domestic birds (4 hours).</td></tr>
<tr><td rowspan="2">3.31. Format of instruction:</td><td>☒ lectures
☐ seminars and workshops
☒ practicals
☐ on line in entirety</td><td>☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor</td><td>3.32. Comments:</td></tr>
<tr><td colspan="3"></td></tr>
</table>

	☐ partial e-learning ☐ field work		☐ (other)			
3.33. Student responsibilities	Students are expected to attend lectures and dissection exercises and prepare cadavers according to course instructions.					
3.34. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0.99	Research		Practical training	0.55
	Experimental work		Report		(other)	
	Essay		Seminar essay		(other)	
	Tests	1.76	Oral exam	2.2	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam

Student requirements are defined in the Regulations on the Integrated Undergraduate and Graduate Study of Veterinary Medicine. Given the above, the student must acquire a minimum number of points from all assessment elements in order to take the final exam. A student can justifiably be absent from up to 50% of the lectures and 30% of the practicals.

The course has 15 hours of lectures. The student has to attend at least 8 hours of lectures.

The course has 63 hours of practicals. The student has to attend at least 42 hours of practicals.

Active participation in the practicals is evaluated through short oral testing during practicals and is graded with 10 points in total. The student has to achieve at least 5 points.

Oral exam is graded with 40 points in total. The student has to achieve at least 24 points at the oral exam.

Type of activity	Minimum number of points	Maximum number of points
Lecture attendance	3	6
Practical training attendance	8	12
Participation in the practical training	5	10
Tests	20	32
Oral exam	24	40
Total	60	100

2.11. Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
KÖNIG, H. E., H.-G. LIEBICH (2007): Veterinary anatomy of domestic mammals, Textbook and color atlas. 3rd Ed. Schattauer, Stuttgart, New York		
DYCE, K. M., W. O. SACK, C. J. G. WENSING (2010): Textbook of veterinary anatomy. 4th Ed. Saunders Elsevier, Philadelphia.	4	

	DONE, S. H., P. C. GOODY, S. A. EVANS, N. C. STICKLAND (2009): Color atlas of veterinary anatomy. Volume 3. The dog and cat. 2nd Ed. Mosby Elsevier, Edinburgh, London, New York.	1	
	EVANS, H. E., A. de LAHUNTA (2010): Guide to the dissection of the dog. 7th Ed. Saunders Elsevier. Philadelphia.		
	McGEADY, T. A., P. J. QUINN, E. S. FITZPATRICK, M. T. RYAN (2006): Veterinary embryology. Blackwell Publishing, Dublin.		
2.53. Optional literature (at the time of submission of study programme proposal)	NICKEL, R., A. SCHUMMER, E. SEIFERLE (1986): The locomotor system of the domestic mammals. Volume I. Verlag Paul Parey, Berlin, Hamburg. NICKEL, R., A. SCHUMMER, E. SEIFERLE (1979): The Viscera of the Domestic Mammals. Volume II. 2nd revised Ed. Verlag Paul Parey, Berlin, Hamburg. NICKEL, R., A. SCHUMMER, E. SEIFERLE (1981): The circulatory system, the skin, and the cutaneous organs of the domestic mammals. Volume III. Verlag Paul Parey, Berlin, Hamburg. NICKEL, R., A. SCHUMMER, E. SEIFERLE (1977): Anatomy of the Domestic Birds. Volume V. Verlag Paul Parey, Berlin, Hamburg. EVANS H. E., A. De LAHUNTA (2012): Miller's anatomy of the dog. 4th Ed. WB Saunders Company, Philadelphia, London. SCHALLER, O. (2007): Illustrated veterinary anatomical nomenclature. 2nd Ed. Ferdinand Enke Verlag, Stuttgart. HYTTEL, P., F. SINOWATZ, M. VEJLSTED (2010): Essentials of domestic animal embryology. Saunders Elsevier, Philadelphia. SADLER, T. W. (2006): Langman's medical embryology, Lippincott Williams & Wilkins a Wolters Kluwer business. 10th Ed. Philadelphia, Baltimore, New York.		
2.54. Quality assurance methods that ensure the acquisition of exit competences	Grading of active participation in the practical training, two written tests, final oral exam		
2.55. Other (as the proposer wishes to add)			

ANIMAL BREEDING AND PRODUCTION

1. GENERAL INFORMATION			
1.29. Course teacher	Sven Menčik, PhD, DVM, Associate Professor	1.81. Year of the study programme	2nd
1.30. Name of the course	**Animal Breeding and Production**	1.82. Credits (ECTS)	7
1.18. Associate teachers	Anamaria Ekert Kabalin, PhD, DVM, Full Professor (permanent) Maja Maurić, PhD, DVM, Associate Professor Ivan Vlahek, PhD, DVM, Assistant Professor Aneta Piplica, PhD, DVM, Postdoctoral Research Assistant Niko Popović, DVM, Assistant	1.83. Type of instruction (number of hours L + S + E)	34 L + 14 S (4 e-learning) + 42 E
1.19. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	1.84. Expected enrolment in the course	20
1.20. Status of the course	Compulsory	1.85. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	4,4%
2. COUSE DESCRIPTION			
3.35. Course objectives	The aim of the course Animal Breeding and Production is to teach veterinary students how to optimally assess and economically utilise the genetic basis of animals. Special attention is given to the genotypic and phenotypic characteristics of traits on which the quantity and quality of animal products depend, as well as to resistance to disease and the interdependence between the animal organism and the environment. The material builds on knowledge acquired in the courses Basics of Statistics in Veterinary Medicine and Animal Breed Characteristics, and is divided into two units. First, students learn about different forms of animal use, appropriate procedures for handling animals, and measures to preserve their health. Subsequently, students acquire knowledge about methods for assessing the genetic basis of individual traits and about breeding and selection methods by which this basis can be altered. In addition, they develop knowledge of data management, information technology as AI, and digital skills and competencies necessary for practical application in veterinary medicine.		
3.36. Course enrolment requirements	Undergraduate courses: Basic Statistics in Veterinary Medicine and Animals Breeds Characteristics		

<table>
<tr><td>and entry competences required for the course</td><td></td></tr>
<tr><td>3.37. Learning outcomes at the level of the programme to which the course contributes</td><td>Students will acquire knowledge about animal species based on their genetic particularities and specific environments. Then, there are lessons about different production systems and the use of animal genetics to improve the quantity and quality of production, as well as how production influences animal health. Finally, students learn how to estimate the genetic basis of particular traits and describe breeding methods that enable us to improve them, using appropriate knowledge of data management, information technology, and the digital skills and competences necessary for practical application in veterinary medicine.</td></tr>
<tr><td>3.38. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td>After successfully completion of the course students will be able to: distinguish between fundamental concepts of population genetics and genetic equilibrium within a population; rank animals based on their breeding value; analyse and compare breeding programmes for the genetic improvement of animal populations; evaluate specific animal selection criteria and compare different breeding methods; assess the potential application of molecular genetic methods to improve animal production and health; evaluate different production systems for the most important domestic animal species; explain the potential impact of breeding systems on animal health and production; apply and interpret current knowledge of modern digital technologies in breeding and technological processes; and enhance information skills related to digital technologies in veterinary medicine within animal production.</td></tr>
<tr><td>3.39. Course content broken down in detail by weekly class schedule (syllabus)</td><td>
<table>
<tr><th>Methodological unit / course content</th><th>Class schedule (“L” lectures + “S” seminars + “E” exercises intramural + “Ef” exercises field)</th></tr>
<tr><td>Animal breeding - introduction, definition and importance. Animal breeding traits - measurability and economic value. General and special animal breeding traits.
Inheritance and variability of animal breeding traits. Phenotype equation. Phenotype/genotype of qualitative and quantitative traits. Phenotypic variability of breeding traits. Genotype determination of qualitative and quantitative breeding traits.
Introduction to the various uses of animals - production, work, experiments, pets, sports, recreation. Importance and basic principles of animal production. General and special traits in breeding of cattle, sheep, goats, pigs, poultry, horses and dogs.</td><td>L 1 + E 2</td></tr>
<tr><td>Production systems in cattle breeding. Technological basics in the production of cow's milk. Technological basics in the production of beef meat. Herd health and production management in cattle farms. Presentation of computer program (decision-making tools with data entry and storage, keeping records on breeding, feeding and animal health knowledge of data management, information technology as AI, and digital skills and competencies necessary for practical application in veterinary medicine.</td><td>L 3 + S 2 +E 2 + E(f) 8</td></tr>
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</table>

	Production systems in sheep and goat farming. Technological basics in the production of sheep and goat milk. Technological basics in the production of sheep and goats meat. Herd health and production management in sheep and goat farms. Presentation of computer program (decision-making tools with data entry and storage, keeping records on breeding, feeding and animal health knowledge of data management, information technology as AI, and digital skills and competencies necessary for practical application in veterinary medicine.	L 3 + S 2 + E 1	
	Production systems in pig breeding. Technological basics in the production of pork. Herd health and production management in pig farms. Presentation of computer program (decision-making tools with data entry and storage, keeping records on breeding, feeding and animal health knowledge of data management, information technology as AI, and digital skills and competencies necessary for practical application in veterinary medicine.	L 2+ S 2 + E 1	
	Production systems in poultry. Technological basics in the production of chicken meat. Technological basics in the production of chicken eggs for food. Production of other poultry species. Herd health and production management in poultry farms.	L 2+ S 2 + E 2 + E(f) 3	
	Training and use of horses. Organization of horse mating, parturition, foal and hare raising. Different use of horses.	L 2 + E 2 + E(f) 1	
	Training and exploitation of dogs. Reproduction, training of young dogs. Different use of dogs. The basics of dogs training. Training of official and therapeutic dogs. Good breeding practice in dogs. Raising cats. Reproduction, breeding and raising young cats. Good breeding practice in cats.	L 2 + E 3	
	Breeding and exploitation of laboratory animals and rabbits. Mating and raising of laboratory mice and rats. Basics of breeding and raising of the most common cage pets.	L 1 + E 1	

	Inheritance and variability of animal breeding traits. Phenotype equation. Phenotype/genotype of qualitative and quantitative traits. Phenotypic variability of breeding traits. Genotype determination of qualitative and quantitative breeding traits.	L 2 + E 2	
	Introduction to genetic improvement of animals by different breeding methods. Breeding population - genetic and genotype structure. Animal improvement by new gene combinations and/or gene frequency change. Methods of animal breeding – pureblood, crossbreeding, bastarding. Biotechnological methods in animal improvement – artificial insemination, multiple ovulation and embryo transfer, cloning, semen sexing, gene tests. Improvements of animal populations - breeding programs, exhibitions, licensing, regionalization, implementation of legal regulations, scientific and professional literature.	L 4 + E 4	
	Introduction to genetic improvement of animals by selection. Selection of animals with regard to qualitative traits. Natural and artificial selection of animals. Methods of selection. The frequency of genotypes and genes in the animal populations. The equilibrium of genotypes and genes in the population. Factors that can change the frequency of genotypes and genes in the population. Harmful genes - degeneration, predisposition to diseases. Major genes – muscular hypertrophy, fertility.	L 4 + E 2	
	Selection of animals with regard to quantitative traits. Causes of variability of quantitative traits. Statistical indicators in the estimation of quantitative traits variability. Relationship and repeatability of quantitative traits. Quantitative traits and environmental impact. Heritability. Setting the selection criteria. Selection Differential. Assessment of the effect of selection. Factors that influence effect of selection: herd renewal, generation interval, crossing effects.	L 4 + E 4	
	Introduction to evaluation of the breeding value - definition, presentation and interpretation of the breeding value. Differences between genotype and breeding value. Sources of data and the accuracy of the estimation of the breeding value. Methods for estimation of breeding values. Breeding value in different animal species.	L 4 + E 4	

	Programs for improvement of the genetic base of different animal species. Breeding programs. Breeding programs in Croatia - cattle, sheep and goats, pigs, poultry and horses. Breeding program for dogs. Breeding program for cats.		S 6 (4 e-learning)

3.40. Format of instruction:	☒ lectures ☒ seminars and workshops ☒ exercises ☐ on line in entirety ☒ partial e-learning ☒ field work	☒ independent assignments ☒ multimedia and the internet ☒ laboratory ☐ work with mentor ☐ (other)	3.41. Comments: -

3.42. Student responsibilities	Student obligations are listed in the Act on integrated study program of the University of Zagreb Faculty for Veterinary Medicine. Student have to gather at least minimum points in each grading element to go to the final exam. Final grade is formed according to the number of points. Number of points for each grading element: - Attending lectures: The maximum number of points from this evaluation element is 6 points (minimum is 3 points) - Attending exercises: The maximum number of points from this evaluation element is 6 points (minimum is 4 points) - Attending seminars: The maximum number of points from this evaluation element is 6 points (minimum is 4 points) - Student activity on exercises and seminars: maximal number of points from this evaluation element is 10 points (minimum is 5 points) - Continuous knowledge checking (tests): maximal number of points from this evaluation element is 32 points (minimum is 20 points) - Final exam: maximal number of points from this evaluation element is 40 points (minimum is 24 points)

3.43. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
Class attendance	1,26	Research		Practical training	0,56
Experimental work		Report		(other)	
Essay		Seminar essay	0,14	(other)	
Tests	2,24	Oral exam	1,4	(other)	
Written exam	1,4	Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	The final grade is formed by summing the before mentioned elements of assessment (Class attendance – lectures, seminars, field exercise i intramural exercise and on-line; practical/ independent assignment, tests and final exam). Grading is done by the grades according to the grading system in table.

points	*grade*
to 59	1 (F)

<table>
<tr><td></td><td colspan="3"><table>
<tr><td>60-68</td><td>2 (E)</td></tr>
<tr><td>69-76</td><td>2 (D)</td></tr>
<tr><td>77-84</td><td>3 (C)</td></tr>
<tr><td>85-92</td><td>4 (B)</td></tr>
<tr><td>93-100</td><td>5 (A)</td></tr>
</table></td></tr>
<tr><td rowspan="3">2.11. Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>Lokhorst & Groot Koerkamp: Precision livestock farming, 2009. Axford, Bishop, Nicholas & Owen: Breeding for disease resistance in farm animals, 2000. Jiang & Ott: Reproductive genomics in domestic animals, 2010. Field & Taylor: Scientific farm animal production, 2009. Brand, Nordhuisen & Schukken: Hered health and production management in dairy practice, 1997. Lasley, J.F.: Genetics of Livestock Improvement. Prentice-Hall, Inc., New Jerxey, 1987. FAO: Marker assisted selection, 2007. Pierce: Genetics, 2003. Muir & Aggrey: Poultry genetics, breeding and biotechnology, 2003. Houghton Brown, Pilliner & Davies: Horse and stable management, 2003. Root Kustritz: The dog breeders guide to successful breeding and health management, 2006. Radostits, O.M.: Herd Health. W.B. Saunders Company. Philadelphia, 2001. Vella, Shelton, Mcgonagle & Stanglein: Robinsons genetics for cat breeders and veterinarians, 2003.</td><td>1 book in the library of The Department of Animal Breeding and Livestock Production</td><td>no</td></tr>
<tr><td>web pages</td><td></td><td>yes</td></tr>
<tr><td>2.56. Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">Prepared written material for lectures and exercises.</td></tr>
<tr><td>2.57. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">Students' work will be monitored through conversations (on lectures, seminars, exercises, online via LMS), as well through continuous knowledge testing. At the end of teaching, the knowledge of students will be verified by a final (written and oral) exam.</td></tr>
<tr><td>2.58. Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

APPLIED ANIMAL NUTRITION

1. GENERAL INFORMATION			
1.31. Course teacher	Full Professor Hrvoje Valpotić, DVM, PhD	1.86. Year of the study programme	2nd
1.32. Name of the course	Applied Animal Nutrition	1.87. Credits (ECTS)	5,5
1.19. Associate teachers	Full Professor Željko Mikulec (vice course leader), Maja Loborec, DVM, Sunčica Heštera, DVM	1.88. Type of instruction (number of hours L + S + E + e-learning)	25 L + 50 E
1.20. Study programme (undergraduate, graduate, integrated)	Integrated	1.89. Expected enrolment in the course	
1.21. Status of the course	Compulsory	1.90. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	2nd level, 10%
2. COUSE DESCRIPTION			
3.44. Course objectives	Upon completion of the lectures and after passing the final "Applied Animal Nutrition" exam, students will be able to recognize the conditions in the field and take feed samples for chemical analysis. They will also know the right procedure for taking samples for analysis and super analysis and to correctly interpret the results. The acquired skills will enable them to individually formulate balanced rations and feedstuffs for all species and categories of animals. They will also be able to recognize specific nutrient deficiencies and malnutrition in domestic and wild animals which could have a negative effect on the health status and their products. Students will be capable of determining and applying preventive and therapeutic feeding in cases of metabolic disorders of high-producing animals. Besides field work the students will be capable of working in feed mills and in other biomedical fields which require basic knowledge of veterinary nutrition.		
3.45. Course enrolment requirements and entry competences required for the course	Attended the course „Basic Animal Nutrition"		
3.46. Learning outcomes at the level of the programme to which the course contributes			
3.47. Learning outcomes expected at the	Upon successful completion of the course, students will be able to:		

level of the course (4 to 10 learning outcomes)	1. Knowing the characteristics of feeding different species of domestic and wild animals in certain physiological periods 2. Estimating the daily nutritive needs of animals according to the tables of nutritional requirements, biological experiments and practical experience 3. Recognize deficiencies in feed of domestic and wild animals 4. Applied manual and computer assembling meals for certain species and categories of animals 5. Recommend proper feeding for different species and categories of animals in practical farm conditions and corrections for inappropriate feeding
3.48. Course content broken down in detail by weekly class schedule (syllabus)	1 Factors affecting feed consumption (Taste. Appearance. Hunger. Appetite. Physical form. Mechanisms of feed intake. Inhibition of feed intake. Expected feed intake. Modulation of feed intake.); 2 Physiological and nutritive specificities of animals (Evolution of feeding. Feeding ecology. Hoffman distribution. Specificities of monogastric and ruminant feeding. Feed utilization strategies); 3 Feeding dairy cows (Feed consumption. Forage-concentrate ratio in cow feeding. Nutritional requirements of dairy cows. Feeding dry cows. Feeding dairy cows in different periods of lactation. Feedstuffs in dairy cow nutrition. Formulating rations for dairy cows. Interpreting milk composition, Malnutrition.); 4 Calf nutrition (Physiological and nutritive characteristics of calves. Nutritive requirements of calves. Feedstuffs for feeding calves. Feeding calves in different feeding systems. Feeding fattening calves.); 5 Feeding beef cattle (Feed consumption in beef cattle. Nutrient requirements of beef cattle. Physiological aspects of fattening. Feedstuffs for beef cattle. Types of rations for beef cattle. Feeding beef cattle in intensive and extensive systems); 6 Feeding heifers (Nutrient requirements of heifers. Rations for heifers.); 7 Feeding bulls (Feeding young bulls. Feeding grown bulls. Nutrient and energy requirements of bulls); 8 Sheep nutrition (Feeding habits of sheep and dry matter intake. Nutrient requirements of sheep. Requirement formation principles. Feeds in sheep production. Formulating rations and feedstuffs for sheep. Feeding sheep in different physiological conditions and production periods. Feeding yearlings. Feeding rams. Malnutrition.); 9 Feeding lambs (Nutritional characteristics of lamb feeding. Nutrient requirements of lambs. Feeding lambs in different weaning systems. Feeds and feedstuffs in lamb nutrition. Feeding fattening lambs. Feeding of breeding lambs.); 10 Goat nutrition (Feeding habits of goats and feed intake. Nutrient requirements of goats. Forages in goat nutrition. Formulating rations and feedstuffs for goats. Feeding goats in different production periods. Feeding yearlings. Feeding bucks. Malnutrition.); 11 Feeding kids (Characteristics of kid feeding. Nutrient requirements of kids. Feeding weaned kids. Feeding fattening kids. Feeding breeding kids.); 12 Feeding sows and boars (Physiological and nutritive characteristics of swine. Feeding gestating sows. Feeding lactating sows. Feeding boars. Feeding gilts.); 13 Feeding piglets. (Physiological and nutritional characteristics of piglets. Weaning systems. Nutritive requirements of piglets. The influence of piglet feeding on mucosal immunity and health); 14 Feeding growing-finishing pigs (Physiological and nutritional characteristics of growing-finishing pigs. Feeding systems for growing-finishing pigs. Nutrient requirements of growing-finishing pigs.); 15 Feeding poultry (Physiological and nutritional characteristics of poultry. Feeding breeders. Feeding replacement pullets. Feeding

	broilers. Feeding turkeys. Feeding ducks. Feeding geese. Feeding Japanese quails. Feeding guinea fowl.); 16 Feeding horses (Physiological and nutritional characteristics of horses. Nutrient requirements of horses. Keeping and feeding systems for horses. Feeding horses in training. Feeding stallions and broodmares. Feeding lactating mares. Feeding foals. Feeding aged and convalescent horses. The influence of nutrition on horse health status.); 17 Dog and cat nutrition (Nutrient requirements of dogs and cats. Similarities and differences of dog and cat nutrition. Nutrition in gestation and lactation. Nutrition of offspring. Nutrition of adult dogs and cats. Nutrition of working dogs. Nutrition of aged animals. Characteristics and types of pet food, Body condition scoring.); 18 Feeding rabbits and fur animals (Characteristics of the digestive system. Digestion of particular substances. Pet rabbits. Commercial breeding. Feeding systems. Nutrition-related diseases.); 19 Game nutrition. (Specific qualities of game nutrition. Nutritive and energy requirements of game. Winter supplement feeding of large and ground game. Nutrition of game animals in intensive production systems.); 20. Fish nutrition (Characteristics of fish nutrition opposed to land animals. Natural feeding habits of the fish. Energy and nutrient requirements of fish. Nutrition of freshwater and saltwater fish.); 21. Feeding exotic animals ((Physiological and nutritional characteristics of digestive system. Nutrient requirement of exotic animals. Nutrition-related diseases).
3.49. Format of instruction:	☒ lectures ☐ seminars and workshops ☒ exercises ☐ on line in entirety ☐ partial e-learning ☒ field work ☒ independent assignments ☒ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)
3.50. Comments:	
3.51. Student responsibilities	

3.52. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
Class attendance	**0,99**	Research		Practical training		
Experimental work		Report		(other)		
Essay		Seminar essay		(other)		
Tests	**2,31**	Oral exam	1,1	(other)		
Written exam	1,1	Project		(other)		

2.10. Grading and evaluating student work in class and at the final exam

e of activity	**Minimal points**	**Maksimal points**
nding lectures ours	**3** (coefficient 0,24) 3 : 0,24 = 13 (12.5)	**6** 6 : 30 = 0,24 (coefficient 0,24)
nding exercises		**12**

	50 hours	**8** (coefficient 0,24) 8 : 0,24 = 34 (33.3)	12 : 50 = 0,24 (coefficient 0,24)	
	Participation at exercises 1 question = 1 point	**5** (coefficient 1) 5 : 5 = 1	**10** 10 : 1 = 1 (coefficient 1)	
	Continuous knowledge checking 1 preliminary exam 1 question = 1 point Total of 32 points	**20** (coefficient 1) 20 X 1 = 20	**32** 32 : 32 = 1 (coefficient 1)	
	Final exam Written exam* Oral exam* * In total, students must obtain at least 24 points in written and oral part of the exam. The number of points obtained from the oral exam may not be less than 12.	**24** (coefficient 8) 24 : 8 = 3	**40** 40 : 5 = 8 (coefficient 8)	
	Total	**60**	**100**	

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and via other media)	Cheeke, P. R. (2005): Applied Animal Nutrition. Feeds and Feeding. (3rd ed.). Pearson Prentice Hall, USA.		
	FEDIAF (2020): Nutritional Guidelines for Complete and Complementary Pet Food for Cats and Dogs. The European Pet Food Industry Scientific Advisory Board (SAB). Bruxelles, Belgium.		
2.59. Optional literature (at the time of submission of study programme proposal)	Pond, W. G., D. C. Church, K. R. Pond: Basic Animal Nutrition and Feeding (Fourth Edition). John Wiley and Sons Inc., USA, 1995.		

	Ensminger, M. E., J. E. Oldfield, W. W. Heinemann: Feeds and Nutrition (Second Edition). The Ensminger Publishing Company, USA,1990.
2.60. Quality assurance methods that ensure the acquisition of exit competences	
2.61. Other (as the proposer wishes to add)	

BASIC ANIMAL NUTRITION

1. GENERAL INFORMATION			
1.33. Course teacher	Full Professor Željko Mikulec	1.91. Year of the study program	2nd year
1.34. Name of the course	Basic Animal Nutrition	1.92. Credits (ECTS)	3,5
1.20. Associate teachers	Associate Professor Hrvoje Valpotić (vice course leader), Maja Loborec, DVM, Sunčica Heštera, DVM	1.93. Type of instruction (number of hours L + S + E + e-learning)	15 L + 30 E
1.21. Study program (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	1.94. Expected enrolment in the course	
1.22. Status of the course	Compulsatory	1.95. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
3.53. Course objectives	After successfully passing the exam of the course “Basic Animal Nutrition” students will gain basic knowledge in the area of animal nutrition necessary for a better understanding of the course "Applied Animal Nutrition" which starts the following semester. This means that students are familiar with the chemical components of feed, nutritive values of different groups of feedstuffs, and are able to apply this knowledge. In addition, students will be trained for autonomous organoleptic testing of feedstuffs propriety, their sampling, taking part in different methods of feed analysis, and interpretation of the results.		
3.54. Course enrolment requirements and entry competences required for the course	Completed final exam in Medicinal Chemistry.		
3.55. Learning outcomes at the level of the program to which the course contributes			
3.56. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	- Understand basic concepts about nutrients - Have an insight into analytical methods and basic chemical analysis of feed - Estimate the nutritional value of feeds - Understand the variations between feed mixtures and pet food		

	- Have knowledge about substances that can contaminate feed
3.57. Course content broken down in detail by weekly class schedule (syllabus)	1. Goals of nutrition and its role in veterinary medicine. (Development of nutrition and current status in science. Interaction: soil, plant, animal. Feed production.); 2. Chemical analysis of feed (Sampling for analysis. Analytical methods. Basic feed composition. Interpretation of feed analysis.); 3. Water and dry matter (Water in feeds. Feed water content. Methods for determining moisture.); 4. Protein and amino acid content of feed (Nitrogenous feeds. Biological value of protein. Ideal protein. Digestible protein and amino acids. Crude protein. Methods for determining crude protein in feedstuffs. Protein in ruminant nutrition.); 5. Carbohydrates in feedstuffs. Methods for determining carbohydrates in feedstuffs. Carbohydrate digestion and the influence on nutrition. Carbohydrate fermentation.); 6. Lipids in feedstuffs (Crude fat and methods for determining crude fat in feedstuffs. Compound lipids. Fatty acids in feedstuffs.); 7. Minerals in feedstuffs (Micro-mineral and macro-mineral elements. Conversion of mineral elements); 8. Vitamins in feedstuffs (Vitamin addition to feeds); 9. Energy metabolism (Energy in feed. Energy fractions in animal system. Importance of energy content in feed formulation.); 10. Feed additives (Classification. Advantages and adverse effects of additive use); 11. Nutrition in different stages of development and production (Maintenance. Growth. Fattening. Work. Reproduction. Gestation. Lactation. Egg production. Wool and mohair production.); 12. Nutritive value of feedstuffs (Dry forages and roughages. Concentrates.); 13. Feed mixtures and pet food (Complete feed mixtures. Premixes. Pet food. Labeling of feed mixtures and pet foods. Legislation concerning feed production.) 14. Factors affecting feed consumption (Taste. Appearance. Hunger. Appetite. Physical form. Mechanisms of feed intake. Inhibition of feed intake. Expected feed intake. Modulation of feed intake.).

3.58. Format of instruction:	X lectures ☐ seminars and workshops X exercises ☐ online in entirety ☐ partial e-learning ☐ fieldwork	☐ independent assignments X multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	3.59. Comments:
3.60. Student responsibilities			

3.61. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
Class attendance	0,63	Research		Practical training	
Experimental work		Report		Participation at exercises	0,35
Essay		Seminar essay		(other)	
Tests	1,12	Oral exam		(other)	
Written exam	1,40	Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	**e of activity**	**Minimal points**	**Maksimal points**
	nding lectures ours	**3** (coefficient 0,4) 3 : 0,4 = 7,5 (8)	**6** 6 : 15 = 0,4 (coefficient 0,4)
	nding exercises ours	**8** (coefficient 0,333) 8 : 0,333 = 24	**12** 12 : 30 = 0,4 (coefficient 0,4)
	icipation at exercises estion = 1 point	**5** (coefficient 1) 5 : 1 = 5	**10** 10 : 10 = 1 (coefficient 1)
	tinuous knowledge checking liminary exam retical questions = 1 point lations = 4 points of 32 points	**20** (coefficient 1) 20 : 1 = 20	**32** 32 : 32 = 1 (coefficient 1)
	l exam ten exam) uestions = 40 points estion = 1 point	**24** (coefficient 1) 24 : 1 = 24	**40** 40 : 40 = 1 (coefficient 1)
	l	**60**	**100**

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and via other media)	POND, W. G., CHURCH, D. C., POND, K. R. (1995): Basic Animal Nutrition and Feeding. Fourth Edition. John Wiley and Sons.		
	DRYDEN, G. (2008): Animal nutrition science. Cambridge University Press. Cambridge		
	CHEEKE, P. R. (2005): Applied Animal Nutrition. Feeds and Feeding. (3rd ed.). Pearson Prentice Hall, USA.		

2.62. Optional literature (at the time of submission of study program proposal)			
2.63. Quality assurance methods that ensure the acquisition of exit competences			
2.64. Other (as the proposer wishes to add)			

GENERAL MICROBIOLOGY

1. GENERAL INFORMATION			
1.35. Course teacher	Associate Professor Selma Pintarić, DVM, PhD	1.96. ear of the study programme	2
1.36. N ame of the course	General Microbiology	1.97. redits (ECTS)	3.5
1.21. A ssociate teachers	Prof. Nevenka Rudan, DVM, PhD Postdoctoral assistant Marija Cvetnić, DVM Teaching assistant Gorana Miletić, DVM Teaching assistant Valentina Huzjak, DVM	1.98. ype of instruction (number of hours L + S + E + e-learning)	L 12 S 12 E 30
1.22. S tudy programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate veterinary study programme	1.99. xpected enrolment in the course	
1.23. S tatus of the course	obligatory	1.100. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
3.62. C ourse objectives	Microbiology is an important preclinical course where students are prepared for further understanding of lessons in Veterinary Pathology, Pharmacology, and clinical courses such as Infectious Diseases of Domestic Animals. Procedures of disinfection and sterilization, of sampling and sending different materials for microbiological and immunological tests, simple procedures of microorganism identification, including use of commercial compounds suitable for veterinarians in practice will be offered throughout practical work to students attending the course. Lessons and practices in microbiology offer basic knowledge on morphology, physiology, specific qualities of cultivation and identification, antigen properties, tenacity, relation to antimicrobial substances, pathogenicity of microorganisms and methods of etiological diagnostics as well as possibilities of immunoprophylaxis of infectious diseases.		
3.63. C ourse enrolment requirements and entry competences required for the course	Attended course lectures of Veterinary Immunology.		
3.64. L earning outcomes at the	Microbiology is an important preclinical course where students are prepared for further understanding of lessons in General and special Veterinary Pathology, Pharmacology, and clinical courses such as Infectious Diseases of Domestic Animals.		

level of the programme to which the course contributes						
3.65. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Microbiology is an important preclinical course where students are prepared for further understanding of lessons in General and special Veterinary Pathology, Pharmacology, and clinical courses such as Infectious Diseases of Domestic Animals. After attended lessons and practicals in microbiology students will be able: - to differentiate morphology, physiology, specific qualities of cultivation and identification of microorganisms - to demonstrate antigen properties, tenacity, relation to antimicrobial substances, and pathogenicity of different microorganisms - to distinguish methods of etiological diagnostics as well as possibilities of immunoprophylaxis of infectious diseases. After the course students can take and send different materials for microbiological and immunological tests, to perform simple procedures of microorganism identification, including use of commercial compounds suitable for veterinarians in practice.					
3.66. Course content broken down in detail by weekly class schedule (syllabus)	1. Microbiology development and its importance in veterinary medicine. 2. Bacterial morphology (shape, size, structure, mobility, spores). Bacterial physiology. Bacterial ecology. Bacterial genetics. 3. Antibiotics and mechanisms of their effects. Bacterial resistance. 4. Morphology, physiology and reproduction of yeast and moulds. 5. Virology development. Basic properties of viruses. Physical properties and chemical composition of viruses. Antigenic properties. Viral replication. Viral cultivation. Effects of viral infection of cell. Hemagglutination. Hemadsorption. 6. Bacteriophages and phage typing. Viral genetics. Viral interference. Tumours. Effects of physical and chemical factors on viruses. Antiviral chemotherapy. Prions and viroids. 7. Viral diseases diagnostics (laboratory diagnostics).					
3.67. Format of instruction:	☒ lectures ☒ seminars and workshops ☒ exercises ☐ online in entirety ☐ partial e-learning ☐ field work		☒ independent assignments ☐ multimedia and the internet ☒ laboratory ☐ work with mentor ☐ (other)		3.68. Comments:	
3.69. Student responsibilities	Students are obliged to attend lectures, seminars, and exercises.					
3.70. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is*	Class attendance	0,63	Research		Practical training	
	Experimental work		Report		Practical work and seminar activities	0,35
	Essay		Seminar essay		(other)	

<table>
<tr><td rowspan="2">equal to the ECTS value of the course)</td><td>Tests</td><td>1,12</td><td>Oral exam</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>1,4</td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">
Student obligations are defined with the Regulations on the integrated undergraduate and graduate study of veterinary medicine. From total 100 points, student must acquire a minimum number of points from all elements of assessment:
1. Attending lectures
2. Attending seminars
3. Attending exercises (practicals)
4. Activities at practicals and seminars
5.Continuous knowledge checking (colloquium)
6. Final exam

<table>
<tr><th>Type of activity</th><th>Minimal number of points</th><th>Maximal number of points</th></tr>
<tr><td>Attending lectures</td><td>3</td><td>6</td></tr>
<tr><td>Attending seminars</td><td>4</td><td>6</td></tr>
<tr><td>Attending exercises (practicals)</td><td>4</td><td>6</td></tr>
<tr><td>Participation at seminars and exercises</td><td>5</td><td>10</td></tr>
<tr><td>Continuous knowledge checking</td><td>20</td><td>32</td></tr>
<tr><td>Final exam</td><td>24</td><td>40</td></tr>
<tr><td>Total</td><td>60</td><td>100</td></tr>
</table>

A student can justifiably be absent from up to 50% of the lectures, 30% of the seminars, and 30% of the practicals.
The course has 12 hours of lectures (six methodological units). The student must attend at least 6 hours of lectures (three methodological units) to gain minimum of 3 points for lectures attendance. The maximum are 6 points (12 hours of lectures or six methodological units).
The course has 12 hours of seminars (six methodological units). The student must attend at least 8 hours of seminars (four methodological units) to gain minimum of 4 points for seminars attendance. The maximum are 6 points (12 hours of seminars or six methodological units).
The course has 30 hours of practicals (15 methodological units). The student must attend at least 20 hours of practicals (10 methodological units) to gain minimum of 4 points for practicals attendance. The maximum are 6 points (30 hours of practicals or 15 methodological units).

During seminars and practicals, the student must obtain a minimum of 5 activity points and can obtain a maximum of 10 points.
</td></tr>
</table>

	Active participation in the practicals is evaluated through short oral testing during practicals and is graded with 1 point for one correct answer. Each successful experimental work can be graded with 1 point. For the preparation and successful presentation of a seminar paper, a student can earn a maximum of 2 points per seminar. Two **continuous knowledge checking** (written colloquia) will be organized as part of practicals. The lowest number of points that a student should gain from this element is 20 points. Maximum is 32 points. A student who does not achieve a minimum of 20 points in the colloquia has the right to retake colloquium a maximum of 2 times. If the student does not achieve the required minimum number of points even after repeated colloquia, he can repeat it the following academic year. The student must acquire a minimum number of points from all assessment elements in order to take the **final exam** (attendance at lectures – 3; seminars – 4; practicals – 4; participation at seminars and practicals – 5; continuous knowledge checking - 20). Final exam is in a written form (multiple-choice questions, yes/no questions, written response questions). A student must gain a minimum of 24 points. The maximum is 40 points. The final grade is based on the total sum of the points from all of elements of assessment (attendance of lectures, seminars, practicals; activity, colloquia and final exam). The evaluation is carried out according to the distribution below. Points Mark do 59 1 (F) 60-76 2 (E, D) 77-84 3 (C) 85-92 4 (B) 93-100 5 (A)

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	Hogg, S. (2013): Essential microbiology, Second Edition. Wiley Blackwell. Chichester, West Sussex.		e-book
	Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders.		e-book
	PowerPoint presentations		LMS
	Markey, B., F. Leonard, M. Archambault, A. Cullinane, D. Maguire (2013): Clinical veterinary microbiology. Second edition. Mosby Elsevier.		

	Edinburgh, London, New York, Oxford, Philadelphia, St Louis, Sydney, Toronto.		
2.65. Optional literature (at the time of submission of study programme proposal)	1. Naglić, T., D. Hajsig, J. Madić, L. Pinter (2005): Specijalna veterinarska bakteriologija i mikologija.Veterinarski fakultet Sveučilišta u Zagrebu i Hrvatsko mikrobiološko društvo. 2. Kalenić, S. i sur. (2019): Medicinska mikrobiologija. Medicinska naklada. Zagreb. 3. Habrun, B. (2014): Klinička veterinarska bakteriologija. Medicinska naklada. Zagreb.		
2.66. Quality assurance methods that ensure the acquisition of exit competences	Continuous oral and written checking of acquired knowledge. Final written exam.		
2.67. Other (as the proposer wishes to add)			

GENERAL AND MOLECULAR GENETICS IN VETERINARY MEDICINE

1. GENERAL INFORMATION			
1.37. Course teacher	Associate prof. Daniel Špoljarić, PhD	1.101. Year of the study programme	2nd
1.38. Name of the course	**General and molecular genetics in veterinary medicine**	1.102. Credits (ECTS)	3,5
1.22. Associate teachers	Full prof. dr. sc. Maja Popović Nikolić Džolan, PhD Full prof. Ksenija Vlahović, PhD; Prof. Josip Kusak,PhD; Prof. Tomislav Gomerčić, PhD; Associate prof. Daniel Špoljarić, PhD; Ira Topličanec, PhD	1.103. Type of instruction (number of hours L + S + E + e-learning)	5+10+30
1.23. Study programme (undergraduate, graduate, integrated)	integrated	1.104. Expected enrolment in the course	
1.24. Status of the course	Compulsory	1.105. Level of application of e-learning 1.106. (level 1, 2, 3), percentage of online instruction (max. 20%)	10%
2. COUSE DESCRIPTION			
3.71. Course objectives	Students will be able to recognize importance and contribution of genomics and proteomics in veterinary medicine and biotechnology. They will be able to comprehend and check basic laws of inheritance at the molecular level, from phenotype expression in prokaryotes and animals, up to qualitative and quantitative phenogenetics of artificial selection. They will acquire knowledge about molecular processes of informative macromolecules up to genome expression in prokaryotes and animals. They will be able to recognize causes and effects of spontaneous and induced mutations in animals. They will acquire with the role and biomedical importance of molecular signals and differential molecules involved in the regulation of cell and life cycle in animals, particularly during their embryomic development. Students will be able to recognize the methods of molecular biology applicable in veterinary medicine and comprehend their importance in prevention, diagnostic and therapy, as well as in the veterinary biotechnology. They will realize possible risks of applying recombinant DNA technology for health and welfare of animals and humans, as well as for environment.		

	For the possibility of taking/attending an exam students must first pass exams of the following courses: Zoology, Plant biology, Medical Chemistry, Biochemistry in Veterinary Medicine.
3.72. Course enrolment requirements and entry competences required for the course	
3.73. Learning outcomes at the level of the programme to which the course contributes	1. Apply, analyze and interpret the knowledge of the sciences on which veterinary medicine is based in order to make evidence-based decisions. 2. Independently search literature, databases and other sources of information in order to improve theoretical knowledge and practical skills in solving professional and scientific problems in the field of veterinary medicine
3.74. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. Compare of contemporary aspects of cytology, molecular biology and genetics in veterinary medicine, public health and forensic 2. Considering of basic principles of molecular research of animal cells and tissue 3. Considering of molecular processes of replication, transcription and translation of animal information macromolecules. 4. Compare of health and ecological justification and risk of using transgenic animal organisms and cells, biotechnological preparations (cytokines, hormones, enzymes, vaccines, medications) and genetically modified food of animal origin. 5. Identify genetic disorders of animals of interest for veterinary medicine 6. Selecting molecular-genetic method for preventive, diagnostic and therapy of ill animal.
3.75. Course content broken down in detail by weekly class schedule (syllabus)	1 Historical aspects and future challenges (Past, present and future of molecular biology and genomic within the scope of veterinary medicine and public health, Concept and importance of genomics and proteomics in veterinary medicine); 2 Origin and evolution of animal cells at the molecular level (Molecular basis of animal embryonic organisms development; Comparative approach to the molecular structure of animal cells (mammals and birds) of interest for veterinary medicine; Animal cells as experimental models in veterinary medicine (epithelial, limbal cells, melanocytes, fibroblasts from domestic pig as a model system in biomedical research); 3 DNA, genes and heredity in animals (DNA molecule as a carrier of genetic information; Comparative review of animal karyograms (mammals and birds); Genetic maps of animals (mammals and birds); Application of Mendelian laws of inheritance in veterinary medicine; Morgans law of inheritance in veterinary medicine; Application of epistatic inheritance in veterinary medicine; Sexually related characteristics in animals (colour of fur in “caliko cats”, colour of coat in cattle, possessing or non possessing of horns in sheep, colour of feathers in hens etc.); Multiple genes of interest for veterinary medicine; Lethal genes of animals; Population genetics: natural and artificial selection at the level of herd and/or flock for health and productivity traits in species of interest for veterinary; phylogenetic relations (species, subspecies, breeds, geographic varieties) of animals at the molecular level; Mutations of genomes, chromosomes and genes in animals; 4 Bioenergetics of animals at the molecular level (a comparative review of mitochondrial genomes); Molecular basis of animal cells metabolism; 5 Replication, self-maintenance and rearranging of genomic DNA of animals (Molecular mechanism of DNA replication – origin and initiation of the replication.) DNA polymerase. Replication fork, fidelity of the replication process. Direct damage reversal of DNA. Telomeres and telomerase (multiplying of chromosomal

	terminal ends. DNA repair (excision and recombination repair). DNA arrangement, transposition and amplification of genes); 6 Synthesis and maturation of RNA (Types of RNA. Transcription, Regulation of transcription - cis regulatory genes; Maturation and metabolism of mRNA); 7 Synthesis, arrangement and regulation of proteins in animals (Transport RNA. Structure of ribosome. Process of translation – initiation, elongation and termination; Levels of structure of proteins); 8 Expression of genetic information in animals (Gene expression in animals. Colinearity of genes and proteins. Genetic markers in animals (birds and mammals). RNA viruses and reverse transcription); 9 Regulation and control of gene expression in animals (Eukaryotic gene function. Transcription control of gene expression – transcription activators, repressors and control gene regions in animals; Posttranscription control (feedback inhibition of translation and protein degradation); Epigenetics 10 Cell signalling in animal cell (Forms of signalling between the cells. Signalling molecules and their membrane receptors. Paths of transfer of cell signals from the membrane to the nucleus – genes. Signalling of cell survival); 11 Cell cycle of animal cell (Molecular events in the M phase – phases of mitosis, meiosis and cytokinesis; Effects of cell growth and extracellular signals on regulation of cell cycle. Control points of the cell cycle. Comparative review of molecular aspects of gametogenesis, fertilization and activation of zygote in animals (mammals and birds). Regulators of development through the cell cycle; Molecular mechanisms of physiological and pathological apoptosis of animal cell); 12 Regulators of normal cell proliferation and differentiation in animals (Stem cells of animal origin and their application in veterinary medicine; Cell proliferation and differentiation. Differentiation molecules and function of mature cells. Protooncogenes – protooncoproteins. Transformation of protooncogenes into oncogenes. Point mutations of protooncogenes in animals. Amplification of protooncogenes. Retrovirus insertion into region of protooncogenes. Translocation of protooncogenes); 13 Signalling in genetic control of the embryonic development of animals (Homeotic genes. Evolution of homeotic genes. Expression of hox genes during embryonic development. Mutations of hox genes – developmental anomalies in animals - birds and mammals); 14 The recombinant DNA technology in veterinary medicine (From genes to proteins and vice versa. Production of recombinant molecules – cytokines, interferons, vaccines of interest for veterinary medicine; Vectors for recombinant DNA. Expression of cloned genes. Detection of nucleic acids. Gene transfer in animals. Transgenic animal cells and organisms – GMO. Molecular genetics in diagnostic of inherited diseases of domestic animals (birds and mammals); Mutagenesis of cloned genes. Production of animal proteins in bacterial cells. Application of gene therapy *ex vivo* and *in vivo* in veterinary medicine. Application of reproductive and therapeutic cloning in veterinary medicine); 15 Cellular and molecular methods in veterinary medicine, public health and animal forensic genetics (Application of cellular and molecular methods in veterinary medicine; Hybrid technology. Animal germinal cell cultures. Animal cells culturing. Functional cell tests. Cytometric determination of lymphoid/myeloid cell profiles in peripheral blood and other body fluids of animals. Electrophoresis. Animal genomic DNA isolation. Animal RNA isolation. Methods for analysis of DNA, RNA and proteins. – Southern blot, Western blot, Northern blot. DNA amplification by polymerase chain reaction - PCR. DNA typing. DNA fingerprinting. DNA sequencing. DNA/RNA hybridization. DNA probes. DNA chips. *In situ* hybridization in immunocytochemistry), Analysis and alignment of nucleotide sequences using bioinformatics tools of the computer program BioEdit and UCSC Genome Browser.			
	☐ **lectures**	☐ independent assignments	3.77.	Comments:

<table>
<tr><td>3.76. Format of instruction:</td><td>☐ seminars and workshops
☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td>☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td></td></tr>
<tr><td>3.78. Student responsibilities</td><td colspan="3">Attending lectures, seminar and lab exercises. Preparing for lab from materials on LMS. Preparing, presenting and defending one seminar.</td></tr>
<tr><td rowspan="6">3.79. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0.63</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Activity (other)</td><td>0.35</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>1.12</td><td>Oral exam</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>1.4</td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td colspan="6"></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="5">During the session of the course, student must attend 3 hours of lectures in order to gain 3 minimal points. The maximal number of points gained from this evaluation element is 6 points. During the session of course, student must attend 7 hours of seminars in order to gain 4 minimal points during the semester. The maximal number of points gained from this evaluation element is 6 points. During the session a student must attend 21 hours of practices in order to gain 4 minimal points during the semester. The maximal number of points gained from this evaluation element is 6 points. During the session at the time of seminars and practices the student must solve specified problems from 5 seminar lessons and 30 exercise lessons, and he/she gains the lecturer’s signature for that. Each correctly done and signed seminar or exercise lesson is worth 1 point. At seminars and exercises a student can gain the total of 35 points. During the session a student must gain the total of 20 points in order to earn minimal 5 points. The maximal number of points gained from this evaluation element is 10. During the session, four preliminary exams will be organized at the time of exercises. From this evaluation element it is possible to earn 35 points max. The student must gain 22 points from preliminary exams in order to earn minimal 20 points. The maximal number of points a student can gain from this evaluation element is 32 points. A student who does not gain minimal 22 points from preliminary exams during the session, has a right to a makeup preliminary exam containing teaching material from all programme exercises, which will be organized upon completion of the lessons in that session. The total number of points at the preliminary exam is 35.
A student who passes the makeup preliminary exam with more than 50 % correct answers has right to take the final exam. The minimal conditions for passing at the first, second, third, fourth and fifth evaluation elements will be summed up and they will be worth a total of 36 points. In order to take the final exam a student should gain the stated 36 points. The final exam starts with a student’s short analysis of results gained from the five types of activities of continuous knowledge checking. Questions in the final exam will be put in a way that a student can answer in writing. The maximum number of points that can be gained from the final exam is 60 points. A student must show at least a sufficient knowledge at the final exam regardless of gained number of points from</td></tr>
</table>

<table>
<tr><td></td><td>the first five evaluation elements, which could be higher than 36. The minimal number of points a student must gain at the final exam is 36 in order to gain minimal number of 24 points. In case a student does not satisfy at the final part of the exam, the lecturer determines time for re-examination. Regardless of a fact that a student gained the number of points from the first five evaluation elements on the basis of makeup preliminary exam or not, the same rules are valid for forming the final mark. The final mark is formed on the basis of total sum from all six evaluation elements, according the following table. The final mark is expressed in terms of quantity by a numeric value and by a grade in accordance with points value, from 1 to 5. Student who didn’t succesfully master the course programme is marked by 1. Mark 1 stands for unsufficient achievement.
<table>
<tr><th>Points</th><th>Grade</th></tr>
<tr><td>up to 59</td><td>1 (F)</td></tr>
<tr><td>60-68</td><td>2 (E)</td></tr>
<tr><td>69-76</td><td>2 (D)</td></tr>
<tr><td>77-84</td><td>3 (C)</td></tr>
<tr><td>85-92</td><td>4 (B)</td></tr>
<tr><td>93-100</td><td>5 (A)</td></tr>
</table>
</td></tr>
<tr><td>2.11. Required literature (available in the library and via other media)</td><td>
<table>
<tr><th>Title</th><th>Number of copies in the library</th><th>Availability via other media</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>1.Cooper, G. M., R. E. Hausman (2016): The cell: A molecular Approach, Sinauer Associates, Inc. Publishers Sunderland, Massachusetts U.S.A.
2.Tamarin, R. H.: Principles of genetics. McGraww Hill, Boston, New York, London, 2002.</td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>2.68. Optional literature (at the time of submission of study programme proposal)</td><td>2. Johnson G.B.: The living world. McGraww Hill, Boston, New York, London, 2000.</td></tr>
<tr><td>2.69. Quality assurance methods that ensure the acquisition of exit competences</td><td>Continuous oral and written checking of acquired knowledge</td></tr>
<tr><td>2.70. Other (as the proposer wishes to add)</td><td></td></tr>
</table>

HISTOLOGY WITH GENERAL EMBRYOLOGY

1. GENERAL INFORMATION			
1.39. Course teacher	**Full Prof Snježana Kužir**	1.107. Year of the study programme	II
1.40. Name of the course	**Histology with General Embryology**	1.108. Credits (ECTS)	7
1.23. Associate teachers	**Lucija Bastiančić**, PhD **Nikolina Škvorc,** PhD	1.109. Type of instruction (number of hours L + S + E + e-learning)	30 + 0 + 60
1.24. Study programme (undergraduate, graduate, integrated)	Integrated Undergraduate and Graduate University Study Program of Veterinary Medicine	1.110. Expected enrolment in the course	35
1.25. Status of the course	Obligatory	1.111. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	2

2. COUSE DESCRIPTION	
3.80. Course objectives	The course aims to provide students with fundamental knowledge of histology and embryology as essential disciplines in veterinary medical sciences. It focuses on the microscopic and submicroscopic organization of cells, tissues, and organs in animals, and on the principles of embryonic development. Through this course, students will develop an understanding of the relationship between structure and function of tissues and organ systems, as well as the importance of normal morphology as a basis for recognizing pathological changes. The course also introduces key concepts of developmental processes and their relevance to the occurrence of congenital anomalies. In addition, the course supports the integration of previously acquired knowledge in macroscopic anatomy with microscopic organization, providing a comprehensive understanding of animal body structure.
3.81. Course enrolment requirements and entry competences required for the course	Completion of the courses Anatomy of Domestic Animals I and II and attendance of the course Anatomy of Domestic Animals III are required.
3.82. Learning outcomes at the level of the programme to which the course contributes	This course builds on the knowledge acquired in the anatomy courses. Students will be able to identify, describe, connect, analyze, explain and integrate the macroscopic and microscopic structure of individual organs and systems using microscope or digital platform. It is also the basis for understanding and linking physiology, pathophysiology and pathology. Students will be able to explain the characteristics of individual cells and tissues that will give a further understanding of physiological, pathophysiological and pathological processes, which is a prerequisite for understanding the pathomorphological changes in the pathogenesis of diseases.

3.83. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	By the end of this course the student should be able to: - Interpret the microstructure of tissues and organs of animal origin; - Compare the microstructure of tissues and organs from different animal species; - Recommend a histological technique of choice for depicting the basic microstructure of tissues and organs, as well as specific structures within organs, with an explanation for the choice; - Demonstrate understanding of ethical principles and professional responsibility through a detailed description of the tissue and organ sample collection and processing procedure, in accordance with professional standards; - Apply standard microscopy procedures and use the digital interface for navigating and viewing histological slides; - Analyze and interpret histological slides of animal tissues; - Relate early embryonic development and histogenesis with the structural features of animal tissues and organs.
3.84. Course content broken down in detail by weekly class schedule (syllabus)	1 Cytology (Cell components. Cell nucleus and nucleolus. Cytoplasm. Plasma membrane structure. Endocytosis and exocytosis through plasma membrane. Mitochondria. Ribosomes. Endoplasmic reticulum. Golgi complex. Lysosomes. Peroxisomes. Cytoplasmic skeleton and inclusions. Cell locomotion. Chemotaxis. Movements within cells. Cell death.) 2 Application of Histological methods (Basic principles of histology. Preparation of tissues for microscopic examination. Staining methods, routine staining and elective staining. Basic principles of histochemistry and cytochemistry. Basic parts of the microscope, using microscope and interpretation of images. Artefacts.) 3 General embryology (Early stages of development in mammals and birds. Primordial germ cells. Spermatogenesis. Oogenesis. Fertilization. Cleavage of fertilized cells in domestic animals. Cleavage of fertilized cells in birds. Gastrulation. Differentiation of ectoderm, endoderm and mesoderm. Formation of notochord. Neurulation. Folding off the embryo. Body formation. Malformations.). 4 Epithelial tissues (Basement membranes and basal lamina. Intercellular junctions. Specializations of the cell surface. Epithelium classification. Covering epithelia. Simple epithelium. Stratified epithelium. Transitional epithelium. Pseudostratified epithelium. Glandular epithelia cells feature. Ultra structure of glandular epithelium cells. Ways

	of excretion. Monocellular glands. Multicellular glands. Simple glands. Complex glands. Alveolar glands. Tubular glands. Serous, mucous and mixed glands. Organization of large exocrine glands. Myoepithelial cells.). 5 Connective tissue (Ground substance. Types of collagens. Collagen biosynthesis and degradation. Collagen fibers. Reticular fibers. Elastic fibers. Dense and loose connective tissue. Mesenchymal cells. Fibroblasts and fibrocytes, White fatty cells. Brown fatty cells. Macrophages. Mononuclear phagocyte system. Other free cells of connective tissue) 6. Blood (Red blood cells. Neutrophil granulocytes. Eosinophil granulocytes. Basophile granulocytes. Lymphocytes. Monocytes. Blood platelets. Bone marrow and hematopoiesis). 7 Supportive tissues (Hyaline cartilage. Elastic cartilage. Fibrocartilage. Microscopic structure of a bone. Bone cells. Bone matrix and collagen fibers. Periosteum and endosteum. Types of bone. Histogenesis of bone. Intramembranous ossification. Endochondral ossification. Growth and remodeling of bones. Joints.). 8 Muscle tissue (Smooth muscle features. Ultrastructure of smooth muscle cells. Ultrastructure of skeletal muscle fibers. Muscle fibrils. Sarcoplasmic reticulum. Mechanism of contraction. Organization of skeletal muscle. Cardiac muscle features. Cardiac muscle fibers. Proprioceptor system.). 9 Nerve tissue (Neuron. Neuron classification. Parts of neuron: perikaryon, dendrites, axons. Synapses. Cell neurology. Myelination. Myelinated nerve fibers. Unmyelinated nerve fibers. Spinal and vegetative ganglia. Nerve structure.) 10 Central nervous system (Histogenesis of the central nervous system. Meninges. Cerebrum. Cerebellum. Spinal cord.). 11 Eye and Ear (Photoreceptor system. Eye and accessory structures of the eye. External layer. Middle layer. Internal layer. Lens. Vitreous body. Conjunctiva. Eyelids. Lacrimal organs. Audioreceptor system. External ear. Middle ear. Internal ear. Vestibular organ.). 12 Endocrine system (Diffuse neuroendocrine system. Hypophysis development. Hypophysis structure: adenohypophysis and neurohypophysis. Hypophysis portal system. Epiphysis, Thyroid gland. Synthesis and hormone accumulation caused by activity of follicular cells. Epithelial corpuscles. Adrenal gland development. Adrenal gland structure: cortex and medulla. Islets of Langerhans). 13 Integumentary system. Skin and skin derivate. (Skin structure in domestic animals. Epidermis. Melanocytes. Langerhans' cells. Merkel's cells. Dermis. Subcutaneous tissue. Development of hairs. Hair structure. Skin characteristics based on animal species. Hair follicles. Tactile hairs. Mammary gland structure. Hoof. Claw. Horn. Skin in poultry. Feather. Somatic and visceral receptor system). 14 Digestive system (General structure of the digestive tract.

	Lips. Cheeks. Tongue and tongue papilla. Organ of taste. Hard palate. Soft palate. Teeth development. Brachyodont teeth. Hypsodont. Oropharynx. Esophagus. Glandular stomach. Cardiac gland region. Fundic gland region. Pyloric gland region. Rumen. Reticulum. Omasum. Abomasum. Avian glandular stomach. Small intestines: duodenum, jejunum, ileum. Large intestine: caecum, colon, rectum. Glands attached to digestive tube: liver, pancreas, salivary glands); 15 Respiratory system (Nasal cavity. Olfactory organ. Nasopharynx. Larynx. Trachea. Bronchial tree. Structure of bronchi. Bronchioles. Blood-air barrier. Avian respiratory system); 16. Urinary system (Kidney: developmental stages: pronephros, mesonephros and metanephros. Kidney structure: nephron, renal corpuscle, proximal convoluted tubule, loop of Henle, distal convoluted tubule, collecting ducts and tubes. Juxtaglomerular apparatus. Blood circulation. Urinary passages. Urinary bladder. Avian urinary system.); 17 Male reproductive system (Testis: tubules seminiferous contorti, interstitium, Leydig's cells, tubules recti, rete testis, ductuli efferentes, and ductus epididymidis. Ductus deferens. Prostate gland. Seminal vesicles. Bulbourethral gland. Urethra masculine. Penis. Testis in cock); 18. Female reproductive system (Ovary: primordial follicles, follicles in growth, Graafian follicles. Interstitial endocrine cells. Ovulation. Corpus luteum. Follicular atresia. Oviduct. Uterus. Endometrium in domestic animals. Myometrium. Perimetrium. Estrous cycle. Uterine cervix. Vagina. Implantation. Fetus position. Extra embryonic membranes. Yolk sac. Amnion. Alantois. Chorion. Placentation. Omphaloplanceta. Alantochorial placenta. Placenta deciduata. Placenta nondeciduata. Morphological classification of placentas. 19 Cardiovascular system (Endocardium. Myocardium. Epicardium. Fibrous cardiac skeleton. Heart valves. Differentiation of angioblasts. Lymph vessels structures.) 20 Lymphatic system (Diffuse lymphatic tissue. T and B lymphocytes. Plasma cells. Antibodies. Lymph nodules. Tonsils. Lymph node. Hemal nodes. Spleen. Thymus. Bursa Fabricii); **Lectures:** General embryology (2h); Epithelial tissue (2h); Connective tissue (2h); Cartilage (1h); Bone (1h); Blood (1h); Muscle tissue (1h); Nerve tissue (1h);Central nervous system (1h); Eye and ear (1h); Endocrine system (1h); Integumentary system (2h); Cardiovascular system (1h); Lymphatic system (2h); Digestive system (4h);

<table>
<tr><td></td><td colspan="6">Respiratory system (1h); Urinary system (2h); Male reproductive system (1h); Female reproductive system (2h); Extra embryonic membrane (1h).

Practicals:
Cytology, histological techniques (2h); Epithelial tissues - simple epithelium, transitional epithelium (2h); Epithelial tissues - Pseudo stratified epithelium, stratified epithelium (2h); Epithelial tissues - glandular epithelium (2h); Connective tissue – fibers (2h); Connective tissue – cell (2h); Blood cell (2h); Cartilage (2h); Bone tissue (2h); Muscle tissue (2h); Nerve tissue (2h); REVISION (2h); Central nervous system (2h); Eye (2h); Endocrine system (2h); Integumentary system (2h); Cardiovascular system (2h); Lymphatic system – lymph nodules, lymph node (2h); Lymphatic system – thymus, spleen, bursa fabricii (2h); REVISION (2h); Digestive system I (2h); Digestive system II (2h); Digestive system III (2h); Digestive system IV (2h); Respiratory system (2h); Urinary system (2h); Male reproductive system (2h); Female reproductive system (2h); Extra embryonic membrane (2h); REVISION (2h).</td></tr>
<tr><td>3.85. Format of instruction:</td><td colspan="2">X lectures
☐ seminars and workshops
X practicals
☐ online in entirety
X partial e-learning
☐ field work</td><td colspan="2">X independent assignments
X multimedia and the internet
X laboratory
☐ work with mentor
X other (flipped classroom, team-based learning, virtual laboratory, discussions and debates, personalized learning, microlearning)</td><td colspan="2">3.86. Comments:
The course integrates the Merlin LMS platform for learning materials, information sharing, assignments, and self-assessment activities, supporting blended learning. Students are allowed to use artificial intelligence tools in assignments, with mandatory critical evaluation of generated content.
Due to microscopy-based practical work, group size is limited to 8–12 students.</td></tr>
<tr><td>3.87. Student responsibilities</td><td colspan="6">Presence at lectures (min 15h or 3 points earned). Presence in practical (min. 42h or 8.4 points earned). Activity in training (a minimum of 5 points earned). Passed Examination of two preliminary exams (min. 10 + 10 points earned). Final oral exam (min. 24 points earned).</td></tr>
<tr><td>3.88. Screening student work (name the proportion of</td><td>Class attendance</td><td>1,26</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
</table>

<table>
<tr><td rowspan="4">ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Experimental work</td><td></td><td>Report</td><td></td><td>Activity)</td><td>0,7</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>2,24</td><td>Oral exam</td><td>2,80</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">Attending lectures (3-6 points)
During the “Histology and general embryology” course, students must attend 15 out of 30 hours of lectures in order to gain the 3 minimal points. The maximum number of points from this evaluation element is 6. Attendance at lectures will be recorded by collecting students’ signatures. One hour of a lecture (45 minutes) is equal to 0.2 points.

Attending at practical (8.4-12 points)
During the “Histology and general embryology” course students must attend 42 out of 60 hours of practical in order to gain the 8,4 minimal points. The maximum number of points from this evaluation element is 12. Attendance at practical sessions will be recorded by calling students’ names at the beginning of each session. One hour of practical (45 minutes) is equal to 0.2 points. In practical sessions, formative assessment is conducted through continuous monitoring of students’ work and understanding by checking their drawings, with the aim of encouraging learning and progress.

Participation in practical (5-10 points)
Students are expected to actively participate in practical sessions by asking questions, drawing and labeling microscopic specimens, and engaging in active learning from literature. Each student’s activity during practical will be assessed based on participation in teaching activities (flipped classroom, critical discussions, group discussions with projected scans, case studies – histological techniques, interactive quizzes) and knowledge demonstrated during entry tests/examinations. During the course, each student’s preparation will be assessed (test/oral) at least five times (maximum of 2 points per assessment). The minimum number of points required from this assessment component is 5, and the maximum is 10 points.

Continuous knowledge checking (preliminary exams: first 10-16 points; second 10-16 points)
Two preliminary exams will be organized during the course. Both are worth minimum 10 and maximum 16 points. To take the oral exam students must have minimal 10 points from each. In case she/he does not earn enough points, the student has the right to repeat preliminary exam twice again. In this context it is possible to gain 32 points maximum.</td></tr>
</table>

Final, oral exam (24-40 points)

The oral examination assesses the achievement of all course objectives, including the ability to recognize and interpret histological specimens and to explain related theoretical concepts. As part of the examination, students are required to identify histological slides; failure to correctly recognize a specimen result in the loss of the corresponding points (8 points) and exclusion from further analysis of that specimen. The examination ensures a comprehensive evaluation of both practical skills and theoretical knowledge.

The final grade is formed on the basis of the total sum of all five evaluation elements in the course of which the student must gain the minimal number of points from each element. The final mark is expressed quantitatively, by a numeric point-system value and by a grade adequate to its value in points, from 1 to 5. Students are marked by grade 1 in case they did not master the curriculum successfully; in other words grade 1 means insufficient.

In order to take the final, oral exam a student must attend at least 15 lectures lessons (3 points) and at least 42 practical (8,4 points), show minimal efforts (5 points) and gain the minimal 20 points from the preliminary exams. On that basis the student can gain a total of 36 points. At the final exam the student must have knowledge by which she/he gains 24 points. In the end the minimal number of points gained is 36 + 24 = 60.

Points	*Grade*
do 59	1 (F)
60-68	2 (E)
69-76	2 (D)
77-84	3 (C)
85-92	4 (B)
93-100	5 (A)

In case a student gains the maximum number of points by attending lectures (6), attending practical (12) and for participation (10), also adding the number of points she/he gained at the preliminary exam (32), the student gains the maximum of 60 points. Showing knowledge and describing five histological slides, the student can earn 40 points more, which makes 100 points in the end and is awarded with an excellent grade (5).

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**

	AUGHEY, E., F. L. FRYE (2001): Comparative Veterinary Histology with Clinical Correlates. Manson Publishing/The Veterinary Press, London, UK.		
	BACHA, W. J., L. M. BACHA (2012): Color Atlas of Veterinary Histology. 3rd ed. J. Willey-Blackwell, Chichester, UK	1	
	BANKS, W. J. (1993): Applied Veterinary Histology. Mosby-Year Book, Inc. St. Louis.		
	HYTTEL, P., F. SINOWATZ, M. VEJLSTED (2010): Essentials of Domestic Animal Embryology. Saunders Elsevier, Philadelphia.	0	
	McGEADY, T. A., P. J. QUINN, E. S. FITZPATRICK, M. T. RYAN (2006): Veterinary Embryology. Blackwell Publishing, Dublin.	1	
	SAMUELSON, D. A. (2006): Textbook of Veterinary Histology. Saunders (W. B.) Co Ltd, London, UK	1	
	PP of lectures and practical		Merlin (LMS)
2.71. Optional literature (at the time of submission of study programme proposal)	DELLMAN, H.-D. (1993): Textbook of Veterinary Histology. Lea & Febiger. Philadelphia. KERR, J. B. (2000): Atlas of Functional Histology. Mosby, London, St. Louis, Philadelphia, Sydney, Tokyo. MESCHER, A. (2013): Junqueira's Basic Histology: Text and Atlas. 13th ed. Mc Graw Hill Companies, Inc NODEN, D. M., A. DE LAHUNTA (1985): The Embryology of Domestic Animals. Developmental Mechanisms and Malformations. Williams & Wilkins. Baltimore, Hong Kong, London, Sydney. SADLER, T. W. (2006): Langman's Medical Embryology, Lippincott Williams & Wilkins a Wolters Kluwer business. 10th ed. Philadelphia, Baltimore, New York, London, Buenos Aires, Hong Kong, Sydney, Tokyo. YOUNG, B., J. W. HEATH (2000): Wheater's Functional Histology, A Text and Colour Atlas. Churchil Livingstone, Edinburgh, London, New York, Oxford, Philadelphia, St. Louis, Sydney, Toronto. **DIGITAL TEACHING MATERIALS:** Students are encouraged to use digital teaching materials: Instagram page: vef_hista https://www.instagram.com/vef_hista/ (VEFUNIZG © 2021 by KUŽIR, S., L. BASTIANČIĆ, N. ŠKVORC, M. POLETTO is licensed under CC BY-NC 4.0) Digitized scans of histological slides http://cytomine.vef.hr (Scanned histological slides. University of Zagreb Veterinary Faculty, Zagreb, Croatia. © 2023 by KUŽIR, S., L. BASTIANČIĆ, N. ŠKVORC, M. POLETTO is licensed under CC BY-NC 4.0) Digitized collection of histological images within VEF EXPO (https://expo.vef.hr/kategorija/zavod-za-anatomiju-histologiju-i-embriologiju / HISTOLOGICAL SECTION: ŠKVORC, N., L. DEVČIĆ, S. KUŽIR)		
2.72. Quality assurance methods that ensure the acquisition of exit competences	The acquisition of exit competences is ensured through a combination of formative and summative assessment methods aligned with the intended learning outcomes. Formative assessment includes continuous monitoring of student performance during practical sessions through evaluation of drawings,		

	labeling of histological specimens, and active participation in discussions, case studies, and quizzes, with regular feedback provided. Summative assessment comprises entry tests, written and/or oral examinations, and evaluation of practical knowledge. Student preparation is assessed multiple times during the course. Clear assessment criteria and predefined scoring thresholds ensure transparency and consistency. Course quality is further supported through analysis of student performance and feedback.
2.73. Other (as the proposer wishes to add)	It is necessary to supply required mandatory and additional literature.

HYGIENE AND HOUSING OF ANIMALS

1. GENERAL INFORMATION			
1.41. Course teacher	Full Prof. Mario Ostović	1.112. Year of the study programme	2
1.42. Name of the course	Hygiene and Housing of Animals	1.113. Credits (ECTS)	6.0
1.24. Associate teachers	Full Prof. Kristina Matković Full Prof. Gordana Gregurić Gračner Postdoctoral Assistant Ivana Sabolek	1.114. Type of instruction (number of hours L + S + E + e-learning)	29 + 22 + 44
1.25. Study programme (undergraduate, graduate, integrated)	Integrated	1.115. Expected enrolment in the course	
1.26. Status of the course	Obligatory	1.116. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
3.89. Course objectives	Students will acquire knowledge and skills qualifying them to ensure appropriate animal accommodation and housing conditions in order to prevent the influence of unfavourable conditions of stable environment on animal health, productivity, reproduction and welfare. In addition, students will acquire knowledge about the methods of animal waste disposal in order to prevent environmental contamination, and the role of veterinarians in the transportation and care of animals in order to avoid stress and disorders in their health due to inappropriate transfer from one setting to another or poor hygiene of animals. Students will gain knowledge about herd health in the context of farm animal housing hygiene and welfare. Biosecurity and sanitation play a crucial role in preventive veterinary medicine; therefore, the course will provide students with due knowledge and skills in the methods, types and effects of disinfection on preserving animal health, as well as in the control of pest insects and rodents in the environment in order to prevent the spread of diseases to animals and humans. The objective of the course is to develop competences qualifying students for maintaining biological balance between the environment and the animal while exhibiting appropriate health status through optimal productivity, reproduction and welfare.		
3.90. Course enrolment requirements and entry competences required for the course	Completed course “Environment, Animal Behaviour and Welfare“.		

3.91. Learning outcomes at the level of the programme to which the course contributes	
3.92. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After successfully mastering the course, students will be able to: - review the impact of the accommodation and housing conditions of certain species and categories of animals on their health, production and reproductive performance - argue the role of veterinarians in the transportation and care of animals in order to avoid stress and disorders in their health due to improper transfer from one environment to another or poor hygiene of animals - differentiate ways of animal waste disposal in order to prevent environmental pollution - independently measure microclimate conditions in certain animal facilities - propose appropriate biosecurity measures, including disinfection, disinsection and deratization, in order to preserve the animal and human health status - independently assess animal welfare on the basis of the production conditions.
3.93. Course content broken down in detail by weekly class schedule (syllabus)	1. Environment and animal health (Environmental factors – biotic and abiotic; Thermocomfort and thermoneutral zone); 2. Construction and equipping of stables (Stable types; Choice of site; Construction elements of stable; Thermal and hydroisolation of housing; Stable equipping); 3. Microclimate and microclimate elements (Temperature, humidity, airflow velocity, dust and airborne microorganisms; Noise and its sources; Lighting; Stable air gas composition; Determination of stable microclimate conditions); 4. Heat balance in stables (Definition; Temperature-humidity complex; Heat balance in stables for particular animal species); 5. Hygiene of cattle housing and accommodation (Bioecologic cattle characteristics in the context of their housing and accommodation; Systems of keeping particular cattle categories; Microclimate factors in cattle stables); 6. Hygiene of sheep housing and accommodation (Sheep stable; Microclimate factors in sheep stable; Sheep stable equipment; Auxiliary structures in modern sheep farm system); 7. Hygiene of goat housing and accommodation (Goat stable; Microclimate factors in goat stable; Goat stable interior; Auxiliary structures in modern goat farm system); 8. Hygiene of pig housing and accommodation (Keeping of gilts, non-pregnant, pregnant and lactating sows; Keeping of weaned piglets; Keeping of fattening pigs; Keeping of boars; Microclimate complex in pig housing); 9. Hygiene of horse housing and accommodation (Types of horse stables; Keeping of particular horse categories; Microclimate specificities of horse stables); 10. Hygiene of poultry housing and accommodation (Bioecologic characteristics of poultry, and types of accommodation and housing of particular species and age categories – chicken, turkey, duck, goose, pheasant, quail, etc.; Species specific egg incubation); 11. Hygiene of pet housing and accommodation (Accommodation and housing of dogs and cats; Hygiene of housing other pet species – rabbits, small rodents, cage birds, aquarium fish, terrapin, etc.); 12. Hygiene of laboratory animal housing and accommodation (Bioecologic characteristics of most common laboratory animals; Basic principles of housing technology; cage, equipment, hygiene and care of laboratory animals); 13. Heard health in the context of housing hygiene and animal welfare; 14. Animal faecal matter (Solid and liquid manure; Processing, hygienization; Composting; Biogas – distribution and environmental effects); 15. Animal waste disposal (Procedures for carcasses

	and confiscated waste: utilization facilities, disposal pits, trench burial, incineration plants); 16. Animal transportation (Specificities of animal transportation by particular transportation facilities in national and international transport; Losses and damages during transportation); 17. Biosecurity (Specificities of performing biosecurity measures at farms); 18. Disinfection in veterinary practice (Types and methods of disinfection; Action and chemical composition of disinfectants; Applied disinfection – drinking water, wastewater, housing facilities, hands, plants for food manufacture and processing, transport facilities; Disinfection in the prevention and control of zoonoses); 19. Control of pest insects in veterinary practice and livestock production (Bioecologic characteristics of pest insects in livestock production and public health; Control methods; Insecticides); 20. Control of pest rodents in veterinary practice and livestock production (Bioecologic characteristics of pest rodents; Their role in veterinary practice and public health; Control methods; Rodenticides); 21. Sanitary measures that are carried out for the purpose of animal health and environmental protection.

3.94. Format of instruction:	■ lectures ■ seminars and workshops ■ exercises ☐ on line in entirety ☐ partial e-learning ■ field work	☐ independent assignments ■ multimedia and the internet ■ laboratory ☐ work with mentor ☐ (other)	3.95. Comments:
3.96. Student responsibilities	Student requirements are defined in the Regulations on the University Integrated Undergraduate and Graduate Study of Veterinary Medicine (2024). Given the above, the student must acquire a minimum number of points from all assessment elements in order to take the final exam: a student can justifiably be absent from up to 50% of the lectures, 30% of the seminars and 30% of the exercises.		

3.97. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
Class attendance	1.08	Research		Practical training		
Experimental work		Report		Activities	0.6	
Essay		Seminar essay		(other)		
Tests	1.92	Oral exam		(other)		
Written exam	2.4	Project		(other)		

2.10. Grading and evaluating student work in class and at the final exam	Activities	Minimum points number	Maximum points number
	Presence at lectures 29 hours 16 (III semester) + 13 (IV semester)	**3** 2 points (III semester) 2/0.25 = 8 hours (student must be on **minimum 8 hours of lectures**) +	**6** 4 points (III semester) 4/16 = 0.25 (coefficient for presence on 1 hour of lectures) +

			1 point (IV semester) 1/0.15 = 7 hours (student must be on **minimum 7 hours of lectures**)	2 points (IV semester) 2/13 = 0.15 (coefficient for presence on 1 hour of lectures)
		Presence at seminars 22 hours: (IV semester) 30% absences = 6 hours	Student must be on **minimum 16 hours of seminars to gain 4 min points**	
		Presence at exercises 44 hours: 24 (III semester) + 20 (IV semester) III semester 30% absences = 8 hours IV semester 30% absences = 6 hours	**4** 2 points (III semester) Student must be on **minimum 16 hours of exercises to gain 2 min points** + 2 points (IV semester) Student must be on **minimum 14 hours of exercises to gain 2 min points**	**6** 3 points (III semester) 3 points (IV semester)
		Activity in seminars and exercises 10 points[1]: 2 (III semester) + 8 (IV semester)	**5** 1 point (III semester) 1/1 = 1 + 4 points (IV semester) 4/1 = 4	**10** 2 points (III semester) 2/2 =1 + 8 points (IV semester) 8/8 = 1
		Continuous knowledge assessment 32 points[2]: 16 (III semester) +	**20** 10 points (III semester) 10/1 = 10 +	**32** 16 points (III semester) 16/16 = 1 +

16 (IV semester)	10 points (IV semester) 10/1 = 10	16 points (IV semester) 16/16 = 1
Final exam (40 points[3])	**24** 24/1 = 24 (coefficient 1) (minimaly student must collect 24 points to achive 24 minimum points)	**40** 40/40 = 1 (coefficient 1)
Total	**60**	**100**

[1] – assessment of activity during exercises (III semester, 2 points) – two positive answers during exercises (each answer one point) and creating a seminar paper during semester (IV semester – 2 points, if in power point additional 2 points); preparation of reports from field exercises (IV semester) 4 points, in total 10 points

[2] – 32 points (4 written tests (in each semester two) × 8 questions = 32 questions; each question 1 point, for passage minimum 5 points per test)

[3] – 40 max points (written exam - 8 questions/2 points for "sufficient" response on the question, 3 points for "good" response on the question, 4 points for "very good" response on the question, 5 points for "excellent" response on the question).

2.11. Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
ALAND, A., T. BANHAZI (2013): Livestock Housing. Wageningen Academic Publishers, NL.	1	
BUCKLE, A. P., R. H. SMITH (1994): Rodent Pests and Their Control. CABI Publishing, London, UK.		online
DEEMING, D. C. (1999): The Ostrich: Biology, Production and Health. CABI Publishing, London, UK.		online
DEWI, I. A., R. F. E. AXFORD, I. F. M. MARAI, H. OMED (1994): Pollution in Livestock Production Systems. CABI Publishing, London, UK.	1	
GRANDIN, T. (2000): Livestock Handling and Transport. 2nd edition. CABI Publishing, London, UK.		online
HARRISON, R. M. (1995): Pollution: Causes, Effects and Control. 2nd edition. The Royal Society of Chemistry, Cambridge, UK.		online
McNAMARA, J. P., D. E. BEEVER (2000): Modeling Nutritient Utilization in Farm Animals. CABI Publishing, London, UK.		online

	METHLING, V., J. UNSHELM (Hrsg.) (2002): Umwelt- und tier- gerechte Haltung von Nutz-, Heim- und Begleitteren. Parey Buchverlag, Berlin, Deutschland.	1	
	STRAUCH, D., R. BÖHM (Hrsg.) (2002): Reinigung und Desinfektion in der Nutztierhaltung und Veredelungswirtschaft. Enke Verlag, Stuttgart, Deutschland.		online
	WATHES, C. M., D. R. CHARLES (1994): Livestock Housing. CABI Publishing, London, UK.	1	
	WEBSTER, J. (Ed.) (2011): Management and Welfare of Farm Animals. The UFAW Farm Handbook. 5th edition. Wiley-Blackwell, UK.	1	online
2.74. Optional literature (at the time of submission of study programme proposal)			
2.75. Quality assurance methods that ensure the acquisition of exit competences	Student questionnaire		
2.76. Other (as the proposer wishes to add)			

INTRODUCTION TO ENGLISH VETERINARY MEDICAL TERMINOLOGY II

1. GENERAL INFORMATION			
1.43. Course teacher	Dubravka Vilke-Pinter, Ph.D.	1.117. Year of the study programme	2
1.44. Name of the course	Introduction to English Veterinary Medical Terminology II	1.118. Credits (ECTS)	1
1.25. Associate teachers		1.119. Type of instruction (number of hours L + S + E + e-learning)	10 hours S + 5 hours E (of which 2 hours e-learning)
1.26. Study programme (undergraduate, graduate, integrated)	University Integrated Undergraduate and Graduate Study Programme Veterinary Medicine	1.120. Expected enrolment in the course	25
1.27. Status of the course	obligatory	1.121. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
3.98. Course objectives	The aim of this course is to expand students' knowledge of the specifics of the language register pertaining to the field of veterinary medicine, primarily of technical terminology that is widely present in the professional literature from the field. The course also aims to develop students' understanding of structural patterns and linguistic means used to achieve textual cohesion in scientific literature. Besides providing training in reading scientific and professional literature the course also aims to develop general written and oral language skills.		
3.99. Course enrolment requirements and entry competences required for the course			
3.100. Learning outcomes at the level of the			

programme to which the course contributes	The course aims to develop students' skills to use technical vocabulary specific to the field of veterinary medicine as well academic ***reading*** skills in order to enhance students abilities to use relevant literature during their academic studies, and beyond, in the course of their future professional careers. The course also focuses on developing students' overall written and oral competence in English to enable them to communicate efficiently in a professional setting.
3.101. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Having successfully completed the course student will/wil be able to: • effectively recognise a number of technical and scientific terms used in various fields of veterinary medicine • independently use a number of scientific terms in a given context • understand structure of scientific text • recognise various types of cohesive devices used to express relations between text elements • actively use some cohesive devices in a text to achieve text cohesion • increase scope of general verbal understanding • improve overall language and communication skills neded to communicate efficiently in a professional setting
3.102. Course content broken down in detail by weekly class schedule (syllabus)	Analysis of the characteristics of scientific and technical texts. Use of professional (subject-specific) terminology. Use of cohesive devices that create coherence in technical and academic texts Topic: Organs and organ systems. Describing physical structure and function. Topics: Skeletal system. Basic terms in genetics. Classifications. Topics: Species diversity; Taxonomic classifications. Graphical presentation of data. Topic: Ecology and endangered species. Description of processes and of sequences of events. Topics: Developmental cycles in some animal species Digestive system of ruminants. Cause-and effect relations. Topic: Etiology and pathogenesis of diseases. Contrasting and comparing. Topic: Cattle breeds.

3.103. Format of instruction:	☐ lectures ☐ seminars and workshops ☒ exercises ☐ on line in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other) language tutorials	3.104. Comments:

3.105. Student responsibilities						
3.106. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	18 %	Research		Practical training	
	Experimental work		Report		Class participation	10%
	Essay		Seminar essay		(other)	
	Tests	32	Oral exam		(other)	
	Written exam	40 %	Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam

	Assessment elements		
Overall grade elements	5. class attendance 6. class participation 7. continual assessment 8. final exam		
Class attendance	15 hourly classes	Minimum number of points	Maximum number of points

			11 Students are required to attend at least 7 out of 10 S hours and 3 out of 5 E hours to receive of the minimum number of points	18	
	Class participation		Minimum number of points	Maximum number of points	
			5 coefficient 10/15 = 0,67 Students must earn at least 5 out of 10 points through in-class assignments	10	
	Continual assessment		Minimum number of points	Maximum number of points	
			20 Students are required to take a midterm test. The minimum passing score is 20 points.	32	
	Final exam		Minimum number of points	Maximum number of points	

			24 Minimum passing score on the final test is 24 points	40
	Final grade	Overall course grade is based on student's performance in the four assessed elements. Students are entitled to take final exam in case they have earned minimum number of points for each evaluated element		

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and via other media)	Vilke-Pinter, D. (2024): Course materials: Introduction to English veterinary medical terminology II. Veterinary faculty, University of Zagreb. Zagreb.	3	

2.77. Optional literature (at the time of submission of study programme proposal)

- Cochran P. (1991): Student's guide to Veterinary Medical Terminology. Mosby, St. Louis, Missouri.
- Cox, K., D.Hill (2007): Preliminary English for Academic Purposes. Longman, London, United Kingdom.
- McBride, D.E. (2002): Learning Veterinary Terminology. Mosby, St. Louis, Missouri.
- McCarthy, M., F. O'Dell (2008): Academic Vocabulary in Use. Vocabulary Reference and Practice. Self-study and Classroom Use. CUP, Cambridge.
- McCormack, J. (2005): English for Academic Study. Garnet Publishing Ltd. Garnet Education. Reading,United Kingdom.
- Porter. D & C Black (2007): Check your Vocabulary for Academic English. A & C Black Publishers Ltd., London, United Kingdom.

2.78. Quality assurance methods that ensure the acquisition of exit competences	Continual asssesment during classes: written and oral asignements,in-class writing activities, homework
2.79. Other (as the proposer wishes to add)	

PHYSICAL EDUCATION III

1. GENERAL INFORMATION			
1.45. Course teacher	Saša Čuić, B.A. – Senior Lecturer	1.122. Year of the study programme	First year
1.46. Name of the course	PHYSICAL EDUCATION III	1.123. Credits (ECTS)	1
1.26. Associate teachers		1.124. Type of instruction (number of hours L + S + E + e-learning)	30 hours per semester of practical work
1.27. Study programme (undergraduate, graduate, integrated)	Integrated	1.125. Expected enrolment in the course	150
1.28. Status of the course	compulsory	1.126. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
3.107. Course objectives	Aims of PHYSICAL EDUCATION AND COLLEGIATE SPORT: (1) learning new conventional motor knowledge, (2) improve basics theoretical and practical kinesiology knowledge, (3) fortifity interest, antropologicalcharacteristics and motor informations, (4) prevent earlier tumble characteristics, abilities and motor knowledge, couse for want of physical exercises, (5) promote sports culture and (6) promote social comunications. Knowledge of structures, rules, training process, specific select kinesiology activities: athletics, swimming, basketball, football, volleyball, handball, yoga, badminton, skating, skiing, fencing, horseriding.
3.108. Course enrolment requirements and entry competences required for the course	Full-time inscription semester.
3.109. Learning outcomes at the level of the programme to which the course contributes	Possibility changes morphological characteristics, motor and functional abilities; training students for independent physical exercises; laws of medical culture; qualitiy nutrition.
3.110. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	-learning new conventional motor knowledge, -improve basics theoretical and practical kinesiology knowledge, -fortifity interest, antropologicalcharacteristics and motor informations -promote sports culture

<table>
<tr><td>3.111. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Swimming, basketball, football, volleyball, handball, yoga, badminton, skating, horseriding.</td></tr>
<tr><td>3.112. Format of instruction:</td><td colspan="2">☐ lectures
☐ seminars and workshops
xx ☐exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>3.113. Comments:</td></tr>
<tr><td>3.114. Student responsibilities</td><td colspan="5">Compulsory full-time appearance and active participate. Possibility of writing seminar work of interest area (kinesiology science) students, in case incomblete work of compulsory programme. Possibility participate at University Championships in 23 male and female sports, cross competition and visiting sport events.</td></tr>
<tr><td rowspan="5">3.115. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>xx</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="5">Initially knowledge students check over interest for some programme, there is no examination, by questionnaire students pursue quality of work course instructors. Accomplishment min. 80% of whole education in semester, students acquire right for signature of professor.</td></tr>
<tr><td rowspan="2">2.11. Required literature (available in the library and via other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="3">Literature is not obliged.
Recommendation:
Heimer, S. (2003). Promotion medical-preventive physical activity in Croatia. Sport for all, 21 (35), 3-4.
Mišigoj-Duraković, M.,Z. Duraković, S. Xiukun, L. Petrinović (2003). Physical exercise in prevent of chronicle aninfection diseases. Sport for all. 21 (33-34), 25-28.
Bartoluci, M., D. Omrčen (2003). Promotion as an element of marketing mix in sport and sport tourism: The Croatian Experience. Kinesiology, 35(1), 72-84.</td><td></td><td></td></tr>
</table>

2.80. Optional literature (at the time of submission of study programme proposal)	Depending on interest area of students: e.g. VOLLEYBALL: Janković, V., N. Marelić (2003).Volleyball for all. Zagreb, authors edition. Officially regulations of volleyball (2004). Croatian volleyball Union, Zagreb. Marelić, N., V. Janković (1996). Vooleyball technics. Zadar, Cesar press. e.g. SWIMMING: Volčanšek, B. (1996). Sportive swimming (Manual). Faculty of Kinesiology, Zagreb. Fina-regulations of swimming (2002). Assembly judges Croatian swimming Union, Zagreb. Volčanšek, B. (2002). Essence of swimming Manual). Faculty of kinesiology, Zagreb. Szabo, I. (2002). Method exercises for development of swimming technics (Master's thesis). Faculty of kinesiology, Zagreb.		
2.81. Quality assurance methods that ensure the acquisition of exit competences	Verification knowledge and skills and participate on education pursues at pedagogic work with students, evidence active sports and medical status pursues at consultations with students, evidence and valuing results on University Championships in 23 male and female sports pursues at consultation with students and on the sport arenas, where competition are preserve.		
2.82. Other (as the proposer wishes to add)			

PHYSICAL EDUCATION IV

1. GENERAL INFORMATION			
1.47. Course teacher	Saša Čuić, B.A. – Senior Lecturer	1.127. Year of the study programme	Second year
1.48. Name of the course	PHYSICAL EDUCATION IV	1.128. Credits (ECTS)	1
1.27. Associate teachers		1.129. Type of instruction (number of hours L + S + E + e-learning)	30 hours per semester of practical work
1.28. Study programme (undergraduate, graduate, integrated)	Integrated	1.130. Expected enrolment in the course	150
1.29. Status of the course	compulsory	1.131. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
3.116. Course objectives	Aims of PHYSICAL EDUCATION AND COLLEGIATE SPORT: (1) learning new conventional motor knowledge, (2) improve basics theoretical and practical kinesiology knowledge, (3) fortifity interest, antropologicalcharacteristics and motor informations, (4) prevent earlier tumble characteristics, abilities and motor knowledge, couse for want of physical exercises, (5) promote sports culture and (6) promote social comunications. Knowledge of structures, rules, training process, specific select kinesiology activities: athletics, swimming, basketball, football, volleyball, handball, yoga, badminton, skating, skiing, fencing, horseriding.		
3.117. Course enrolment requirements and entry competences required for the course	Full-time inscription semester.		
3.118. Learning outcomes at the level of the programme to which the course contributes	Possibility changes morphological characteristics, motor and functional abilities; training students for independent physical exercises; laws of medical culture; qualitiy nutrition.		
3.119. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	-learning new conventional motor knowledge, -improve basics theoretical and practical kinesiology knowledge, -fortifity interest, antropologicalcharacteristics and motor informations -promote sports culture		

<table>
<tr><td>3.120. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Swimming, basketball, football, volleyball, handball, yoga, badminton, skating, horseriding.</td></tr>
<tr><td>3.121. Format of instruction:</td><td colspan="2">☐ lectures
☐ seminars and workshops
xx ☐exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>3.122. Comments:</td></tr>
<tr><td>3.123. Student responsibilities</td><td colspan="5">Compulsory full-time appearance and active participate. Possibility of writing seminar work of interest area (kinesiology science) students, in case incomblete work of compulsory programme. Possibility participate at University Championships in 23 male and female sports, cross competition and visiting sport events.</td></tr>
<tr><td rowspan="6">3.124. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>xx</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="5">Initially knowledge students check over interest for some programme, there is no examination, by questionnaire students pursue quality of work course instructors. Accomplishment min. 80% of whole education in semester, students acquire right for signature of professor.</td></tr>
<tr><td rowspan="2">2.11. Required literature (available in the library and via other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="3">Literature is not obliged.
Recommendation:
Heimer, S. (2003). Promotion medical-preventive physical activity in Croatia. Sport for all, 21 (35), 3-4.
Mišigoj-Duraković, M.,Z. Duraković, S. Xiukun, L. Petrinović (2003). Physical exercise in prevent of chronicle aninfection diseases. Sport for all. 21 (33-34), 25-28.
Bartoluci, M., D. Omrčen (2003). Promotion as an element of marketing mix in sport and sport tourism: The Croatian Experience. Kinesiology, 35(1), 72-84.</td><td></td><td></td></tr>
</table>

2.83. Optional literature (at the time of submission of study programme proposal)	Depending on interest area of students: e.g. VOLLEYBALL: Janković, V., N. Marelić (2003).Volleyball for all. Zagreb, authors edition. Officially regulations of volleyball (2004). Croatian volleyball Union, Zagreb. Marelić, N., V. Janković (1996). Vooleyball technics. Zadar, Cesar press. e.g. SWIMMING: Volčanšek, B. (1996). Sportive swimming (Manual). Faculty of Kinesiology, Zagreb. Fina-regulations of swimming (2002). Assembly judges Croatian swimming Union, Zagreb. Volčanšek, B. (2002). Essence of swimming Manual). Faculty of kinesiology, Zagreb. Szabo, I. (2002). Method exercises for development of swimming technics (Master's thesis). Faculty of kinesiology, Zagreb.		
2.84. Quality assurance methods that ensure the acquisition of exit competences	Verification knowledge and skills and participate on education pursues at pedagogic work with students, evidence active sports and medical status pursues at consultations with students, evidence and valuing results on University Championships in 23 male and female sports pursues at consultation with students and on the sport arenas, where competition are preserve.		
2.85. Other (as the proposer wishes to add)			

PHYSIOLOGY OF DOMESTIC ANIMALS I

1. GENERAL INFORMATION			
1.49. Course teacher	**Jasna Aladrović, PhD, full professor;** Lana Pađen, PhD, associate professor- deputy	1.132. Year of the study programme	II.
1.50. Name of the course	**Physiology of domestic animals I**	1.133. Credits (ECTS)	6
1.28. Associate teachers	Jasna Aladrović, PhD, full professor; Ana Shek Vugrovečki, PhD, associate professor; Ivona Žura Žaja, PhD, associate professor; Dražen Đuričić, PhD, assistant professor; Jadranka Pejaković Hlede, PhD, assistant professor; Stefani Fruk Šimunec, DVM	1.134. Type of instruction (number of hours L + S + E + e-learning)	30+0+50
1.29. Study programme (undergraduate, graduate, integrated)	University Integrated undergraduate and graduate study of veterinary medicine	1.135. Expected enrolment in the course	
1.30. Status of the course	Compulsory	1.136. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	.....
2. COUSE DESCRIPTION			
3.125. Course objectives	Course of Physiology of domestic animals I qualifies students for progressive development of knowledge and understanding of basic principles and facts of physiological processes from cell to the total body, understanding and correlating of regulatory mechanisms, understanding of homeostasis keeping, acid-base balance, development of knowledge and skills related to body liquids in special regard of blood physiology, understanding of physiological function of muscle/nervous system, physiological function of hormones in context of the whole homeostatic system. The goal is to provide the progressive development of skills in collecting, preparing, and interpreting the results of the different sample analysis, to provide modern trends in veterinary physiology so that students will achieve a working knowledge of physiology; development of abilities for interpretation, and conclusion about information; the abilities of searching for information in the literature.		

3.126. Course enrolment requirements and entry competences required for the course	**Enrolment requirements:** passed exam in Medical Chemistry **Entry competences:** - acquired knowledge and skills in: a) Physics and Biophysics, b) Biochemistry for Veterinary Medicine c) Domestic animals' anatomy with organogenesis II
3.127. Learning outcomes at the level of the programme to which the course contributes	1. apply, analyse and interpret the knowledge of the sciences on which veterinary medicine is based in order to make evidence-based decisions 2. independently use appropriate laboratory equipment and conducts critical analysis of laboratory test results, with an understanding of applied techniques and diagnostic procedures in veterinary medicine
3.128. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After successfully mastering the course students will be able to: 1. explain the physiological functions of blood, muscle, nerve and endocrine cells 2. to argue the importance of the functions of the blood, nervous, muscular and endocrine systems 3. integrate regulatory mechanisms, maintenance of homeostasis and acid-base balance 4. prepare plasma and serum for analysis and analyze animal blood 5. judge the results of hematological examinations of domestic animals 6. measure the physiological parameters of the electrical activity of the cells, and be able to interpret the obtained results
6.1. Course content broken down in detail by weekly class schedule (syllabus)	1. Introduction (Introduction to physiology of living creatures, importance in veterinary medicine, necessary knowledge). 2. Body fluids (Body fluids dynamics, osmotic pressure, intracellular and extra cellular fluid). 3. Homeostasis, acid-base balance (Internal environment – confined system, ways of keeping homeostasis, mechanisms for acid-base balance keeping): 4. Cell Physiology (Transport across cell membranes, epithelial transport, plasma-membrane receptors, membrane potentials, action potentials. 5. Blood Physiology (Blood functions, plasma; composition and role, haematopoiesis, regulation of haematopoiesis, nutritive and maturation factors of haematopoiesis. Erythrocytes, leukocytes, physiological haemolysis, platelets, blood coagulation. Blood groups). 6. Nervous Physiology (Nervous system organisation, neuron, nerve impulse formation, impulse travels, synapse, neurotransmitters, receptors and receptor potential. Peripheral nervous system, CNS, autonomic nervous system). 7. Muscle Physiology (Physiological features of skeletal and smooth muscle, mechanisms of muscle contraction and energy requirements. Motor units, muscle twitch, muscle tone, tetanus). 8. Endocrinology (Neuroendocrine system, autonomic nervous system-endocrine glands binding. Cortex-limbic system-hypothalamus-hypophysis. Hormone receptors, hormone interaction. Mechanisms of hormone action. Thyroid hormones, pancreatic hormones, adrenal hormones (cortex, medulla), parathyroid hormones, sex hormones, tissue hormones.

<table>
<tr><td>6.2. Format of instruction:</td><td colspan="2">x lectures
☐ seminars and workshops
x exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>6.3. Comments:</td></tr>
<tr><td>6.4. Student responsibilities</td><td colspan="5">Lectures: 1) Introduction, body fluids - 1 hours, 2) homeostasis, acid-base balance - 2 hours, 3) cells physiology - 2 hours, 4) blood physiology- 6 hours, 5) nervous system physiology - 5 hours 6) muscular system physiology - 4 hours 7) endocrinology - 10 hours
Lab exercises: 1) general physiology - 4 hours, 2) body fluids - 4 hours; 3) blood physiology - 22 hours; 5) nervous system - 8 hours; 6) muscular system - 4 hours 7) endocrinology - 8 hours</td></tr>
<tr><td rowspan="5">6.5. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0.5</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Activity</td><td>1</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>1</td><td>Oral exam</td><td>3.5</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="5">1. lectures attending: During semester a student must attend 15 lecture lessons to gain minimal 3 points. The maximum number of points from this evaluation element is 6.

2. lab exercises attending: During semester a student must attend 36 exercise lessons to gain minimal 8 points. The maximum number of points from this evaluation element is 12. When the student upon the completion of teaching in the first try makes up for nonattendance of an exercise (excused and approved), points are added to the ones gained. If the student makes up for the unattended lessons in further tries the points do not count.

3. activity during lab exercises: During the practical part of the lesson (exercises), which is 50 hours of teaching, the student must successfully complete scheduled. During the exercise the student can achieve a total of 4.2 (4) points. During the course, the student's activity is evaluated during the exercises. For six positive (oral or written) answers, the student earns an additional 6 points. During the practical part of the course, the student must achieve a minimum of 5 points and can achieve the maximum of 10 points.

4. continuous assessment: During the course of the Physiology of Domestic Animals I two assessments of knowledge (colloquia) will be organized. The first colloquium includes basic physiology and physiology of the blood, and the second examination involves the physiology of the muscular and nervous system. At each colloquium, the student must achieve at least 10 points to achieve the required 20 points. The maximum number of points scored from this grading element is 32 points.</td></tr>
</table>

<table>
<tr><td></td><td colspan="3">A student who does not achieve the necessary points during the course instruction is entitled to three times access to a correctional colloquium that will be organized in certain terms.

5. final exam: The final exam starts with a student’s short analysis of results gained from the first four evaluation elements. At the final exam the student answers the questions in oral form. The final exam comprises the material from endocrinology, and it estimates the capability of a student to connect physiological processes. The maximum number of points gained at the final exam is 40 points. Regardless of the number of points gained from the first four evaluation elements, the student must show minimal knowledge at the final exam to earn minimal 24 points. In case the student is not satisfied with the final part of the exam, the lecturer determines
time for re-examination.</td></tr>
<tr><td rowspan="4">2.11. Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>SJAASTAD, Ø. V., SAND, O., HOVE, K. (2010): Physiology of Domestic Animals. 12. izd., Scandinavian Veterinary Press.</td><td>1</td><td></td></tr>
<tr><td>REECE, W. O. (2004): Dukes’ Physiology of Domestic Animals. 12. izd., Cornell University Press, Ithaca and London.</td><td>1</td><td></td></tr>
<tr><td>CUNNINGHAM, J. G. (2002): Textbook of Veterinary Physiology. 3. izd., W. B. Saunders Company.</td><td>1</td><td></td></tr>
<tr><td>2.86. Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">1. FELDMAN, B. F., ZINKL, J. G., JAIN, N. C. (2000): Schalm’s Veterinary Hematology. 5. izd., Lippincott Williams & Wilkins.
2. KANEKO, J. J., HARVEY, J. W., BRUSS, M. L. (1987): Clinical Biochemistry of Domestic Animals. Academic Press, San Diego, Boston, New York, Sydney, Tokyo.
3. PAYNE, J. M., PAYNE, S. (1987): The Metabolic Profile Test. Oxford University Press, Oxford, New York, Tokyo.
4. SCHMIDT-NIELSEN, K. (1997): Animal Physiology: Adaptation and Environment. Cambridge University Press.
5. STURKIE, P. D. (2000): Avian Physiology. Springer Verlag, New York, Berlin, Heidelberg, Tokyo.</td></tr>
<tr><td>2.13 Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">Students' work quality monitoring during the semester, which provides acquisition of exit competencies, is carried out through continuous assessment and skills during the execution of all forms of teaching. Thus, acquired knowledge and skills are validated on exercises and tests and especially through the final written exam</td></tr>
<tr><td>2.14 Other (as the proposer wishes to add)</td><td colspan="3">/</td></tr>
</table>

PHYSIOLOGY OF DOMESTIC ANIMALS II

1. GENERAL INFORMATION			
1.51. Course teacher	Ivona Žura Žaja, PhD, associate professor; Ana Shek Vugrovečki, PhD, associate professor- deputy	1.137. Year of the study programme	II.
1.52. ame of the course	**Physiology of domestic animals II**	1.138. Credits (ECTS)	10
1.29. ssociate teachers	Jasna Aladrović, PhD, full professor; Lana Pađen, PhD, associate professor; Ana Shek Vugrovečki, PhD, associate professor; Ivona Žura Žaja, PhD, Dražen Đuričić, PhD, assistant professor; Jadranka Pejaković Hlede, PhD, assistant professor; Stefani Fruk Šimunec, DVM	1.139. Type of instruction (number of hours L + S + E + e-learning)	45+25+60
1.30. tudy programme (undergraduate, graduate, integrated)	University Integrated undergraduate and graduate study of veterinary medicine	1.140. Expected enrolment in the course	
1.31. tatus of the course	Compulsory	1.141. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	.....
2. COUSE DESCRIPTION			
3.129. ourse objectives	Course **Physiology of domestic animals II** qualifies students for progressive development of knowledge and understanding of basic principles and facts of physiological processes from cell to the total body, understanding and correlating of regulatory mechanisms, understanding of homeostasis keeping, acid-base balance, development of knowledge and skills related to body liquids in special regard of blood physiology, understanding of physiological function of muscle/nervous system, physiological function of hormones in context of the whole homeostatic system. The goal is to provide the progressive development of skills in collecting, preparing, and interpreting the results of different samples analysis, to provide modern trends in veterinary physiology so that students will achieve a working knowledge of physiology; development of abilities for interpretation, and conclusion about information; abilities of searching for information in literature.		
3.130. ourse enrolment	**Enrolment requirements:** completed course **Physiology of domestic animals I** **Entry competences:** - acquired knowledge and skills in **Physiology of domestic animals I**		

requirements and entry competences required for the course	
3.131. earning outcomes at the level of the programme to which the course contributes	1. apply, analyze and interpret the knowledge of the sciences on which veterinary medicine is based in order to make evidence-based decisions 2. independently use appropriate laboratory equipment and conducts critical analyzes of laboratory test results, with an understanding of applied techniques and diagnostic procedures in veterinary medicine
3.132. earning outcomes expected at the level of the course (4 to 10 learning outcomes)	After successfully mastering the course students will be able to: 1. explain the physiological functions of individual organs and organ systems of monogastric animals and ruminants, excretion, metabolism of nutrients, minerals and vitamins, physiological processes of egg laying, lactation and thermoregulation. 2. relate the regulatory mechanisms of individual body systems. 3. integrate the functions of different body systems during different physiological states. 4. measure certain physiological parameters in virtual and real environments, and know how to interpret the obtained results. 5. apply modern laboratory diagnostic methods and devices (hematological and biochemical analyzer, spirometer, electrocardiograph). 6. analyze the results of laboratory tests.
3.133. ourse content broken down in detail by weekly class schedule (syllabus)	1. Cardiovascular system (Physiological features of cardiovascular system in domestic animals, physiology of cardiac muscle, heart as a pump, rhythmic excitation of the heart. Cardiac cycle – electric changes, mechanic changes, pressure and volume changes, sound changes; blood flow through heart. Striking volume, minute volume, regulation of heart pumping - auto regulation, humoral, endocrine and nervous regulation, cardiovascular receptors. Electrocardiography (Einthoven's triangle, uni – and bipolar electrocardiography). Energetic of heart pumping. Arterial and venous blood pressure, blood pressure regulation. Measurement of blood pressure and pulse - Valsalvin maneuver. Hemodynamics, peripheral circulation – arterial, capillary and venous blood flow, peripheral circulation regulation, metabolism of substances and liquids in tissues, lymph. Special blood flows: pulmonary, coronary, hepatic, brain circulation). 2. Respiration (Ventilation and lung mechanics, partial pressures lungs-blood, transport of oxygen and carbon dioxide in blood. Control of respiration; respiratory centres, factors that influence on respiratory centres. External breathing; inspiration, expiration, respiratory volumes, alveolar ventilation, intrapulmonary pressure and pressure in thorax).3. Digestion in mouth and simple stomach (Function of digestion. Physiological features of digestion in carnivores, herbivores and omnivores. Food taking, swallowing, salivation, regulation of salivation, gastric motility, regulation of gastric secretion. Store, mix, and dissolve food in stomach, emptying of dissolved food into small intestine. Vomiting. 4. Digestion in ruminants (Basic principles of symbiosis ruminant-micro population, motility; relation water-dry substances, oesophagus, rumination, gasses in rumen;

	influence of pH, nourishment, elimination, role of bacteria and infusoria in digestion, efficacy of digestion in rumen. Digestion of carbohydrates, proteins and fats, ruminohepatic circle of nitrogen, synthesis of vitamins, metabolic pathways of low fatty acids, digestion in abomasums). 5. Digestion in small and large intestine (Relation stomach - duodenum, pH change and influence of food, secretion of bile and pancreatic juice, regulation of their secretion. Gutt polypeptides. Secretion of small and large intestine, digestion and absorption). 6. Excretion (Role of excretory organs; general and special functions, formation of urine, nephrone physiology. Regulation of primary and secondary urine secretion, counter current mechanism, urination physiology): 7. Metabolism of carbohydrate (Regulation of anaerobic and aerobic glycolysis; metabolic pathway of lactate, Kory cycle, regulation of gluconeogenesis; ruminants, carnivores. Pentose-phosphate pathway, glucuronic acid cycle; regulation, role, glycogenic reserve). 8. Protein metabolism (Classification of body proteins, half-life of body proteins, protein synthesis and degradation in different animal species; regulation. Specificities of non-protein nitrogen elimination, regulation of biosynthesis; hormonal, genetic, energetic, by nourishment). 9. Metabolism of fats (Regulation of lypogeneseis-lypolisis relation, possible pathways of AcCoA; receptive capacities – ketogeneses, cholesterinogenesis. Body fats – transport fats relation. Saturation of fat acids, lypolisis. 10. Metabolism of minerals (Role of minerals in synthesis and metabolism of tissues; microelements, macro elements, minerals as coenzymes, mechanism of excretion). 11. Metabolism of vitamins (Role of vitamins in metabolic processes, hydro soluble vs. liposoluble vitamins, absorption of vitamins, deposition in the body and vitamins excretion). 12. Antioxidative status (Free radical production during the metabolic processes, mechanism of free radicals action, effect of harm free radical activity, in vivo antioxidants, antioxidative enzymes, nonenzymatic antioxidative molecules, oxidative stress). 13. Bioenergetics (Basic principles of bioenergetics and metabolic rate, brutto energy of food, digestible energy, metabolizable energy, specific dynamic action of food, resting energy metabolism, importance of ATP, efficacy of production processes, biocaloimetry, respiratory quotient and its interpretation). 14. Exercise physiology (Energetic metabolism during exercise. Neuromuscular aspect of exercise. Exercise effect on cardiovascular system. Effect of exercising on breathing system. 15. Physiology of oviposition (Composition of egg, egg formation as enriched egg-cell, oviposition, control of oviposition). 16. Physiology of lactation (Composition of milk in different animal species, mamogenesis, lactogenesis, metabolism of mammary gland). 17. Thermoregulation (Poikilotherms, homeotherms, hibernation, thermoreceptors, organisms defence of hypothermia and hyperthermia). 18. Physiology of skin (Physiological features of skin and mucous membrane, skin glands). 19. Physiology of reproduction (Hormonal regulation, male and female reproductive system, pregnancy). 20. Behaviour in domestic animals, memory and learning (The role of the hormone system in food intake, sexual behavior, parental behavior and learning. Immediate, working and long-term memory).		
3.134. ormat of instruction:	**x lectures** **x seminars and workshops** **x exercises** ☐ on line in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	3.135. Comments:

<table>
<tr><td>3.136.
tudent responsibilities</td><td colspan="6"></td></tr>
<tr><td rowspan="5">3.137.
creening student work
(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>1,8</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Seminars</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>conversation</td><td></td></tr>
<tr><td>Tests</td><td>3,2</td><td>Oral exam</td><td>4</td><td>Activity</td><td>1</td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">Evaluation elements: 1) lectures attending, 2) participation during seminars, 3) lab exercises attending; 4) exercise and seminars attending; 5) continuous assessment; 6) final exam
1. lectures attending: During semester a student must attend 24 lecture lessons in order to gain minimum of 3 points. The maximum points from this evaluation element is 6.
2. seminars attending: During the course the student must attend 15 seminars in order to achieve a minimum of 4 points. The maximum points gained in this element is 6 points. After completion of the classes student can compensate absent seminar (which was previously justified, and compensation is granted) and points will be attributed to the other points. When a student compensates absentee classes in subsequent attempts, points will not be attributed.
3. lab exercises attending: During the course the student must be present at the 44 hours of lab exercises to get minimum of 4 points. The maximum points gained in this element is 6 points. After completion of the classes a student can compensate absentee exercise (which was previously justified, and compensation is granted) If it is compensated in the first attempt, points will be attributed to the other points. When a student compensates absentee classes in subsequent attempts, points will not be attributed.
4. activity on lab exercises and seminars: During the 60 hours of the exercise classes, the student must complete the assigned tasks. A student can earn up to 2 points per seminar (maximum 4 points). For six positive answers (oral and/or written) the student earns an additional 6 points. During the course of seminars and exercises, the student must achieve at least 5 points and a maximum of 10 points.
5. continuous assessment: During the course of Physiology of domestic animals II. two lab tests will be organized. The first test covers the physiology of the cardiovascular and respiratory systems, and the second test covers the physiology of digestion and excretion. At each test a student must achieve a minimum of 10 points in order to achieve the required 20 points. The maximum number of points in this element is 32 points. Students who do not achieve the necessary points during the teaching have the right to access test three times, which will be organized at a specific time.</td></tr>
</table>

<table>
<tr><td></td><td colspan="3">6. final exam: The final exam begins with brief analysis of the results from the first five elements of evaluation for each student. On the final exam, the student responds to the questions orally. At the final exam, the questions are from every area of the curriculum that the student has attended the lectures and seminars, and each question is scored separately. The maximum number of points on the final exam is 40 points. Regardless of the credits from the first five elements of evaluation, student has to demonstrate minimal knowledge on the final exam in order to achieve the minimum of 24 points. If a student did not pass the final exam, it can be reassessed again at a specific time.</td></tr>
<tr><td rowspan="4">2.11. Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>1. SJAASTAD Ø. V., SAND O., HOVE K. (2010): Physiology of Domestic Animals. The 12th ed. Scandinavian veterinary press.</td><td>1</td><td></td></tr>
<tr><td>2. CUNNINGHAM, J. G.:(2002): Textbook of veterinary physiology. 3rd edition, W. B. Saunders Company.</td><td>1</td><td></td></tr>
<tr><td>3. WILLIAM O. REECE (2004): Dukes’ physiology of domestic animals, The 12th ed. Cornell University Press. Ithaca and London</td><td>1</td><td></td></tr>
<tr><td>2.87. Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">1. FELDMAN, B. F., ZINKL J. G., JAIN N. C. (2000): Schalm´s Veterinary Hematology. 5th ed. Lippincott Williams & Wilkins.
2. KANEKO, J. J., HARVEY J. W., BRUSS M. L (1987): Clinical Biochemistry of Domestic Animals. Academic Press. San Diego, Boston, New York, Sydney, Tokyo.
3. PAYNE, J. M., PAYNE S. (1987): The Metabolic Profile Test. Oxford University Press. Oxford, New York, Tokyo.
4. SCHMIDT-NIELSEN, K. (1997): Animal Physiology. Adaptation and Environment. Cambridge University Press.
5. STURKIE, P.D. (2000): Avian Physiology. Springer Verlag, New York, Berlin, Heidelberg, Tokyo.</td></tr>
<tr><td>a. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">Students' work quality monitoring during the semester, which provides acquisition of exit competencies is carried out through continuous assessment and skills during the execution of all forms of teaching. Thus, acquired knowledge and skills are validated on exercises and tests and especially through the final written exam.</td></tr>
<tr><td>b. Other (as the proposer wishes to add)</td><td colspan="3">/</td></tr>
</table>

VETERINARY IMMUNOLOGY

1. GENERAL INFORMATION			
1.53. Course teacher	Full Prof. Nevenka Rudan	1.142. Year of the study programme	II.
1.54. Name of the course	Veterinary Immunology	1.143. Credits (ECTS)	2.5
1.30. Associate teachers	Additional Prof. Selma Pintarić; Assistant Marija Cvetnić; Assistant Gorana Miletić; Assistant Valentina Huzjak	1.144. Type of instruction (number of hours L + S + E + e-learning)	16 + 0 + 14 + 0
1.31. Study programme (undergraduate, graduate, integrated)	integrated	1.145. Expected enrolment in the course	-
1.32. Status of the course	obligatory	1.146. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	-
2. COURSE DESCRIPTION			
3.138. Course objectives	The veterinary immunology course is taught to second-year veterinary medical students via fifteen didactic lectures. Students get familiar with basic immunology knowledge, inflectional immunology and allergology, basic knowledge of autoimmune diseases and immunomodulation. Veterinary immunology is an important preclinical course which enables student to understand other courses such as microbiology, pathology, pharmacology, internal diseases and infectious diseases, particularly regards to pathogenesis and infectious diseases diagnostics and hypersensitivity, carrying out of immunoprophylaxis and assessment of immune status. During the study students become familiar with vaccines and their usage, simple immunology diagnostic procedures and use of commercially available vaccines.		
3.139. Course enrolment requirements and entry competences required for the course			
3.140. Learning outcomes at the level of the programme to which the course contributes	At the course students of veterinary medicine get familiar with infectional immunology and allergology, basic knowledge of autoimmne diseases and immunomodulation. Veterinary immunology is an important preclinical course which enables student to understand other courses such as microbiology, pathology, pharmacology, internal diseases and infectious diseases, particularly as regards pathogenesis and infectious diseases diagnostics and hypersensitvity, carrying out of immunoprophylaxis and immune status. During the study students become		

	familiar with vaccines and their usage, simple immunology diagnostic procedures and use of commercially available vaccines.
3.141. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	- **knowledge** of innate immunity mechanisms, inflamation and its role in course of immune respose cells of immune system and their enrolment in immune raction, adaptive immuninty to microbs and parasites, mucosal immunitiy, - **understand** function and role of complement system, cytokines, antigens, dendritic cells, major histocompatibility complex, cells and tissues of the immune system, - **understand** mechanisms od adaptive immunity, antibody syntesis, immunity of fetus and newborn animals, mucosal immunity, - **use** adoptive knowledge about hypersensitivity mechanisms, production and usage of vaccines, adjuvants and their immunomodulatory activity.
3.142. Course content broken down in detail by weekly class schedule (syllabus)	**1. Immune system overview: Innate and adaptive immunity (2 hours lectures)** **2. Antigens and antibodies (2 hours lectures)** **3. Cells and Tissues of the Immune System (2 hours lectures)** **4. Complement System (2 hours lectures)** **5. The Biology of T Lymphocytes (2 hours lectures)** **6. The Biology of B Lymphocytes (2 hours lectures)** **7. Hypersensitivity Mechanisms (2 hours lectures)** **8. Vaccine and vaccination (2 hours lectures)** **1. Paired sera, titer (2 hours exercises)** **2. Agglutination, precipitation (2 hours excecises)** **3. Immunofluorescence, ELISA (2 hours exercises)** **4. Complement-fixation test, First Preliminary Exam (2 hours exercises)** **5. Hemagluttination-inhibition assay (2 hours exercises)** **6. Virus neutralization test (2 hours exercises)**

	7. Repetition, Second Preliminary Exam (2 hours exercises)					
2.1. Format of instruction:	☒ lectures ☐ seminars and workshops ☒ exercises ☐ on line in entirety ☐ partial e-learning ☐ field work		☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)		2.2. Comments:	
2.3. Student responsibilities						
2.4. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0.45	Research		Practical training	
	Experimental work		Report		Participation at exercises	0.25
	Essay		Seminar essay		(other)	
	Tests	0.8	Oral exam		(other)	
	Written exam	1.0	Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam

TYPE OF ACTIVITY	MINIMAL NUMBER OF POINTS	MAXIMAL NUMBER OF POINTS
Attending lectures	**3**	**6**
(15 lecture hours)	coefficient=0.4 (8 hours x 0.4=3.2 points)	6 points:15 hours=0.4 (coefficient) 15 hours x 0.4=6 points
	A student must attend a minimum of 8 lecture hours in order to gain a minimum of 3 points	
Attending exercises	**8**	**12**
(15 exercise hours)	coefficient=0.8 (10 hours x 0.8=8 points)	12 points:15 hours =0.8 (coefficient) 15 hours x 0.8=12 points

		A student must attend a minimum of 10 exercise hours in order to gain a minimum of 8 points	
	Participation at exercises	**5**	**10**
	Attendance at all exercises (5 points) Oral questions (2.5 points each)	Attendance at all exercises (5 points) or 5 points from answers to oral questions A student must attend all exercises or give 2 correct answers to oral questions in order to earn a minimum of 5 points	Attendance of all exercises (5 points) plus 5 points from answers to oral questions = 10 points or 4 answers x 2.5 points = 10 points
	Continuous knowledge checking	**20**	**32**
	2 preliminary written exams, 16 questions each 1 question = 1 point 32 questions x 1.0 = 32 points	coefficient=1.0 (20 answers x 1.0 = 20 points) A student must give correct answers to 20 questions in order to gain a minimum of 20 points	32 points:32 questions = 1.0 (coefficient) 32 correct answers x 1.0 = 32 points

	Final exam	**24**	**40**
	Written exam 40 questions, a total of 40 points 1 question =1 point	coefficient = 1.0 (24 answers x 1.0 = 24 points)	40 points:40 questions =1.0 (coefficient) 40 correct answers x 1.0 = 40 points
	40 questions x 1.0 point = 40 points	A student must give correct answers to 24 questions in order to gain a minimum of 24 points	
	TOTAL	**60**	**100**

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and via other media)	Michael J. Day, Ronald D. Schultz: „Veterinary Immunology, Principles and Practice“, Manson Publishing, 2011.	0	
2.88. Optional literature (at the time of submission of study programme proposal)	Tizard Ian: Veterinary Immunology. 9th ed. W.B. Saunders Company. A Harcourt Health Sciences Company. Philadelphia, London, Toronto, Montreal, Sydney, Tokyo, 2012.		

2.89. Quality assurance methods that ensure the acquisition of exit competences	Continous checking via disscusion plus two written preliminary exams.
2.90. Other (as the proposer wishes to add)	

LIST OF OBLIGATORY SUBJECTS – 3rd STUDY YEAR

Obligatory Subjects – 3rd study year

Clinical Propedeutics

Communication Skills in Veterinary Medicine

General Veterinary Pathology

Parasitology and Parasitic Diseases

Pathophysiology I

Pathophysiology II

Pharmacology

Radiation Hygiene

Special Microbiology

Special Veterinary Pathology

CLINICAL PROPEDEUTICS

1. GENERAL INFORMATION			
1.55. Course teacher	Assoc. Prof. Martina Crnogaj, PhD Course leader substitution: Assist. Prof. Iva Šmit, PhD	1.147. Year of the study programme	III
1.56. Name of the course	Clinical propedeutics	1.148. Credits (ECTS)	8
1.31. Associate teachers	Teachers: Full Prof. Mirna Brkljačić, PhD, Full Prof. Damjan Gračner, PhD; Full Prof. Nada Kučer, PhD; Full Prof. Nikša Lemo, PhD; Full Prof. Vesna Matijatko, PhD; Full. Prof. Marin Torti, PhD; Assoc. Prof. Martina Crnogaj, PhD; Assoc. Prof. Jelena Gotić, PhD: Assoc. Prof. Darko Grden, PhD; Assoc. Prof. Ivana Kiš, PhD; Assoc. Prof. Iva Šmit, PhD, Asst. prof. Ines Jović, PhD Associate teachers: postdoctoral assistant Maša Efendić, PhD; postdoctoral assistant Gabrijela Jurkić Krsteska, PhD; postdoctoral assistant Filip Kajin, PhD, Karol Šimonji, PhD; Blanka Beer Ljubić, PhD; teaching assistant Tea Dodig; teaching assistant Katarina Marjanović; teaching assistant Elizabeta Pongrac; Lucija Jeremić, DVM; Nejra Puvača, DVM; Elena Maduna, DVM	1.149. Type of instruction (number of hours L + S + E + e-learning)	L 45 + E 60

1.32. Study programme (undergraduate, graduate, integrated)	integrated	1.150. Expected enrolment in the course	
1.33. Status of the course	compulsory	1.151. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	There are no online lectures.
2. COURSE DESCRIPTION			
3.143. Course objectives	The objective of the course is to acquire basic knowledge and skills necessary to perform physical examination of the domestic animals, compose the list of clinical problems and form the diagnostic plan. Furthermore, the objective of the course is to become acquainted with basic additional diagnostic methods and interpretation of laboratory and other additional findings. Knowledge and skills acquired through participation in this course prepare the students to be able to work in clinical departments and give them base for further learning and specialization in clinical disciplines.		
3.144. Course enrolment requirements and entry competences required for the course	Anatomy of domestic animals I, II and III, Histology and embriology		
3.145. Learning outcomes at the level of the programme to which the course contributes	Students will be able to take history, and correctly approach to large and small animals and perform clinical, dermatological and neurological examination in a safe manner. The knowledge obtained during clinical propedeutics shall be the basis for all other clinical subjects (eg. Internal diseases, Diseases and treatment of dogs and cats II, Herd medicine, Equine diseases).		
3.146. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Upon passing the examination students will be able to: 1. Assess anamnestic data obtained from the animal owner 2. Select appropriate methods for calming and preparing animals to ensure a safe clinical examination 3. Determine clinical findings using basic and additional clinical examination methods and formulate them in a clinical record 4. Evaluate the obtained clinical findings of various organs or organ systems 5. Distinguish physiological from pathological conditions of individual organs or organ systems based on clinical examination. 6. Perform diagnostic and therapeutic procedures on domestic ruminants, equines, and small companion carnivores.		
3.147. Course content broken down in	Introduction to clinical propedeutics of domestic animals, methods of clinical examination, vital signs, mucous membranes and lymph nodes, examination of digestive system, examination of circulation, examination of		

detail by weekly class schedule (syllabus)	respiratory system, examination of urinary system, examination of neurologic system, examination of skin, hematology and laboratory medicine, application of medication, small mammals, creating a diagnostic plan					
3.148. For mat of instruction:	+ lectures ☐ seminars and workshops + exercises ☐ on line in entirety ☐ partial e-learning ☐ field work		+ independent assignments ☐ multimedia and the internet + laboratory ☐ work with mentor ☐ (other)		3.149. Comments : 	
3.150. Stud ent responsibilities						
3.151. Scre ening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	1,44	Research		Practical training	
	Experimental work		Report		Activity at classes	0,8
	Essay		Seminar essay		(other)	
	Tests	2,56	Oral exam	3,2	(other)	
	Written exam		Project		(other)	
2.10. Grading and evaluating student work in class and at the final exam						

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	1.Teacher handouts via the LMS and/or printed handouts		
	2. RADOSTITS, O. M., I. G. MAYHEW, D. M. HOUSTON (2000): Veterinary clinical examination and diagnosis. WB Saunders, London, Edinburgh, New York, Philadelphia, St Louis, Sydney, Tornto.		
	3. RIJNBERK, A., F. J. VAN SLUIJS (2009): Medical history and physical examination in companion animals. 2nd ed., Saunders Elsevier, Houten		

<table>
<tr><td>2.91. Optional literature (at the time of submission of study programme proposal)</td><td>ASPINALL, V., R. ASPINALL (2013): Clinical procedures in small animal veterinary practice. Saunders Elsevier, Edinburgh.

BEXFIELD, N., K. LEE (2010): BSAVA Guide to procedures in small animal practice. BSAVA, Gloucester.

COSTA, L. R. R., M. R. PARADIS (2018): Manual of clinical procedures in the horse. Willey Blackwell, New Delhi.

ENGLAR, R. E. (2017): Performing the small animal physical examination. Willey Blackwell, New York. ROCKETT, J., S. BOSTED (2016): Veterinary clinical procedures in large animal practice. 2nd ed., Cengage Learning, Boston.

JACKSON, P. G. G., P. D. COCKCROFT (2002): Clinical examination of farm animals. Blackwell science, Oxford, Malden, Iowa, Victoria, Berlin.

MILLER, W. JR, C. GRIFFIN, K. CAMPBELL (2013): Muller & Kirk's Small Animal Dermatology. 7th ed., Saunders-Elsevier, St Louis.

SPEIRS, V. E., R. H. WRIGLEY (1997): Clinical examination of horses. Saunders, Pennsylvania

ETTINGER S. J., E. C. FELDMAN, E. COTE (2024): Textbook of Veterinary Internal Medicine Expert Consult, 9th Edition, Elsevier, Inc. St. Louis, Missouri, United States.</td></tr>
<tr><td>2.92. Quality assurance methods that ensure the acquisition of exit competences</td><td>
<table>
<tr><th>ACTIVITIES</th><th>MINIMAL SCORE</th><th>MAXIMAL SCORE</th></tr>
<tr><td>Lecture attendance

45 h of lectures

Student has to be present minimally at 50% of exercises</td><td>23 lectures: 3 points

(the student must attend a minimum of 23 hours of lectures to achieve 3 minimum points)</td><td>45 lectures: 6 points</td></tr>
<tr><td>Exercise attendance

60 h of exercise</td><td>42 hours: 8 points

(the student must attend a minimum of 42 hours of exercise to achieve 8 minimum points)</td><td>60 hours: 12 points</td></tr>
</table>
</td></tr>
</table>

	Student has to be present minimally at 70% of exercises		
	Activity at exercises 60 hours of exercises, each student is graded according to his/hers activity	**5**	**10**
	Continuous monitoring of knowledge		
	Colloquium Consists of 5 questions, for each question student can obtain minimally 4, and maximally 6,4 points	**20** (the student **must achieve a minimum 4 points from each question**; to achieve 20 minimum points)	**32**
	Written part of exam A student can obtain a maximum of 20 points on the written part of the exam. The written part of the exam consists of 20 questions. Each correct answer carries 1 point. The student must answer 12 questions correctly to achieve 12 points in order to meet the requirement for attending the oral part of the exam. **Oral part of exam**	**Student can apply for the exam if he/she has obtained totally at least 36 points (from attendance + activity +colloquium)**	

	A student can obtain a maximum of 20 points on the oral part of the exam. The oral part of the final exam contains a mandatory practical part. The oral part of the exam consists of of 5 questions. The minimum number of points per question is 2.4 points, and the maximum is 4 points. To pass students must obtain a minimum of 12 points.		
	Exam **(written and oral part)** The questions on the exam cover the entire course material.	**24** (the student **must achieve a minimum 24 points; minimum 12 points from written and 12 points from oral part of the exam;** to achieve 24 minimum points)	**40**
	Total points for determining the grade of each student	**Points** up to 59 60 - 76 77 - 84 85 - 92 93 - 100	**Grade** 1 2 3 4 5
2.93. Other (as the proposer wishes to add)			

COMMUNICATION SKILLS IN VETERINARY MEDICINE

1. COURSE DECRIPTION – GENERAL INFORMATION			
1.1. Course teacher	Prof. Danijel Labaš, Ph.D., professor	1.6. Year of the study	III.-IV.
1.2. Name of the course	Communication skills in veterinary medicine	1.7. ECTS credits	1
1.3. Associate teachers		1.8. Type of instruction (number of hours L + S + E + e-learning)	L16+6E+6e-learning
1.4. Study programme (undergraduate, graduate, integrated)	integrated	1.9. Expected enrolment in the course	120
1.5. Status of the course	Obligatory subjects	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	/
2. COURSE DESCRIPTION			
3.1. Course objectives	The main goal of the course is to familiarize students with communication science as an interdisciplinary and integrative knowledge of its postulates in order to solve and improve their own communication, while the specific aims of the course are the acquisition of communication skills at interpersonal, social and media level, with the acquisition of knowledge of the correct relationship and use of verbal and nonverbal communication. Communication and relationship between veterinarians and patient owners, as well as other public (especially media), are extremely important and have a number of effects on treatment outcomes as well as satisfaction with treatment, compatibility, clinical outcome and quality of life, patient safety, teamwork, cultural sensitivity and reduced the number of complaints about the veterinarians work, and equally affect the presentation of a real image of the profession in public.		
3.2. Enrolment requirements and/or entry competences required for the course	Enrolled integrated study.		
3.3. Learning outcomes at the level of the programme to which the course contributes	Students will be familiar with the anthropological, communicational and psychological approach to multiple levels of communication. In particular, they will be able to properly use verbal communication and learn to properly evaluate and interpret nonverbal communication in different social and cultural environments, with particular emphasis on the relationship between the veterinarian and the client's owner. One of the more sensitive areas of biomedicine in terms of the importance of quality communication is access to communication in severe and incurable diseases, and particularly challenging opportunities for the clients to convey bad news, to recognize his emotional reactions, to listen actively, to include him in communication, to discuss the prognosis and the risk , assist in making a decision or encouraging its acceptance. But no less important is the public reaction to complaints about the profession, mostly in the media. Students will therefore be able to use the acquired communicative knowledge and develop the skills of		

	critical observation, presentation and analysis of contemporary communication dynamics and models, particularly in interpersonal communication, as well as communication in public and the media, and will acquire the knowledge and skills required for public relations.
3.4. Expected learning outcomes at the level of the course (3-10 learning outcomes)	Students will be able to: 1. analyze and compare various types of communication; 2. correctly interpret the underlying concepts - intrapersonal, interpersonal, verbal, nonverbal, social and media communication; 3. argue the importance of knowing the communication dynamics and challenges of communication in veterinary; 4. to describe the role of verbal and non-verbal communication in everyday and business life and prepare to talk about giving diagnosis and therapy; 5. analyze and interpret the verbal and non-verbal communication of their interlocutors; 6. use the acquired knowledge about the relationship of interpersonal communication and communication in the business environment; 7. to evaluate the quality of interpersonal communication; 8. analyze and compare communication relationships in dialogue and persuasion in discussing the prognosis of treatment and risk communication; 9. critically analyze and adopt the process of active listening in interpersonal diagnostic communication; 10. to argue the reasons why it is necessary to know the communication dynamics in the everyday and business environment and how to use them in relation between veterinarian and owner of the client; 11. critical approach to establishing communication with the public and the media and analyzing crisis communication strategies.
3.5. Course content (syllabus)	
3.6. Format of instruction:	☐ x lectures ☐ seminars and workshops ☐ x exercises ☐ online in entirety ☐ x partial e-learning ☐ field work ☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)
3.7. Comments:	
3.8. Student responsibilities	

3.9. Monitoring student work									
	Class attendance	**YES**	NO	Research	YES	NO	Oral exam	**YES**	NO
	Experimental work	YES	NO	Report	YES	NO	(other)	YES	NO
	Essay	YES	NO	Seminar paper	YES	NO	(other)	YES	NO
	Preliminary exam	**YES**	NO	Practical work	YES	NO	(other)	YES	**NO**
	Project	YES	NO	Written exam	YES	NO	ECTS (total)	1	

3.10. Required literature (available in the library and/or via other media)	**Title**	**Number of copies in the library**	**Availability via other media**

	LITTLEJOHN, S. W. – FOSS A. K., *Theories of Human Communication*, Wadsworth Publishing Company, Wadshwort 2011 (10th or later edition), pp. 3-41; 79-122; 179-228.		
	LABAŠ, D., *Nonverbal communication: The Body as an Extention of the Soul* in: Djurdja Bartlett (ed.), *Body in Transition*, Faculty of Textile Technology, University of Zagreb, Department of Fashion Design, Zagreb 1999, 74-83.		
	ADAMS, C. L, FRANKELM R. M., It May Be a Dog's Life But the Relationship with Her Owners Is Also Key to Her Health and Well Being: Communication in Veterinary Medicine, *Vet Clin Small Anim*, 37 (2007) 1-17.		
	HAMOOD, W. J., CHUR-HANSEN, A., McARTHUR, M. L., A qualitative study to explore communication skills in veterinary medical education, *International Journal of Medical Education*, 2014;5:193-198.		
3.11. Optional literature (name the title)	McDermott, M. P., Tischler, V. A., Cobb M. A, Robbé I. J., Dean, R. S., Veterinarian-Client Communication Skills: Current State, Relevance, and Opportunities for Improvement, *J Vet Med Educ.*, 42(2015)4:305-14 **Shaw, J. R., Four Core Communication Skills of Highly Effective Practitioners, *Veterinary Clinics of North America: Small Animal Practice,* 36(2006)2: 385-396.** **Shaw J. R., Barley, G. E., Hill, A. E.,Larson, S., Roter, D. L., Communication skills education onsite in a veterinary practice, *Patient Education and Counseling*, 80(2010)3: 337-344.** Shaw, J. R., Bonnett, B. N., Adams, C. L., Roter, D. L., Veterinarian-client-patient communication patterns used during clinical appointments in companion animal practice, Journal of the American Veterinary Medical Association, 228(2006)5: 714-721. World Organisation for Animal Health, *Communication Handbook Veterinary Services*, World Organisation for Animal Health, 2015 (dostupan pdf svim studentima).		

GENERAL VETERINARY PATHOLOGY

1. GENERAL INFORMATION			
1.3. Course teacher/ Deputy	Associate Professor Ivan-Conrado Šoštarić-Zuckermann, DVM, PhD / Professor Andrea Gudan Kurilj, DVM, PhD, DECVP	1.11. Year of the study programme	3rd
1.4. Name of the course	**General veterinary pathology**	1.12. Credits (ECTS)	7
1.4. Associate teachers	Professor Andrea Gudan Kurilj, DVM, PhD, DECVP; Assoc. professor Ivan-Conrado Šoštarić-Zuckermann, DVM, PhD, DECVP; Assistant professor Lidija Medven Zagradišnik, DVM, PhD; Ivana Mihoković Buhin, DVM; Iva Ciprić, DVM; Marija Batinjan Matković, DVM	1.13. Type of instruction (number of hours L + S + E + e-learning)	30+60+0+0
1.5. Study programme (undergraduate, graduate, integrated)	Integrated	1.14. Expected enrolment in the course	
1.6. Status of the course	Active	1.15. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1
2. COUSE DESCRIPTION			
3.12. Course objectives	Upon completion of this course, students will acquire knowledge of general pathology and pathology of organ systems, which is necessary to follow further classes in clinical subjects. The ultimate goal is that upon completion of the study students can recognize the pathological process and make the correct diagnosis in order to choose appropriate therapy, or if the animals die, in the correct way (dissection and other additional laboratory tests) make an accurate diagnosis and thus act preventively in other animals .		
3.13. Course enrolment requirements and entry competences required for the course	Previous passing courses: Anatomy with organogenesis of domestic animals 1,2,3 and Histology and embriology.		

<table>
<tr><td>3.14. Learning outcomes at the level of the programme to which the course contributes</td><td>At the end of the course students will get knowledge in general pathology for further performing of education in other clinical subjects. The final goal upon the end of the studying is to be able to recognise a pathological process, make a right diagnosis and give the proper therapy, or if the animal perishes to get the right diagnosis in a proper way (by autopsy and other laboratory studies) thus act as a preventive measure for other animals.</td></tr>
<tr><td>3.15. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td>At the end of the course students will:
1. Recognize and interpret pathological changes in different tissues and organs.
2. Classify and categorize various pathological changes.
3. Explain the origin and development of diseases of fundamental pathological processes at the cellular level.
4. Independently perform necropsies of domestic, wild, exotic, and laboratory animals.</td></tr>
<tr><td>3.16. Course content broken down in detail by weekly class schedule (syllabus)</td><td>LECTURES:
<table><tr><th>Methodological unit</th><th>Contents</th><th>No. of hours</th></tr><tr><td>Introduction and general aethiology</td><td>Introduction and general aethiology</td><td>1 hr</td></tr><tr><td>Circulatory disturbances</td><td>General circulatory disturbances and haemostasis</td><td>1 hr</td></tr><tr><td>Circulatory disturbances</td><td>Haemostasis; oedema, hyperaemia, haemorrhages</td><td>2 hrs</td></tr></table></td></tr>
</table>

	Circulatory disturbances	Thrombosis, DIK, embolia	2 hrs	
	Circulatory disturbances	Infarction and shock	1 hrs	
	Reversibile cell injury	Cell adaptation	2 hrs	
	Chronic cell injury and adaptation	Intracellular accumulations (liids, glycogen, hyaline, and the other cell inclusions); extracellular accumulations (hyaline, amyloid and the other	2 hrs	
	Cell death	Irreversible cell injury Necrosis, apoptosis	2 hrs	
	Inflammation	Historical datas, definition, characteristics of the inflammation, cardinal signs of inflammation, triad of inflammation, haemodynamic	2 hrs	
	Inflammation	Cellular reaction and phagocytosis, byomediators of inflammation	2 hrs	

Inflammation	Nomenclature of inflammation, clasiffication of inflammation according to affected tissue, classification of inflammation according to characters	2 hrs
Chronic inflammation	Mechanisms of chronic inflammation, granulomatous inflammations, wound healing and angiogenesis	2 hrs
Basic immunopathology	Hypersensitivity reactions	2 hrs
Basic immunopathology	Mechanisms of genesis of autoimune diseases; amyloidosis	2 hrs
Tumors	Definition, general characteristics, types of tumors	2 hrs
Tumors	Nomenclature, characteristics, tumor growth	2 hrs
Tumors	Grading of tumors, oncogenesys, paraneoplastic syndrome	2 hrs

PRACTICALS:

<table>
<tr><td></td><td colspan="6">Necropsy: necropsy technique and recognition of pathologic changes – 30h</td></tr>
<tr><td>3.17. Format of instruction:</td><td colspan="2">X lectures
☐ seminars and workshops
X exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">X independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td colspan="2">3.18. Comments:</td></tr>
<tr><td>3.19. Student responsibilities</td><td colspan="6"></td></tr>
<tr><td rowspan="6">3.20. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>1,26</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Activity</td><td>0,7</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>2,24</td><td>Oral exam</td><td>2,8</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td></td><td colspan="5"></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6"></td></tr>
</table>

TYPES OF ACTIVITIES	MINIMAL NUMBER OF POINTS	MAXIMAL NUBMER OF POINTS
Attending lectures	**3**	**6**
The total of 30 lecture hours	(each particular lecture hour is summed as 0,2 point)	
	A student must attend minimal 15 lecture hours in order to gain 3 minimal points;	
Attending practicals	**8**	**12**
Total of 60 exercise hours	**A student must attend minimal 42 exercise hours in order to gain 8 minimal points;**	
Participation at practicals	**5**	**10**
	During the semester, the student is required to perform at least 5 necropsies; for each necropsy, the student can earn a maximum of 2 points (5 necropsies × 2 points = maximum of 10 points), and must achieve a minimum of 5 points for this element to be considered fulfilled.	

Elements that are evaluated during the performance of a necropsy:

1	Correctly positions the animal's body for necropsy	0	0,2
2	Correctly uses the necropsy instruments	0	0,2
3	Correctly performs the necropsy technique	0	0,2
4	Recognizes the topographic regions and anatomical structures within them	0	0,2
5	Correctly names and describes the topographic regions and anatomical structures within them	0	0,2
6	Recognizes postmortem changes	0	0,2
7	Correctly names and describes postmortem changes	0	0,2
8	Recognizes macroscopic pathological changes	0	0,2
9	Correctly names and describes macroscopic pathological changes	0	0,2
10	General impression: overall dissection skill, professionalism, theoretical knowledge	0	0,2

Continuous knowledge checking	**20** (Colloquium on necropsy technique and the recognition and description of postmortem changes - 10 points; Colloquium on the recognition and description of pathological changes related to disease mechanisms (degenerative processes, circulatory disturbances, inflammations, neoplastic processes - 10 points)	**32** (Colloquium on necropsy technique and the recognition and description of postmortem

			changes - 16 points; Colloquium on necropsy technique and the recognition and description of postmortem changes - 16 points)
		Colloquium on necropsy technique and the recognition and description of postmortem changes The quiz consists of 16 questions, each scored with a maximum of 1 point. The student must earn at least 10 points for the colloquium to be considered passed. **Colloquium on necropsy technique and the recognition and description of postmortem changes** Colloquium on the recognition and description of pathological changes related to disease mechanisms (degenerative processes, circulatory disturbances, inflammations, neoplastic processes). During the practical sessions, images of the fundamental disease mechanisms will be taken and made available to students in the “practical exercises” folder on the course website as a self-assessment quiz. The questions for the colloquium will be drawn from these materials, along with content from the required literature and lectures. The colloquium consists of 16 questions, each scored with a maximum of 1 point. The student must earn at least 10 points for the colloquium to be considered passed; the maximum possible score is 16 points	

Final exam	**24**	**40**
Written and oral	(a student must show sufficient knowledge in order to gain minimal 24 points)	
TOTAL	**60**	**100**

Final exam:

The final exam consists of written and oral part. The written part of the exam is in essay form. It lasts 60 minutes and consists of 5 questions. Each question is scored with a maximum of 5 points. A minimum of 15 points is required to pass the written exam, and minimum of 2 points per each question should be achieved. Each question will have guidelines to clarify what is expected in the answer. A maximum of 25 is possible to get from written part of the exam. After scoring a written part of the exam, students who achieve a minimum of 15 points can access the oral part of the exam. Students who do not achieve the minimum score (15 points) on the written part of the exam, receive a negative grade and will not be able to access the oral part of the exam. Questions at the oral part of the exam are on the same principle as essay type question in the written part. The grade on the final exam is the one derived from the points that student has collected from the written and oral part of the exam. The maximum amount of points in final exam is 40. The distribution of grades is done according to the Regulations on the Integrated Undergraduate and Graduate Study of Veterinary Medicine and the Course Syllabus.

Note: on the final exam students should know the material of the colloquiums, and they can be asked questions from colloquiums.

Final evaluation:
Regardless of a fact that a student gained the number of points from the first four evaluation elements on the basis of makeup preliminary exam or not, the same rules are valid for forming the final mark. The final mark is formed on the basis of total sum from all five evaluation elements (attending lectures, attending practicals, participation at practicals, continuing knowledge checking, final exam) according to the following table.

Points	*Grade*
up to 59	1 (F)
60-68	2 (E)
69-76	2 (D)
77-84	3 (C)
85-92	4 (B)
93-100	5 (A)

2.11. Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
Kumar V, Abbas AK, Aster JC, Debnath J, Das A. **Robbins, Cotran & Kumar Pathologic Basis of Disease**. 11th ed. St. Louis (MO): Elsevier; 2025		
ZACHARY, J. F. (2022): Pathologic Basis of Disease, 7th edition, Elsevier, Philadelphia.	5	
D. O. Slauson, Cooper, B. J.: Mechanisms of Disease. 3th edition, Mosby, St. Louis, 2002.		

2.94. Optional literature (at the time of submission of study programme proposal)	Grabarević, Željko i Sabočanec, Ruža (ur.): Osnove razudbe domaćih životinja. Medicinska naklada, Zagreb, 2016. Notes and presentations provided by lecturers.		
2.95. Quality assurance methods that ensure the acquisition of exit competences			
2.96. Other (as the proposer wishes to add)			

PARASITOLOGY AND PARASITIC DISEASES

1. GENERAL INFORMATION			
1.5. Course teacher	Associate Prof. Franjo Martinković	1.16. Year of the study programme	third
1.6. Name of the course	Parasitology and Parasitic Diseases	1.17. Credits (ECTS)	7
1.5. Associate teachers	Full Prof. Albert Marinculić Assistant Lea Lovrić, Assistant Nika Konstantinović	1.18. Type of instruction (number of hours L + S + E + e-learning)	34+0+56+0
1.6. Study programme (undergraduate, graduate, integrated)	integrated	1.19. Expected enrolment in the course	
1.7. Status of the course		1.20. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	Level1, 10%
2. COUSE DESCRIPTION			
3.21. Course objectives	Understanding the biology and ecology of parasites and vectors of medical and veterinary importance, differentiation and recognition of individual groups of parasites as well as individual parasites and their developmental forms within groups, understanding of invasion methods and pathogenesis of diseases caused by parasites, achievement of diagnostic skills and competencies for taking, preparing and processing samples, diagnosis by identification of parasites or their developmental stages, knowledge of treatment, prevention and monitoring of parasitic diseases, as well as understanding contemporary trends in veterinary parasitology..		
3.22. Course enrolment requirements and entry competences required for the course	Regular knowledge achieved throughout the veterinary study.		
3.23. Learning outcomes at the level of the programme to which the course contributes			
3.24. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After successful completing the course, the student will be able to: -Associate the biology and ecology of parasites (or vectors) of veterinary and medical importance -Identify important parasites and their developmental forms -Describe the pathogenesis of diseases/conditions caused by parasites or their developmental forms -Demonstrate diagnostic skills in collecting, preparing and examining samples		

	-To comment the results of diagnostic methods -Suggest control (diagnosis and prevention) and adequate treatment of certain parasitic diseases
3.25. Course content broken down in detail by weekly class schedule (syllabus)	LECTURES 1st week Introduction to Veterinary Parasitology 2nd week Coccidiosis in poultry and carnivores, Cyst Forming Coccidia 3rd week Piroplasmosis,Giardiosis, Cryptosporidiosis,Neosporosis 4th week Leishmaniosis 5th week Diseases caused by trematodes 6th week Diseases caused by tapeworms 7th week Tapeworms of carnivores 8th week Echinococcosis, Cysticercosis 9th week Introduction Nematodes,Ascaridae,Ancylostomidae,Oxyuridae 10th week Rhabditidae,Trichostrongylidae,Strongylidae 11th week Trichinellidae,Trichuridae 12 th week Dictyocaulidae,Metastrongylidae,Protostrongylidae, canine and feline lungworms 13th week Filariata, Spirurata, Arthropoda –Introduction 14th week , Acari, Ixodidae, Argasidae 15 th week Sarcoptidae, Psoroptidae, Demodicidae, Cheyletiidae, Trombicidae 16th week Insecta –Introduction,Malophaga, Anoplura, Siphonaptera,Tabanidae, Muscidae Calliphoridae, Sarcophagidae 17th week Oestridae, Hippoboscidae, Psychodidae,Culicidae, Ceratopogonidae,Cimicidae EXERCISES

	1st week Introduction to parasitology 2nd week Coccidiosis of poultry and carnivores 3rd week Cyst forming coccidia 4th week Piroplasmosis,Giardiosis, Leishmaniosis 5th week Trematodes 7th week Tapeworms of herbivores and carnivores 8th week Canine tapeworms and cestode larval stages T9th week Coprological examination 10th week Ascaridae, Oxyuridae, Ancylostomidae 11th week Strongylidae , Trichuris, Strongyloides, Lungworms 12th week Trichostrongylidae 13th week Diagnostics of trichinellosis 14th week Ticks 15th week Mange mites 16th week Biting lice, Sucking lice, Fleas 17th week Myasis		
3.26. Format of instruction:	x☐ lectures ☐ seminars and workshops x☐ exercises ☐ on line in entirety x☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia and the internet x☐ laboratory ☐ work with mentor ☐ (other)	3.27. Comments:

3.28. Student responsibilities	In the 5th semester, the student will have 18 hours of lectures organized into 9 block-hours. The student must attend 5 block-hours (10 hours of lectures) to earn the minimum of 1.5 points. The maximum number of points that can be earned from this assessment component in the 5th semester is 3 points. In the 6th semester, students will have 16 hours of lectures organized into 8 block-hours. The student must attend 4 block-hours (8 hours of lectures) to earn the minimum of 1.5 points. The maximum number of points that can be earned from this assessment component in the 6th semester is 3 points. **During the 5th semester**, the student must attend 8/12 practical exercise sessions to earn the minimum of 4 points during the semester (the maximum is 6 points). **During the 6th semester**, the student must attend 11/16 practical exercise sessions to earn the minimum of 4 points during the semester (the maximum is 6 points). Students receive the materials for preparation for the practical exercises in advance. During the 5th and 6th semesters, students are required to come to the practical exercises prepared and complete the assigned tasks in 28 practical exercise sessions (56 hours). Upon completion of the assigned tasks, the student receives the teacher's signature at the end of each practical exercise session. Before the beginning of the practical exercise session, each student may, through active participation ("volunteering") or by being selected by the teacher ("being called upon"), undergo an oral assessment twice during each semester, on different practical exercise programs. Following the assessment of the student's preparation and knowledge, the student is awarded 1.5 points if adequately prepared. If the student is unable to answer the questions during the oral assessment, no 1.5 points are awarded for activity. **During the 5th semester**, a student can earn a maximum of 3 points for activity (demonstration of adequate preparation through two oral assessments, each worth 1.5 points). **During the 6th semester**, a student can also undergo two oral assessments on different practical exercise programs. Following the assessment of preparation and knowledge, the student is awarded 1.5 points if adequately prepared (a maximum of 3 points for two satisfactory oral assessments). **During the 6th semester**, two mandatory assessments of practical skills will also be conducted as part of the practical exercises. The first is the oral/practical assessment **"Coprological Examinations"**, which is worth 2 points upon successful completion. The second is the mandatory oral/practical assessment **"Parasitological Examination of the Skin"**, which is also worth 2 points upon successful completion.

	During the 6th semester, a student can earn a maximum of 7 points for activity: 1.5 points for each of two satisfactory oral assessments, plus 2 points for each demonstrated practical skill in the mandatory practical assessments (**"Coprological Examination"** and **"Parasitological Examination of the Skin"**). The maximum total number of points that can be earned for activity during the practical exercises in the 5th and 6th semesters is **10 points**, while the minimum is **5.5 points**. **After completing both semesters, the student must have at least one satisfactory oral assessment (1.5 points) within the activity assessment component in order to be eligible to receive the course signature/permission upon completion of the 6th semester.** To achieve the minimum required number of points, the student must successfully pass both practical assessments in the 6th semester (**"Coprological Examination"** and **"Parasitological Examination of the Skin"**) and obtain at least **1.5 points from the knowledge assessment during either the 5th or 6th semester**. **The minimum number of points that a student must earn during the 5th semester (and the requirement for obtaining the course signature and enrolling in the course in the 6th semester) is 15.5 points.** These points are obtained by adding 10 points from two written colloquia, attendance at 5 block-hours (50% of lectures), which awards 1.5 points, and attendance at 8 practical exercise sessions (70%), which awards 4 points. **The maximum number of points in the 5th semester** is 28, obtained by adding 16 points (two colloquia completed with 100% of the required answers correct) + 3 points (activity during classes, i.e. two satisfactory oral assessments on different practical exercise programs) + 6 points (attendance at all practical exercises) + 3 points (attendance at all lectures). **During the 6th semester**, the student must earn a minimum of 19.5 points (10 points for the two written colloquia, with a minimum of 5 points required for each, and 4 points from the two mandatory practical assessments), 1.5 points for attending 4 block-hours (50%) of lectures, and 4 points for attending 11 practical exercise sessions (70%). **The maximum number of points in the 6th semester** is 32 (3 points for two satisfactory oral assessments, 16 points for two colloquia completed with 100% of the required answers correct, and 4 points for successfully completing the two mandatory practical assessments), plus 3 points for 100% attendance at lectures and 6 points for 100% attendance at practical exercises. **THE MINIMUM NUMBER OF POINTS REQUIRED FOR OBTAINING THE COURSE SIGNATURE AND BEING ELIGIBLE TO TAKE THE FINAL EXAMINATION IS 36 POINTS.** This is the sum of the minimum

	points from the 5th and 6th semesters for the specified assessment components (attendance at lectures and practical exercises, the two mandatory practical assessments, and the four mandatory written colloquia), together with at least one satisfactory oral assessment before a practical exercise session in either the 5th or 6th semester (worth 1.5 points). **THE MAXIMUM NUMBER OF POINTS A STUDENT CAN EARN BEFORE TAKING THE FINAL EXAMINATION IS 60 POINTS.** This consists of 100% attendance at lectures and practical exercises, four satisfactory oral assessments (combined total for the 5th and 6th semesters), four written colloquia completed with 100% of the required answers correct (combined total for the 5th and 6th semesters), and the two mandatory practical assessments. **FINAL EXAMINATION** The final examination begins with a brief analysis of the results achieved by each individual student in the first four components of continuous assessment. During the final examination, the student answers the questions orally. The maximum number of points that can be earned in the final examination is **40 points**. The oral examination consists of **8 questions**. Each question is worth **0–5 points**, for a maximum total of **40 points**.

3.29. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
	Class attendance	**1,26**	Research		Practical training	
	Experimental work		Report		**Activity** (other)	**0,7**
	Essay		Seminar essay		(other)	
	Tests	**2,24**	Oral exam	2,8	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the department library**	**Availability via other media**
	DEPLAZES, P., J. ECKERT, A. MATHIS, G. VON SAMSON-HIMMELTJERNA, H. ZAHNER (2016): Parasitology in Veterinary Medicine. Wageningen Academic Publishers, Enke, Germany. 650 p.	1	

	BOWMAN, D. D. (2014): **Georgis' Parasitology for Veterinarians**. 10th ed. St. Louis: Saunders, 2014. 496 p.	1	
	ZAJAC, A. M., G. A. CONBOY, S. E. LITTLE, M. V. REICHARD (2021): Veterinary Clinical Parasitology. 9th edition. Wiley. 432 p.	1	
2.97. Optional literature (at the time of submission of study programme proposal)	HENDRIX, C. M., E. ROBINSON (2022): Diagnostic Parasitology for Veterinary Technicians. 6th edition. Mosby. 432p ESTRADA-PEÑA, A. BOUATTOUR, J.-L. CAMICAS, A. WALKER (2004): Ticks of domestic animals in the Mediterranean region. A guide to identification of species. University of Zaragoza, Spain, str. 1-131.		
2.98. Quality assurance methods that ensure the acquisition of exit competences	Course information documentation, annual monitoring reports, student feedback by student questionnaire that cover all aspects of the course.		
2.99. Other (as the proposer wishes to add)			

PATHOPHYSIOLOGY I

1. GENERAL INFORMATION			
1.7. Course teacher	Full Prof. Mirna Robić	1.21. Year of the study programme	third
1.8. Name of the course	Pathophysiology I	1.22. Credits (ECTS)	2.5
1.6. Associate teachers	Full Prof. Romana Turk, Full Prof. Maja Belić, Assistant Siniša Faraguna, DVM	1.23. Type of instruction (number of hours L + S + E + e-learning)	12+4+9
1.7. Study programme (undergraduate, graduate, integrated)	Integrated graduate and postgraduate study	1.24. Expected enrolment in the course	
1.8. Status of the course	obligatory	1.25. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
3.30. Course objectives	During the course of Pathophysiology I students achieve knowledge on basic pathophysiological processes on cellular and tissue level during homeostatic disturbances in organism. Therefore the basis for better understanding disturbances in particular organs and organic system is achieved for understanding the course of Pathophysiology II. During practical part of the course students gain skills in performing basic biochemical laboratory analyses, choosing the correct method and proper interpretation of achieved results.		
3.31. Course enrolment requirements and entry competences required for the course	Succesfully passed all the exams of 1st year of study and participation in lectures and excercises in Physiology of domestic animals I and II		
3.32. Learning outcomes at the level of the programme to which the course contributes	After succesfull Pathophysiology I mastering, student will be able to define the terms health and disease, describe endocrinopathies, describe pathophysiolgy of inflammation, describe disturbances in neural system function, master biological samples handling, determine serum protein, glucose concentrations, recognize the most common acid-base disturbances and interprete the results.		
3.33. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After succesfull Pathophysiology I mastering, student will be able to: -define the terms health and disease, -describe endocrinopathies and their systemic effects on organism -describe pathophysiology of inflammation, -describe disturbances in neural system function and their effects on organsim		

	-master biological samples handling in accordance with basic laboratory protocols -determine serum protein, glucose concentrations, recognize the most common acid-base disturbances and interprete the results
3.34. Course content broken down in detail by weekly class schedule (syllabus)	**Lectures:** Introduction in pathophysiology, pathophysiology of inflammation and repair (2 hours); Disturbances in acido-base balance (2 hours); Pathophysiology of tumorogenesis (2 hours); Disturbances in adrenal gland function (2 hours); Disturbances in pituitary gland function and disturbances in pancreatic function (2 hours); Pathophysiology of central and peripheral neural system diseases (2 hours). **Seminars:** Oxidative stress and antioxidative system (2 hours); Disturbances in hydrosoluble and liposoluble vitamins and minerals metabolism (2 hours). **Practicals:** Absorption spectrophotometry and interferences of laboratory results (1 hour); Changes in total protein concentration in serum (2 hours); Diagnostic importance of acute phase proteins (2 hours); Disturbances in glucose metabolism (2 hours); Laboratory diagnostic of acid-base balance (2 hours).

3.35. Format of instruction:		3.36. Comments:
x lectures X seminars and workshops X exercises ☐ on line in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	

3.37. Student responsibilities	

3.38. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
Class attendance	0.45	Research		Practical training		
Experimental work		Report		Active participation in exercises	0.25	
Essay		Seminar essay		(other)		
Tests	0.8	Oral exam	0.6	(other)		
Written exam	0.4	Project		(other)		

2.10. Grading and evaluating student work in class and at the final exam	Elements of evaluation	Minimal points	Maximal points
	Lectures attendance (12 hours of lectures)	3 (coefficient 0.5) 6 x 0,5 = 3 Student must attend 6 hours of lectures to get minimal 3 points	6 (coefficient: 0,5) 12 x 0,5 = 6

	Seminars attendance (4 hours of seminars)	3 (coefficient: 1.5) 2 x 1.5= 3 Student must attend 2 hours of seminars to get minimal 3 points	6 (coefficient: 1.5) 4 x 1.5 = 6
	Excercise attendance (9 hours of exercises)	4 6/9=0.67 Student must attend 6 hours of excercises to get minmal 4 points	6 (coefficient: 0.67) 9 x 0.67 = 6.03
	Active participation in excercises and seminars Excercises done and signed by teacher Short knowledge examinations During the seminars, students will independently work on assigned topics in small groups, with the possibility to earn up to 3 points.	5	10 5 x 2 = 10 points
	Continous knowledge checking Written test Biochemistry I	20	32
	Written and oral final exam	24	40

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	David O. Slauson, Barry J. Cooper (1982, 1999): Mechanisms of disease. Mosby, St. Louis, London, Philadelphia, Sydney, Toronto	1	Department library
	Steven L. Stockham and Michael A. Scott (2008): Fundamentals of Veterinary Clinical Pathology. Blackwell Publishing	1	Department library
	Mary Anna Thrall (2004): Veterinary Hematology and aClinical Chemistry, Lippincott Williams & Wilkins.	1	Department library

	J. Kaneko (1980, 2008): Clinical Biochemistry of Domestic Animals	1	Department library
	e-learning materials		LMS
2.100. Optional literature (at the time of submission of study programme proposal)	www. ivis. org		
2.101. Quality assurance methods that ensure the acquisition of exit competences	Written and oral exam		
2.102. Other (as the proposer wishes to add)			

PATHOPHYSIOLOGY II

1. GENERAL INFORMATION			
1.9. Course teacher	Full Prof. Maja Belić	1.26. Year of the study programme	third
1.10. Name of the course	**Pathophysiology II**	1.27. Credits (ECTS)	6,5
1.7. Associate teachers	Full Prof. Mirna Robić, Full Prof. Romana Turk, Assistant Siniša Faraguna, DVM	1.28. Type of instruction (number of hours L + S + E)	39+6+50
1.8. Study programme (undergraduate, graduate, integrated)	University Integrated Undergraduate and Graduate Study Programme Veterinary Medicine	1.29. Expected enrolment in the course	
1.9. Status of the course	obligatory	1.30. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
3.39. Course objectives	The course objective is gaining knowledge on mechanisms involved in development of pathophysiological processes in individual organs and organ systems on molecular and cellular level and tissue and organs levels which providing understanding the course of disease and basis for understanding clinical courses. Overall consideration of pathophysiological mechanisms enables students to develop sense for integrative approach to pathological process at the whole organism level. In addition, the objective of the course is to develop skills in laboratory diagnostic of pathological processes and interpretation of changes in laboratory findings that could help in diagnosis of diseases.		
3.40. Course enrolment requirements and entry competences required for the course	Participation in course Pathophysiology I (lectures, seminars, exercises).		
3.41. Learning outcomes at the level of the programme to which the course contributes	Students are enabled to describe digestive system pathophysiology; disturbances in hepatic and biliary function; disturbances in carbohydrate, fat and protein metabolism; renal disease pathophysiology; disturbances in blood and hematological system functions and heart diseases; disturbances in respiratory system functions and pathophysiology of shock. In addition, students will gain skills in performing biochemical and hematological laboratory diagnostics and interpretation of laboratory findings to be used in understanding the mechanisms and course of pathological process.		

<table>
<tr><td>3.42. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="3">After successful mastering, student will be able to:
1. Describe disorders of carbohydrate, lipid, and protein metabolism and their systemic consequences.
2. Describe the pathophysiological mechanisms of liver and biliary system dysfunction.
3. Describe the pathophysiology of digestion.
4. Explain the pathophysiological mechanisms of cardiac and vascular dysfunction, including hemodynamic alterations and disturbances in the regulation of circulation.
5. Describe the pathophysiological mechanisms of blood and hematopoietic organ disorders.
6. Explain the pathophysiological mechanisms of respiratory system dysfunction.
7. Explain the pathophysiological mechanisms of kidney diseases.
8. Perform basic biochemical and hematological analyses of blood, serum, urine, and cerebrospinal fluid in accordance with standard laboratory protocols.
9. Interpret laboratory results in the context of pathophysiological disturbances of individual organ systems.</td></tr>
<tr><td>3.43. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="3">Lectures: Disturbances in carbohydrate, fat and protein metabolism (5 hours), pathophysiology of liver and biliary system diseases (5 hours), pathophysiology of hemopoietic system (4 hours), disorders of hemostasis (2 hours), pathophysiology of digestive system (10 hours), pathophysiology of cardiac function and mechanisms of shock (6 hours), pathophysiology of respiratory system diseases (3 hours), pathophysiology of renal diseases (4 hours).
Seminars: (6 hours): Individual students' presentation on specific topics in mechanisms of diseases.
Practicals: lipid and lipoprotein disorders (2 hours), urinalysis (2 hours), bilirubin metabolism disorders (2 hours) clinical enzymology (2 hours), laboratory evaluation of kidney function (2 hours), introduction to hematopoietic system disorders (2 hours), hematological analyses – blood cells counting (2 hours), determination of sedimentation rate and packed cell volume (2 hours), determination of hemoglobin concentration and calculation of erythrocyte indices (2 hours), determination of reticulocytes count (2 hours), morphological changes of erythrocytes (2 hours), morphology of developmental stages of leukocytes (2 hours), determination of WBC and morphology changes of leukocytes (2 hours), differential cell count (2 hours), determination of eosinophils count and importance of changes (2 hours), differential WBC count (2 hours), interpretation of changes in total blood cell count in various species (2 hours), blood cells in birds (2 hours), blood cells in reptiles (2 hours), interpretation of morphology changes of blood cells (2 hours), changes in blood cells morphology in neoplastic diseases of hematopoietic system (2 hours), laboratory diagnostics of hemostasis disorders (2 hours), preparation and inspection of bone marrow slides (2 hours), laboratory evaluation of cerebrospinal fluid (2 hours), interpretation of laboratory findings (2 hours).</td></tr>
<tr><td rowspan="2">3.44. Format of instruction:</td><td>X lectures
X seminars and workshops
X exercises
☐ on line in entirety
☐ partial e-learning</td><td>☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>3.45. Comments:</td></tr>
<tr><td colspan="3"></td></tr>
</table>

	☐ field work					
3.46. Student responsibilities						
3.47. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	**0,715**	Research		Practical training	
	Experimental work		Report		(other)	
	Essay		Seminar essay		(other)	
	Tests	**1,3**	Oral exam	1.56	(other)	
	Written exam		Project		(other)	
2.10. Grading and evaluating student work in class and at the final exam	Student work in class will be evaluated according to lectures, seminars and practical attendance and active participation in practicals and seminars. That way students can gain minimal 16 and maximal 28 points. Knowledge checking in written form can assure minimal 20 and maximal 32 points. To access the final exam students have to gain minimal points for attendance and knowledge checking. At the final exam, which will be in oral form, students need to answer questions correctly to gain minimal 24 or maximal 40 points. The final grade is the sum of points gained by each criteria mentioned before. Grading scheme is as follows: up to 59 points is grade F (insufficient), 60-68 points is grade E (sufficient), 69-76 points is grade D (sufficient), 77- 84 points is grade C (good), 85-92 points is grade B (very good) and 93-100 points is grade A (excellent).					

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	DUNLOP, R. H., C.-H. MALBERT (2004): Veterinary Pathophysiology, Blackwell Publishing, Ames, Iowa.		
	FELDMAN, B. F., J. G. ZINKL, N. C. JAIN (2000): Schalm's Veterinary Hematology. Lippincott Williams and Wilkins, Philadelphia, Baltimore, New York, London, Buenos, Aires, Hong Kong, Sydney, Tokyo.		
	SLAUSON, D. O., B. J. COOPER (2002): Mechanism of Disease. Mosby, St. Louis, London, Philadelphia, Sydney, Toronto.		
	HANSEN, M. (1998): Pathophysiology. Foundations of disease and Clinical Intervention. Saunders company, USA.		
	REAGAN, W. J., T. G. SANDERS, D. B. DENICOLA (1998):Veterinary Hematology: Atlas of Common Domestic Species, Iowa State University Press.		
	E-learning materials		

2.103. Optional literature (at the time of submission of study programme proposal)	
2.104. Quality assurance methods that ensure the acquisition of exit competences	

Evaluation elements	Minimal points	Maximal points
Lectures attendance	3	6
Seminars attendance	4	6
Practicals attendance	4.2	6
Active participation in practicals and seminars	5	10
Knowledge checking	20	32
Total points till final exam	36	60
Final exam	24	40

2.105. Other (as the proposer wishes to add)	

PHARMACOLOGY

1. GENERAL INFORMATION			
1.11. Course teacher	prof. Frane Božić, PhD, DVM; Deputy course leader: Prof. Andreja Prevendar Crnić, PhD, DVM	1.31. Year of the study programme	3.
1.12. Name of the course	Pharmacology	1.32. Credits (ECTS)	6.5
1.8. Associate teachers	prof. Frane Božić, PhD, DVM, prof. Andreja Prevendar Crnić, PhD, DVM Assistant Ena Oster, PhD, DVM Assistant Nikola Čudina, DVM	1.33. Type of instruction (number of hours L + S + E + e-learning)	45L + 35E + 5S
1.9. Study programme (undergraduate, graduate, integrated)	Integrated	1.34. Expected enrolment in the course	-
1.10. Status of the course	Obligatory	1.35. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	-
2. COUSE DESCRIPTION			
3.48. Course objectives	Based on knowledge gained upon the completed course and passed the exam “General and special pharmacology” students will be able to understand pharmacological basis of medical effects as well as species, age and other factors impacting on it. Besides, students will gain knowledge of effecting mechanisms of particular drug groups and will be able to choose the most appropriate drug (or drugs) indicated for specific disease or a pathological state. While doing so they will know to apply the drug in its optimal dose according to prescribed dose, while in the case of possible combination of a couple of drugs they will be aware of their mutual effects on each other (desirable or undesirable). Students will particularly learn to approach specific species and categories of animals individually, but to treat farm animals as a group, as well. As regard that an animal should be get rid of pain in any moment it suffers, students will learn mechanisms of pain occurrence and its importance as well as the meaning of “multimodal pain therapy” concept.		

3.49. Course enrolment requirements and entry competences required for the course	Passed exams from the first year of study and attended courses Physiology of domestic animals I. and II.
3.50. Learning outcomes at the level of the programme to which the course contributes	1. choose the most suitable drug(s) indicated for a specific disease or pathological condition, taking into account antimicrobial resistance, species, age and other factors 2. differentiate the treatment approach with regard to the categories of animals (individual and group treatment) 3. choose pharmacotherapy in the optimal dose, dosing regimen and method of application 4. prescribe and dispense medicines correctly and responsibly in accordance with legislation and latest guidance 5. choose the appropriate analgesic therapy within the framework of multimodal pain therapy 6. access the appropriate sources of data on licensed medicines 7. explain the process of research and development of a new drug 8. describe and explain the general principles of pharmacodynamics and pharmacokinetics 9. report suspected adverse reactions of medicines through the appropriate channel
3.51. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. choose the most suitable drug(s) indicated for a specific disease or pathological condition, taking into account antimicrobial resistance, species, age and other factors 2. differentiate the treatment approach with regard to the categories of animals (individual and group treatment) 3. choose pharmacotherapy in the optimal dose, dosing regimen and method of application 4. prescribe and dispense medicines correctly and responsibly in accordance with legislation and latest guidance 5. choose the appropriate analgesic therapy within the framework of multimodal pain therapy 6. access the appropriate sources of data on licensed medicines 7. explain the process of research and development of a new drug 8. describe and explain the general principles of pharmacodynamics and pharmacokinetics 9. report suspected adverse reactions of medicines through the appropriate channel
3.52. Course content broken down in detail by weekly class schedule (syllabus)	1 General pharmacology and pharmacology (concept and medication nomenclature, curative preparations, basis of pharmacotherapy, distribution and destiny of medication in organism, pharmacokinetics, pharmacodynamics, mechanisms of medication effects, factors influencing medication effects, medication biotransformation, observing of medication effects, medication residuum, NOEL, ADI, MRL, residues, medication listing) 2 Peripheral nervous system pharmacology (Chemical neurotransmission, cholinergic and adrenergic), receptors through the influence of which neurotransmitters act and mechanism of neurotransmitters activities, medications efficient to cholinergic and adrenergic neurotransmission);

	3 Central nervous system pharmacology (Sedatives, general anaesthetics (injective and inhalation), dissociative anaesthetics, local anaesthetics, myorelaxants, opioid analgesics, anticholinergics, analeptics); 4 Pharmacology of heart and vascular system (Heart stimulators, antiarrhythmics, antihypertensives, vasodilators); 5 Pharmacology of urinary organs and reproduction (Diuretics, antidiuretics, acidotic and alkalotic, uroantiseptics, reproduction pharmacology); 6 Pharmacology of respiratory organs (Expectorants, mucolytics, antitussive, bronchodilators, breathing stimulators); 7 Pharmacology of digestive system (Emetics, antiemetics, antacids, prokinetics, laxatives, antidiarrhoeics, antimycotics); 8 Anti-inflammatory and immunomodulate drugs (Nonsteroidal anti-inflammatory drugs (effects and side effects), steroid anti-inflammatory drugs (effects and side effects), immunosuppressives, immunostimulatory); 9 Antimicrobial medications (Antimicrobial spectrum, pharmacodynamics, pharmacokinetics, application, resistance, side effects); 10 Beta lactams (Benzylpenicillin (Na, K, procaine, benzathine), ampicillin and amoxicillin, inhibitors beta lactamase – clavulanic acid, isoxazole penicillins, cephalosporins – I, II, III and IV generation); 11 Aminoglycosides, aminocyclitols, polypeptides (Streptomycin, gentamicin, neomycin, amikacin, spectinomycin, polymyxin B and E, zincbacitracin); 12 Macrolides, lincosamides, tetracyclines (Erythromycin, tyrosine, azithromycin, lincomycin, tetracycline, oxytetracycline, doxycycline); 13 Phenicol, quinolones, sulphonamides (Chloramphenicol, fluor phenicol, thiamphenicol, flumequine, enrofloxacin, norfloxacin; Sulphonamides – enteric and systematic); 14. Antimycotics (Griseofulvin, nystatin, imidazothiazoles, amphotericin B, terbinafine, iodine preparations, etc.); 15. Antiprotozoals (anticoccidial drugs – ionophore antibiotics, amprolium, antihistomonal, antihemosporidial drugs – diminazens imidocarb, triazines); 16. Antiendoparasitics (antinematode, antitrematodes, anticestodes, combined preparations); 17. Antinematode (benzimidazoles and probenzimidazoles, nicotinic anthelmintics, macrocyclic lactones, organophosphorus compounds, other antinematode) 18. Antitrematodes (benzimidazoles: albendazole and triclabendazole; salicylates: brotianide, clioxanide, closantel, niclosamide, oxyclozanide, rafoxanide; substituted phenols: bithionol, disophenol, hexachlorophene, niclofolan, nitroxinil; aromatic amides: diamphenetide); 19. Cestocides (bunamidine, niclosamide, bithionol, dichlorophene, praziquantel, arsenic compounds); 20. Antiectoparasitics (pyrethrins, pyrethroids, OFS, carbamates, avermectins - milbemycins, amitraz, fipronil, insect growth and development inhibitors, isoxazolines).

3.53. Format of instruction:	■ lectures ■ seminars and workshops ■ exercises ☐ online in entirety ☐ partial e-learning ☐ field work		■ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)		3.54. Comments:		
3.55. Student responsibilities	Attending lectures, continuous assessment and final exam						
3.56. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	1,17	Research		Practical training		
	Experimental work	**0**	Report		(other)		
	Essay	**0**	Seminar essay	0,65	(other)		
	Tests	2,08	Oral exam	2,6	(other)		
	Written exam	0	Project		(other)		

2.10. Grading and evaluating student work in class and at the final exam

Student effort and the engagement during pharmacology problem solving practicals is evaluated and scored. Continuous knowledge checking will be done with preliminary written exams which will be organised during the semester. The preliminary exams will be divided in two parts. Student must acquire a minimum number of points from all assessment elements in order to take the final exam. Regardless of a fact that a student gained the number of points from the first four evaluation elements on the basis of the preliminary exam or not, the same rules are valid for forming the final mark. The final mark is formed on the basis of the total sum from all five evaluation elements: attending lectures, seminars, exercises, participation at seminars and exercises, continuous knowledge checking and final exam.

Activity	Minimum number of points	Maximum number of points
Attending lectures	3	6
Attending seminars	4	6
Attending exercises	4	6
Active participation at exercises and seminars	5	10
Continuous knowledge checking	20	32
Final exam	24	40
Total	60	100

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Lecture handouts and notes	-	Yes, Merlin
2.106. Optional literature (at the time of submission of study programme proposal)	1. Riviere, J., M. Papich (2018): Veterinary Pharmacology and Therapeutics, 8th ed. Wiley Blackwell. 2. Maddison, Page and Church (2008): Small Animal Clinical Pharmacology. 2nd ed. Saunders Elsevier. 3. Papich, M.G. (2011): Saunders Handbook of Veterinary Drugs. 3rd Ed. Elsevier Saunders. 4. Booth D. M. (2012): Small animal Clinical Pharmacology, Elsevier (Saunders) 2nd ed., St. Louis, Missouri 63043.		
2.107. Quality assurance methods that ensure the acquisition of exit competences	For each student of the Department there will be a Form for keeping records of his/her attendance of the lectures, exercises and seminars, with columns for evaluating his/her participation at seminars and exercises. In the part of continuous knowledge checking there will be the date of taking the preliminary exams, examiner's name and number of gained points.		
2.108. Other (as the proposer wishes to add)			

RADIATION HYGIENE

1. GENERAL INFORMATION			
1.13. Course teacher	Assist. Prof. Jadranka Pejaković Hlede, DVM, PhD	1.36. Year of the study programme	III.
1.14. Name of the course	**Radiation Hygiene**	1.37. Credits (ECTS)	2.5
1.9. Associate teachers	Prof. Marinko Vilić, DVM, PhD – deputy course leader	1.38. Type of instruction (number of hours L + S + E + e-learning)	16 + 0 + 14 + 0
1.10. Study programme (undergraduate, graduate, integrated)	University Integrated Undergraduate and Graduate Study of Veterinary Medicine	1.39. Expected enrolment in the course	
1.11. Status of the course	Compulsory	1.40. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COURSE DESCRIPTION			
3.57. Course objectives	The aim of the Radiation Hygiene course is to provide students, building on their knowledge of natural and preclinical sciences, particularly physiology, with essential knowledge and skills in radiation protection, radioecology and radiobiology. Through lectures and practical classes, students gradually develop an understanding of the fundamental principles of protection against ionizing radiation. The course also introduces the biological effects of ionizing and non-ionizing radiation on animals and humans, which are necessary for work in radiology, veterinary nuclear medicine and other veterinary activities involving electromagnetic radiation. Completion of this course is a legal requirement for performing X-ray examinations and procedures using open radioactive isotopes in veterinary nuclear medicine, and it is also necessary for professional work in veterinary inspection and for certain tasks in animal hygiene.		
3.58. Course enrolment requirements and entry competences required for the course	**Enrolment requirements:** Students must have completed Physics and Biophysics, and Physiology of Domestic Animals I. **Entry competences required for the course:** acquired basic knowledge in physics, biophysics and physiology necessary for understanding ionizing and non-ionizing radiation, biological effects of radiation, radiation protection and radiation-related procedures in veterinary medicine.		
3.59. Learning outcomes at the level of	3. Apply, analyse and interpret the knowledge of the sciences on which veterinary medicine is based in order to make evidence-based decisions		

the programme to which the course contributes	4. Independently use appropriate laboratory equipment and conduct critical analysis of laboratory test results, with an understanding of applied techniques and diagnostic procedures in veterinary medicine
3.60. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After successfully mastering the course, students will be able to: 7. Differentiate between sources and types of ionizing and non-ionizing radiation and assess their biological effects 8. Evaluate modes of exposure and pathways of radioactive contamination in humans and animals, and analyse the consequences of radiation exposure and contamination 9. Apply protective measures for humans and animals against exposure and radioactive contamination in accordance with the principles of radiation protection 10. Apply methods of radioactive decontamination of humans, animals, food, water and the environment 11. Determine the radiation hygiene compliance of food and feed 12. Operate radiation measuring instruments, including detectors and dosimeters, and interpret measurement results for the purpose of protection and radiation risk assessment 13. Explain the method of food preservation using ionizing radiation and formulate a reasoned opinion regarding this procedure
13.1. Course content broken down in detail by weekly class schedule (syllabus)	1. Introduction to radiation hygiene (radioecology, radiobiology, radiotoxicology, radiation protection) 2. Basics of nuclear physics (types of ionizing radiation, physical quantities and measurement units) 3. Sources of ionizing radiation (natural and artificial) 4. Radioactive contamination of the environment and pathways of contamination in animals 5. Biologically significant radionuclides (^{131}I, ^{90}Sr, ^{137}Cs) 6. Effects of ionizing radiation (deterministic and stochastic effects) 7. Protection of humans and animals from ionizing radiation (basic principles of radiation protection) 8. Radioactive decontamination of animals, animal feed, food and the environment (role of the veterinarian) 9. Radiation hygiene control of food, water and animal feed 10. Regulations in the field of radiation protection 11. Food preservation using ionizing radiation 12. Dosimeters – role and application of personal dosimetry 13. Ionizing radiation detectors – types and application 14. Gamma spectrometry 15. Procedures involving animals in cases of environmental contamination with artificial radionuclides 16. Permitted activities of radionuclides in animal feed 17. Calculation of safe distance from a radiation source, shielding thickness near a radioactive source and permitted time spent in a contaminated area 18. Calculation of radiation risk 19. Sources and spectrum of non-ionizing radiation

<table>
<tr><td></td><td colspan="6">20. Biological effects of non-ionizing electromagnetic radiation
21. Instrumentation and dosimetry of non-ionizing radiation</td></tr>
<tr><td>13.2. Format of instruction:</td><td colspan="2">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>13.3. Comments:
/</td><td></td></tr>
<tr><td>13.4. Student responsibilities</td><td colspan="6">Students are required to attend lectures and practical classes, actively participate in practical classes, complete two short written tests based on the material covered during practical classes, pass the continuous knowledge assessment covering practical class material, and take the final written exam.</td></tr>
<tr><td rowspan="5">13.5. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0.53</td><td>Research</td><td></td><td>Practical training</td><td>0.47</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Activity</td><td>0.47</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>0.53</td><td>Oral exam</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>0.50</td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">Lecture attendance: During lectures, students can achieve a maximum of 6 points for 16 hours of lectures, and a minimum of 3 points for 8 hours of lectures.

Practical class attendance: During the course, students must attend at least 10 hours of practical classes in order to receive the minimum of 8 points. Full attendance, 14 hours of practical classes, is awarded with the maximum of 12 points. In the case of a justified absence of up to 30% of practical classes, the corresponding points will be awarded. An unjustified absence from practical classes does not bring the corresponding points.

Activity during practical classes: During practical classes, students take two short written tests based on the material covered. For correct answers, students can achieve a maximum of 10 points, while they must achieve at least 5 points. Each test carries a maximum of 5 points.

Continuous knowledge assessment: At the end of the course cycle, students take one written test covering practical class material. The maximum number of points is 32, and the minimum number of points required to pass is 20.</td></tr>
</table>

<table>
<tr><td></td><td colspan="3">Final exam: The final exam is written. The maximum number of points is 40, and the minimum number of points required to pass is 24. The final grade is formed on the basis of the total number of points achieved from all assessment elements.</td></tr>
<tr><td rowspan="7">2.11. Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>HOWARD, B. J., N. A. BERESFORD, G. VOIGT (2001): Countermeasures for animal products: a review of effectiveness and potential usefulness after an accident. Journal of Environmental Radioactivity, 56, 115–137.</td><td>1</td><td>Available digitally via Merlin e-learning system</td></tr>
<tr><td>INTERNATIONAL ATOMIC ENERGY AGENCY (2010): Radiation Biology: A Handbook for Teachers and Students. Training Course Series No. 42. IAEA, Vienna.</td><td>1</td><td>Available digitally via Merlin e-learning system</td></tr>
<tr><td>INTERNATIONAL ATOMIC ENERGY AGENCY (2021): Nuclear and Radiological Emergencies in Animal Production Systems: Preparedness, Response and Recovery. Naletoski, I., Luckins, A. G., Viljoen, G. (Eds.). Springer, Berlin, Heidelberg. Selected chapters.</td><td>0</td><td>Available digitally via Merlin e-learning system</td></tr>
<tr><td>INTERNATIONAL ATOMIC ENERGY AGENCY (2021): Radiation Protection and Safety in Veterinary Medicine. IAEA Safety Reports Series No. 104. IAEA, Vienna.</td><td>0</td><td>Available digitally via Merlin e-learning system</td></tr>
<tr><td>VILIĆ, M. (2014): Radiation Hygiene: Selected Chapters of Radioecology, Radiobiology and Radiation Hygiene. Internal teaching material, Faculty of Veterinary Medicine, University of Zagreb.</td><td>1</td><td>Available digitally via Merlin e-learning system</td></tr>
<tr><td>2.109. Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">1. EISENBUD, M. (1997): Environmental Radioactivity. 5th ed. Academic Press, London.
2. HALL, J. E., A. J. GIACCIA (2019): Radiobiology for the Radiologist. 8th ed. Wolters Kluwer, Philadelphia.
3. INTERNATIONAL ATOMIC ENERGY AGENCY (2019): IAEA Safety Glossary: Terminology Used in Nuclear Safety and Radiological Protection. IAEA, Vienna.</td></tr>
<tr><td>2.13 Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">The acquisition of learning outcomes and exit competences is continuously monitored through lecture and practical class attendance, active participation in practical classes, two short written tests, continuous knowledge assessment and the final written exam. The evaluation includes both theoretical and practical course content, with particular emphasis on the application of radiation protection principles, the use of radiation measuring instruments, and the interpretation of measurement results in the context of veterinary medicine.</td></tr>
<tr><td>2.15 Other (as the proposer wishes to add)</td><td colspan="3">/</td></tr>
</table>

SPECIAL MICROBIOLOGY

1. GENERAL INFORMATION			
1.15. Course teacher	Prof. Nevenka Rudan, PhD	1.41. Year of the study programme	Third (3.) year of the study programme
1.16. Name of the course	Special microbiology	1.42. Credits (ECTS)	4.5 ECTS
1.10. Associate teachers	Additional Prof. Selma Pintarić, Assistant Marija Cvetnić, Assistant Gorana Miletić, Assistant Valentina Huzjak	Type of instruction (number of hours L + S + E + e-learning)	15+15+30+0
1.11. Study programme (undergraduate, graduate, integrated)	Integrated study	1.43. Expected enrolment in the course	
1.12. Status of the course	Regular course	1.44. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
3.61. Course objectives	Students will get knowledge of the most important causative agents of animal infectious diseases as well as on basic microbiological techniques for their isolation and identification which could be used in practice. They will get special skills in taking and sending of clinical materials to a microbiological laboratory. They will get acquainted with methods of culturing microorganisms, with preparing specimens for optical microscope and with staining procedures for bacteria, and also how to prepare fresh, living preparations (uncoloured) for dermatophytosis diagnostics. They will master the methods of culturing of microorganisms on bacteriological media and get acquainted with properties of the most important species of bacteria, fungi and viruses.They will get acquainted with their morphologic, growing, physiologic and antigenic features important for making aetiological diagnosis of infectious diseases. They will get knowledge of microbiological drugs and possibilities of immunoprophylaxis.
3.62. Course enrolment requirements and entry competences required for the course	Audited teaching from „Veterinary immunology“ and „General microbiology“
3.63. Learning outcomes at the level of the	Students will get knowledges necessary for clinical courses, especially for „Infectious diseases of domestic animals“

<table>
<tr><td>programme to which the course contributes</td><td colspan="6"></td></tr>
<tr><td>3.64. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">Understanding the basic principles and techniques for isolation and identification of pathogenic microorganisms, and what diagnostic tests should be performed for their identification; Interpreting the meaning of the results of microbiological examination in the process of etiological diagnosis of infectious diseases; Information of classification the bacteria, viruses and fungi with genera and species important for veterinary medicine; Knowledge about specifics of microorganism grows, virulence properties of microorganism and disease it causes; Understanding what specimens should be collected and get acquainted with preventive and therapeutic strategies.</td></tr>
<tr><td>3.65. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Lectures: 1., 2. lesson Taksonomy of bacteria, History of microbiology, Spiral bacteria 1. part; 3., 4. lesson Spiral bakteria 2. part; 5., 6. lesson Bacillus spp. and Clostridium spp.; 7., 8. lesson Streptococcus spp. and Staphylococcus spp.; 9., 10. lesson Mycoplasmas, Klebsiella spp. and Yersinia spp.; 11., 12. lesson Poxviridae and Parvoviridae; 13., 14. lesson Orthomyxoviridae and Paramyxoviridae; 15., 16. lesson Papillomaviridae and Circoviridae; Seminars: 1., 2. lesson Spiral bacteria, Bacteroides, Fusobacterium, Francisella tularensis; 3., 4. lesson Chlamydias and rickettias, Salmonella spp. and Escherichia coli; 5., 6. lesson Mycobacterium spp., Listeria monocitogenes, Erysipelothrix rhusiopathiae, Actinobacillus spp.; 7., 8. lesson Herpesviridae and Picornaviridae; 9., 10. lesson Flaviviridae and Rhabdoviridae; 11., 12. lesson Reoviridae and Arteriviridae; 13., 14. lesson Retroviridae, Coronaviridae and Adenoviridae; Excercises: 1., 2. lesson Spiral bacteria; 3., 4. lesson Pseudomonas aeruginosa, Burkholderia pseudomallei, Burkholderia mallei; 5., 6. lesson Mycobacterium spp.; 7., 8. lesson Pasteurella multocida, Manheimia haemolytica, Haemophilus-Histophilus; 9., 10. lesson Escherichia coli, Klebsiella pneumoniae subs. pneumoniae; 11., 12. lesson Salmonella, Yersinia enterocolitica, Yersinia pseudotuberculosis; 13., 14. lesson Staphylococccus spp.; 15., 16. lesson Bacillus spp., Clostridium spp.; 17., 18. lesson Listeria monocytogenes; 19., 20. lesson Erysipelothrix rhusiopathiae, Corinebacterium-Arcanobacterium; 21., 22. lesson Streptococcus spp; 23., 24. lesson CPE of herpesviruses and arteriviruses in horses; 25., 26. lesson Fungi; 27., 28. lesson Dermatophytes, Moulds; 29., 30. lesson Calculation of viral titer</td></tr>
<tr><td>3.66. Format of instruction:</td><td colspan="3">x lectures
x seminars and workshops
x exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>3.67. Comments:</td></tr>
<tr><td>3.68. Student responsibilities</td><td colspan="6"></td></tr>
<tr><td>3.69. Screening student work (name the proportion of</td><td>Class attendance</td><td>0.81</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
</table>

ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)	Experimental work		Report		Activity at seminars and exercises	**0.45**
	Essay		Seminar essay		(other)	
	Tests	**1.44**	Oral exam		(other)	
	Written exam	**1.8**	Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	Two preliminary exams will be organized during the course. Each preliminary exam contains 16 questions, and 1 question is worth with 1 point. A student must gain minimal 20 points from both exams and 32 points maximal. A student who gains 20 points from continuous checking can take the final exam. For final exam a student additionally must gain minimal 3 and maximal 6 points from attending lectures, minimal 5 points and maximal 7 points from attending seminars, minimal 5 points and maximal 6 points from attending exercises. Activity at seminars and exercises is evaluated with 7 points minimal and 10 points maximal.The final exam is written exam and student must gain minimal 24 points and maximal 40 points.

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Carter, G. R., Darla J. Wise (2004): Essentials of Veterinary Bacteriology and Mycology. Blackwell Publishing, 6. edition		
	Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London		
	MacLachlan, N. J., E. J. Dubovi (2011): Fenner's Veterinary Virology. Elsevier, A.P. Amsterdam, Boston, Heidelberg, London, New York, Oxford, Paris, San Diego, San Francisco, Singapore, Sydney, Tokyo. Fourth Edition		
	King, A. M. Q., M. J. Adams, E. B. Carstens, E. J. Lefkowitz (2012): Virus Taxonomy. Classification and Nomenclature of Viruses. Amsterdam, Boston, Heidelberg, London, New York, Oxford, Paris, San Diego, San Francisco, Singapore, Sydney, Tokyo. Ninth Edition		

2.110. Optional literature (at the time of submission of study programme proposal)	Naglić, T., D. Hajsig, J. Madić, Lj. Pinter (2005): Veterinary microbiology – Special bacteriology and mycology. Veterinary faculty, Zagreb Kalenić, S., E. Mlinarić-Missoni (2005): Medical bacteriology and mycology. Merkur A.B.D. Zagreb Presečki, V. i sur. (2002): Virolology. Medical edition, Zagreb

2.111. Quality assurance methods that ensure the acquisition of exit competences	With continued testing of students by oral exams and tests. By utilization the results of anonymous student's polls in which they put forward a critiques and proposals for teaching improvement.
2.112. Other (as the proposer wishes to add)	

SPECIAL VETERINARY PATHOLOGY

1. GENERAL INFORMATION			
1.17. Course teacher	Associate Professor Ivan-Conrado Šoštarić-Zuckermann, DVM, PhD, DECVP	1.45. Year of the study programme	3rd
1.18. Name of the course	**Special veterinary pathology**	1.46. Credits (ECTS)	10,5
1.11. Associate teachers	Professor Andrea Gudan Kurilj, DVM, PhD, DECVP; Associate Professor Ivan-Conrado Šoštarić-Zuckermann, DVM, PhD, DECVP; Lidija Medven Zagradišnik, DVM, PhD; Ivana Mihoković Buhin, DVM, Iva Ciprić, DVM; Marija Batinjan Matković, DVM	1.47. Type of instruction (number of hours L + S + E + e-learning)	60+0+75+0
1.12. Study programme (undergraduate, graduate, integrated)	integrated	1.48. Expected enrolment in the course	
1.13. Status of the course	active	1.49. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1
2. COUSE DESCRIPTION			
3.70. Course objectives	At the end of the course students will get knowledge in pathology of organic systems necessary for further performing of education in other clinical subjects. The final goal upon the end of the studying is to be able to recognise a pathological process, make a right diagnosis and give the proper therapy, or if the animal perishes to get the right diagnosis in a proper way (by autopsy and other laboratory studies) thus act as a preventive measure for other animals.		
3.71. Course enrolment requirements and entry competences required for the course	Previous completion of General veterinary pathology course.		

<table>
<tr><td>3.72. Learning outcomes at the level of the programme to which the course contributes</td><td>At the end of the course students will get knowledge in pathology of organic systems necessary for further performing of education in other clinical subjects. The final goal upon the end of the studying is to be able to recognise a pathological process, make a right diagnosis and give the proper therapy, or if the animal perishes to get the right diagnosis in a proper way (by autopsy and other laboratory studies) thus act as a preventive measure for other animals.</td></tr>
<tr><td>3.73. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td>By the completion of the course students should be able to:

- Recognize, connect and classify macroscopic pathological changes, identify the disease and formulate a diagnosis- analyze microscopic slides of basic pathologic processes and most important animal diseases

- Make diagnosis and conclusion about emergence and development of diseases or animal death

- Correlate macroscopic and microscopic changes together with the results of other ancillary laboratory tests

- Analyze microscopic slides of basic pathological processes and most important animal diseases

- write necropsy report</td></tr>
<tr><td>3.74. Course content broken down in detail by weekly class schedule (syllabus)</td><td>Lectures:

<table>
<tr><th>Methodological unit</th><th>Contents</th><th>No. of hours</th></tr>
<tr><td>Special pathology of digestive system</td><td>Oral cavity, salivary glands, esophagus</td><td>2h</td></tr>
<tr><td>"</td><td>Forestomachs and stomach</td><td>2h</td></tr>
</table>
</td></tr>
</table>

	"	Intestines	2h
	"	Liver	2h
	"	Egzocrine part of pancreas, peritoneum	1h
	Special pathology of respiratory system	General informations, nasal cavity and synuses, larynx,trachea	2h
	"	Lungs	5h
	Special pathology of urinary system	Kidneys	3h
	"	Lower urinary tract	3h
	Special pathology of cardiovascular system	Heart	2h
	"	Blood vessels	1h
	Special pathology of hematopoietic system	Bone marrow	1h

	"	Blood cells	1h
	"	Lymphatic system	2h
	Special pathology of nervious system	Central nervous system	6h
	"	Peripheral nervous system	2h
	Special pathology of musculoskeletal system	Skeletal muscles	2h
	"	Bones and joints	2h
	Special pathology of endocrine system	Introduction	2h
	"	Diseases of endocrine glands	2h
	Special pathology of the eye	Eye, eyelids, conjuctivae, eye socket	2h
	Special pathology of genital system	Female genital system	3h

"	Male genital system	3h
Special pathology of the skin	Introduction	2h
"	Degenerative changes	3h
"	Inflammatory changes	2h

Practicals:

Necropsy: necropsy technique and recognition of pathologic changes – 30h

Histopathology - 45h

3.75. Format of instruction:	X lectures ☐ seminars and workshops X exercises ☐ on line in entirety ☐ partial e-learning ☐ field work	X independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	3.76. Comments:

3.77. Student responsibilities	Active participation during course.					
3.78. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	1,89	Research		Practical training	
	Experimental work		Report		Activity	1,05
	Essay		Seminar essay		(other)	
	Tests	3,36	Oral exam	4,2	(other)	
	Written exam		Project		(other)	
2.10. Grading and evaluating student work in class and at the final exam						

TYPES OF ACTIVITIES	MINIMAL NUMBER OF POINTS	MAXIMAL NUBMER OF POINTS
Attending lectures	**3**	**6**
(The total of 60 lecture hours)	(each particular lecture hour is summed as 0,1 point)	
	A student must attend minimal 30 lecture hours in order to gain 3 minimal points;	
Attending exercises	**8**	**12**
(Total of 75 exercise hours; Autopsy 30 hours, Histopathology 45 hours)		
	(A student must attend minimal 53 hours of exercise in order to gain 8 minimal points)	

	Participation at exercises	**5** (Autopsy 2.5 points, Histopathology 2.5 points)	**10** (Autopsy 5 points, Histopathology 5 points)
		In this element, student must achieve a minimum of 5 points, and can achieve a maximum of 10 points. Active participation in practicals will be awarded according to the lower tables: Activity on necropsy practicals:	

1	Correctly performs the necropsy technique	0	0,1
2	Correctly names and describes the topographical regions and anatomical structures within them.	0	0,1
3	Correctly names and describes postmortem changes	0	0,1
4	Recognizes macroscopic pathological changes	0	0,1
5	Correctly names and describes macroscopic pathological changes	0	0,1

6	Formulates a morphological diagnosis/etiological diagnosis/disease name.	0	0,1	
7	Connects and classifies macroscopic pathological changes, links them with possible causes/identifies the disease.	0	0,1	
8	Correctly collects tissue samples for histopathological examination and clearly communicates the method of sending samples for histopathological examination.	0	0,1	
9	Correctly collects samples for other additional laboratory tests and clearly communicates the method of sending samples for other additional laboratory tests (microbiological, toxicological, parasitological)	0	0,1	
10	Overall impression: overall dissection skill,	0	0,1	

	professionalism, theoretical knowledge		

Evaluation of necropsy report:

1	The necropsy report contains all the required sections	0	0,2
2	It is written accurately, in complete sentences and fluently, in clear and labeled sections (according to the instructions/example)	0	0,2
3	Pathological changes are described clearly and precisely	0	0,2
4	Morphological diagnoses are derived from the described pathological changes, and everything is summarized in the final conclusion.	0	0,2
5	Overall impression, style.	0	0,2

During necropsy practicals, a student may perform two (2) to four (4) necropsies. To

		obtain the minimum number of points for this component, the student is required to perform at least two (2) necropsies, while to obtain the maximum number of points (4), the student must perform four necropsies. For each completed necropsy, the student may earn up to 1 point. As part of one of these necropsies, the student must write a necropsy report, for which an additional point may be awarded. **A recorded and graded necropsy report is a prerequisite for taking the final examination.** **Activity – histopathology practicals** Histopathology practicals are program-based. Prior to attending the practicals, students are required to prepare according to the instructions (e.g., study the histological structure of tissues/organs, read the relevant textbook chapter, review the teaching materials, etc.). The topics for the practicals will be available in the course folder on Merlin. For histopathology practicals, students must bring a printed A4 sheet (available in the practicals folder of the course on Merlin)	

		containing the specified parameters that will be addressed during the practicals. For each practical, a student may earn 0.5 points (maximum of 5 points for 10 practicals), and the minimum required from this component is 2 points. In addition, students may bring a separate notebook for taking notes and making sketches during the practicals.	
	Continuous knowledge checking	**20** (written preliminary exam from Pathology of skin 10 points; practical partial exam from Histopathology 10 points)	**32** (written preliminary exam from Pathology of skin 16 points; practical partial exam from Histopathology 16 points)
		Diagnostic practicals - necropsy The student is required to complete four diagnostic practicals (during 30 hours of necropsy practicals) by actively following the necropsy and participating in the discussion, and by completing a diagnostic assignment as homework. Depending on the disease identified at necropsy, the assignment consists of answering the given questions. The questions may include: establishing a	

		morphological and/or etiological diagnosis or the name of the disease/condition based on images of pathological changes identified at necropsy; providing a brief histopathological description of the lesion; defining the cause and pathogenesis of the disease; describing the consequences of the disease, and similar tasks. Each student must complete four diagnostic practicals, and for each successfully completed practical the student may receive a maximum of 4 points (4 practicals × 4 points per practical = 16 points). A minimum of 10 points is required for the diagnostic practicals to be considered successfully completed. **Practical colloquium in Histopathology**. In the histopathology colloquium (midterm exam), the student is given four histopathological slides, and for each slide a maximum of 4 points may be awarded: identification of the organ – 1 point; description of histopathological changes – 2 points; diagnosis – 1 point. In this way, the student may obtain a maximum of 16 points,	

	and must obtain at least 10 points for the colloqium to be considered passed.	
Final exam	**24**	**40**
(Oral exam)	(0-23 points=insufficient knowledge, 24-27 points=sufficient knowledge, 28-31 points=good knowledge, 32-36 points=very good knowledge, 37-40 points=excellent knowledge)	
	(a student must show sufficient knowledge in order to gain minimal 24 points)	
TOTAL	**60**	**100**

Final exam:
Minimal conditions for passing the first, second, third and fourth evaluation elements are all summed up and they are worth 36 points all together. In order to take the final exam a student must gain the 36 points. The final exam consists of a written and oral part. Written part of the final exam will last for 60 minutes, and consists of two parts. The first part is recognition of macroscopic pathological changes (duration: 20 minutes). In this part, 10 photographs of pathological processes (one photo at 2 minute intervals) will be displayed on the LCD projector. For each photo, two questions will be asked, and the student can get maximum of 0.5 point per photograph (points are awarded in range from 0.25 to 0.5). The second part of the written exam is in the essay form. Each question will have guidelines to clarify what is expected in answers. Students will briefly describe some pathological processes. This part of the exam contains of 4 questions, and each question will be scored with a maximum of 5 points. A minimum of 15 points is required to pass the written exam, while a maximum of 25 points is possible. After scoring the written part of the exam, students who received a minimum number of points (15) have the right to access the

oral part of the exam, while those who have a lower number of points receive a negative grade and do not have the right to access the oral part of the exam. Additional oral questions are askeed according to the same principle as the essay type of questions in the written part, and it is possible to achieve a maximum of 15 points in the oral part.The grade of the final exam is the one derived from the points that student has collected from the written and oral part of the exam. The maximum amount of points in final exam is 40.

Final evaluation:
Regardless of a fact that a student gained the number of points from the first four evaluation elements on the basis of makeup preliminary exam or not, the same rules are valid for forming the final mark. The final mark is formed on the basis of total sum from all six evaluation elements, according the following table

Points	*Grade*
up to 59	1 (F)
60-68	2 (E)
69-76	2 (D)
77-84	3 (C)
85-92	4 (B)
93-100	5 (A)

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**

	1. ZACHARY, J. F. (2022): Pathologic Basis of Disease, 7th edition, Elsevier, Philadelphia. 2. Notes and presentations provided by lecturers.	5	
2.113. Optional literature (at the time of submission of study programme proposal)	1. Grabarević, Željko i Sabočanec, Ruža (ur.): Osnove razudbe domaćih životinja. Medicinska naklada, Zagreb, 2016. 2. Maxie MG, editor. **Jubb, Kennedy & Palmer's Pathology of Domestic Animals**. 7th ed. 3 vols. St. Louis (MO): Elsevier; 2025.:		
2.114. Quality assurance methods that ensure the acquisition of exit competences			
2.115. Other (as the proposer wishes to add)			

LIST OF OBLIGATORY SUBJECTS – 4th STUDY YEAR

Obligatory Subjects – 4th study year

Biology and Pathology of Beneficial Insects

Biology and Pathology of Aquatic Organisms

Game Breeding and Management

Internal Medicine

Obstetrics and Reproduction I

Surgery, Orthopaedics and Ophthalmology I

Surgery, Orthopaedics and Ophthalmology II

Toxicology

Veterinary Diagnostic Imaging

Veterinary Physical Therapy, Diagnostics and Rehabilitation

BIOLOGY AND PATHOLOGY OF BENEFICIAL INSECTS

1. GENERAL INFORMATION			
1.1. Course teacher	Assoc. Professor Krešimir Matanović	1.6. Year of the study programme	4 th
1.2. Name of the course	Biology and Pathology of Beneficial Insects	1.7. Credits (ECTS)	2.5
1.3. Associate teachers	Professor Ivana Tlak Gajger, Assoc. Professor Krešimir Matanović, Valerija Benko, PhD, DVM	1.8. Type of instruction (number of hours L + S + E + e-learning)	11+0+25+0
1.4. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate university study of veterinary medicine	1.9. Expected enrolment in the course	-
1.5. Status of the course	Obligatory	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	level 1

2. COUSE DESCRIPTION	
2.1. Course objectives	During lectures and exercises student must obtain general knowledge about honeybee breading in order to comprehend the importance and role of veterinarians in recognizing and controlling diseases. The skills which one must accomplish are proper examination of honeybee colonies, recognition of clinical signs, sampling and sending the materials for laboratory procedures, and also apply prevention and therapy of honeybee diseases.
2.2. Course enrolment requirements and entry competences required for the course	Completed exams of next courses: General Veterinary Pathology, Pharmacology and Special Microbiology.
2.3. Learning outcomes at the level of the programme to which the course contributes	The course is linked to the basic veterinary courses in previous years of study, and represents synthesis of previous veterinary disciplines applicable to the biology and pathology of beneficial insects. The course prepares students for laboratory and field work in biology and pathology of beneficial insects array.
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	- argue the role of honey bees in natural ecosystems, - explain manner of life and activities of honeybee colony, construction of combs and development of brood, - differentiate the types of hives, feeders, watering containers and beekeeping tools, - describe individual organs of health honeybee and alterations caused by diseases, - distinguish diseases of brood and adult bees based on characteristic signs, - apply basic clinical and diagnostic techniques with aim to appoint suspicion on honeybee diseases,

<table>
<tr><td></td><td colspan="6">- manage the procedures of taking and sending samples for laboratory examination, treatment and remediation of honeybee diseases.</td></tr>
<tr><td>2.5. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Lectures (11):
- Introduction (Honeybees in nature, pollination, veterinarian and bees); Species and races of honeybees (origin, Asian and European)
- Honeybee colony (members and division of work); Honeybee colony during season (building up of colony, migratory beekeeping, overwintering); Reproduction (development of brood, queen rearing); Apian products
- Introduction in honeybee pathology (particularities of epizootiology)
- Viral diseases
- Diseases caused by bacteria
- Diseases caused by fungi
- Diseases caused by parasites
- Non-infectious diseases
- Pest and enemies
- Intoxications

Exercises (25):
- Hives and beekeeping equipment
- Anatomy of honeybee
- Diagnostic proceedings of disease and sanitation
- Work on apiary
- Breading and diseases of bumblebee colony
- Breading and diseases of solitary bees (Osmia spp.)</td></tr>
<tr><td rowspan="2">2.6. Format of instruction:</td><td colspan="2">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☒ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☒ laboratory
☐ work with mentor
☐ (other)</td><td colspan="2">2.7. Comments:</td></tr>
<tr><td colspan="2">Laboratory work includes teaching sessions where students themselves prepare and use microscope preparations of pathological materials.</td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="6">Active attending and participation at lectures (50%), exercises and field work (70%). Accessing to continuous knowledge checking and final exam.</td></tr>
<tr><td rowspan="2">2.9. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS</td><td>Class attendance</td><td>0.45</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Activity on exercises</td><td>0.25</td></tr>
</table>

credits is equal to the ECTS value of the course)	Essay		Seminar essay		(other)	
	Tests	0.8	Oral exam	1	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	Attending lectures 3 – 6 points (1 lecture hour equals 0.54 point) Attending exercises 8 - 12 points (1 programme (two hours) equals 0.48 points) Note: Due to specifics of honeybee colony life during active beekeeping season, non-attendance on field trip is not possible to compensate. Participation at exercises 5 – 10 points (participation at exercises will be evaluated with short oral tests with 5 points at least) Continuous knowledge checking 20 - 32 points (preliminary exam (20 questions), (1 question equals 1.6 points)) Final exam - oral: 24-40 points, (5 questions: 1 question equals 8 points).

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	Vidal-Naquet, N. (2015): Honeybee Veterinary Medicine: *Apis mellifera* L. 5m Publishing Benchmark House, Sheffield, UK.	1	
	Snodgrass, R. E., E. H. Erikson (2005): The anatomy of the honey bee. The hive and the honey bee (ed. J. M. Graham). Dadant and Sons, Hamilton, USA.	1	
	Southwick, E. E. (2005): Physiology and social physiology of the honey bee. The hive and the honey bee (ed. J. M. Graham). Dadant and Sons, Hamilton, USA.	1	
	Gary, N. E. (2005): Activities and behaviour of honey bees. The hive and the honey bee (ed. J. M. Graham). Dadant and Sons, Hamilton, USA.	1	
	Bailey, L., B. Ball (1991): Honey bee pathology. Academic Press, London.	1	
	Tlak Gajger, I. (2021): Honeybee Diseases in Modern Production. University of Zagreb Faculty of Veterinary Medicine, Zagreb.		

	PP presentations of lectures and exercises		LMS
2.12. Optional literature (at the time of submission of study programme proposal)	Jürgen Tautz (2008): The buzz about bees – biology og a superorganism. Springer, Germany. Caron, D. M., L.J. Connor (2013): Honey bee biology and beekeeping. Wicwas Press, Pennsylvania, USA.		
2.13. Quality assurance methods that ensure the acquisition of exit competences	Final exam - oral. At the Department there will be a Form for each student for keeping records of his/her lecture and exercises attendance and with a columns foe evaluating his /her participation at exercises and for continuous knowledge checking.		
2.14. Other (as the proposer wishes to add)	Anonimous student questionar about teacing work.		

BIOLOGY AND PATHOLOGY OF AQUATIC ORGANISMS

1. GENERAL INFORMATION			
1.1. Course teacher	Assoc. Professor Krešimir Matanović	1.6. Year of the study programme	4th
1.2. Name of the course	Biology and Pathology of Aquatic Organisms	1.7. Credits (ECTS)	2.5
1.3. Associate teachers	Full Professor Emil Gjurčević, Assoc. Professor Krešimir Matanović	1.8. Type of instruction (number of hours L + S + E + e-learning)	11+0+25+0
1.4. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate university study of veterinary medicine	1.9. Expected enrolment in the course	30
1.5. Status of the course	Obligatory	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	level 1
2. COUSE DESCRIPTION			
2.1. Course objectives	During lectures and exercises, students obtain general knowledge about breeding of aquatic organisms in order to comprehend the importance and role of veterinarians in recognising and controlling aquatic organism diseases. The skills which one must accomplish are proper examination of aquatic organisms, recognition of clinical signs, sampling and sending the materials for laboratory procedures, and also prevention and therapy in aquaculture.		
2.2. Course enrolment requirements and entry competences required for the course	Completed exams in the following courses: General Veterinary Pathology, Pharmacology and Special Microbiology		
2.3. Learning outcomes at the level of the programme to which the course contributes	The course is linked to the basic veterinary courses in previous years of study and represents synthesis of previous veterinary disciplines applicable to the biology and pathology of fish and other aquatic organisms. The course prepares students for laboratory and field work in the field of biology and pathology of fish and other aquatic organisms.		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	○ Distinguish fish species and other aquatic organisms important for breeding. ○ Understand the basic principles of farming of aquatic organisms. ○ Explain the importance and role of veterinarians in maintenance of fish health and human health. ○ Perform routine diagnostic examination, recognize clinical signs of disease ○ Collect and transport samples for laboratory examinations. ○ Apply therapeutic measures and measures for prevention of disease.		

<table>
<tr><td>2.5. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Lectures (11)
○ Introduction (Importance of breeding of aquatic organisms); The aquatic environment (Basic water quality parameters for aquatic organisms);
○ Natural and artificial spawning;
○ Breeding of aquatic organisms;
○ Viral fish diseases (Diseases prevented by Regulations of veterinary medicine and others important for breeding);
○ Bacterial fish diseases (Diseases important for breeding);
○ Parasitic fish diseases (Diseases important for breeding);
○ Fungal fish diseases and diseases caused by abiotic factors;
○ Diseases of crabs and molluscs (Diseases prevented by Regulations of veterinary medicine and others important for breeding);
○ Zoonoses.

Exercises (25)
○ Systematic of aquatic organisms (Systematic of freshwater and marine fish and other aquatic organisms important for breeding);
○ Anatomy of aquatic organisms (Fish and molluscs anatomy);
○ Clinical examination (External examination and biopsy);
○ Sending of the materials for laboratory examinations;
○ Ichthyosanitary measures;
○ Virological, bacteriological, parasitological and haematological procedures (specifics of procedures for aquatic organisms).</td></tr>
<tr><td rowspan="2">2.6. Format of instruction:</td><td colspan="2">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☒ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☒ laboratory
☐ work with mentor
☐ (other)</td><td colspan="2">2.7. Comments:</td></tr>
<tr><td colspan="4"></td><td colspan="2">Laboratory work includes teaching sessions where students themselves use microscope for pathological examination.</td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="6">Attendance of lectures (50%) and exercises (70%); active participation at exercises; continuous assessment .</td></tr>
<tr><td rowspan="3">2.9.Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is</td><td>Class attendance</td><td>0.45</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Participation at exercises</td><td>0.25</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
</table>

equal to the ECTS value of the course)	Tests	0.8	Oral exam	1	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	Evaluation elements: 1. Attending lectures: 3-6 points (1 lecture hour equals 0.54 point) 2. Attending exercises: 8-12 points (1 lecture hour equals 0.48 point) 3. Participation at exercises: 5-10 points (evaluated with short oral tests) 4. Continuous knowledge checking: 20-32 points 5. Final exam – oral: 24-40 points (5 questions): 1 question equals 8 points

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	BARDACH, J. E., J. H. RYTHER, W. O. McLARNEY (1972): Aquaculture: The Farming and Husbandry of Freshwater and Marine organisms. Wiley-Interscience, New York-London-Sydney-Toronto.	1	
	HOLE, D., D. BUCKE, P. BURGESS, I. WELLBY (2001): Diseases of carp and other cyprinid fishes. Fishing News Books, London.	1	
	NOGA, E. J. (2000): Fish disease: Diagnosis and treatment. Iowa State University.	1	
	ROBERTS, R. J. (2001): Fish pathology. W. B. Saunders. London.	1	
	WOO, P. T. K., D. W. BRUNO (1999): Fish Diseases and disorders. Vol. 3.: Viral, bacterial and fungal infections. CABI Publishing.	1	
	PP presentations of lectures and exercises		MERLIN

2.12. Optional literature (at the time of submission of study programme proposal)	BOYD, C. E. (1990): Water Quality in Ponds for Aquaculture. Auburn University, Alabama, USA. FERGUSON, H. W. (2006): Systemic pathology of fish: A text and atlas of normal tissues in teleosts and their responses in disease. Scotian Press London. GREENBERG, D. B. (1960): Trout farming. Chilton company – book division, Philadelphia-New York. HORVATH, L., G. TAMAS, C. SEAGRAVE (1992): Carp and pond fish culture. Fishing News Book, Oxford. PLUMB, J. A. (1999): Health maintenance and principal microbial diseases of cultures fishes. Iowa State University. SINDERMANN, C. J. (1990): Principal diseases of marine fish and shellfish. Academic Press, London.

2.13. Quality assurance methods that ensure the acquisition of exit competences	Final exam – oral. At the Department there will be a Form for each student for keeping records of his/her lecture and exercises attendance and with a columns for evaluating his/her participation at exercises and for continuous knowledge checking.
2.14. Other (as the proposer wishes to add)	Anonymous student questionnaire about teaching work.

GAME BREEDING AND MANAGEMENT

1. GENERAL INFORMATION			
1.19. Course teacher: leader/deputy	Assistant professor Magda Sindičić, PhD, DVM Full professor Alen Slavica, PhD, DVM	1.50. Year of the study programme	4
1.20. Name of the course	**Game Breeding and Management**	1.51. Credits (ECTS)	2.5
1.12. Associate teachers	Full professor Alen Slavica, PhD, DVM; Full professor Zdravko Janicki, Professor Dean Konjević, PhD, DVM;	1.52. Type of instruction (number of hours L + S + E + e-learning)	4+0+26
1.13. Study programme (undergraduate, graduate, integrated)	Integrated	1.53. Expected enrolment in the course	
1.14. Status of the course	Compulsory	1.54. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	Level 1
2. COUSE DESCRIPTION			
3.79. Course objectives	By attending the Game breeding and management course students will gain the knowledge on peculiarities of natural and intensive breeding of different game species. They will gain the basic knowledge on natural sciences, animal welfare, handling and breeding as well as on legislative, Croatian and EU regulations of the aforementioned activities. The subject curriculum is formed in a way to inspire the bioethical approach to the game breeding, which is based on the newest welfare understanding and traditional game breeding system. Attendants can meet the essentials of selective work in game breeding, the models of intensive breeding of large and small game and guidelines for the game production. In practical part students gain knowledge and competency of game breeding, keeping and management particularly by sex and age determination, estimation of game breeding value, social structure evaluation, breeding technology comprehension (natural and farm breeding of small and large game) with etiologic base and welfare satisfaction at breeding and handling with stress on loading, hunting, binding, dazing, transport, weighing, operator risk determining etc. In that way the attendants will be able to master specialised skills and competence in expert activities of planning, conduction and improvement of intensive and natural game breeding.		
3.80. Course enrolment	To meet course entry competences student must have attended all courses of VI semester and passed the examination in the subjects General Pathology and Special Pathology		

requirements and entry competences required for the course		
3.81. L earning outcomes at the level of the programme to which the course contributes	- Implementation of intensive farming technology on wildlife species - Designing and sizing of breeding capacity - Application of bioethical principles in the breeding planning and implementation - Planning and implementation of natural and intensive game farming - Design and implementation of health surveillance in game breeding - Meeting the welfare of game by types of farming - Capture and restraint of wildlife, individually and collectively - Risk assessment in manipulation with wildlife species - The organization and implementation of chemical immobilization - Preparation and implementation of game transportation - Selection in game breeding	
3.82. L earning outcomes expected at the level of the course (4 to 10 learning outcomes)	- Development and Implementation of Game management plan and Game protection plan - Modelling of intensive farming of large and small game species - Design of a farm for breeding large and small game - Design and implementation of Hunting management plan - Planning and design of game management and technical facilities - Operation and maintenance game management and technical facilities - Nutrition and winter feeding of game - Introducing and rewilding of reared game - Estimation of the economic and rearing value of game - Application of methods for preventing detriments on game and form game	
3.83. C ourse content broken down in detail by weekly class schedule (syllabus)	Keynote lecture - 1 hour Wildlife Management I - 1 hour	Presentation of the curriculum, organization of lectures and exams; defining concepts - wild animals, g wildlife and protected species, hunting management; models of farming. Game and hunting by the Hunting Act, ZOL, types of hunting grounds; Establishing redistribution of fi and forests; Population dynamics and rearing age, game planning in the natural rearing of game spec

Wildlife Management II - 1 hour Selection - 1 hour	Components of HMP, glossary, definition of the hunting ground evaluation, determination hunt-produc area and hunt-management capacity; Funds of game – reproductive and total stock, growth and accr gain coefficient according to the type of hunting grounds and solvency. Selection work in the breeding cultivation of large game, the basic principles, selection according to th gender, selection by age categories.
Arrangement and maintenance hunting ground - 1 hour Detriments on game and form game - 1 hour	Technical arrangement of hunting ground, hunting management and technical facilities. Damage to wildlife and damage from wildlife, game road kills; measures of detriments prevention; de on game by nature
The principles of selection in game breeding, estimate age and gender - 2 hours	Selection in natural rearing of game, identification of game age categories, perspective and non-pers male and female, quality selection models and their adjustment to breeding goal, culling types, Practi work - selection in red deer, fallow deer, roe deer and mouflon population. Estimation of age.
Practical work in hunting ground – 6 hours	1. Setting up and dismantling electrical fences 2. Measures for technical arrangement of hunting grounds (HM and T objects) 3. Hygienic sanitation and maintenance of the HG and T facilities 4 IR cameras for wildlife 5. cartography 6. Survey of the field, drive counting
Natural rearing of game and HMP - 2 hours	Practical: determining hunt productive area and prudential grades; calculation of the breeding stock, increment and culling, Determining hunt management capacity; fund development of big and small ga species
Health surveillance and veterinary profession in hunting 1 hour Profession training of qualified person in the hunting area 1 hour	The organization of health surveillance, Coprological monitoring, hygienic-sanitary measures, rules concerning inspection and transport of venison, regulations related to the disposal of carcasses. Competent person, official records. Practical work: filling out forms of spring growth and abundance o and big game species.
Equipment for capture and immobilization	Methods of capturing wildlife, equipment and accessories for injection application; Application routes technical means for immobilization; transport of large and small game, Game welfare in transport.

	Capture and transport of game 2 hours	
	Chemical immobilization -2 hour	Decision making in immobilization drug selection and dose estimation, environmental and game cond Transport premedication; immobilization protocol and preparing the operator; professional procedure immobilized beast; Technical problems and complications of manipulation and immobilization; prever and elimination of complications
	Chemical immobilization -2 hour	Practical work - Selecting immobilization drug on the game species; calculation of dose per kg / body and total dose of application, determination of percent concentration; Preparation sedatives, darts an capture guns for the application; darting targets
	management of game outside the hunting area 2 hours	Management objectives, methods of monitoring and research, assessment and habitat improvement measures, reintroduction
	Farm breeding big game - 2 hours	The spatial dimensions of the farm and small fenced area; Positioning farms and farming plants; farm areas, corridors and 'Crush' systems for manipulation, protection of breeding areas and types of fenc nutrition and feeding, farm rearing of wild boars
	Farming small furry and feathered game 2 hours	The technology of hare breeding, cage and polygon type farming methods re wilding methodology; technopathy morbidity and mortality in farm breeding, farm breeding of pheasants, partridge and quai facilities in the breeding of game birds; formation of broodstock and selection of breeding stock; Phas breeding of game birds and nutrition standards , methods and effectiveness of pheasants and partric release, preparing hunting area for game birds release; facilities for the reception and releasing gam in hunting area; technopathy and diseases game birds in farm breeding

3.84. Format of instruction:	X lectures ☐ seminars and workshops X exercises ☐ on line in entirety ☐ partial e-learning X field work	X independent assignments X multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	3.85. Comments:
3.86. Student responsibilities	Attending lectures (50%), exercise (80%), active participation in exercises and seminars, self-support task/problem solving, continuous preliminary exam (once).		

3.87. Screening student work *(name the proportion of ECTS credits for each activity so that the total*						
	Class attendance	0,18x2,5=0,45	Research		Practical training	0,1x2,5=0,25
	Experimental work		Report		(other)	
	Essay		Seminar essay		(other)	
	Tests	0,32x2,5=0,8	Oral	0,4x2,5=1,0	(other)	

<table>
<tr><td>number of ECTS credits is equal to the ECTS value of the course)</td><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td colspan="7">2.10. Grading and evaluating student work in class and at the final exam
<table>
<tr><th>Type of activity</th><th>Minimal points</th><th>Maximal points</th></tr>
<tr><td>Attending lecture
(4 hour lecture)</td><td>3
(coefficient 1,5) 2x1,5=3
(student must be minimally in two-hour lecture in order to achieve the minimum 3 points)</td><td>6
6:4=1,5 (coefficient 1,5)</td></tr>
<tr><td>Attending exercise
(26 hours of practic work
=13 programs)</td><td>8
(coefficient 0,4) 20 x 0,4 = 8
(the student must be at least 20 hours of practice in order to achieve the minimum 8 points)</td><td>12
12 : 26=0,45 (coefficient 0,4)</td></tr>
<tr><td>Participation at exercise
Solving a problem at exercise = 0,5 point 4 x problem
Dedication at solving a field problem
2 points for a solved problem (2 x field task)
Preparation for exercise</td><td>5
(coefficient 0,5) 4x0,5=2 points
(coefficient 2) 2x2=4 points
(coefficient 1) 4 x1=4 points
The student must achieve minimum 5 points total from all three types of activities</td><td>10
(2)
(4)
(4)</td></tr>
</table></td></tr>
</table>

	1 point = one correct and complete answer at exercises		
	2 x preliminary exam **16 questions per exam** 1 question = 1 point 16 x 1 = 16 points **Total = 32 points**	(2x10) **20** (coefficient 1) 10 x 1 =10 (a student must have 10 correct answers to get minimum 10 points per each exam)	**32** 32 :32=1 (**coefficient 1**)
	Final exam	**24**	**40**
	(Oral exam) 1 question = 5points(max.) 8 questions = 40 points	To pass the oral part of the exam a student must gain minimal 24 points	maxsimal 40 points at the oral exam 2 point for 'sufficient' 3 points for 'good' 4 points for 'very good' 5 points for a 'excelent' oral answer per question
	TOTAL	**60**	**100**

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and via other media)	1. Haigh, J. C., R. J. Hudson (1993): Farming Wapiti and Red Deer. Mosby-Yearbook, Inc., St. Louis, Missouri, USA		
	2. Nielsen, L. (1999): Chemical Immobilization of Wild and Exotic Animals. Iowa State University Press, Ames, Iowa, USA		
	3. Schemnitz, S. D. (Ed) (1980): Wildlife Management Techniques Manual. The Wildlife Society, Inc., Maryland, USA		

2.116. Optional literature (at the time of submission of study programme proposal)	1. Reid, H. W. (1988): "The Management and Health of Farmed Deer". Kluwer Academic Publishers, Boston, London.
2.117. Quality assurance methods that ensure the acquisition of exit competences	1. Presence at lectures and presence in exercises 2. Continuous assessment 3. Participation in the training 4. Final exam The student must be present at the two-hour lecture to get minimum 3 points. The maximum number of points on 6 The student must be present at the 20 hours of practice to get minimum 8 points. The maximum number of points is 12 During program exercise in the practicum student must answering questions to prove preparedness. Each correct and complete answer carries 0.5 points. The minimum number of points in this assessment is 5. The maximum number of points is 10. Knowledge is written preliminary twofold checks after the first and after second half of the treated material. The minimum number of points is 20, and the maximum number of points is 32. To access the final exam, the student must be in the school district, or by scoring the previous elements of assessment to collect a minimum of 36 out of a possible 60 points. The final exam is an oral. Student answers the eight questions. Each correct and complete answer brings 5 points. The minimum number of points is 20. The maximum number of points is 40. During the oral examination 0-5 points are given to each answer, with a minimum of 2 points per answer.
2.118. Other (as a proposer wishes to add)	

INTERNAL MEDICINE

1. GENERAL INFORMATION			
1.21. Course teacher	Assoc. Prof. Jelena Gotić Deputy: Prof. Marin Torti	1.55. Year of the study programme	IV
1.22. Name of the course	Internal Medicine	1.56. Credits (ECTS)	VII 10 VIII 6
1.13. Associate teachers	Prof. Mirna Brkljačić, DVM, PhD, Prof. Damjan Gračner, DVM, PhD, Prof. Nada Kučer, DVM, PhD, Prof. Nikša Lemo, DVM, PhD, DECVD, Prof. Vesna Matijatko, DVM, PhD, Prof. Marin Torti, DVM, PhD, Assoc. Prof. Martina Crnogaj, DVM, PhD, Assoc. Prof. Jelena Gotić, DVM, PhD, Assoc. Prof. Darko Grden, DVM, PhD, Assoc. Prof. Ivana Kiš, DVM, PhD, Assoc. Prof. Iva Šmit, DVM, PhD, Assist. Prof. Ines Jović, DVM, PhD, Maša Efendić, DVM, PhD, Filip Kajin, DVM, PhD, DECVN, Gabrijela Jurkić-Krsteska, DVM, PhD, Petra Bratić DVM, Katarina Marjanović, DVM, Elizabeta Pongrac, DVM	1.57. Type of instruction (number of hours L + S + E + e-learning)	VII L60+P69 VIII L30+S9+P42
1.14. Study programme (undergraduate, graduate, integrated)	Integrated	1.58. Expected enrolment in the course	
1.15. Status of the course	Compulsory	1.59. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			

3.88. Course objectives	Diagnosis and treatment of diseases of the gastrointestinal, cardiovascular, respiratory, and urinary systems, as well as the diagnosis and treatment of neurological, endocrine, hematopoietic, neoplastic, and dermatological diseases in domestic animals. Fundamentals of veterinary emergency and critical care medicine.
3.89. Course enrolment requirements and entry competences required for the course	Anatomy of domestic animals; physiology of domestic animals; pathophysiology of domestic animals; pharmacology; and clinical propedeutics.
3.90. Learning outcomes at the level of the programme to which the course contributes	During the study of internal medicine in domestic animals, students develop and consolidate clinical reasoning based on the medical knowledge acquired during their preclinical studies. This approach enables the education of specialists who are continuously open to new knowledge, are not constrained by stereotypes, and validate their clinical reasoning through objective diagnostic procedures. After mastering the course material, students will be able to perform a clinical examination of an individual animal or a herd, recognize the clinical signs of disease, and establish a diagnosis based on their findings. They will also be able to confirm the preliminary diagnosis using additional laboratory and basic diagnostic imaging procedures (primarily basic screening ultrasonography), while critically evaluating and applying current scientific literature. Students will determine the appropriate therapy for diseases within the field of internal medicine and prepare a clinical report describing the clinical case. When euthanasia is indicated, students will be able to make an independent professional recommendation to the owners regarding humane euthanasia, ensuring that the procedure is carried out in accordance with legal requirements and with due respect for both the animal and its owners. Students will also be able to independently adopt an integrated and longitudinal approach to the assessment and interpretation of various diseases. Upon completion of the course, students will be well prepared to successfully participate in further clinical courses, as well as in courses within the field of public veterinary health.
3.91. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. Differentiate the clinical signs of diseases affecting internal organs and metabolic disorders. 2. Correlate clinical signs involving different organs or organ systems and prepare a clinical report or case presentation accordingly. 3. Critically evaluate the results of basic laboratory tests and other diagnostic procedures in individual patients or animal herds. 4. Integrate findings from clinical examinations and diagnostic procedures to establish an early diagnosis in individual patients or animal herds. 5. Recognize when euthanasia is indicated, make an appropriate professional recommendation, and perform the procedure in accordance with legal and ethical standards. 6. Establish a prognosis based on clinical findings and treatment outcomes.

	7. Interpret specific conditions, syndromes, and diseases affecting internal organs, and critically evaluate the professional literature to obtain relevant information on topics related to internal medicine in animals. 8. Conduct clinical examinations of individual patients or animal herds using appropriate examination methods and clinical techniques. 9. Plan the optimal type and sequence of therapeutic procedures and evaluate the course, effectiveness, and outcomes of treatment.
a. Course content broken down in detail by weekly class schedule (syllabus)	**Skin diseases.** Inflammatory diseases of the skin. Pruritus. Allergies. Otitis externa. Dermatology of cats. Immune-mediated skin diseases. Burns, hypovitaminoses, endocrine imbalances. **Hematopoietic system diseases and clinical pathology.** Anaemia. Polycythaemia. Leukopenia, leucocytosis, leukaemia. Coagulopathies, haemorrhagic diatheses. Blood types, blood transfusion. Interpretation of laboratory results – enzymes. Interpretation of laboratory results – metabolites. **Gastrointestinal system diseases.** Clinical signs and diagnostics of digestive system diseases. Mouth, pharynx, and oesophagus. Gastric dilatation volvulus. Gastritis, gastric ulcer. Inflammatory bowel disease. Enteritis, colitis, ileus, constipation. Hepatic diseases – hepatitis, portosystemic shunts, hepatic lipidosis. Pancreatic diseases – acute and chronic pancreatitis, exocrine pancreatic insufficiency. **Urinary system diseases.** Clinical signs and diagnostics of urinary tract diseases. Acute renal failure. Chronic renal failure. Lower urinary tract inflammation, urolithiasis, FLUTD, urethral obstruction in cats. **Cardiovascular system diseases.** Clinical signs of cardiovascular system diseases and diagnostic work-up. Congenital heart diseases. Valvular diseases. Cardiomyopathies. Arrhythmias. Pericardial diseases. **Respiratory system diseases.** Rhinitis, sinusitis. Diseases of larynx and trachea. Bronchitis. Pneumonias. Pneumothorax, pleural effusions. **Endocrine diseases.** Diagnostics of endocrine diseases. Diabetes insipidus. Hypothyroidism, hyperthyroidism. Hypoadrenocorticism, hyperadrenocorticism. Diabetes mellitus. Diabetic ketoacidosis and other complication of diabetes. Insulinoma and other hormonally active tumours. **Nervous system diseases.** Clinical signs and diagnostic test in nervous system diseases. Vestibular disease. Seizures. SRMA and other inflammatory diseases of nervous system. Spinal diseases. Myasthenia gravis and other diseases of the peripheral nervous system. Behavioural disorders. **Oncology.** Approach to a patient with mass, bump, or lump - clinical signs and diagnosis of neoplastic diseases. Paraneoplastic syndrome. The most frequent tumours – lymphoma, mast-cell tumour, melanoma, hemangiosarcoma, mammary gland adenocarcinoma. Life quality assessment and palliative care of patient with malignant tumours. **Veterinary emergency and critical care medicine.** Triage and CPR. Respiratory distress. Shock. Selected emergencies in small animal medicine. Critical care. **Diseases of ruminants**. Alimentary indigestions. Traumatic indigestion. Ruminal tympany (bloat): acute, chronic, frothy. Pyelonephritis and other urinary tract diseases. Ketosis. Bronchopneumonia and other respiratory diseases. Tetany, vitamin, and mineral metabolism disorders. Ketosis and hepatic steatosis in sheep and goats, and other significant diseases of sheep and goats.

<table>
<tr><td></td><td colspan="6">Swine diseases. Anaemia in piglets, hypoglycaemia in piglets, multiple degeneration of muscles and myocardium in swine. Peptic ulcer. Specific vitamin and mineral deficiencies.

Equine diseases. Clinical signs, diagnostic work-up and treatment of equine diseases. Equine endocrine diseases. Equine cardiology: overview of most common equine heart diseases. Recurrent airway obstruction (equine asthma) and other respiratory diseases. Colic. False colic and urinary tract diseases. Exercise (paralytic) myoglobinuria and equine atypical myopathy.

Neurology of large animals. Dermatology of large animals. Small mammal diseases. Selected diseases of ferrets: insulinoma, FADC, lymphoma, cardiomyopathies. Selected diseases of rabbits and rodents (malocclusion, gastric stasis, pneumonias, urolithiasis, vestibular disease).</td></tr>
<tr><td>b. Format of instruction:</td><td colspan="3">+ lectures
+ seminars and workshops
+ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="3">+independent assignments
☐ multimedia and the internet
+laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td></td><td colspan="3">c. Comments:</td><td colspan="3"></td></tr>
<tr><td>d. Student responsibilities</td><td colspan="6"></td></tr>
<tr><td>e. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0.7/0.3</td><td>Research</td><td></td><td>Practical training attendance</td><td>3.0/1.2</td></tr>
<tr><td></td><td>Experimental work</td><td></td><td>Report</td><td></td><td>Practical training activity</td><td>2.5/0.9.</td></tr>
<tr><td></td><td>Essay</td><td></td><td>Seminar</td><td>0.6</td><td>(other)</td><td></td></tr>
<tr><td></td><td>Tests</td><td>5.1</td><td>Oral exam</td><td>1.1</td><td>(other)</td><td></td></tr>
<tr><td></td><td>Written exam</td><td>1.9</td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">By attending lectures in the seventh semester the student gains from 2 to 4 points (60 lecture hours; each lecture hour equals a coefficient of 0,0665) and in the eight semester 1 to 2 points (30 lecture hours; each lecture hour equals a coefficient of 0,0665). Student must attend at least 30 lecture hours (50%) in the seventh semester, for a minimum of 3 points, and at least 15 lecture hours (50%) in the eight semester, for a minimum of 1 point. The maximum number of points from this element is 6 points.
By attending practicals in the seventh semester the student gains from 5 to 7 points (69 exercise hours; each exercise hour equals a coefficient of 0,1) and in the eight semester 3 to 4 (42 exercise hours; each exercise hour equals a coefficient of 0,1). Student must attend at least 48 exercise hours (70%) in the seventh</td></tr>
</table>

semester, for a **minimum of 5 points**, and **at least 30 exercise hours (70%) in the eight semester**, for a **minimum of 3 points**. The maximum number of points from this element is 10 points.
During the semester the student must perform at least **8 different standardized practical procedures** on animals for a **minimum of 5 points**. The maximum number of points from this element is 10 points, or 16 different practical procedures.
By attending **seminars**, in the **eight semester**, the student gains from 1 to 2 points (9 seminar hours; each seminar hour equals a coefficient of 0,1). Student must attend **at least 6 seminar hours (70%)**, for a **minimum of 1 point**.
The students will have a mid-term (preliminary) written exam or colloquium consisting of 16 questions. Each question equals 2 points, with a maximum of 32 points. The **minimum number of points required to pass is 20**. Taking and passing the test is required for the continuation into the eight semester and registration of final exam.
The final exam consists of a written and oral part. The written part of the exam consists of 24 questions. Each question equals 1 point, and the **minimum required number of points to pass is 14**. After successful completion of the written part of the final exam, the students take the oral part of the exam which consists of eight questions. Each question is graded, so a student can achieve a minimum of 10, and maximum of 16 points. Final grade is formed by the total sum of points achieved from the above-mentioned elements:

Points	Grade
up to 59	1 (F, insufficient)
60-68	2 (E, sufficient)
69-76	2 (D, sufficient)
77-84	3 (C, good)
85-92	4 (B, very good)
93-100	5 (A, excellent)

2.11. Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
1. Lecture handouts via Merlin or printed handouts		
2. Ettinger S.J., Feldman, E.C.: Textbook of Veterinary Internal Medicine Expert Consult: Expert Consult, 9 th edition, Saunders, Elsevier, USA, 2024 – selected chapters.		
3. Small Animal Internal Medicine, 6th Edition by Richard W. Nelson, DVM and C. Guillermo Couto, DVM, 2019.		

	4. Radostits, O.M, Gay, C. C., Hinchcliff, K. W., Constable, P. D.: Veterinary Medicine: A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses 10th Edition, Saunders, Elsevier, USA – selected chapters.		
	5. Large Animal Internal Medicine, 6th Edition by Bradford Smith, David Van Metre, Nicola Pusterla, 2021.		
2.119. Optional literature (at the time of submission of study programme proposal)			
2.120. Quality assurance methods that ensure the acquisition of exit competences	Continuous knowledge assessment, mid-term (preeliminary) exam/colloquium, final exam (written and oral part).		
2.121. Other (as the proposer wishes to add)			

OBSTETRICS AND REPRODUCTION I

1. GENERAL INFORMATION			
1.23. Course teacher	Assoc. prof. Branimira Špoljarić	1.60. Year of the study programme	4 (VIII semester)
1.24. Name of the course	**Obstetrics and Reproduction I**	1.61. Credits (ECTS)	12.5
1.14. Associate teachers	Full Prof. Juraj Grizelj, Full Prof. Martina Lojkić, Full Prof. Nikica Prvanović Babić, Full Prof. Marko Samardžija, Full Prof. Silvijo Vince Assoc. Prof. Ivan Folnožić, Assoc. Prof. Iva Getz, Assoc. Prof. Branimira Špoljarić, Assist. Prof. Ivan Butković, Postdoctoral Assistant Juraj Šavorić, PhD, DVM Assistant Ivan Tomić, DVM	1.62. Type of instruction (number of hours L + S + E + e-learning)	60 + 0 + 100+5 + 0
1.15. Study programme (undergraduate, graduate, integrated)	Integrated Undergraduate and Graduate University Study of Veterinary Medicine in English	1.63. Expected enrolment in the course	25

1.16. Status of the course	Compulsory	1.64. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	-
2. COUSE DESCRIPTION			
3.92. Course objectives	Within the course framework. the students will get acquainted in detail with the hormonal regulation of the reproductive cycle of domestic animals, including phases, a clinical view of reproductive cycles and the artificial insemination of domestic animals Students will also be thoroughly familiarized with oogenesis. the mechanism of ovulation, fertilization, nidation and placentation as well as pregnancy, pregnancy diagnostics and pathology of pregnancy and the phases of parturition, physiology and pathology of puerperium. spermiology, and udders.		
3.93. Course enrolment requirements and entry competences required for the course	Students are required to previously complete the courses of the General Veterinary Pathology and Special Veterinary Pathology. They should be able to take the animal's history, restrain it in a safe way and perform a general clinical examination. The student should be able to propose diagnostic examinations and understand the principles of the therapeutical approach which could be performed on the gynaecologic patient. Also, students should have basic knowledge of sexual hormone structure and function, anaesthesiology protocols and aseptic and antiseptic principles.		
3.94. Learning outcomes at the level of the programme to which the course contributes	To be able to independently take the gynaecologic history and perform gynaecological / andrological examinations (including udders) of female and male animals, including rectal palpation and ultrasound checking, in order to define the animal's reproductive status. To be able to timely perform artificial insemination, understand the principles of semen collection and insemination dose, and perform basic semen tests. To be able to properly assist labour and apply obstetrical methods in case of need. To check post-parturient animal and determine if the puerperium of the animal is running physiologically; and if not, to be able to assess the proper therapeutic approach. To assess general conditions at the farm level which influence optimal animal reproduction and milk production, overall animal production at the farm level, animal welfare and safety of animal products.		
3.95. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	to analyse the physiological function of the gonads to analyse the impact of various endogenous and exogenous factors on ovarian function, and relate with the phase of reproductive cycle to relate embryonic and fetal development to methods of diagnosing pregnancy in domestic animals to analyse the physiology of parturition		

	to explain the physiology and pathology of pregnancy and puerperium in domestic animals to analyse the factors that affect male reproduction, and choose appropriate semen collection methods and artificial insemination of domestic animals to explain the clinical picture, available diagnostic methods and therapeutic approach in inflammatory conditions of the mammary gland of domestic animals, applying the principles of responsible use of veterinary medicinal products, especially antimicrobial therapy, and the "One Health" concept
3.96. Course content broken down in detail by weekly class schedule (syllabus)	Introduction to the hormonal regulation of the sexual cycle; sexual cycle specificity in cows and heifers; sexual cycle specificity in mares; sexual cycle specificity in sows; sexual cycle specificity in sheep and goats; sexual cycle specificity in bitches and queens; oogenesis and folliculogenesis; hormonal regulation of ovulation; fertilization and embryo nidation; placentation; physiology of pregnancy, pregnancy diagnostics; physiology of delivery; spermiology; artificial insemination; physiology and pathology of puerperium; physiology and diseases of mammary gland.

3.97. Format of instruction:			3.98. Comments:
	☒ lectures ☐ seminars and workshops ☒ exercises ☐ on line in entirety ☐ partial e-learning ☒ field work	☒ independent assignments ☐ multimedia and the internet ☒ laboratory ☐ work with mentor ☐ (other)	

3.99. Student responsibilities	Students are obliged to attend at least 30 lecture hours and 73 hours of practicals. A minimum of 5 (max. 10) points must be gained during practicals.

3.100. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
Class attendance	0.75	Research	-	Practical training		
Experimental work	-	Report	-	Activity	2.75	
Essay	-	Seminar essay	-	(other)		
Tests	4	Oral exam	5	(other)		
Written exam	-	Project	-	(other)		

2.10. Grading and evaluating student work in class and at the final exam	By attending lectures the student gains 3-6 points (60 lecture hours; each lecture hour equals a 0.1 coefficient). Students must attend at least 30 lecture hours. By attending practicals the student gains 8-12 points (105 exercise hours; each exercise hour equals a 0.11 coefficient). Students must attend at least 73 exercise hours. The activity at the practicals is evaluated with 5-10 activity points. Each point earned at activities will be multiplied by coefficient 0,1, to obtain activity points. The activity will be evaluated through the following: 1) Participating in clinical work and the treatment of the patient (pets – dogs, cats, etc.), the student can gain a maximum of 20 points (taking a history, clinical examination of the animal, establishing a differential diagnosis, treatment options), 2) Participating in clinical work and the treatment of the patient (farm animals - cows, horses, pigs, sheep, goats); the student can gain a maximum of 20 points (taking a history, clinical examination of the animal, establishing a differential diagnosis, treatment options), 3) Evaluation of the collected semen (assessment of sperm motility, determination of sperm concentration and evaluation of sperm vitality), the student can gain a maximum of 30 points (the student independently performs the specified tests of the semen in order to create an evaluation report of the semen), 4) Examination of the mammary gland of domestic animals, the student can get a maximum of 10 points (the student takes a history and independently performs an examination of the mammary gland, including an examination of obtained milk sample - examination on a black background, mastitis test), 5) Artificial insemination of domestic animals, where the student can get a maximum of 10 points (the student will choose the domestic animal species, explain the procedure with male animals, methods of semen collection, the procedure of evaluating and preparing sperm doses, methods of synchronizing the sexual cycle and defining the optimal time for the insemination of females and methods of deposition of the semen), 6) A short oral exam in order to check whether the student has prepared for the practicals; the student can gain a maximum of 10 points (the student can be assessed any time during the practicals in order to check if he/she has acquired the knowledge required to attend the practicals). Through the described, the student can earn maximum of 100 points, to gain 10 activity points (100x0,1=10). Minimum is 50 earned points, for minimal 5 activity points. Principles of rounding to the nearest whole number will be applied. There will be a progress test performed during the semester consisting of 32 questions and performed in written form. The progress test brings 32 points (each question equals a 1 point), 20 points being the minimum required to pass. Taking the progress test during the main term is compulsory (missing the main term needs to be justified). 3 additional progress test terms will be announced, as per agreement with students. A passing grade for the progress test is a requirement in order to register for the final exam. However, the progress test is not a requirement for a signature in the grade book. If the student fails the progress test 4 times,

	he/she needs to take the whole course over again. In case he/she doesn't take the progress test or fails it 4 times, an additional term is possible if the student representative writes an official request to the respective Vice Dean. The Course leader makes the final decision. In order to take the final exam, a student must gain a minimum of 16 points by attending lectures, practicals and through activities during practicals, and at least 20 points from continuous knowledge assessments. The final exam consists of 10 oral questions and in total brings up to 40 points (a minimum of 24 points to pass). The total sum of points achieved from the above-mentioned elements is expressed in the final mark (1 – 5), 1 being a fail. **Points** / **Grade** up to 59 / 1 (F) insufficient 60-68 / 2 (E) sufficient 69-76 / 2 (D) sufficient 77-84 / 3 (C) good 85-92 / 4 (B) very good 93-100 / 5 (A) excellent

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	NOAKES, D. E, T J. PARKINSON, G. C. W. ENGLAND (2018): Arthur's Veterinary Reproduction and Obstetrics, 10th Ed (Noakes, D. E., TJ. Parkinson, G. C. W. England, Eds.), W. B. Saunders Company Ltd	1	-
	Senger, P. L. (2012): Pathways to Pregnancy and Parturition. 3rd edition. Current Conceptions, Inc.	1	-
	Jackson, P. G. G. (2004): Handbook of Veterinary Obstetrics. Saunders W. B. Company.	1	-

	Constable, P. D., K. W. Hinchcliff, S. H. Done, W. Grünberg, O. M. Radostits (2017): Veterinary medicine : a textbook of the diseases of cattle, horses, sheep, pigs and goats. St. Louis, Mo. : Elsevier. Pp. 1904-1998.	1	-
	Green, M. (2012): Dairy herd health. CAB International. Pp. 117-168.	1	-
	BSAVA Manual of Canine and Feline Reproduction and Neonatology, 2nd Ed. 2019., (G. England, A. von Heimendahl, Eds), British Small Animal Veterinary Association. Gloucester, UK	1	-
	JOHNSTON, S. D, M. V. ROOT KUSTRITZ, P. S. OLSON (2003): Canine and Feline Theriogenology, 2nd Ed., Saunders Company Ltd, USA	1	-
2.122. Optional literature (at the time of submission of the study programme proposal)	Jonston, Kustritz, Olson (2003): Canine and Feline Theriogenology. Saunders Company Ltd. Simpson, G. (2008): BSAVA Manual of Small Animal Reproduction and Neonatology. British Small Animal Association. Gloucester Blanchard, T. L et al., (2003): Manual of Equine Reproduction. Mosby. BSAVA Manual of Canine and Feline Abdominal Surgery. Williams and Niles (eds.), BSAVA, 2005 Landsberg, G., W. L. Hunthausen, L.J. Ackerman (2003): Handbook of Behavioural Problems of the Dog and Cat. Saunders W. B. Company Angus O. McKinnon (1993): Equine Reproduction. LEA & FEBIGER Gordon, I. (1997): Controlled Reproduction in Pigs. CAB International. JC Samper (2000): Equine Breeding Management and Artificial Insemination. Saunders The Merck Veterinary Manual, 10th edition, (2010), Merck & Co. Hafez (1993): Reproduction in Farm Animals. Lea and Febiger. Pugh (2002): Sheep and Goat Medicine. Saunders Smith and Sherman (2009): Goat Medicine. Wiley Blackwell Solaiman (2010): Goat Science and Production. Wiley Blackwell Paterson, B. (2001): Colour Atlas of Clinical Anatomy of the Dog and Cat. Mosby Wagner H. (1995): The Biology and Medicine of Rabbits and Rodents. Williams & Wilkins Baker L. (2000): Colour Atlas of Cytology of the Dog and Cat, Mosby Blowey, R., P. Edmondson (2010): Mastitis Control in Dairy Herds 2nd ed. CAB International. Hogeveen, H. (2005): Mastitis in dairy production. Wageningen Academic Publisher		

2.123. Quality assurance methods that ensure the acquisition of exit competences	Regular classes' attendance-checking, continuous student activity assessment during the entire semester; continuous knowledge checking (progress tests), regular student consultation, students' questionnaire.

SURGERY, ORTHOPAEDICS AND OPHTHALMOLOGY I

1. GENERAL INFORMATION			
1.25. Course teacher	Assis. prof. Marija Lipar / Prof. Dražen Vnuk	1.65. Year of the study programme	4th
1.26. ame of the course	Surgery, orthopaedics and ophthalmology I	1.66. Credits (ECTS)	7
1.15. ssociate teachers	Prof. Dražen Matičić F. C. A.; Prof. Boris Pirkić; Prof. Dražen Vnuk; Prof. Ozren Smolec; Prof. Nika Brkljača Bottegaro DECVSMR; Assoc. Prof. Marko Pećin; Assis. prof. Marija Lipar; Assis. prof. Petar Kostešić; Assis. prof. Valentina Plichta, PhD; Petra Dmitrović, PhD; Mirta Vučković, PhD; Marija Mamić, PhD; Niko Ivkić, DVM; Ana Smajlović, DVM; Katarina Miljak, DVM; Petra Ricijaš, DVM; Mirna Abaffy Kirin, DVM; Branko Petričević, DVM; Ema Sajdl, DVM; Karlo Tanhofer, DVM; Valentina Kos, DVM, Valentina Margić, DVM	1.67. Type of instruction (number of hours L + S + E + e-learning)	30+0+60
1.16. tudy programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	1.68. Expected enrolment in the course	25
1.17. tatus of the course	Compulsory	1.69. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
3.101. ourse objectives	1. Introduction to surgery, organisation of work at the clinics. Premises and equipment of the surgical clinics 2. Surgical instruments 3. Procedure, approach, inhibition and refutation of surgical patients		

	4. History and surgical propaedeutics 5. Principles of surgical asepsis and antisepsis. Sterilization and disinfection. 6. Surgical infections and the use of antibiotics in surgery 7. Introduction to anaesthesiology. Premedication and sedation. Anaesthesia classification. Local and regional analgesia. 8. Intravenous and inhalation anaesthesia. 9. Shock: Diagnosis and treatment 10. Fluid therapy and acid-base balance 11. Disorders of coagulative mechanism and haemostasis 12. Injuries and wounds; Definition, aetiology and classification. Wound healing and basic principles of treatment. 13. Surgical procedures of burns, frostbite and injuries caused by electricity, radiation and chemicals 14. Surgical techniques of suturing 15. Suture materials 16. Bandages, dressings, drains 17. Essential reconstruction surgeries (sutures, flaps, grafts) 18. Surgical oncology 19. Cardiopulmonary resuscitation
3.102. ourse enrolment requirements and entry competences required for the course	Upon gaining of provided skills and knowledge a student is capable of taking history, treating and restraining the animal in a safe and a human way, teaching the others the same techniques, and performing the whole clinical examination. The student is ready to give his/her opinion of the other additional diagnostic examinations which are to be done on the surgical patient. In the postoperative period a student can determine the way of treatment (pain control, treatment with antibiotics, physical therapy and other was of treatment). By this programme a student acquires knowledge of performing the surgical and anaesthesiologic protocol and taking records in the book of a patient in a way understandable to his/her profession and the public. He/she is well educated to correctly apply the principles of sterilization of surgical equipment and principles of aseptic surgery. The student is capable to safely apply sedation, local and general anaesthesia and to estimate and control the pain. He/she is ready to recognise conditions that require euthanasia and perform it humanely with the understanding the emotional state of the owner. The student can apply techniques of first aid.
3.103. earning outcomes at the level of the programme to which the course contributes	• Take history, perform restrain in the safe manner for personal and animal, perform basic clinical examination. • Implement additional diagnostic procedure in order to gain objective assesment of health status of surgical patient. • Create and argue the treatment option in post-surgical period. Suggest, implement and fulfill. anaesthesilogic form, Explore possible surgical options and take record of surgical procedure. • Create anesthesia protocol and apply sedatives, local and general anaesthetics. Align analgesia with surgical procedure. • Classify and represent indications of euthanasia and provide it according to an ethical statement. Anticipate owners ' reaction. Making judgement of owners' emotional status has to be with special attention. • Select and aplly selected options of first aid in case of bleeding, wound care, burns and frost, and bite injuries.

<table>
<tr><td></td><td colspan="3">

Classify and implement bandaging, immobilization and hemostasis.
Create aseptic procedure of surgical patient and operating team, and surgical equipment and facilities, also assisting during surgery. Provide sterile sugical instruments
Perform conservative and surgical treatment of wound. Implement sutures for different organs and tissues. Argue selection of the suitable sutures technique and material and implement selected suture materials.

</td></tr>
<tr><td>3.104.
earning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="3">

Take history, perform restrain in the safe manner for personal and animal, perform basic clinical examination.
Implement additional diagnostic procedure in order to gain objective assesment of health status of surgical patient.
Create and argue the treatment option in post-surgical period. Suggest, implement and fulfill. anaesthesilogic form, Explore possible surgical options and take record of surgical procedure.
Create anesthesia protocol and apply sedatives, local and general anaesthetics. Align analgesia with surgical procedure.
Classify and represent indications of euthanasia and provide it according to an ethical statement. Anticipate owners ' reaction. Making judgement of owners' emotional status has to be with special attention.
Select and aplly selected options of first aid in case of bleeding, wound care, burns and frost, and bite injuries.
Classify and implement bandaging, immobilization and hemostasis.
Create aseptic procedure of surgical patient and operating team, and surgical equipment and facilities, also assisting during surgery. Provide sterile sugical instruments
Perform conservative and surgical treatment of wound. Implement sutures for different organs and tissues. Argue selection of the suitable sutures technique and material and implement selected suture materials.

</td></tr>
<tr><td>3.105.
ourse content broken down in detail by weekly class schedule (syllabus)</td><td colspan="3">Introduction to surgery, organisation of work at the clinics. Premises and equipment of the surgical clinics; Surgical instruments; Procedure, approach, inhibition and refutation of surgical patients; History and surgical propedeutics; Principles of surgical asepsis and antisepsis. Sterilization and disinfection; Introduction to anaesthesiology. Premedication and sedation. Anaesthesia classification. Local and regional analgesia. Intravenous anaesthesia; inhalation anaesthesia; Shock: Diagnostics and treatment; Fluid therapy and acid-base balance; Disorders of coagulative mechanism and haemostasis; Injuries and wounds; Definition, aetiology and classification. Healing and basic principles of treatment; Surgical procedures of burns, frost bite and injuries caused by electricity, radiation and chemicals; Surgical techniques of suturing; Suture materials; Bandages, dressings, drains; Infections and the use of antibiotics in surgery; Essential reconstruction surgeries (stitches, lobes, grafts), Surgical oncology</td></tr>
<tr><td>3.106.
ormat of instruction:</td><td>☒ lectures
☐ seminars and workshops
☒ exercises (practicals)
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td>☒ independent assignments
☐ multimedia and the internet
☐ laboratory
☒ work with mentor
☐ (other)</td><td>3.107. Comments:</td></tr>
</table>

<table>
<tr><td>3.108.
tudent responsibilities</td><td colspan="6">1. Lectures attendance
2. Exercise attendance
3. Active participation at exercises
4. Mid term exams
5. Final exam</td></tr>
<tr><td rowspan="5">3.109.
creening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0.42</td><td>Research</td><td></td><td>Practical training</td><td>0.84</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Activity during practical training</td><td>0.7</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>2.24</td><td>Oral exam</td><td>1.4</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>1.4</td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">1. Lecture attendance
During the semester student must be present on 15 hours of lectures (from the amount of 30 hours) to obtain a minimum 3 final points during the semester. Maximum obtained number of final points from this element is 6.
2. Exercise (practicals) attendance
During the semester student must be present on 42 hours of excercises (from amount of 60 hours) to obtain minimum 8.4 points during the semester. Maximum obtained number of points from this element is 12. Sixty hours of exercise are divided in 6 days:
1. 10 hours - thematic practicals- work at surgical clinic, surgical instruments, surgical asepsis and antisepsis, anesthesia principles, intensive care unit principles
2. 10 hours- thematic practicals- suture materials, suturing, knotting, bandage, drains
3. 10 hours- clinical rotation, practical work with patient
4. 10 hours- clinical rotation, practical work with patient
5. 10 hours- clinical rotation, practical work with patient
6. 10 hours- practical work with patients during night duty
3. Active participation at the practicals</td></tr>
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	Participating actively at the practicals students can gain 45 points max., what brings them 10 final points. Points for performing the following tasks: a) 15 points (first exercise – thematic – participation is not evaluated; second exercise – thematic – participation is not evaluated; third exercise - practical clinical work during clinical rotation - 5 points max., fourth exercise – practical clinical work during clinical rotation - 5 points max., fifth exercise – practical clinical work during clinical rotation - 5 points max., sixth exercise – practical clinical work during clinical rotation will not be evaluated, but could be replaced with practical work in extracurricular time eg. afternoon round, night round or weekend round,) = **keeping records of anaesthesiologic protocols** in an orderly manner. please find instructions to fill in the Anaesthesiologic protocol at MERLIN. b) 15 points (first exercise – thematic – participation is not evaluated; second exercise – thematic – participation is not evaluated; third exercise - practical clinical work during clinical rotation - 5 points max., fourth exercise – practical clinical work during clinical rotation - 5 points max., fifth exercise – practical clinical work during clinical rotation - 5 points max., sixth exercise – practical clinical work during clinical rotation will not be evaluated, but could be replaced with practical work in extracurricular time eg. afternoon round, night round or weekend round,) = **keeping records of Patient protocols** in an orderly manner. please find instructions to fill in the Patient protocol at MERLIN. c) 15 points (first exercise – thematic – participation is not evaluated; second exercise – thematic – participation is not evaluated; third exercise - practical clinical work during clinical rotation - 5 points max., fourth exercise – practical clinical work during clinical rotation - 5 points max., fifth exercise – practical clinical work during clinical rotation - 5 points max., sixth exercise – practical clinical work during clinical rotation will not be evaluated, but could be replaced with practical work in extracurricular time eg. afternoon round, night round or weekend round,) = **active participation in the work with patients**. Students must obtain minimally 5 final points (22,5 points x coefficient 0,2222). Active participation at exercise during surgical rotation will be contionously evaluated. 4. Mid term exams During the semester students will be checked by 3 mid term exams. Each mid term exams will contain 11 questions from following topics. a) The surgical asepsis and surgical instruments; the bandages and draines and infection of surgical patients, containing antimicrobial prophylaxis (MERLIN) b) The suture materials and techniques of suturing (MERLIN)

c) Surgical oncology and reconstructive surgery (MERLIN)

Within this element of valuation it is possible to obtain maximum 32 final points (33 answers x coefficient 0.9696).

Student must achieve minimum of 7 points per mid term exam to obtain total of 21 points (21 x coefficient 0.9696= 20 final points).

A student who does not gain minimal 21 points during the semester from mid term exam has a right to take 2 makeup mid term exams only those which failed. A student who passes the makeup mid term exam with minimally 7 correct answers from eleven (11) has a right to take the final exam.

5. Final exam

Minimal conditions for passing the first, second, third and fourth (lecture attendance, practicals attendance, practicals and seminars activity, mid term exams) evaluation element are summed up and they are worth 37.6 points all together. Maximum points to gain from all 4 elements is 60.

Questions in the final exam will be put in a way that a student can answer in written and oral form. In the written form there will be 20 questions divided in 5 groups (20 points), 12 of which must be answered correctly in order to take the oral exam. The maximum number of points that can be gained at the oral exam is 20 points (five questions), where maximally 4 points can be gained for 1 correct answer (0-4). The minimal number of points a student must gain at the final exam is 24 (12 points minimal at written and 12 as well at oral exam). The maximal number of points on written exam together with oral exam can be 40 points. If student does not gain minimum 12 points on written exam one can not take oral exam. If student does not gain minimum 12 points in oral exam, one fails.

The final grade from a course programme is expressed in quantity, by a numeric point-system value and by a grade adequate to its value in points, from 1 to 5. Student is marked by grade 1 in case she/he did not master the programme course successfully, in other words grade 1 means insufficient standing.

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	https://moodle.srce.hr/2025-2026/course/view.php?id=248311 https://moodle.srce.hr/2025-2026/course/view.php?id=248459		x
2.124. Optional literature (at the time of submission	Theresa Fossum - Small Animal Surgery (2018.)		

of study programme proposal)	Jorg A. Auer; John A. Stick – Equine Surgery (2019.)			
	Ames N.K. – Noordsy's Food Animal Surgery (2014.)			
	Grimm K.A., et al. – Veterinary Anesthesia and Analgesia (2015.)			
2.125. Quality assurance methods that ensure the acquisition of exit competences	During the semester there will be three (3) mid term exams organised at the time of exercises each containing eleven (11) problems or questions. Each correctly solved problem or correctly answered question is worth one (1) point. A student must gain the total of 21 points from mid term exams (minimal 7 from each mid term exam) in order to earn minimal 20 total points. (21 times 0.9696). The maximal number of points a student can gain from this evaluation element is 32 points. A student who does not gain minimal 21 points during the semester from mid term exam has a right to take a makeup mid term exam. The two makeup mid term exams will be organised upon completion of the teaching in the semester. To pass makeup mid term exam student has same criteria as for primary mid term exams.			
2.126. Other (as the proposer wishes to add)				

SURGERY, ORTHOPAEDICS AND OPHTHALMOLOGY II

1. GENERAL INFORMATION			
1.27. Course teacher	Assist. Prof. Valentina Plichta/ Prof. Dražen Vnuk	1.70. Year of the study programme	4th
1.28. Name of the course	Surgery, Orthopaedics and Ophthalmology II	1.71. Credits (ECTS)	5,5
1.16. Associate teachers	Prof. Dražen Matičić F. C. A.; Prof. Boris Pirkić; Prof. Dražen Vnuk; Prof. Ozren Smolec; Prof. Nika Brkljača Bottegaro DECVSMR; Assoc. Prof. Marko Pećin; Assis. prof. Marija Lipar; Assis. prof. Petar Kostešić; Assis. prof. Valentina Plichta, PhD; Petra Dmitrović, PhD; Mirta Vučković, PhD; Marija Mamić, PhD; Niko Ivkić, DVM; Ana Smajlović, DVM; Katarina Miljak, DVM; Petra Ricijaš, DVM; Mirna Abaffy Kirin, DVM; Branko Petričević, DVM; Ema Sajdl, DVM; Karlo Tanhofer, DVM; Valentina Kos, DVM, Valentina Margić, DVM	1.72. Type of instruction (number of hours L + S + E + e-learning)	30+0+45
1.17. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	1.73. Expected enrolment in the course	
1.18. Status of the course	Compulsory	1.74. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			

3.110. Course objectives	Objective is to introduce the student with the basic knowledge in ophthalmology, abdominal and thoracic surgery, and dentistry of domestic animals.
3.111. Course enrolment requirements and entry competences required for the course	Upon gaining of provided skills and knowledge a student is capable of recognising particular diseases of head and neck in small and large animals (dehornisation in bovine) and starting the basic treatment. The student is acquainted with the diseases of thorax, bases of their treatment and stabilisation of the patient with the thoracic diseases as well as with indication for referring such patients to referral clinics. He/she is trained to recognise particular types of hernia and basis of their treatment. The student is acquainted with indications for castration in particular animal species, with the way of performing the castration and post castration complications. He/she can recognise diseases of digestive system and of urinary and sex organs in dogs and cats, undertake the stabilisation of the patient and estimate indication for its referring to a referral clinic. The student is acquainted with the basic laparotomy in ruminants and possibilities of treatment of diseases of digestive system. He/she can recognise signs of abdominal pain in horses and understands the principles of emergency surgical treatment of different gastrointestinal pathologies that cause colic signs in horses. In addition, he/she can, undertake the evaluation and stabilisation of the equine patient and estimate indication for a surgical treatment and referral. A student is acquainted with basic postulates of dental disorders. Upon gaining of knowledge and skills the student will be able to recognise diseases of eye in small and large animals treated during the teaching lessons, to start the treatment and treat them in emergency case, to estimate indication for a surgical treatment and for its referring to a referral clinic.
3.112. Learning outcomes at the level of the programme to which the course contributes	In the 8th semester students broaden their knowledge and skills gained in the previous semester in order to improve the quality of their competence.
3.113. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Student will be able to: - recognize certain diseases of head and neck of small and large animals, as well as undergo basic treatment - recognize thoracic diseases and undergo basic treatment - stabilize thoracic patient and point him to referral clinic - recognize various types of hernias and decide the type of treatment - recognize indications for castration in various animal species - recognize the patient with alimentary and urogenital disease, type of treatment and indication for pointing him to referral clinic - deciding the indication for laparotomy in ruminants - recognize the abdominal disease in a horse, with colic pain as the cardinal symptom - discuss the basic postulates of dentistry

<table>
<tr><td></td><td colspan="3">- recognize the eye diseases of small and large animals
- undergo basic treatment of eye disease, as well as emergency treatment, and pointing to referral clinic</td></tr>
<tr><td>3.114. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="3">Lectures:
2 Surgery of head and neck in large animals
3 Surgery of head and neck in small animals
4 Surgical diseases of thorax
5 Hernia
6 Castrations
7 Introduction in veterinary dentistry
8 Surgical treatment of diseases of digestive system in dogs and cats
9 Surgical treatment of diseases of rectum and anus
10 Surgical treatment of diseases of urogenital tract
11 Surgical treatment of diseases of abdomen in ruminants
12 Surgical treatment of colic in horses
13 Diseases of eyelids, conjunctiva and lacrimal apparatus
14 Diseases of cornea
15 Diseases of middle ocular layer and lens
16 Glaucoma
17 Diseases of retina, vitreous body, optic nerve and eye orbit

Practical training:
1. Ophthalmologic examination
2. Intestinal resection and anastomosis- wet and dry lab</td></tr>
<tr><td rowspan="2">3.115. Format of instruction:</td><td>☒ lectures
☐ seminars and workshops
☒ exercises (practicals)
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td>☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>3.116. Comments:</td></tr>
<tr><td colspan="3"></td></tr>
</table>

<table>
<tr><td>3.117. Student responsibilities</td><td colspan="6">1. Lectures attendance
2. Exercise (practicals) attendance
3. Active participation at exercises
4. Midterm exams
5. Final exam</td></tr>
<tr><td rowspan="5">3.118. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0.99</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(other)</td><td>0.55</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>1.76</td><td>Oral exam</td><td>2.2</td><td></td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">1. Lecture attendance

During the semester student must be present on 15 hours of lectures (from amount of 30 hours) to obtain minimum 3 points during the semester. Maximum obtained number of points from this element is 6.

2. Exercise attendance

During the semester student must be present on 32 hours of excercises (from amount of 45 hours) to obtain minimum 8,4 points during the semester. Maximum obtained number of points from this element is 12. Forty five hours of exercise are divided in 7 days:

1. 5 hours - intestinal resection and anastomosis (wet and dry lab) and ophthalmologic examination (practical training)

2. 7 hours- clinical rotation, practical work with patient</td></tr>
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3. 7 hours- clinical rotation, practical work with patient
4. 7 hours- clinical rotation, practical work with patient
5. 7 hours- clinical rotation, practical work with patient
6. 7 hours- clinical rotation, practical work with patient
7. 5 hours- practical work with patients during night duty

3. Active participation at the exercise (practicals)

The **final 10 points** are awarded by completing the following tasks:

1. **Proper maintenance of the patient logbook** – continuous completion of the surgical form (instructions for correctly completing the form are available on Merlin), through which the student may earn a maximum of **25 points**:
    - First practical session – thematic exercises, not assessed
    - Second practical session – maximum 5 points
    - Third practical session – maximum 5 points
    - Fourth practical session – maximum 5 points
    - Fifth practical session – maximum 5 points
    - Sixth practical session – maximum 5 points
    - Seventh practical session – clinical duty shifts, not assessed
2. **Proper completion of the dental form, examination protocols for different organ systems, or the anesthesiology protocol**(instructions for correctly maintaining the protocols are available on Merlin), through which the student may earn a maximum of **25 points**:
    - First practical session – thematic exercises, not assessed
    - Second practical session – maximum 5 points
    - Third practical session – maximum 5 points
    - Fourth practical session – maximum 5 points
    - Fifth practical session – maximum 5 points
    - Sixth practical session – maximum 5 points

- Seventh practical session – clinical duty shifts, not assessed

3. **Active participation in working with patients**, through which the student may earn a maximum of **25 points**:
   - First practical session – thematic exercises, not assessed
   - Second practical session – maximum 5 points
   - Third practical session – maximum 5 points
   - Fourth practical session – maximum 5 points
   - Fifth practical session – maximum 5 points
   - Sixth practical session – maximum 5 points
   - Seventh practical session – clinical duty shifts, not assessed

Students must obtain a **minimum of 5 final points** (37.5 points × coefficient 0.13333). Student activity during practical sessions will be monitored continuously.

4. Mid term exams

During the semester there will be three (3) mid term exams (veterinary dentistry, thorax and ophthalmic exam) organised at the time of exercises each containing eleven (11) problems or questions. Each correctly solved problem or correctly answered question is worth one (1) point. A student must gain the total of 21 points from 3 mid term exams (minimal 7 from each mid term exam) in order to earn minimally 20 final points (21 point multiply with 0.9696). The maximal number of points a student can gain from this evaluation element is 32 final points (33 point multiply with 0.9696). A student who does not gain minimally 21 points during the semester from mid term exam has a right to take 2 makeup mid term exams only those which failed. A student who passes the makeup mid term exam with minimally 7 correct answers has a right to take the final exam.

1. Surgical diseases of thorax
2. Introduction in veterinary dentistry – small and large animals
3. Ophthalmological examination.

5. Final exam

	Minimal conditions for passing the first, second, third and fourth –(lecture attendance, excercise (practicals) attendance, active participation in excercise, mid term exams) evaluation element are summed up and they are worth 37.6 points all together. Maximum points to gain from all 4 elements is 60. Questions in the final exam will be put in a way that a student can answer in written and oral form. In the written form there will be 20 questions divided in 5 groups (20 points), 12 of which must be answered correctly in order to take the oral exam. The maximum number of points that can be gained at the oral exam is 20 points (five questions), where maximally 4 points can be gained for 1 correct answer (0-4). The minimal number of points a student must gain at the final exam is 24 (12 points minimal at written and 12 as well at oral exam). The maximal number of points on written exam together with oral exam can be 40 points. If student does not gain minimum 12 points on written exam one can not take oral exam. If student does not gain minimum 12 points in oral exam, one fails. The final grade from a course program is expressed in quantity, by a numeric point-system value and by a grade adequate to its value in points, from 1 to 5. Student is marked by grade 1 in case she/he did not master the program course successfully, in other words grade 1 means insufficient standing.

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Teaching materials available on https://moodle.srce.hr/2025-2026/course/view.php?id=248468		web

2.127. Optional literature (at the time of submission of study programme proposal)	
	1. Welch Fossum, T. (2018): Small Animal Surgery, 5th ed.
	2. Auer, J.A., J.A. Stick, J.M. Kummerle, T.Prange (2019): Equine Surgery. 5th ed.
	3. Kent Ames, N. (2013): Noordsy's Food Animal Surgery, 5th ed.
	4. Maggs, D., P. Miller, R. Ofri (2018): Slatter's fundamentals of veterinary ophtalmology. 6th ed.

2.128. Quality assurance methods that ensure the acquisition of exit competences	During the semester there will be three (3) mid term exams organised at the time of exercises each containing eleven (11) problems or questions. Each correctly solved problem or correctly answered question is worth one (1) point. A student must gain the total of 21 points from mid term exams (minimally 7 from each mid term exam) in order to earn minimally 20 final points. (21 x 0,9696). The maximal number of points a student can gain from this evaluation element is 32 final points. A student who does not gain minimal 21 points during the semester from mid term exam has a right to take makeup mid term exams. The two makeup mid term exams will be organised upon completion of the teaching in the semester. To pass makeup mid term exam student has same criteria as for primary mid term exams.
2.129. Other (as the proposer wishes to add)	

TOXICOLOGY

1. GENERAL INFORMATION			
1.29. Course teacher	Prof. Andreja Prevendar Crnić, Ph.D, DVM; Deputy course leader: Prof. Frane Božić, Ph.D, DVM	2.6. Year of the study programme	4rd
1.30. Name of the course	Toxicology	2.7. Credits (ECTS)	3.5
1.17. Associate teachers	Prof. Andreja Prevendar Crnić, Ph.D, DVM Prof. Frane Božić, Ph.D., DVM Ena Oster, Ph.D., DVM Nikola Čudina, DVM	2.8. Type of instruction (number of hours L + S + E + e-learning)	24+6+24
1.18. Study programme (undergraduate, graduate, integrated)	integrated	2.9. Expected enrolment in the course	35
1.19. Status of the course	obligatory	2.10. Level of application of *e-learning* (level 1, 2, 3), percentage of online instruction (max. 20%)	level 2 on-line instructions 10%
2. COUSE DESCRIPTION			
3.119. Course objectives	With the knowledge gained at the Toxicology course students will be able to recognize animal poisoning, conduct stabilization, differential diagnosis, and treatment of poisoned patients, assess the success of treatment, and provide for possible wider harmful effects of poisoning (ecotoxicology). Proper sampling and sending materials for toxicological analysis; evaluation of chemical-toxicological test results in case of residues. Within the laboratory exercises for proving toxins in biological samples, students will acquire basic knowledge and skills in analytical toxicology (qualitative and semi-qualitative tests). During the processing of clinical poisoning cases with discussion, students are introduced to clinical toxicology and practice. They will also be able to identify possible sources of pet poisoning among things from their immediate living environment. In addition to poisoning domestic animals and pets, students will gain basic knowledge in the toxicology of birds and fish.		
3.120. Course enrolment requirements and entry competences required for the course	Completed exams in Biochemistry, Physiology of domestic animals I and Physiology of domestic animals II; Pathophysiology I and Pathophysiology II; General veterinary pathology and Special veterinary pathology; Pharmacology.		

3.121. Learning outcomes at the level of the programme to which the course contributes	1. determine and differentiate poisonings of domestic and companion animals with pesticides, metals and other potentially toxic elements and chemical compounds, mycotoxins, industrial pollutants and plant toxins. 2. recognize possible sources of pet poisoning among their immediate environments. 3. sample appropriate materials for diagnostic procedures and chemical-toxicological analysis. 4. choose and apply appropriate therapeutic procedures and evaluate their effectiveness. 5. evaluate results of chemical-toxicological analyses in accordance with the legally prescribed highest permitted concentrations in food of animal origin. 6. predict possible dangerous consequences of poisons on the ecosystem. 7. recognize poisoning of fish and birds. 8. identify venomous animals and the effects of venom and create a treatment plan.
3.122. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. determine and differentiate poisonings of domestic and companion animals with pesticides, metals and other potentially toxic elements and chemical compounds, mycotoxins, industrial pollutants and plant toxins. 2. recognize possible sources of pet poisoning among their immediate environments. 3. sample appropriate materials for diagnostic procedures and chemical-toxicological analysis. 4. choose and apply appropriate therapeutic procedures and evaluate their effectiveness. 5. evaluate results of chemical-toxicological analyses in accordance with the legally prescribed highest permitted concentrations in food of animal origin. 6. predict possible dangerous consequences of poisons on the ecosystem. 7. recognize poisoning of fish and birds. 8. identify venomous animals and the effects of venom and create a treatment plan.
3.123. Course content broken down in detail by weekly class schedule (syllabus)	1. Introduction to veterinary toxicology (Definitions and technical terminology in toxicology; Toxicity; Possible sources of animal poisoning, Factors affecting toxicity and occurrence of poisoning, Treatment with poisoned animal, Diagnosis of poisoning, taking and sending material for chemical-toxicological examination, Fundamentals of instrumental quantitative laboratory analytics in toxicology, Basic mechanisms of poison action, Poison therapy, Antidotes). 2. Poisoning of animals with pesticides (Insecticides, Rodenticides, Limacides, Herbicides, Qualitative tests for detection of pesticides in biological samples). 3. Poisoning of animals with toxic elements (Mercury, Copper, Zinc, Iron, Lead, Cadmium, Arsenic, Selenium, Qualitative tests for the detection of heavy metals). 4. Industrial pollutants (Cyanides and cyanogenic plants, Fluorine, PCBs, Dioxins, Polycyclic aromatic hydrocarbons (PAH), Brominated flame retardants and perfluorinated substances); Nanotoxicology. 5. Toxic effects of nitrogen compounds (Nitrates, Nitrites, Nitroso compounds, Urea, Ammonia and ammonium salts, Qualitative tests for the detection of industrial pollutants and nitrogen compounds in biological samples). 6. Poisoning of domestic animals and pets with food and substances from the immediate environment (Sodium chloride, Ethylene glycol, Chocolate, Coffee, Grapes and raisins, Xylitol, Onions, Macadamia nuts, Avocados, Alcohol and others); Drug poisoning of pets; Analysis of data from the Report of the World Poison Control Centers.

	7. Mycotoxins (Hepatotoxins, Nephrotoxins, Trichothecenes, Fumonisins, Eestrogenic Mycotoxins, Tremorgenous Mycotoxins, Mycotoxin Analytics). 8. Poisoning by venoms and toxins of animals (bite of poisonous snakes in animals, stings of hymenopterous insects, stings or bites of ticks and spiders in animals, contact with Oak Processionary Moth, Production of antitoxins - invited lecture. 9. Ecotoxicology, Organotoxicology. 10. Toxicology of fish, Toxicology of birds. 11. Chemical and biological weapons in the context of veterinary toxicology. 12. Case reports of poisoning with discussion						
3.124. Format of instruction:	X lectures X seminars and workshops X exercises ☐ *online* in entirety ☐ partial e-learning ☐ field work		X independent assignments X multimedia and the internet X laboratory ☐ work with mentor ☐ (other)		3.125. Comments: -		
3.126. Student responsibilities	Attending lectures, continuous assessment and final exam.						
3.127. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0.63	Research	-	Practical training		
	Experimental work	-	Report	-	Activity	0,35	
	Essay	-	Seminar essay		(other)	-	
	Tests	1.12	Oral exam	1.4	(other)	-	
	Written exam		Project	--	(other)	-	
2.10. Grading and evaluating student work in class and at the final exam	**Attending lectures** 24 HOURS 3 – 6 points 1 double period is worth 0.5 point (1 period = 0,25 point) To gain minimal 3 points, a student must attend 6 lectures out of 12 **Attending seminars** 6 HOURS 4 – 6 points 1 seminar is worth 1 point To gain minimal 4 points a student must attend 2 seminars out of 3 **Attending exercises**						

24 HOURS 4 – 6 points

1 double period is worth 0.5 point (1 period = 0.25 point)

To gain minimal 4 points a student must attend 9 practicals out of 12

Participation at exercises

5 – 10 POINTS

Participation at seminars will be evaluated during the presentation of seminar works with 2.5 – 5 points.

Participation at exercises will be evaluated with 2.5- 5 points.

Continuous knowledge checking

20 – 32 points

1st PRELIMINARY EXAM - verification of the knowledge acquired during the practicals in toxicology, and general toxicological terminology (max. 16 points, min. 10 points)

2nd PRELIMINARY EXAM - verification of knowledge acquired during the practicals and seminars in toxicology (max. 16 points, min. 10 points)

CORRECTIVE ASSESSMENT, by agreement

Final exam

WRITTEN AND ORAL 24 – 40 POINTS

In order to take the final exam a student must gain minimal 18 points from attending and participation at lectures, exercises and seminars, and minimal 20 points from continuous knowledge checking.

Final evaluation points

According to the sum of gained points and the following table:

Points	*Grade*
up to 59	1 (F)

60-68	2 (E)
69-76	2 (D)
77-84	3 (C)
85-92	4 (B)
93-100	5 (A)

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	1. GUPTA, R.C. (2018): Veterinary Toxicology: Basic and Clinical Principles. 3rd ed., Elsevier, Academic Press, London, San Diego, Cambridge, Oxford.		Department
	2. BEASLEY, V. (1999): Veterinary toxicology. IVIS, Ithaca, New York. (available at http://www.ivis.org/library.asp)		web
	3. OSWEILER, G. D. (1996): Toxicology. 1st ed., Williams & Wilkins, Philadelphia.		Department
	4. POPPENGA, R. H., S. M. GWALTNEY-BRANT (2011): Small Animal Toxicology Essentials. 1st ed., Wiley-Blackwell, Chichester.		Department
	5. PP presentations of lectures, exercises and laboratory work		Merlin

2.130. Optional literature (at the time of submission of study programme proposal)	
2.131. Quality assurance methods that ensure the acquisition of exit competences	Continuous knowledge checking
2.132. Other (as the proposer wishes to add)	

VETERINARY DIAGNOSTIC IMAGING

1. GENERAL INFORMATION			
1.31. Course teacher	Assoc. Prof. Hrvoje Capak, PhD	2.11. Year of the study programme	4th
1.32. Name of the course	**Veterinary diagnostic imaging**	2.12. Credits (ECTS)	3.5
1.18. Associate teachers	Assoc. Prof. Zoran Vrbanac, PhD, DECVSMR, DACVSMR Assoc. Prof. Hrvoje Capak, PhD Ana Javor, DVM, PhD, Barbara Mratović, dr. med. vet., Iva Sulić, dr. med. vet.	2.13. Type of instruction (number of hours L + S + E + e-learning)	15 L + 30 E
1.19. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study	2.14. Expected enrolment in the course	
1.20. Status of the course	Compulsory	2.15. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
3.128. Course objectives	The course content covers the fundamentals of diagnostic imaging, the physical principles underlying the formation of radiographic, ultrasonographic, computed tomography (CT), and magnetic resonance imaging (MRI) images, as well as radiation protection from ionizing radiation. It further encompasses the application of diagnostic imaging in clinical diagnosis, general imaging anatomy and pathology, and the diagnostic imaging of diseases affecting the musculoskeletal, respiratory, cardiovascular, gastrointestinal, and urogenital systems.		
3.129. Course enrolment requirements and entry competences required for the course	3rd year courses		
3.130. Learning outcomes at the level of the			

programme to which the course contributes			
3.131. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. To explain the formation of X-ray, ultrasound, MR, and CT images, as well as the harmful effects of ionizing radiation and protection methods, 2. independently produce an X-ray image and perform its digital processing, 3. to interpret anatomical relationships and various types of pathological changes on radiographs and sonograms for diagnostic purposes, 4. to select and perform various types of contrast media examinations and compare the results with plain (native) imaging, 5. to evaluate the scope of diagnostic imaging in various pathological conditions and suggest possible solutions.		
3.132. Course content broken down in detail by weekly class schedule (syllabus)	LECTURES: L1: Introduction to diagnostic imaging L2: Diagnostic imaging of skeletal system – bones amatomy and pathology L3: Diagnostic imaging of skeletal system – joints and spine L4: Diagnostic imaging of respiratory system L5: Diagnostic imaging of cardiovascular system L6: Diagnostic imaging of gastrointestinal system L7: Diagnostic imaging of urogenital system L8: Equine and farm animal diagnostic imaging PRACTICAL: P1: Introduction to diagnostic imaging P2: Diagnostic imaging techniques, positioning and projections P3: Locomotor system 1 – bones P4: Locomotor system 2 - joints, spine P5: Respiratory system P6: Cardiovacular system P7: Gastrointestinal system P8: Urogenital system		
	☒ lectures	☐ independent assignments	3.134. Comments:

<table>
<tr><td>3.133. Format of instruction:</td><td>☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td>☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td colspan="4"></td></tr>
<tr><td>3.135. Student responsibilities</td><td colspan="6"></td></tr>
<tr><td rowspan="6">3.136. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>18%</td><td>Research</td><td></td><td>Practical training</td><td>10%</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>32%</td><td>Oral exam</td><td>40%</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td colspan="6"></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">Evaluation elements:

1. Attending lectures

2. Attending exercises

3. Participation at exercises

4. Continuous knowledge checking

5. Final exam

Attending lectures 3-6 points (15 lecture hours. 1 lecture hour is worth 0.4 point). A student must attend minimal 8 lecture hours.

Attending exercises 8-12 points (8 programmes. 1 programme (double period) is worth 1.5 points). A student must attend minimal 6 programmes (21 hours).

Participation at exercises 5-10 points – participation at exercise will be evaluated with short oral tests with 5 points at least two times.

Continuous knowledge checking 20-32 points

1st preliminary exam (10 questions) 10 points min. – 16 points max. (1 question is worth 1.6 points)</td></tr>
</table>

2nd preliminary exam (10 questions) 10 points min. – 16 points max. (1 question is worth 1.6 points)

Preliminary exams in online form.

ORAL EXAM: 24-40 points

(5 questions: 1 question is worth 8 points)

To take the final exam a student must gain minimal 16 points from attending lectures and exercises and participation at exercises and minimal 20 points from continuous knowledge checking.

The total sum of points gained from all evaluation elements is expressed by a grade from 1 to 5 (the following table).

Points	*Grade*
up to 59	1 (F)
60-68	2 (E)
69-76	2 (D)
77-84	3 (C)
85-92	4 (B)
93-100	5 (A)

At the Department there will be a Form for each student for keeping records of his/her attendance of the lectures and exercises with a column for evaluating his/her participation exercises. In the part of continuous knowledge checking there will be: the date of taking the preliminary exam, the name of the lecturer and the number of gained points.

At the final exam the Form with the total number of points gained from all evaluation elements will be presented to the lecturer

Types of activities	**Minimal number of points**	**Maximal number of points**
Attending lectures	3	6

Attending exercises	8	12
Participation at exercises	5	10
Continuous knowledge checking	20	32
Final exam	24	40
Total	60	100

In order to take the final exam a student must gain minimal 36 points from attending and participation at lectures and exercises and from continuous knowledge checking.

2.11. Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
Kealy J. Kevin, Hester McAllister (2004): Diagnostic Radiology and Ultrasonography of the Dog and Cat, 4th Edition, Philadelphia	2	
Thrall D.E. (2013): Textbook of Veterinary Diagnostic Radiology. Saunders. St. Louis, Missouri	3	

2.133. Optional literature (at the time of submission of study programme proposal)	
2.134. Quality assurance methods that ensure the acquisition of exit competences	
2.135. Other (as the proposer wishes to add)	

VETERINARY PHYSICAL THERAPY, DIAGNOSTICS AND REHABILITATION

1. GENERAL INFORMATION			
1.33. Course teacher	Assoc. Prof. Zoran Vrbanac, PhD, DECVSMR, DACVSMR	2.16. Year of the study programme	4th
1.34. Name of the course	Veterinary Physical Therapy, Diagnostics And Rehabilitation	2.17. Credits (ECTS)	2.5
1.19. Associate teachers	Assoc. Prof. Zoran Vrbanac, PhD, DECVSMR, DACVSMR Assoc. Prof. Hrvoje Capak, PhD Ana Javor, DVM, PhD, Barbara Mratović, DVM	2.18. Type of instruction (number of hours L + S + E + e-learning)	15 L + 15 E
1.20. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study	2.19. Expected enrolment in the course	
1.21. Status of the course	Compulsory	2.20. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
3.137. Course objectives	The aim of the course is to familiarise students with the principles, methods and clinical application of physical medicine and rehabilitation in veterinary practice. The course focuses on developing students' ability to diagnostically assess movement disorders and other functional impairments, as well as conditions requiring physical therapy and rehabilitation, and to design appropriate rehabilitation programmes based on the established clinical presentation.		
3.138. Course enrolment requirements and entry competences required for the course	3rd year courses		
3.139. Learning outcomes at the level of the programme to which the course contributes	Students are trained to select and apply suitable physical therapy modalities while considering the individual needs of the patient. Particular emphasis is placed on the implementation of a multimodal therapeutic approach and on the critical evaluation of the effectiveness of physical therapy in relation to other treatment options.		

<table>
<tr><td>3.140. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">1- Analyse the physiological and pathophysiological mechanisms underlying the effects of physical therapy and rehabilitation on the organism.
2- Assess movement disorders and other functional impairments through clinical examination and basic functional measurements.
3- Develop a rehabilitation plan and select and apply appropriate therapeutic modalities within a multimodal approach.
4- Monitor and evaluate the course and outcomes of therapy and adjust the treatment plan when necessary.
5- Plan and integrate physical therapy as a standalone (conservative) treatment modality and in combination with surgical interventions, including pre- and postoperative rehabilitation.</td></tr>
<tr><td>3.141. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Introduction and general principles, physiological effects of heat and cold modalities, hydrotherapy, electrotherapy, therapeutic exercise and manual techniques, functional assessment, therapeutic ultrasound, phototherapy, laser therapy and extracorporeal shock wave therapy</td></tr>
<tr><td rowspan="2">3.142. Format of instruction:</td><td colspan="2">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td colspan="2">3.143. Comments:</td></tr>
<tr><td colspan="6"></td></tr>
<tr><td>3.144. Student responsibilities</td><td colspan="6"></td></tr>
<tr><td rowspan="6">3.145. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>6% (0,15)</td><td>Research</td><td></td><td>Practical training</td><td>12% (0,3)</td></tr>
<tr><td>Experimental work</td><td>10% (0,25)</td><td>Report</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>32%</td><td>Oral exam</td><td>40% (1)</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">Evaluation elements:

1. Attending lectures

2. Attending exercises

3. Participation at exercises</td></tr>
</table>

4. Continuous knowledge checking

5. Final exam

Attending lectures 3-6 points (15 lecture hours. 1 lecture hour is worth 0.4 point). A student must attend minimal 8 lecture hours.

Attending exercises 8-12 points (8 programmes. 1 programme (double period) is worth 1.6 points). A student must attend minimal 6 programmes (12 hours).

Participation at exercises 5-10 points – participation at exercise will be evaluated with short oral tests with 5 points at least two times.

Continuous knowledge checking 20-32 points

1st preliminary exam (10 questions) 10 points min. – 16 points max. (1 question is worth 1.6 points)

2nd preliminary exam (10 questions) 10 points min. – 16 points max. (1 question is worth 1.6 points)

Preliminary exams in **online form**.

ORAL EXAM: 24-40 points

(5 questions: 1 question is worth 8 points)

To take the final exam a student must gain minimal 16 points from attending lectures and exercises and participation at exercises and minimal 20 points from continuous knowledge checking.

The total sum of points gained from all evaluation elements is expressed by a grade from 1 to 5 (the following table).

Points	*Grade*
up to 59	1 (F)
60-68	2 (E)

69-76	2 (D)
77-84	3 (C)
85-92	4 (B)
93-100	5 (A)

At the Department there will be a Form for each student for keeping records of his/her attendance of the lectures and exercises with a column for evaluating his/her participation exercises. In the part of continuous knowledge checking there will be: the date of taking the preliminary exam, the name of the lecturer and the number of gained points.

At the final exam the Form with the total number of points gained from all evaluation elements will be presented to the lecturer

Types of activities	**Minimal number of points**	**Maximal number of points**
Attending lectures	3	6
Attending exercises	8	12
Participation at exercises	5	10
Continuous knowledge checking	20	32
Final exam	24	40
Total	60	100

	In order to take the final exam a student must gain minimal 36 points from attending and participation at lectures and exercises and from continuous knowledge checking.		
2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Millis, D.L., D. Levine, R.A. Taylor: Canine Rehabilitation and Physical Therapy. Second edition. Elsevier, Philadelphia, 2014	3	
	Bockstahler, B, D. Levine, D. Millis: Essential Facts of Physiotherapy in Dogs & Cats - Rehabilitation and Pain Management, BE VetVerlag Babenhausen, 2004.	1	
2.136. Optional literature (at the time of submission of study programme proposal)			
2.137. Quality assurance methods that ensure the acquisition of exit competences			
2.138. Other (as the proposer wishes to add)			

LIST OF OBLIGATORY SUBJECTS – 5th STUDY YEAR

Obligatory Subjects – 5th study year

Diseases and Treatment of Dogs and Cats I

Equine Medicine

Field Service Clinic

Food Hygiene and Quality Control

Hygiene, technology and food safety

Infectious Diseases of Domestic Animals

Obstetrics and Reproduction II

Surgery, Orthopaedics and Ophthalmology III

State Veterinary Medicine

Veterinary Epidemiology

Veterinary Legislation and Food Safety Control

DISEASES AND TREATMENT OF DOGS AND CATS I

1. GENERAL INFORMATION			
1.35. Course teacher	**Assoc. prof. Zoran Vrbanac, DECVSMR, DACVSMR**	2.21. ear of the study programme	5th year
1.36. ame of the course	**Diseases and treatment of dogs and cats I**	2.22. redits (ECTS)	3,5
1.20. ssociate teachers	Prof. Dražen Matičić, Prof. Frane Božić, Prof. Andrea Gudan Kurilj, Prof. Suzana Hađina, Prof. Boris Pirkić, Prof. Zrinka Štritof, Prof. Dražen Vnuk, Prof. Ivan Conrado Zuckermann Šoštarić Assoc. Prof. Hrvoje Capak; Assoc. Prof. Josipa Habuš, Assoc. Prof. Marko Pećin, Assoc. Prof. Vladimir Stevanović; Assoc. Prof. Hrvoje Valpotić; Assoc. Prof. Zoran Vrbanac Assist. Prof. Marija Lipar, Assist. Prof. Petar Kostešić, Assist. Prof. Matko Perharić, Assist. Prof. Lidija Medven Zagradišnik Iva Benvin, PhD, Petra Dmitrović, PhD, Ana Javor, PhD, Marija Mamić, PhD, Ena Oster, PhD, Valentina Plichta, PhD, Mirta Vučković, PhD, Iva Zečević, PhD Mirna Abaffy Kirin, DVM, Iva Ciprić, DVM, Ivona Ćorić, DVM, Nikola Čudina, DVM, Niko Ivkić, DVM, Maja Loborec, DVM, Ivana Mihoković Buhin, DVM, Barbara Mratović, DVM	2.23. ype of instruction (number of hours L+S+E+ e-learning)	Exercises 45 hours
1.21. tudy programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	2.24. xpected enrolment in the course	15-20

1.22. tatus of the course	Obligatory elective	2.25. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
3.146. ourse objectives	SURGERY ORTHOPEDICS AND OPHTHALMOLOGY Students widen their ophthalmology knowledge and skills acquired in eighth semester. Practical exercises are focused at ocular examination (tonometry, biomicroscopy and fundoscopy), and also students can observe nasolacrimal canal irrigation in dogs. Students start during exercise practical dentistry course. First, they repeat oral cavity anatomy and physiology. Afterward, they learn dentistry instruments and equipment and principles of dentistry diagnostic. They will be able to recognize which condition they can treat and which they have to send to referral clinic. Students will know and principles of periodontal diseases. After listening of this subject, students will know to determine and mark each tooth and to examine oral cavity. They must recognize and treat some diseases, primary cremor dentium, paradontosis and gingivitis. Principles of teeth extraction will be presented. Students had anesthesia in seventh semester, but they have also clinical cases where it is necessary to perform anesthesia to the end of study. In this subject, critical points of canine and feline anesthesia, preanesthetic exam of patients and anesthesia of emergency patient will be presented. Student will be ready to perform less complicated cases of anesthesia under supervision of teacher. Basic principles of fracture management and practical work with implants at plastic models of bone will be presented. Students will have basis to attend specialised osteosynthesis course in the future. INFECTIOUS DISEASES OF DOGS AND CATS Students will widen acquired knowledge about differential diagnosis and infectious disease treatment in dogs and cats. Students will also learn to perform objective diagnosis of infectious diseases by simple methods available at daily basis. Students will also learn about new drugs, registered for treatment of infectious diseases (immunomodulatory drugs and antiviral drugs) and general prophylaxis and immunoprophylaxis. PATHOLOGY The most often dermatological diseases and skin tumors will be presented to students and the importance of cytological an pathohistological diagnosis in final diagnosis will be focused as factor for determination of prognosis and therapeutic efficiency. Tumor and skin biopsy samples collecting will be repeated as important step to achieve diagnosis. RADIOLOGY (X-ray, Computed Tomography) AND ULTRASOUND Students will be able to recognize and describe the most often diagnosis of bones and joints, and thoracic and abdominal diseases using different diagnostic imaging modalities (radiography, basic CT and ultrasonography).		

	CLINICAL PHARMACOLOGY Students will repeat acquired knowledge of pharmacology at clinical cases and it will be also add some chapters which were not sufficiently studied in colegium Pharmacology. The focus will be put on rational use of antibiotic and antiparasitic and correct drug use in cats.
3.147. ourse enrolment requirements and entry competences required for the course	Enrolled tenth semester
3.148. earning outcomes at the level of the programme to which the course contributes	
3.149. earning outcomes expected at the level of the course (4 to 10 learning outcomes)	- to perform ocular examination and determine indication of nasolacrimal canal irrigation - to diagnose and treat specific diseases of oral cavity - to conduct less demanding anesthesia in dogs and cats - to recognize specific implants for osteosynthesis and to know indication for their use - to recognize specific histopathological samples of dermatological diseases and the most often tumors in dogs and cats - to perform objective diagnosis of infectious diseases by simple methods available at daily basis and to treat infectious diseases using of different drugs - individual approch to general prophylaxis and immunoprophylaxis - to recognize the most often diagnosis of bones and joints, and thoracic and abdominal cavity diseases using different diagnostic imaging modalities - to rational use antibiotics and antiparasitics and to use correctly drugs in cats - to evaluate nutritional status, food and feeding procedure and to correct meal during dietary management of specific disease
3.150. ourse content broken	SURGERY ORTHOPEDICS AND OPHTHALMOLOGY (16 hours)

down in detail by weekly class schedule (syllabus)	1.Tonometry 2.Biomicroscopy and fundoscopy 3. Nasolacrimal canals irrigation in small animals 4. Anatomy and physiology of oral cavity 5.Instruments and equipment for dentistry 6. Diagnostic in dentistry and interpretation of radiographs of oral cavity 7.Basic of periodontal diseases 8. Principles of teeth extraction 9.Special consideration about canine and feline anesthesia 10. Anesthesia of emergency patients 11. Principles of osteosynthesis- practical approach INFECTIOUS DISEASES OF DOGS AND CATS (6 hours) 1.Infectious gastroenteritis of dogs and cats 2. Retroviral infections of dogs and cats (new therapy modalities) 3. Rapid diagnostic assay in dogs and cats 4. Imunomodulators and antiviral agents 5. General prophylaxis of infectious diseases 6. Imunoprophylaxis RADIOLOGY AND ULTRASOUND (6 hours) 1.Fractures, arthrosis, elbow dysplasia, OCD, hip dysplasia, pattelar luxation and spondylosis deformans 2. Diaphragmatic hernia, pneumonia, mitral insuficiency, dilatative cardiomiopathy, hypertrophic cardiomiopathy in cats 3. Metastasis, pyometra, gravidity, hernia, ileus, urolithiasis, intraabdominal tumors PATHOLOGY (6 hours) 1. Citology in dermatology 2. Definition of morphology of primary and secondary skin lesions 3. Patomorphology and patohistology of the most common dermatologic diseases: atopic dermatitis, bacterial, viral and parasitic dermatitis 4. Tumors definition and morphology (histopathologic examination, tumor grading and tumor margins) 5. The most common skin tumors (histiocytoma, mast cell tumor, lymphoma) 6. The mammary gland tumors (incidence, pathohistologic tumor classification and determination of malignancy grade CLINICAL PHARMACOLOGY (5 hours) 1.Treatment of staphylococcal dermatitis 2. Treatment of caninie otitis externa 3. Antiparasitic drug in dogs- principles of use 4. Use of antibiotics in cats- the most common problems 5. Pharmacotherapy in cats (problems with NSAID use in cats, insecticids in cats- piretrins) CLINICAL NUTRITION OF DOGS AND CATS (6 hours) 1.Evaluation of nutritional status (body condition, laboratory tests) 2.Food evaluation (quantity, different types) 3,Evaluation of feeding 4. Meal correction 5. Dietary management of special diseases 6. Basic principles of feeding in diferent age phases		
	☐lectures		3.152. Comments:

<table>
<tr><td>3.151.
ormat of instruction:</td><td colspan="2">☐seminars and workshops
x exercises
☐on line in entirety
☐partial e-learning
☐field work</td><td colspan="2">☐independent assignments
☐multimedia and the internet
☐laboratory
☐work with mentor
☐ (other)</td><td colspan="2"></td></tr>
<tr><td>3.153.
tudent responsibilities</td><td colspan="5">Class attendance, active participation in exercise, tests, written exam</td></tr>
<tr><td rowspan="5">3.154.
creening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>18% (0,63)</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Active participation in exercise</td><td>10% (0,35)</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>32% (1,12)</td><td>Oral exam</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>40% (1,4)</td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="5">Class attendance

A student has to attend 28 hours of exercise (totally 45 hours) to collect minimal 11 points. The maximal value is 18 points, if a student attends to each exercise. A attendance of one hour of exercise brings 0,4 point (18/45). Attendance in exercise (minimally 28 hours) is criterium for collection of index signature.

Active participation in exercise

Active participation in exercise is continuously evaluated during 12 practical exercises with grades from 1 to 5. Maximal value is sum of grades during 12 exercises (12 x 5) 60 and for this maximal value student can collect 10 points. Student must collect minimally sum of 30 to collect 5 points. 10/60 = 0,1667. Sum of grades must be multiplied with coefficient 0,1667 to calculate final score for active participation in exercise. Student which did not collect minimal sum of grades can not collect index signature and must attend next year subject gain.

Tests

Student can collect in continuous assesment maximal 32 points. Student must collect minimal 20 points to be able to attend final exam, but not to collect index signature. The continuous assesment test is consisted of 32 questions. One correct</td></tr>
</table>

	answer is one point. Questions are from Pathology (8), Clinical pharmacology (8), Clinical nutrition (8) and Radiology and ultrasound (8). Time of continuous assesment test will be arranged with subject coordinators. Final exam The final exam can get maximally 40 points to student. A written form of exam is consisted of 40 questions (30 Surgery orthopedics and ophthalmology and 10 infectious disease). Each correct answer gets 1 points to student. Student must collect minimal 24 points or 60% of answers from one subject (18 from Surgery orthopedics and ophthalmology and 6 from infectious disease). In the case that student did not collect minimal value from one subject, student will attend next time only to exam from this subject.		
2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Tobias, K.M., S.A. Johnston, (2012): Veterinary surgery small animal. Elsevier, St.Louis.		
	McKelvey D., K.W.Hollingshead (2003): Veterinary anesthesia and analgesia. Mosby, St.Louis.		
	Greene, E. G. (2012): Infectious diseases of dog and cat, fourth edition, Elsevier inc., St Louis, Missouri.		
	Pibot, P., V.Biourge, D. Elliot (2006): Encyclopedia of Canine Clinical Nutrition. Aniwa SAS, France.		
	Case, L. P., D. P. Carey, D. A. Hirakawa, L. Daristotle (1995): Canine and Feline Nutrition (Second Edition). Mosby Inc., St. Louis.		
	Kealy K. J., H.McAlllister, J.P.Graham (2011): Diagnostic radiology and ultrasonography of the dog and cat. Elsevier Saunders.		
	Nyland T.G., J.S.Mattoon (2002): Small animal diagnostic ultrasound. Saunders Elsevier.		
	Thrall D.E. (2013.): Textbook of Veterinary Diagnostic Radiology. Saunders. St. Louis, Missouri.		
	Cowell R.L., R.D.Tyler, J.H.Meinkoth, D.B. DeNicola (2008): Diagnostic Cytology and Hematology of the Dog and Cat / 3rd ed,, Elsevier Health Sciences.		
	Zachary J.F., M.D. McGavin (2011): Pathologic Basis of Veterinary Disease, Edition 3 Mosby .		
	Einstein R., R.S. Jones, A.Knifton, G.A. Starmer (1994): Priniciples of Veterinary		

	Therapeutics. Lohman Scientific and Technical, Lohman Group UK Ltd.		
	Barragry T.B. (1994): Veterinary Drug Therapy, Lea & Febiger, Philadelphia.Tokyo.		
	Bonagura J.D. (2000): Kirk's Current Veterinary Therapy XIII Small Animal Practice W.B. Saunders Comp., Philadelphia Tokyo.		
	Bonagura J.D. (2009): Kirk's Current Veterinary Therapy XIV Small Animal Practice, David C. Twedt DW.B. Saunders - Elsevier Comp., Philadelphia Tokyo.		
2.139. Optional literature (at the time of submission of study programme proposal)			
2.140. Quality assurance methods that ensure the acquisition of exit competences	Student evaluation		
2.141. Other (as the proposer wishes to add)			

EQUINE MEDICINE

1. GENERAL INFORMATION			
1.1. Course teacher	Assoc. Prof. Nika Brkljača Bottegaro, DECVSMR	1.2. Year of the study programme	5th (X semester)
1.2.Name of the course	**EQUINE MEDICINE**	1.3. Credits (ECTS)	7
1.3.Associate teachers	Ljubo Barbić, Full Prof., Frane Božić, Full. Prof., Juraj Grizelj, Full Prof., Mario Kreszinger, Full Prof., Tomislav Mašek, Full Prof., Boris Pirkić, Full Prof., Andreja Prevendar-Crnić, Full Prof., Nikica Prvanović-Babić, Full Prof., Ivana Kiš, Assoc. Prof., Nika Brkljača Bottegaro, Assoc. Prof., Ivan-Conrado Šoštarić-Zuckermann, Assoc. Prof., Hrvoje Capak, Assist. Prof., Jelena Gotić, Assist. Prof., Darko Grden, Assist. Prof., Ivan Folnožić, Assist. Prof., Franjo Martinković, Assist. Prof., Vladimir Stevanović, Assist. Prof., Matko Perharić, Assist. Prof., Dunja Vlahović, PhD, DVM, Dorotea Huber, PhD, DVM, Lidija Medven Zagradišnik, PhD, DVM, univ. mag. Branimir Škrlin, DVM, Ivan Butković, DVM, Juraj Šavorić, DVM, Valentina Plichta, DVM, Marija Mamić, DVM, Petra Dmitrović, DVM, Ivana Mihoković Buhin, DVM, Katarina Miljak DVM, Mirta Vučković DVM, Ana Javor, DVM	1.4. Type of instruction (number of hours L + S + E + e-learning)	13+32+45
1.4.Study programme	Integrated Undergraduate and Graduate University Study of Veterinary Medicine in English	1.5. Expected enrolment in the course	

(undergraduate, graduate, integrated)			
1.5. Status of the course	Elective	1.6. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
3.1. Course objectives	Subject is offered as elective in tenth semester involved in specialized education in track “Farm animals and horses”. The content is presented to students mainly in the form of seminars and exercises and is supplementation to completed fundamental preclinical and general clinical education. Practical exercises are held on clinical patients and on the stud farms. Students are trained to diagnose and treat the most common problems and diseases in horses. This course qualifies involved students with competent knowledge in the field of equine medicine.		
3.2. Course enrolment requirements and entry competences required for the course	Enrolled tenth semester.		
3.3. Learning outcomes at the level of the programme to which the course contributes	The course contributes to higher competences in the field of equine medicine, continuing education and extended program of integrated undergraduate and graduate board of reproduction and breeding management, internal diseases, surgery, orthopaedics and ophthalmology, of diagnostic imaging, infectious diseases, equine veterinary pathology, nutrition and dietetics, clinical pharmacology and toxicology and parasitology. This course presents an important part in the education of a new generation of students since they will obtain knowledge and skills in equine medicine on a more elaborate level than so far.		
3.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	REPRODUCTION AND OBSTETRICS Monitoring of follicular dynamics in mares by ultrasound examination, hormonal examination and getting know with hormonal references during cycle of mare. Optimal time of mating and insemination in mare. Artificial insemination of mares with fresh, chilled diluted and frozen semen, different regimes (treatments) for applications of hormonal preparations (light and progestagen treatments, prostanglandins in oestrus cycle, use of GnRH, hCG) - advantages and disadvantages; Endometrium evaluation (cytology, bacteriology, biopsy). Swabbing technique and evaluation of cytological result, sending and analysing method followed by EU conditions, endoscopic examination of uterus. Specifics of Andrology examination in stallions, special spermiology, collection and evaluation of stallion semen. Early ultrasound and laboratory diagnosis of pregnancy, monitoring of fetal development using Doppler, diagnostics and reduction of twins, diagnosis and monitoring of high-risk pregnancy; Irregularities in the structure of the sexual organs (congenital and acquired). Embryonic loss, abortions, twin pregnancy, endometritis and endometriosis, functional disorders of ovarian function and ovulation;		

	Vitality foal determination at birth (APGAR), intensive care of new-borns, foal watch and nursing of orphaned foals, procedures and treatment of new-borns with weak vitality, procedures and treatment of prematurely born foals, treatment of specific new-born; Retention of meconium, septicaemia, diarrhoea, neonatal isoeritrolysis and other. INTERNAL DISEASES Students will expand their knowledge in gastrointestinal diseases (endoscopic approach, colics, colitis X, ulceration of the digestive tract), respiratory diseases. Diseases of cardiovascular system, diseases of blood and blood forming organs, urological diseases (urolithiasys), dermatological and neurological diseases. Special emphasis will be put on gastrointestinal endoscopy, diagnostic and therapeutical approach to equine colic, also tracheal aspirate-indications, techniques and interpretation and bronchoalveolar lavage technique will be explained. SURGERY, ORTHOPAEDICS AND OPHTHALMOLOGY Students will learn how to approach an injured horse and treat different types of wounds. Also, students will expand their knowledge in the field of equine anaesthesia and analgesia with the emphasis on sedation, general intravenous and local anaesthesia in the field conditions. Emphasis will be put on diagnosis, surgical decision and preoperative management approach to urgent equine colics discomfort. Students will learn how to asses pain in horses and how to choose an appropriate analgesia protocol during postoperative care. Students will be able to perform postoperative care and recognise complications after colic surgery. In purpose of performing lameness diagnostics, it is essential to gain knowledge of clinical examination of the lame horse, diagnostic analgesia, and special methods of lameness diagnostics (ultrasound, CT, MR, arthroscopy, tenoscopy, nuclear scintigraphy and kinetic and kinematic analysis) . Also, the students will master pathogenesis, diagnostics and treatment of soft tissues, joint and bone lesions of the limbs and axial skeleton in sport horses. In the ophthalmology course students will be acquired with the most common eye diseases, ocular examination techniques and treatments. In equine dentistry students will be acquired with principles of examination of the oral cavity, performing prophylactic teeth floating procedures in the field condition and treatment of basic pathological diseases in the oral cavity. INFECTIOUS DESEASES During the practical work students will learn how to obtain the most suitable clinical samples required for objective diagnostic procedures of infectious diseases of horses. Furthermore, they will be provided with information about referral diagnostic methods and referral laboratories for particular infectious disease of the horses. The acquired knowledge will prepare students for correct interpretations of the diagnostics tests results and knowledge about general prophylaxis will give to them sustained knowledge for implementation of control measures in prevention of infectious diseases. Finishing the course students will be also able to make appropriate immunization schedules for horses. RADIOLOGY AND ULTRASOUND During practical work students will be trained for independent radiography of the extremities in horses and setting radiographic diagnosis. PARASITOGY Students are introduced to the development, morphology and determination of internal parasites as an etiological factor in the development of clinical signs in the most common invasive diseases of horses. They are also trained to perform a parasitological

	examination and determine the most common horse parasites in which prevention and treatment are an integral part of animal health care. In those invasive diseases for which diagnosis is possible in a specialized laboratory, they are able to properly take the material after the suspicion and deliver it to a specialized laboratory with all the necessary information. PATHOLOGY – SELECTED CHAPTERS Students will expand their knowledge of the horse necropsy technique and recognition of pathological changes in diseases that are relatively common in horses and foals. CLINICAL PHARMACOLOGY During the conservatorium students will be introduced to the typical diseases of this noble species of animals and the possibility of their treatment. CLINICAL TOXICOLOGY Students will be able to recognize poisoning, approach the treatment of poisoned animals, assess the success of treatment and to sample material for diagnostic tests in an appropriate manner, primarily for toxicological analysis. NUTRITION AND DIETETICS IN HORSES Introducing future veterinarians with feeding as an important factor in preventing the emergence of a significant number of diseases and as a possible additional therapy in the treatment of the sick horses.
3.5. Course content broken down in detail by weekly class schedule (syllabus)	OBSTETRICS AND REPRODUCTION 1. Breeding management of mares: Oestrus and its detection, Endocrinology of the equine oestrous cycle. Monitoring of follicular dynamic in the mare with ultrasound examination. Optimal timing of mating and insemination in mare. 2. Assesment of mare fertility,. Contagious equine metritis: Recommendations for disease prevention and control during the breeding season. Examination and swabbing mares and stallions for CEM 3. Assessment of stallion fertility and breeding activity. Collecting and evaluating stallion semen. 3. Artificial insemination in mares with diluted, chilled and frozen semen: timing and techniques. 4. Management of the postpartum mare 5. Gynaecological surgery in mares 6. Pregnancy diagnosis - early ultrasound examination and resolving problems during pregnancy 7. Infertility in mares: embryonic loss, twin pregnancy, endometritis and endometriosis, ovulation failures 8. Neonatal care 9. Foal illnesses. SURGERY, ORTHOPAEDICS AND OPHTHALMOLOGY 1. The first aid approach to to equine trauma; 2. Application of sedation, general intravenous and local anaesthetics in field conditions: 3. Acute abdomen (diagnsis, surgical decision, preoperative management); 4. Postoperative care and complications related to abdominal surgery; 5. Application of manipulative tests and diagnostics analgesia in lameness diagnostic: 6. The most common diseases and treatment of equine limbs 7. Treatment of soft tissues diseases: tendons, ligaments, bursae; 8. The basic principles in treatment of palpebral and corneal injuries and inflammation of the uveal tract 9. The basic of equine dentistry and dental prophylaxis. INTERNAL MEDICINE 1. Gastrointestinal diseases (gastrointestinal endoscopy; diagnostic and therapeutic approach to equine colic, colitis X; gastric and duodenal ulcers in horses and foals). 2. Respiratory diseases (tracheal aspirate-indications, techniques and interpretation; bronchoalveolar lavage; obstructive pulmonary disease; exercise induced pulmonary hemorrhage; bronchodilatators and corticosteroids in aerosol form; immunomodulators in respiratory diseases therapy). 3. Diseases of cardiovascular system

	(arrhythmias; congenital cardiac defects; valvular diseases; endocarditis; pericarditis). 4. Diseases of blood and blood forming organs (anemia; polycythemia; thrombocytopenia; hemostasis; vasculitis; lymphoproliferative and myeloproliferative diseases). 5. Urological diseases (urolithiasis). 6. Dermatological diseases. 7. Neurological diseases (painful back, vestibular syndrome). INFECTIOUS DISEASES 1. Review of the incidence of infectious diseases of horses and making of differential diagnosis based on epizootiological data and clinical symptoms; 2. Procedures in of horse infectious diseases diagnostics – sampling of adequate diagnostic material for microbiological, molecular and immunological diagnostic methods; 3. Treatment of infectious diseases of the horses; 4. General prophylaxis of infectious diseases of the horses; 5. Imunoprophylaxis of infectious diseases of the horses - immunization schedules. RADIOLOGY AND ULTRASOUND 1.The procedures of radiological and ultrasound diagnosis. Diagnosis of pathological conditions of the distal phalanx. 2. Diagnosis of navicular disease 3. Pathology of metacarpophalangeal joint and carpus 4. Pathology of metacarpophalangeal joint and tarsus 5. Pathological conditions of stifle 6. Asthma) and pneumonia; PARASITOGY 1.The common parasites of GI tract – coprological examination, dehelmentization and treatment 2. Samples shipment and laboratory diagnostis 3. Dehelmentization schedule of foals and young horses 4. Dehelmentization schedule of adult horses PATHOLOGY – SELECTED CHAPTERS 1. Incidence of diseases and causes of death in horses, specifics of dissection of horses; 2. Pathomorphological changes in disorders of the stomach and intestines position in horses; 4. Pathomorphological changes in metabolic diseases of horses. CLINICAL PHARMACOLOGY 1.Treatment of colic in horses (spasmolitycs, nonsteroidal anti-inflammatory drugs) 2. Pharmacoterapeutic basics: prevention and treatment of laminitis (aseptic inflammation of the hoof dermis) 3. Prevention and treatment of asthma of horses (anti-inflammatory drugs, bronchodilators). CLINICAL TOXICOLOGY 1.Clinical cases of pesticide poisoning in horses (case study) 2. Clinical cases of poisoning horses with herbs 3. Clinical cases of hymenoptera stings and snake bites. NUTRITION AND DIETETICS IN HORSES 1.Dietetics in horses 2. Feeding in the prevention of disease 3. Therapeutic feeding.		
3.6. Format of instruction:	X lectures X seminars and workshops X exercises ☐ on line in entirety ☐ partial e-learning	X independent assignments X multimedia and the internet X laboratory X work with mentor ☐ (other)	3.7. Comments:

<table>
<tr><td></td><td colspan="6">X field work</td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>3.8. Student responsibilities</td><td colspan="10">Students are obliged to participate lectures, seminars and exercise.</td></tr>
<tr><td rowspan="6">3.9. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>1.26</td><td>Research</td><td></td><td>Practical training</td><td colspan="5"></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>activity (other)</td><td colspan="5">0.7</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td colspan="5"></td></tr>
<tr><td>Tests</td><td>2.24</td><td>Oral</td><td></td><td>(other)</td><td colspan="5"></td></tr>
<tr><td>Written exam</td><td>2.8</td><td>Project</td><td></td><td>(other)</td><td colspan="5"></td></tr>
<tr><td colspan="10"></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="10">1 progress test – 30 questions (5 pathology, 5 infectious diseases, 5 radiology, 5 pharmacology and toxicology, 5 nutrition and dietetics in horses, 5 parasitology).

Final written exam:

A passing grade for the progress test is a requirement in order to register for the final exam. However, the progress test is not a requirement for a signature in the grade book. If the student fails the progress test 4 times, he/she needs to take the whole course over again. In case he/she doesn’t take the progress test or fails it 4 times, an additional term is possible if the student representative writes an official request to the respective Vice Dean. The Course leader makes the final decision.

Maksimal : 40
Minimal: 24

Final written exam: 30 questions (10 from internal medicine, 10 from surgery, orthopaedics and ophthalmology, 10 from reproduction, obstetrics and neonatology)
1,333 point per question.</td></tr>
<tr><td>2.11. Required literature (available</td><td colspan="3">Title</td><td colspan="2">Number of copies in the library</td><td colspan="4">Availability via other media</td></tr>
</table>

in the library and via other media)	The Merck Veterinary Manual		http://www.merckvetmanual.com/mvm/index.jsp
	Noakes, D. E., T. J. Parkinson and G. C. W. England (2009): Veterinary reproduction & obstetrics, 9th edition. W. B. Saunders Company Ltd.	3	
	Gordon, I. (1996): Controlled reproduction in Horses. CAB International, University Press, Cambridge.	2	
	McKinnon, A. and J. L. Voss (1992): Equine reproduction. Lea & Febiger, Philadelphia.	2	
	Lumb and Jones (2015): Veterinary anesthesia, 5th ed., Williams and Wilkins, Baltimore.	2	
	Auer, J. A, Stick J. A. (2019): Equine surgery, W. B. Saunders company, 5thd ed. Philadelphia, London, Toronto,	2	

	Montreal, Sydney, Tokyo		
	Ross M. W., Dyson S. J. (2011): Diagnosis and management of lameness in the horse, Saunders company, Philadelphia.	2	
	Radostits, O.M., C.C. Gay, D. C. Blood, K. W. Hinchcliff: Veterinary Medicine, A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses, 9th edition, W. B. Saunders, 2000.	3	
	Sellon, D., M. Long: Equine infectious diseases. W. B. Saunders 2007.	2	
	Reef, Virginia (1998): Equine diagnostic ultrasound. W. B. Saunders company.	3	
	Zachary, J. (2017): Pathologic Basis of	2	

	Veterinary Disease, 6th Ed. Mosby		
	Osweiler, G. D.: Toxicology, Williams & Wilkins Philadelphia, Baltimor, 1996.	2	http://www.ivis.org/library.asp
2.12. Optional literature (at the time of submission of study programme proposal)	MAKEK, Z., I. GETZ, N. PRVANOVIĆ, A. TOMAŠKOVIĆ, J. GRIZELJ (2009). Rasplođivanje konja. Veterinarski fakultet, Zagreb. CERGOLJ, M., M. SAMARDŽIJA (2006): Veterinarska andrologija. Veterinarski fakultet Sveučilišta u Zagrebu. MATIČIĆ, Ž, CAPAK D. (1999.): Oftalmologija domaćih životinja, Veterinarski fakultet, Zagreb CAPAK, D., D. MATIČIĆ (2002): Veterinarska kirurška onkologija. U: Veterinarska onkologija. Ur. Željko Grabarević. DSK-FALCO, Zagreb. SLAVKO CVETNIĆ: Opća epizootiologija. Školska knjiga – Zagreb, 1993. SLAVKO CVETNIĆ: Virusne bolesti životinja. Školska knjiga – Zagreb, 1997. SLAVKO CVETNIĆ: Bakterijske i gljivične bolesti životinja. Medicinska naklada – Zagreb, 2002. ŠEHIĆ, M. (2000): Osteoartropatije u domaćih životinja. Skaner studio Zagreb. M. DONALD MCGAVIN, JAMES F. ZACHARY: Specijalna veterinarska patologija. Prema četvrtom američkom izdanju. Urednik hrvatskog izdanja: Željko Grabarević. Stanek d.o.o., Varaždin, 2008. RUŽA SABOČANEC, KRIŽAN ČULJAK: Osnove obdukcijske tehnike životinja. Zagreb, 1995.		
2.13. Quality assurance methods that ensure the acquisition of exit competences	Regular classes' attendance-checking, continuous student activity assessment during the entire course; continuous knowledge checking (progress tests), regular student consultation, students' questionnaire. They have obligatory seminars, test and final written exam.		
2.14. Other (as the proposer wishes to add)-			

FIELD SERVICE CLINIC

1. GENERAL INFORMATION			
1.37. Course teacher	Assoc. prof. dr.sc. Darko Grden	2.26. Year of the study program	5th
1.38. Name of the course	Field Service Clinic	2.27. Credits (ECTS)	3,5
1.21. Associate teachers	Multidisciplinary and case-oriented nature of this subject would include variable team of clinical veterinary surgeons, depending of case load. Clinical surgeons would involve all teaching staff from Clinic for obstetrics and reproduction, Clinic for internal diseases, Clinic for surgery, orthopedics and ophthalmology and Department for microbiology and infectious diseases with clinics.	2.28. Type of instruction (number of hours L + S + E + e-learning)	0+0+60+0
1.22. Study program (undergraduate, graduate, integrated)	integrated	2.29. Expected enrolment in the course	
1.23. Status of the course	obligatory	2.30. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			

3.10. Course objectives	In addition to the general objectives and tasks of educating future veterinary surgeons, a special objective within this course to enable students to do professional work in the diagnosis, curing and prevention of animal diseases in the field.		
3.11. Course enrolment requirements and entry competences required for the course	Attended all cases I - IX. semester		
3.12. Learning outcomes at the level of the program to which the course contributes	Acquiring the skills needed to perform the independent veterinary practices in the field condition.		
3.13. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Independently perform all diagnostic procedures including methods of clinical examination in conditions of field work. Taking samples from the live patients or cadavers which would enable material for all types of laboratory tests. Perform all obstetrical procedures that can be performed well in the conditions of fieldwork and routine gynecological and andrological exams for all aspects of clinical reproductive practice. Perform all surgical procedures adapted to conditions of fieldwork and thorough clinical examination of all kinds of internal diseases on farm.		
3.14. Course content broken down in detail by weekly class schedule (syllabus)	Students in the 10th semester deepen the knowledge and skills acquired through attending and completing preclinical courses, as well as consolidate the theoretical and practical knowledge and skills acquired in the clinical courses they have attended and successfully completed to date. This primarily refers to the courses “Propaedeutic,” “Internal Medicine,” “Surgery, Orthopedics and Ophthalmology I, II and III,” “Obstetrics of Domestic Animals I and II,” and “Infectious Diseases of Domestic Animals” within the integrated undergraduate and graduate study program in Veterinary Medicine. For the implementation of practical field-based training in veterinary organizations, the course coordinator and the supervisors of the daily field training, together with the heads of the veterinary organizations, must ensure a sufficient number of farm animal and equine patients on which students can further develop their acquired knowledge and skills. Course teachers and teaching associates must base the delivery of the course on students’ practical work with patients under field conditions. The objective of the course is to provide students with individual practical experience in applying the knowledge acquired during their studies, while further deepening their knowledge and developing practical skills through field-based work. The knowledge and skills acquired through practical work should provide a foundation for independent professional work in veterinary organizations engaged in field-based veterinary practice.		
3.15. Format of instruction:	☐ lectures ☐ seminars and workshops ☒ exercises	☒ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor	3.16. Comments:

	☐ on line in entirety ☐ partial e-learning		☒ field work			
3.17. Student responsibilities	Keeping high biosecurity and animal welfare standards according to previous knowledge from clinical subjects and according to strict instructions from course leaders					
3.18. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	1	Research		Practical training	1
	Experimental work		Report		Activity	1,5
	Essay		Seminar essay		(other)	
	Tests		Oral exam		(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	descriptive assessment		
2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Complete obligatory literature for all clinical subjects i.e. Reproduction of domestic animals, internal diseases of domestic animals, surgery, orthopedics and ophthalmology of domestic animals and infectious diseases of domestic animals (please see course description for each subject)		
2.142. Optional literature (at the time of submission of study program proposal)	Complete additional literature for all clinical subjects i.e. reproduction of domestic animals, internal diseases of domestic animals, surgery, orthopedics and ophthalmology of domestic animals and infectious diseases of domestic animals (please see course description for each subject)		
2.143. Quality assurance methods that ensure the acquisition of exit competences	All students would be evaluated for each case. Complete case load would be documented in student notebook, that needs to be presented any time during field work and after it, when requested. All data in student notebook should be verified and signed by clinical teacher responsible for that specific case and practical work.		
2.144. Other (as the proposer wishes to add)			

FOOD HYGIENE AND QUALITY CONTROL

1. GENERAL INFORMATION			
1.39. Course teacher	Full Prof. Nevijo Zdolec	2.31. Year of the study programme	5
1.40. Name of the course	Food Hygiene and Quality Control	2.32. Credits (ECTS)	3,5
1.22. Associate teachers	Full Prof. Željka Cvrtila, Full Prof. Nevijo Zdolec, Assist. Prof. Tomislav Mikuš, teaching assistant Marta Kiš. PhD, teaching assistant Mladenka Vukšić, DVM	2.33. Type of instruction (number of hours L + E + S + e-learning)	11+30+4
1.23. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	2.34. Expected enrolment in the course	
1.24. Status of the course	Compulsory elective subject	2.35. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
3.19. Course objectives	To inform the students about the trends in chemistry, toxicology and analytics as constituents of veterinary control in the protection of foodstuff hygienic quality and health safety. By means of lectures, exercises and seminars the students should acquire skills for independent interpretation of the obtained results of chemical analysis and bioresidue findings for the purpose of food quality and health safety evaluation. Furthermore, the aim of the subject is to make the students familiar with the methods of determination and isolation of microorganisms causing food spoilage and poisoning (alimentary infections and intoxications).
3.20. Course enrolment requirements and entry competences required for the course	The course can enroll only students of orientation "Hygiene and technology of animal food and veterinary public health"
3.21. Learning outcomes at the level of the programme to which the course contributes	In the frame of veterinary public health and food safety to accept techniques for control of the quality and safety of food hygiene and understand the application of laboratory results in the evaluation of food safety.
3.22. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	-define quality of foodstuffs -to determine the chemical composition of food of animal origin -perform sensory and microbiological analysis of foods, and in terms of improving quality and hygienic -interpret the results of sensory, chemical and microbiological food ingredients searches -explain the meaning of spices and additives in processed foods

<table>
<tr><td></td><td colspan="3">-evaluate the safety of foods on the basis of the tests performed</td></tr>
<tr><td>3.23. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="3">Lectures 11 hours
Foodstuff quality (Definition of quality. Quality parameters. Foodstuff quality control. Nutritional tables) – 2 hours;
Chemical composition of meat, fish, milk, eggs and their changes in the course of processing – 2 hours
Chemical analysis of foodstuffs – 2 hour
Microbiological analysis of foodstuffs I part – 2 hours
Microbiological analysis of foodstuffs II part – 2 hours
Health safety of foodstuffs (Hygienic quality, accuracy of chemical composition, accuracy of declaration).– 1 hour

Exercises 30 hours (6 hours field exercises)
Sampling and representative quality of samples in chemical analysis of foodstuffs – 1 hour
Determination of total, connective-tissue and muscle proteins. Determination of water and fat in foodstuffs. Ash. – 4 hours
Chemical analysis of foodstuffs – 4 hours
Chemical analysis of foodstuffs – field exercises – 6 hours
Screening methods in analysis of food – 3 hours
Microbiological analysis of foodstuffs I - 3 hours
Microbiological analysis of foodstuffs II -2 hours
Microbiological analysis of foodstuffs III – 3 hours
Microbiological analysis of foodstuffs IV – 1 hour
Microbiological analysis of foodstuffs V – 1 hour
Microbiological analysis of foodstuffs VI – 2 hour

Seminars 4 hours
Sensoric (organoleptic) properties of foodstuffs
Additives and spices in meat processing</td></tr>
<tr><td>3.24. Format of instruction:</td><td>x ☐ lectures
x ☐ seminars and workshops
x ☐ exercises
☐ on line in entirety
☐ partial e-learning
x ☐ field work</td><td>x ☐ independent assignments
☐ multimedia and the internet
x ☐ laboratory
☐ work with mentor
☐ (other)</td><td>3.25. Comments:</td></tr>
<tr><td>3.26. Student responsibilities</td><td colspan="3">Students are required to attend all forms of teaching the subject.</td></tr>
</table>

3.27. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0.63	Research		Practical training	
	Experimental work		Report		Activities	0.35
	Essay		Seminar essay		(other)	
	Tests	1.12	Oral exam		(other)	
	Written exam	1.4	Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam

TYPES OF ACTIVITIES	KOEFICIJENT	MINIMAL NUMBER OF POINTS	MAXIMUM NUMBER OF POINTS
Attending lectures	**0.55**	**3**	**6**
The total of 11 lecture hours	6:11=0.55	3:0.55=5.45 (5) The student must attend 5 lecture hours in order to gain minimal 3 points Each particular lecture hour is summed as 0.55 point	The student must attend 11 lecture hours in order to gain maximal 6 points
Attending exercises	**0.2**	**4**	**6**
Total of 30 exercise hours	6:30=0,2	4:0,2 = 20 The student must attend 20 exercise hours in order to gain minimal 4 points Each particular exercise hour is summed as 0.2 point	
Attending at seminares	**1.5**	**4**	**6**
Total of 4 seminars hours	6:4=1,5	4: 1,5 =2,6 (3) The student must attend 3 seminars hours in order to gain minimal 4 points Each particular seminar hour is summed as 1.5 point	
Activity at exercises and seminares		**5**	**10**

	Seminare prepared and held = 3 points Oral answers to exercises = 4 points (4x1) Oral answers to seminares= 3 points (3x1)		5:1=5 The student gain minimal 5 points (oral answers at exercises and seminares)	
	Continuous knowledge checking		**20**	**32**
			During the course, continuous knowledge will be evaluated by 1 preliminary written exams (8 questions; 4 questions – chemistry of food and 4 questions food microbiology). The minimal number of points a student must gain is 20 (5 questions). In case a student answers less than 5 questions correctly at a preliminary exam, he/she must retake the preliminary.	
	Final exam		**24**	**40**
			The final exam comprises all results gained from attending lessons. The exam is written. At the exam a student answers 20 questions. One correct answer is worth 2 points. Minimal number of points is 24.	
	Final evaluation		**60**	**100**
			Regardless of a fact that a student gained the number of points from	

			the first four evaluation elements on the basis of makeup preliminary exam or not, the same rules are valid for forming the final mark. The final mark is formed on the basis of total sum from all five evaluation elements, according the following table. Points Grade: up to 59 — 1 (F); 60-68 — 2 (E); 69-76 — 2 (D); 77-84 — 3 (C); 85-92 — 4 (B); 93-100 — 5 (A)	

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Jeantet, R., T. Croguennec, P. Schuck, G.Brulé (2016): Handbook of Food Science and Technology 1 - Food Alteration and Food Quality. John Wiley & Sons, Inc., London, UK		
	Jeantet, R., T. Croguennec, P. Schuck, G.Brulé (2016): Handbook of Food Science and Technology 2 - Food Process Engineering and Packaging. John Wiley & Sons, Inc., London, UK		
	Belitz H.-D., W. Grosch, P. Schieberle (2009): Food Chemistry 4th revised and extended edition. Springer-Verlag, Berlin, DE.		
	FAO Food and Nutrition Paper No 14/9, FAO Roma, Manual of Food Quality Control.		
	AOAC (1990): Official methods of analysis of the AOAC,1990. Izd. K. Helbrick, Arlington.		
	International Standard ISO Methods.		

2.145. Optional literature (at the time of submission of study programme proposal)	James, C. S. (1995): Analytical chemistry of foods. Blackie Academic & Professional. Prevot, A., V. Fredette (1966): Manual for the Classification and Determination of the Anaerobic Bacteria. Montreal 1966. Stannard, C. J., S. B. Petitt and F. A. Skinner (1989): . Rapid microbiological Methods for Foods, Beverages and Farmaceuticals. Blackwell scientific Publications. Oxford, London, Edinburg, Boston, Melbourne. 1989. Nollet, L. M. L., F. Toldrá (2015): Handbook of Food Analysis – 3rd Edition Vol I. Taylor & Francis Group, Boca Raton, U.S.A. Ray, B., A. Bhunia (2014): Fundamental Food Microbiology. 5th edition. CRC Taylor & Francis, SAD. Zdolec, N. (2016): Fermented Meat Products: Health Aspects. CRC Taylor & Francis, SAD.
2.146. Quality assurance methods that ensure the acquisition of exit competences	
2.147. Other (as the proposer wishes to add)	

HYGIENE, TECHNOLOGY AND FOOD SAFETY

1. GENERAL INFORMATION			
1.41. Course teacher	Assist. Prof. Tomislav Mikuš	2.36. Year of the study programme	5th year, IX. and X. semester
1.42. Name of the course	Hygiene, technology and food safety	2.37. Credits (ECTS)	12.5
1.23. Associate teachers	Full Prof. Željka Cvrtila, Full Prof. Nevijo Zdolec, Assist. Prof.Tomislav Mikuš, teaching assistant Marta Kiš, PhD, teaching assistant Mladenka Vukšić, DVM	2.38. Type of instruction (number of hours L + E + S + e-learning)	60+105+0
1.24. Study programme (undergraduate, graduate, integrated)	intergrated	2.39. Expected enrolment in the course	
1.25. Status of the course	obligatory	2.40. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
3.28. Course objectives	In addition to the general aim and tasks, the education of future doctors of veterinary medicine has a special aim. It is the task of lecturers to teach the students how to perform independently all expert activities, and to apply the scientifically verified standards of hygiene and technology within the frameworks of the veterinary inspection and evaluation of food safety and quality. Of course, this is possible only by means of education in the field of application of process methods (technology) in the production of food products of high quality and hygiene standards, all in the context of improvement of veterinary public health.
3.29. Course enrolment requirements and entry competences required for the course	A condition for attending the course: attended and passed all couses in the first three years of study. Attended all courses from the fourth year of study and passed exams in the subject: Internal Medicine (VII semester) and Game management and breeding (VII semester).
3.30. Learning outcomes at the level of the programme to which the course contributes	Course Hygiene, Technology and Food Safety is an important segment of veterinary public health, which allows students to engage with the acquired knowledge in tasks and activities of veterinarians in the area of food inspection, official controls and systematic monitoring of the safety of food of animal origin. Students are trained to carry out veterinary inspections and controls of food, from its production, processing and transport.

3.31. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	By the completion of the course students should be able to: - distinguish the structure, purpose and methods of veterinary inspection in the production of food of animal origin - rank the hazards and risks involved in the production and of food of animal origin - evaluate the results of the food hygiene and quality control assessment - distinguish the type of food according to the production process -determine the factors for the acceptability of foods for human consumption -interpret legislation for the needs of participation in the preparation and analysis of reports in the field of hygiene -review production hygiene procedures in the facility and process control indicators
3.32. Course content broken down in detail by weekly class schedule (syllabus)	**Lectures:** 1. Introduction/hygiene, technology and food safety (terms, basic regulations, organization of official controls - meat, milk, fish, shellfish, egg, honey) 2. Food microbiology (meat, milk, fish, shellfish, eggs, honey; pathogens, standards) and methods in food microbiology 3. Food-borne infections and intoxications, Antimicrobial resistance, EFSA/ECDC zoonoses report 4. Ante-mortem inspection 5. Welfare at slaughter 6. Slaughterhouse processing of ungulates and solipeds; slaughtering facilities, carcass grading 7. Slaughterhouse processing of poultry and game, facilities, carcass grading 8. Quality aspects of meat, judgment (composition, meat biochemistry, stress and consequences, spoilage) 9. Chemical-toxicological hazards in food chain 10. Operational prerequisite programs in slaughterhouses 11. HACCP system in slaughterhouses 12. Post-mortem inspection and meat assessment 13. Risk-based meat inspection -Meat Safety Assurance System 14. Milk hygiene, technology and safety (production hygiene, species, mastitis, milk pathogens, residues, spoilage, shelf life, refrigeration, milk heat treatment, heat treatment validation) 15. Milk quality aspects (chemical composition, quality regulations, sampling methods and quality assessment, processing value, milk declarations, milk composition modulation, milk additives)

	16. Hygiene, technology and safety of dairy products (Types of dairy products, technological processes. Hazards and risks - process microbiology) 17. Hygiene, technology and safety in cheesemaking 18. Inspection and control in the production of milk and dairy products (Regulation on the inspection of raw milk intended for public consumption. Control system - the role of veterinarians. Control of raw materials - Antibiotics, mycotoxins. Official controls in milk processing. Traceability. Sampling and lab. analyses.) 19. Prerequisite programs and HACCP in dairy industry 20. Hygiene, technology and safety of meat products - heat-treated (Chemical preservation, Types of products, Production technology. Hazards and risks, impact of the process. Thermal processing and validation) 21. Hygiene, technology and safety of meat products – thermally non treated (Chemical preservation, Types of products, Production technology. Hazards and risks, impact of the process) 22. Food processing - chemical - toxicological hazards (additives, allergens, processing hazards) 23. Veterinary official controls in meat processing (hygiene and safety- control of oPRP, HACCP, traceability, sampling, measures) 24. Composition and quality of fish, crustaceans and shellfish. Fishery products. 25. Hygiene, technology and safety of fish, shellfish (Primary production-hygiene, cold chain. Species: fresh fish, filleted, smoked, shellfish (live bivalves), depuration/purification. Biological and chemical hazards. Classification of production areas, monitoring. Heat treatment, freezing. 26. Hygiene, technology and safety of eggs and honey (Farm hygiene and biosecurity of laying hens, Types of eggs, liquid eggs, processed eggs. Microbiological risk. National program for the control of salmonellosis in poultry. Chemical risks. Traceability and labeling. Hygiene of apiaries and good beekeeping practices. Types of honey. Microbiological risk. Chemical risks. Quality control.) 27. Prerequisite programs and HACCP in processing – meat, fish (Hygiene of the facility and equipment, GMP/GHP, design and maintenance of premises. Hazards and risk. Prerequisite programs (PRP). HACCP application: CCP (e.g. heat treatment, cooling, metal detector), validation (temperature, time), monitoring and verification. 28. Food Fraud

	29. Alternative foods 30. New technologies in food hygiene, safety and control . **Exercises:** 1. Sampling for microbiological examinations of food/carcasses/surfaces in facilities 2. Microbiological examination of meat and work surfaces 3. Interpretation of the results of microbiological examinations 4. Microbiological criteria for food – problem solving tasks 5. Virtual slaughterhouse – cattle, pigs 6. Virtual slaughterhouse - poultry, game 7. Water holding capacity, Meat pigments 8. Meat freshness 9. FSMS – prerequisites – slaughterhouse – constructing layout, equipment, biosafety 10. FSMS – HACCP – slaughterhouse – hazard analysis, process diagrams, CCP 11. Slaughterhouse field practicals - pigs, cattle slaughter processing and veterinary inspection 12. Poultry slaughterhouse field practicals – slaughter processing and veterinary inspection 13. Post mortem meat inspection – section hall practical training 14. Post mortem- problem solving tasks – cases 15. Determination of milk freshness and milk fat 16. Determination of the hygienic quality of raw milk (hygiene standards for raw milk, microbiological examination, reductase tests, antibiotics residues, aflatoxin) 17. Interpretation of microbiological examinations of milk, classification of milk – SCC, TVC 18. Food sampling for chemical-toxicological examinations, sensorial analysis 19. Minced meat and meat preparations, additives, spices (toxicological formula, ADI, exposure assessment – additives) 20. Hygiene, technology and safety of meat products (sensory, safety and quality criteria, constructing a label - nutritional, energy calculation, hazard analysis, thermal processing)

<table>
<tr><td></td><td colspan="6">21. Technology, quality of dairy products (sensory, safety and quality criteria, constructing a label - nutritional, energy calculation, hazard analysis, thermal processing)
22. Hygiene and safety - fish, fresh fishery products, shellfish (freshness-sensory, parasites, microbes)
23. Hygiene and safety - eggs (freshness, Salmonella control -farm, trade) honey (chemical-toxicological hazards, adulteration)"
24. Food fraud - methods of adulteration, testing (milk, minced meat, fish and products, etc.)
25. FSMS - meat/milk/fish processing - prerequisites – construction of layout, equipment, biosafety
26. FSMS- HACCP - meat/milk/fish processing - hazard analysis, process diagrams, CCP
27. Microbiological criteria in food processing - problem solving tasks
28. Field practicals – meat processing facility – processes and official controls
29. Field practicals – milk processing facility – processes and official controls
30. Field practicals – eggs/fish packaging/processing facility – processes and official controls
31. Epidemiological study of foodborne diseases – problem solving tasks</td></tr>
<tr><td>2.6.Format of instruction:</td><td colspan="2">x lectures
☐ seminars and workshops
x exercises
☐ on line in entirety
☐partial e-learning
x field work</td><td colspan="2">x independent assignments
☐ multimedia and the internet
x laboratory
☐ work with mentor
☐ (other)</td><td colspan="2">2.7.Comments:</td></tr>
<tr><td>2.8.Student responsibilities</td><td colspan="6">Students are required to attend all forms of teaching the subject.</td></tr>
<tr><td rowspan="5">2.9.Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>2.25</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Activity</td><td>1.25</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>4</td><td>Oral exam</td><td>5</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6"><table>
<tr><th>ACTIVITIES</th><th>MINIMAL SCORE</th><th>MAXIMAL SCORE</th></tr>
<tr><td>Lecture attendance</td><td>3</td><td>6</td></tr>
<tr><td>60 hours of lectures

(coefficient: 0,1)</td><td>Student must attend 30 hours of lectures (15h in IX. semester</td><td>60 x 0,1 = 6 points</td></tr>
</table></td></tr>
</table>

	and 15h in X. semester) in order to gain 3 points		
Exercise attendance	**8**	**12**
105 hours of exercises (coefficient: 0,11 – for calculating minimal attendance of 73h)	student must attend 73 hours of exercises(42h in IX. semester and 31h in X. semester) in order to gain 8 points	
Activity at exercises	**5**	**10**
Oral questions (2,5 points each)	2 answers (1 per semester) in order to gain 5 points	4 answers x 2,5 = 10 points
Continuous knowledge checking	**20**	**32**
2 preliminary written exams, 8 questions each. 1 question = 2 points 16 questions x 2 = 32 points The student must attend the first organized term of the test. In case of justified absence (medical proof), the student can access the remedial test. The first preliminary test (end of the IX sem) covers teaching units referring to veterinary control in meat production (4 questions) and lab excersises (4 questions). The second	A student must give correct answers to 10 questions in order to gain 20 points	16 correct answers x 2 = 32 points

	preliminary test (X sem) covers veterinary inspection, control and examination of milk, fish, eggs, honey and other foodstuffs and technological processing in production of milk, fish, eggs, honey and other foodstuff (4 questions) and lab excersises (4 questions).		
	Final exam	**24**	**40**
	Oral exam, 10 questions. 1 question = 4 points 10 questions x 4 = 40 points	A student must give correct answers to 6 questions in order to gain 24 points	10 correct answers x 4 = 40 points

	Title	**Number of copies in the library**	**Availability via other media**
Sut2.11. Required literature (available in the library and via other media)	**Borda. D., A. I. Nicolau, P. Raspor** (2018): Trends in Fish Processing Technologies. CRC Taylor & Francis, SAD		pdf
	Chandan, C.R., A. Kilara, N. P. Shah (2008): Dairy Processing & Quality Assurance. A John Wiley & Sons, Ltd., Publication, 2008		pdf
	D.S. Collins, R. J. Huey (2015): Gracey's Meat hygiene. 11th edition. A John Wiley & Sons, Ltd., Publication, 2015.	1	pdf
	G.C. Mead (2004): Poultry meat processing and quality. CRC Press. 2004.		pdf
	Ray, B., A. Bhunia (2014): Fundamental Food Microbiology. 5th edition. CRC Taylor & Francis, SAD	1	
	Sutherland J. P., A. H. Varnam, M. G. Evans (1986): A colour Atlas of FOOD QUALITY CONTROL. A Wolfe Science Book.	1	
	Zdolec, N. (2016): Fermented Meat Products: Health Aspects. CRC Taylor & Francis, SAD	10	pdf

2.148. Optional literature (at the time of submission of study programme proposal)	**Ninios, N., J. Lunden, H. Korkeala, M. Fredriksson-Ahomaa** (2014): Meat inspection and control in the slaughterhouse. Wiley Blackwell. REGULATION (EC) No 178/2002 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety REGULATION (EC) No 852/2004 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the hygiene of foodstuffs REGULATION (EC) No 853/2004 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL laying down specific hygiene rules of food of animal origin REGULATION (EU) 2017/625 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on official controls and other official activities performed to ensure the application of food and feed law, rules on animal health and welfare, plant health and plant protection products
2.149. Quality assurance methods that ensure the acquisition of exit competences	Assessment during exercises.
2.150. Other (as the proposer wishes to add)	

INFECTIOUS DISEASES OF DOMESTIC ANIMALS

1. GENERAL INFORMATION			
1.43. Course teacher	Prof. Zrinka Štritof	2.41. Year of the study programme	5 th
1.44. Name of the course	**Infectious Diseases of Domestic Animals**	2.42. Credits (ECTS)	13,5
1.24. Associate teachers	Full Prof. Nenad Turk; Full Prof. Ljubo Barbić; Prof. Zrinka Štritof; Prof. Suzana Hađina; Prof. Josipa Habuš; Assoc. Prof. Vladimir Stevanović; Assist. Prof.Matko Perharić,, Iva Zečević, PhD, DVM, Iva Benvin, PhD, DVM, Iona Ćorić, DVM	2.43. Type of instruction (number of hours L + S + E + e-learning)	75 + 0 + 105 + 0
1.25. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	2.44. Expected enrolment in the course	At least 50% of lectures and 70% of exercises
1.26. Status of the course	Compulsory	2.45. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
3.33. Course objectives	The course on Infectious diseases of domestic animals will give an understanding of mechanisms of the occurrence, spreading and eradication of infectious diseases; students will gain comprehension of infectious disease diagnostics and available prophylactic measures and procedures for eradicating infectious diseases. Understanding the natural foci of infectious diseases, reservoirs, and zoonotic pathogens is particularly important for the protection of animal health as well as the health of animal breeders and veterinarians working with animals. Students are to gain practical knowledge of infectious disease diagnostics through epizootiological, clinical, microbiological, serological, pathoanatomical and therapeutic methods and biological experiments. In that way, attendants can be autonomous in practice and comprehend all the procedures taken elsewhere as support in objective diagnostics. In case of infection. It is essential for a veterinarian to be competent in using the right approach while taking the samples for diagnostics and to introduce adequate prophylactic measures.		

3.34. Course enrolment requirements and entry competences required for the course	Attended and passed all courses from 1st, 2nd and 3rd year of study; attended all courses from 4th year of study
3.35. Learning outcomes at the level of the programme to which the course contributes	The course on Infectious diseases of domestic animals will give an understanding of infectious disease outbreaks, transmission and control, diagnostics and preventive and control measures. Emphasis will be given to natural focal infectious diseases, reservoirs and zoonotic pathogens in order to preserve animal health, as well as the health of farmers and veterinarians. Students should acquire knowledge and practical skills in the diagnostics of infectious diseases of animals only using epizootiological, clinical, microbiological, serological, pathological and therapeutic methods, as well as biological experiments.
3.36. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After successfully finishing the course, students will be able to: - Identify the suspicion of an infectious disease - Identify the factors that determine the occurrence, spread and end of infectious disease - Introduce measures to prevent the spread of infectious diseases temporarily - Carry out adequate diagnostic procedures to confirm an infectious disease - Choose the proper method of sampling and the necessary laboratory tests for objective diagnosis of infectious diseases - Analyse results of diagnostic tests - Decide on the proper management of animals suffering from an infectious disease - Carry out specific treatment of infectious diseases - Implement prescribed measures for the control and/or eradication of infectious diseases - Recommend additional preventive and control measures that are not legally regulated
New learning outcomes	Upon successful completion of the course, the student will be able to: • recognise a clinical suspicion of an infectious disease; • identify factors that influence the emergence, transmission and cessation of infectious diseases; • implement measures for the temporary prevention of disease spread; • perform diagnostic procedures aimed at establishing a working suspicion of an infectious disease; • select appropriate sampling techniques and laboratory tests required for objective diagnosis; • evaluate and interpret laboratory findings from diagnostic specimens; • determine the appropriate subsequent management for animal(s) affected by an infectious disease; • implement targeted therapeutic interventions; • execute legally mandated measures for control and/or eradication of infectious diseases; • recommend control and prevention measures for infectious diseases not specifically governed by legislation.

3.37. Course content broken down in detail by weekly class schedule (syllabus)

Curse content

IX semester

Hours	Lecture topics
2	Introduction to epizootoilogy
2	Infection, Macro-organism defence mechanisms, Development of active immunity
2	Source of infection
2	Routes for spread of infectious diseases, Port of entry for pathogens
2	Susceptibility to infection
2	Prevention of infectious diseases
2	Immunoprofilaxis
2	Classification of infectious diseases; Stages of an acute infectious disease
2	Canine viral and bacterial gastroenteritidies I
2	Canine viral and bacterial gastroenteritidies II
2	Feline immunodeficiency virus infection, Feline leukaemia virus infection, Feline infectious peritonitis
2	Feline parvovirus infection, Feline respiratory disease, Feline infectious anaemia
2	Canine distemper, Infectious canine hepatitis, Canine infectious respiratory disease, Canine herpesvirus infection

Exercises

Hours	Exercise topics
3	Biosafety
3	Pathogenesis and clinical manifestations of infectious diseases
3	Clinical examination in infectious disease
3	Diagnostics of infectious diseases – epizootiological and clinical methods
3	Diagnostics of infectious diseases – Pathoanatomical diagnosis, experimental infections as diagnostic method and success of treatment as a diagnostic method
3	Sampling and submission of laboratory samples
3	Microbiological, immunological and molecular diagnostic methods I

3	Microbiological, immunological and molecular diagnostic methods II
3	Microbiological, immunological and molecular diagnostic methods III
3	Microbiological, immunological and molecular diagnostic methods IV
3	Microbiological, immunological and molecular diagnostic methods V
3	Microbiological, immunological and molecular diagnostic methods VI
3	Interpretation of serological test results
3	Infectious diseases surveillance, Reporting of infectious disease
3	Intensive care and treatment of patients with infectious diseases
3	Antibiotic therapy
3	Differential diagnosis of canine and feline infectious gastroenteritis
3	Differential diagnosis of canine and feline respiratory infections
3	Immunoprophylaxis of infectious disease in dogs and cats
3	Vector-borne diseases

X semester

Lectures

Hours	Lectures topics
2	Equine infectious anaemia, African horse sickness
2	Equine influenza, Equine viral arteritis; Equine viral rhinopneumonits
2	West Nile virus infection, Bovine viral diarrhoea – mucosal disease
2	Contagions equine metritis, Infectious abortion caused by Salmonella, Equine coital exanthema
2	Strangles; *Rhodococcus equi* infection
2	Bovine enzootic bronchopneumonia (Crowding disease), Infectious bovine rinotracheitis, Malignant catarrhal fever, Infectious bovine keratoconjunctivitis (Pink eye)
2	Viral diarrhoea in calfs, Winter dysentery, Lumpy skin disease
2	Enzootic bovine leucosis, Bovine spongiform encephalopathy
2	Classical swine fever, African swine fever
2	Swine erysipelas, Greasy pig disease, *Streptococcal and Staphylococcal* infections in swine

2	Swine dysentery, Transmissible gastroenteritis of swine, Colibacillosis in piglets, Edema disease
2	Enzootic pneumonia (Mycoplasmal pneumonia), Glässers disease, Pleuropneumonia in pigs
2	Porcine circovirus associated diseases, Porcine reproductive and respiratory syndrome, Inclusion body rhinitis, Progressive atrophic rhinitis
2	Caprine arthritis and encephalitis, Ovine pulmonary adenomatosis; Contagious ecthyma, Sheep and goat pox
2	Bluetongue, Foot rot in sheep, Caseous lymphadenitis
2	Rabies, Auyeszki disease
2	Anthrax, Tetanus, Botulism
2	Enterotoxemia, Black leg, Malignant edema
2	Tularemia, Listeriosis
2	Leptospirosis, Q-fever
2	Brucellosis, Melitococcosis
2	Tuberculosis, Paratuberculosis, Actinomycosis, Botryomycosis
2	Foot and mouth disease; Vesicular stomatitis
2	Ringworm, Warts (Papillomatosis), Eperythrozoonosis
2	Myxomatosis, Rabbit haemorrhagic disease, Pasteurellosis in rabbits

Exercises

Hours	Exercises topics
3	Differential diagnosis in equine enteric infections and equine respiratory infections
3	Differential diagnosis in equine infectious abortion; Immunoprophylaxis of infectious disease in equine
3	Differential diagnosis in bovine infectious respiratory diseases; Immunoprophylaxis of infectious disease in bovine
	Differential diagnosis in bovine infectious abortion; Differential diagnosis in bovine enteric infections
3	Differential diagnosis of swine infectious abortion; Differential diagnosis in swine enteric infections
3	Differential diagnosis of infectious respiratory diseases of swine; Immunoprophylaxis of infectious disease of pigs
3	Differential diagnosis of caprine and ovine infectious diseases
3	Differential diagnosis in neurological infectious disease

3.38. Format of instruction:	x lectures ☐ seminars and workshops x exercises ☐ on line in entirety ☐ partial e-learning ☐ field work		☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor x clinical exercises		3.39. Comments:		
3.40. Student responsibilities							
3.41. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	2,43	Research		Practical training		
	Experimental work		Report		Class activities	1,35	
	Essay		Seminar essay		(other)		
	Tests	4,32	Oral exam	5,4	(other)		
	Written exam		Project		(other)		

2.10. Grading and evaluating student work in class and at the final exam

1. Lecture attendance

IX semester

During the IX semester, students can justifiably be absent from up to 50 % of the 25 hours of lectures. To obtain a minimum of 1.5 points, students must attend seven lectures or 13 hours.

X semester

During the X semester, students can justifiably be absent from up to 50 % of the 50 hours of lectures. To obtain 1.5 points, the minimum students must attend 13 lectures or 25 hours.

The maximal number of points is 3 per semester or 6 in total. During two semesters, a student must obtain a minimum of 3 points.

2. Practical attendance

IX semester

During the IX semester, students can justifiably be absent from up to 30 % of the 75 hours of practicals. To obtain 4 points, the minimum, students must attend 14 practicals or 53 hours.

X semester

During the X semester, students can justifiably be absent from up to 30 % of the 30 hours of lectures. To obtain the minimal number of 4 points, students must attend six practicals or 21 hours.

The maximum number of points is 6 per semester or 12 in total. During two semesters, a student must obtain a minimum of 8 points.

3. Active participation in the practicals

With active participation in practicals, students must obtain at least 5 points. The maximum number of points is 10. Active participation implies understanding the subject of the practicals, which is orally assessed during the IX and X semesters. Students must collect 2.5 points per semester (a complete answer to one oral assessment will give a student 2.5 points). The oral assessment is done without previous notice during practicals. Students can be awarded 2.5 points for additional effort during practicals, a substitute for one oral evaluation.

4. Colloquium

During two semesters of the Infectious Diseases of Domestic Animals course, one oral colloquium with 8 questions will be held. The colloquium covers the curriculum of the first semester - General Epizootiology (lectures and practicals). Students can take a colloquium after the end of the IX semester. At the colloquium, the student must obtain a minimum of 20. As part of this evaluation element, achieving a maximum of 32 points is possible. A student who does not reach a minimum of 20 points can take a remedial colloquium two times in the academic year. The remedial oral colloquium contains the same number of questions and is graded the same way as the initial colloquium. A student with a minimum of 20 points on the remedial colloquium has the right to take the final exam.

5. Final exam

The requirement for the final exam is to achieve the minimum number of points in each of the previous four assessment elements. The added minimal points earned in the previous four assessment elements should be 36 to be able to take the final exam. The maximum number of points students can achieve before the final exam is 60. The final exam begins with a short analysis of the student's results of the other four elements of continuous assessment. The exam is oral and includes all methodical units of the course. The exam consists of 10 questions. Each answer is graded with 0 - 4 points, so the maximum possible number of points is 40. Regardless of the points earned from the previous four assessment elements, the student must demonstrate sufficient knowledge in the final exam to collect a minimum of 24 points. If the student did not pass the final exam, retaking the oral exam at another approved date is possible.

TYPES OF ACTIVITIES	MINIMAL NUMBER OF POINTS	MAXIMAL NUMBER OF POINTS
Attending lectures	**3**	**6**
IX semester (25 hours)	1.5 At least 13 hours (7 lecture topics)	3
X semester (50 hours)	1.5 At least 25 hours (13 lecture topics)	3
Attending practicals	**8**	**12**
IX semester (75 hours)	4 At least 60 hours (16 practical topics)	6
X semester (30 hours)	4 At least 24 hours (7 practical topics)	6
Active participation in practicals	**5**	**10**
Two oral tests per semester	A complete answer to a question at practicals = 2.5 point	
Colloquium (8 questions with 4 points per question)	**20**	**32**
Final exam (10 questions with 4 points per question)	**24**	**40**

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Sellon, D. C., M. T. Long (2014): Equine infectious diseases. 2nd Ed., Elsevier Saunders, St. Louis, Missouri, SAD.	3	
	Green, C. (2012): Infectious diseases of dog and cat. 4th edition. Saunders Elsevier	3	
	Constable P., K. W. Hinchcliff, S. Done, W. Gruenberg (2016): Veterinary Medicine, A Textbook of the Diseases of Cattle, Horses, Sheep, Pigs and Goats, 11th Ed., 2 Volume set, W. B. Saunders Ltd.	1	
	Aiello S. E., M. A. Moses (2016):The Merck Veterinary Manual. 11th Ed. Wiley, Hoboken, New Jersey, SAD.	2	
2.151. Optional literature (at the time of submission of study programme proposal)	Hagan, W. A. and Bruner, D. W. (1998): Microbiology and Infectious Diseases of Domestic Animals. 8th ed., Comstock, Ithaca. Rolle, M. (2001): Mikrobiologie, Infektions- und Seuchenlehre. 7th Ed., Ferdinand Enke Verlag., Stuttgart. Naglić, T., D. Hajsig, J. Madić, L. Pinter (2005): Specijalna veterinarska bakteriologija i mikologija. Veterinarski fakultet Sveučilišta u Zagrebu i Hrvatsko mikrobiološko društvo, Zagreb. Hajsig, D., Lj. Pinter, T. Naglić, R. Antolović (2012): Veterinarska klinička imunologija. Sveučilišni udžbenik, Veterinarski fakultet Sveučilišta u Zagrebu i Hrvatsko mikrobiološko društvo, Zagreb. Pugh, D. G., N. Baird (2012): Sheep and Goat Medicine, 2nd Ed., Elsevier Saunders, St. Louis, Missouri, SAD. Sykes, J. E. (2013): Canine and feline infectious diseases, 1st Ed., Elsevier Saunders, St. Louis, Missouri, SAD. Cvetnić, Ž. (2013): Bakterijske i gljivične zoonoze. Medicinska naklada, Zagreb. Šeol Martinec, B., V. Herak Perković, urednice hrvatskog izdanja (2013): Veterinarska imunologija, Načela i primjena, prijevod: M. J. Day, R. D. Schultz: Veterinary Immunology: Principles and Practice,1st. Ed. CRC Press, Taylor & Francis Group, 2010. Medicinska naklada, Zagreb. Cvetnić, S. (1993): Opća epizootiologija; Školska knjiga, Zagreb. Zaharija, I. (1980): Opća epizootiologija; Školska knjiga, Zagreb. Cvetnić, S. (1997): Virusne bolesti životinja; Školska knjiga, Zagreb. Cvetnić, S. (2002): Bakterijske i gljivične bolesti životinja, Medicinska naklada, Zagreb Zaharija, I. (1978): Zarazne bolesti domaćih životinja; Školska knjiga, Zagreb.		

	Jukić, B. (2003): Tropske zarazne bolesti životinja; Veterinarski fakultet Sveučilišta u Zagrebu.
2.152. Quality assurance methods that ensure the acquisition of exit competences	
2.153. Other (as the proposer wishes to add)	

OBSTETRICS AND REPRODUCTION II

1. GENERAL INFORMATION				
1.45. Course teacher	Full Prof. Martina Lojkić	2.46. Year of the study programme	5 (IX semester)	
1.46. Name of the course	**Obstetrics and Reproduction II**	2.47. Credits (ECTS)	5.5	
1.25. Associate teachers	Full Prof. Juraj Grizelj, Full Prof. Martina Lojkić, Full Prof. Nikica Prvanović Babić, Full Prof. Marko Samardžija, Full Prof. Silvijo Vince, Assoc. Prof. Ivan Folnožić, Assoc. Prof. Iva Getz, Assoc. Prof. Branimira Špoljarić, Assist. Prof. Ivan Butković, Postdoctoral assistant Juraj Šavorić, Ivan Tomić, DVM	2.48. Type of instruction (number of hours L + S + E + e-learning)	30+0+45	
1.26. Study programme (undergraduate, graduate, integrated)	Integrated Undergraduate and Graduate University Study of Veterinary Medicine in English	2.49. Expected enrolment in the course	25	
1.27. Status of the course	Compulsory	2.50. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	-	
2. COUSE DESCRIPTION				
3.42. Course objectives	Within the course framework, the students will get acquainted in detail with the pathology of pregnancy and parturition, with causes, clinical picture, diagnostics and therapeutic approach of infertility in domestic animals.			

	Students will also be thoroughly familiarized with pathology of mammary gland in companion animals, principles of contraception, including pregnancy termination, causes, diagnosis and therapy of common diseases of the new-born animals and basic principles of assisted reproduction methods.		
3.43. Course enrolment requirements and entry competences required for the course	Students are required to have pending completion of the course of Obstetrics and Reproduction 1 as an enrolment requirement. As the entry competences they should be able to take the animal's gynaecologic history, perform a gynaecological clinical examination and recognize clinical signs of reproductive cycle, pregnancy, parturition and puerperium. Also to perform a clinical examination of the mammary gland and apply basic principles of clinical examination of males and laboratory semen tests.		
3.44. Learning outcomes at the level of the programme to which the course contributes	-		
3.45. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	to explain the irregular ovarian function in domestic animals; to relate the impact of feeding and keeping animals on their reproduction; to use knowledge about inflammatory conditions of uterus and its diagnostics; to check parturient animal and define the pathology of parturition status, propose the proper obstetrical method and/or gynaecological surgery as a method of proper therapeutic approach. to diagnose congenital and acquired abnormalities of the reproductive organs that could cause infertility; to independently choose a method of assisting the difficult parturition; to understand the approach to pregnancy termination.		
3.46. Course content broken down in detail by weekly class schedule (syllabus)	Obstetrics and treatment of dystocia in domestic animals, Infertility in bovine, Infertility in mares, Infertility in sheep and goats, Infertility in swine, Infertility in dogs and cats, Neoplasia of mammary glands, Contraception and pregnancy termination, Pseudopregnancy of bitches and queens, Fibroadenomatous hypertrophy of queens, Veterinary neonatology, Assisted reproduction in veterinary medicine.		
3.47. Format of instruction:	☒ lectures ☐ seminars and workshops ☒ exercises ☐ on line in entirety ☐ partial e-learning ☐ field work	☒ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	3.48. Comments:
3.49. Student responsibilities	Students are obliged to attend at least 15 lecture hours and 32 hours of practicals. A minimum of 5 (max 10) points must be gained during practicals, which consists of the completion of a minimum of 3 (max 6) positively		

<table>
<tr><td></td><td colspan="6">evaluated assignments imposed by teacher and based on active participation during practicals (signed off by the teacher), and 2 (max 4) positive answer on short oral exam.</td></tr>
<tr><td rowspan="6">3.50. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0.99</td><td>Research</td><td></td><td>Practical training</td><td>0.55</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>1.76</td><td>Oral exam</td><td>2.2</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">By attending lectures the student gains 3-6 points (30 lecture hours; each lecture hour equals 0.1 coefficient). Students must attend at least 15 lecture hours.
By attending practicals the student gains 8-12 points (45 hours of practicals; each practicals hour equals 0.27 coefficient). Students must attend at least 32 hours of practicals.
The activity at the practicals is evaluated with 5-10 points; the activity will be evaluated through short oral exams and practical assignments.
A student can obtain a maximum of 10 points and a minimum of 5 points from the activity. Students collect points by actively participating in the exercises, and can collect a maximum of 100 points, which are multiplied by a coefficient of 0.1, resulting in a maximum final score of 10 points, by completing the following tasks:

1. Practical work in the skills' lab is evaluated - obstetrical procedures for correcting irregular positions of the fetus, fetotomy and caesarean section. The student can earn a maximum of 40 points (a maximum of 8 points for correction of incorrect positions of the head, legs, situs and positions, placing incisions for fetotomy, suturing in caesarean section).
2. The properly recorded anesthetic plan on the patient's chart - anesthetic protocol form is evaluated; the student can collect a maximum of 10 points.
3. Active participation in working with patients is evaluated, whereby the student can collect a maximum of 20 points (taking a history, the patient assessment, setting differential diagnoses, treatment options).
4. The assessment and treatment of the neonatological patient is evaluated, whereby the student can collect a maximum of 10 points.
5. Treatment of cases of infertility in domestic animals is assessed, whereby the student can receive a maximum of 20 points (treatment of cases of pyometra, neoplasia of the mammary gland, abortion, vulvoplasty, and caesarean section in dogs and cats, infertility of mares, cows, pigs and small ruminants).</td></tr>
</table>

During the course, students are required to hand in forms about work in the skills' lab, and reports on patients admitted (instructions available on the Clinic's website and on the Merlin course system). Each completed form is assessed, scored and signed.
The final sum of points is multiplied by a coefficient of 0.1.
The earned points are rounded to the nearest whole number which represents the final student's score from the activity.
Students must collect a minimum of 5 final points (50 points x coefficient 0.1), and a maximum of 10 final points from the activity. Students' activity during the exercises will be continuously monitored.

There will be a progress test performed during the semester consisting of 10 questions and performed in written form. The progress test brings 32 points (each question equals 3.2 points), 20 points being the minimum required to pass. Taking the progress test during the main term is compulsory (missing the main term needs to be justified).

3 additional progress test terms will be announced, as per agreement with students.

A passing grade for the progress test is a requirement in order to register for the final exam. However, the progress test is not a requirement for a signature in the grade book. If the student fails the progress test 4 times, he/she needs to take the whole course over again. In case he/she doesn't take the progress test or fails it 4 times, an additional term is possible if the student representative writes an official request to the respective Vice Dean. The Course leader makes the final decision.

In order to take the final exam, a student must gain a minimum of 16 points by attending lectures and practicals and through activities during practicals, and at least 20 points from continuous knowledge assessments.

The final exam consists of 10 oral questions and in total brings up to 40 points (a minimum of 24 points to pass). The total sum of points achieved from the above-mentioned elements is expressed in the final mark (1 – 5), 1 being a fail.

Points	*Grade*
up to 59	1 (F)
60-68	2 (E)
69-76	2 (D)
77-84	3 (C)
85-92	4 (B)
93-100	5 (A)

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Noakes, D. E., T. J. Parkinson and G. C. W. England (2009): Veterinary Reproduction & Obstetrics, 9th edition. W. B. Saunders Company Ltd.	1	-
	Gordon, I. (1997): Controlled Reproduction in Pigs. CAB International.	1	-
	Blanchard, T. L. et al., (2003): Manual of Equine Reproduction. Mosby.	1	-
	Simpson, G. (2008): BSAVA Manual of Small Animal Reproduction and Neonatology. British Small Animal Association. Gloucester	1	-
	Johnston, S. D., M. V. Root Kustritz, P. S. Olson (2001): Canine and Feline Theriogenology. Saunders	1	-
	Jackson, P. G. G. (2004): Handbook of Veterinary Obstetrics. Saunders W. B. Company.	1	-
	Jonston, Kustritz, Olson (2003): Canine and Feline Theriogenology. Saunders W. B. Company.	1	-
2.154. Optional literature (at the time of submission of study programme proposal)	BSAVA Manual of Canine and Feline Abdominal Surgery; Williams and Niles (eds.), BSAVA, 2005 Gary Landsberg, Wayne L. Hunthausen, Lowell J. Ackerman (2003): 5. Handbook of Behavioural Problems of the Dog and Cat, W. B. Saunders Company. McKinnon A. O. (1993): Equine Reproduction, Lea and Febiger. Samper J. C. (2000): Equine Breeding Management and Artificial Insemination. W. B. Saunders Company. The Merck Veterinary Manual 10th edition (2010): Merck & CO. Hafez (1993): Reproduction in Farm Animals. Lea and Febiger. Pugh (2002): Sheep and Goat Medicine. W. B. Saunders Company. Smith and Sherman (2009): Goat Medicine. Wiley Blackwell. Solaiman (2010): Goat Science and Production. Wiley Blackwell. Paterson, B. (2001): Colour Atlas of Clinical Anatomy of the Dog and Cat, Mosby. Baker, L. (2000): Colour Atlas of Cytology of the Dog and Cat, Mosby		
2.155. Quality assurance methods that ensure the acquisition of exit competences	Regular classes' attendance-checking, continuous student activity assessment during the entire semester; continuous knowledge checking (progress tests), regular student consultation, students' questionnaire.		

SURGERY, ORTHOPAEDICS AND OPHTHALMOLOGY III

1. GENERAL INFORMATION			
1.47. Course teacher	Asis. prof. Petar Kostešić/ prof. Dražen Vnuk	2.51. Year of the study programme	5th
1.48. ame of the course	Surgery, orthopaedics and ophthalmology III	2.52. Credits (ECTS)	5,5
1.26. ssociate teachers	Prof. Dražen Matičić F. C. A.; Prof. Boris Pirkić; Prof. Dražen Vnuk; Prof. Ozren Smolec; Prof. Nika Brkljača Bottegaro DECVSMR; Assoc. Prof. Marko Pećin; Assis. prof. Marija Lipar; Assis. prof. Petar Kostešić; Assis. prof. Valentina Plichta, PhD; Petra Dmitrović, PhD; Mirta Vučković, PhD; Marija Mamić, PhD; Niko Ivkić, DVM; Ana Smajlović, DVM; Katarina Miljak, DVM; Petra Ricijaš, DVM; Mirna Abaffy Kirin, DVM; Branko Petričević, DVM; Ema Sajdl, DVM; Karlo Tanhofer, DVM; Valentina Kos, DVM, Valentina Margić, DVM	1.8.Type of instruction (number of hours L + S + E + e-learning)	30+45
1.27. tudy programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	1.9 Expected enrolment in the course	
1.28. tatus of the course	Compulsory	2.0 Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
3.51. ourse objectives	The course goals are to introduce basics of small and large animal orthopaedics and basics of small animal neurosurgery in order to prepare students for diagnostic procedures and treatment.		
3.52. ourse enrolment requirements and entry	Upon gaining of provided skills and knowledge a student is capable of recognising particular orthopaedics and neurological diseases of small animals and orthopaedics diseases of large animals with enrolment in treatment of toes and hooves diseases.		

competences required for the course	
3.53. earning outcomes at the level of the programme to which the course contributes	In the 9th semester students broaden their knowledge and skills gained in the 7th and the 8th semester in order to improve their competences.
3.54. earning outcomes expected at the level of the course (4 to 10 learning outcomes)	Student can: • Compare and apply the basic clinical methods for the orthopedic examination of small and large animals. • Apply the basic principles of fracture treatment in small animals. • Determine the priority of procedures in the diagnosis and treatment of a traumatized patient and the treatment of bone fractures. • Distinguish between the most common diseases of muscles, tendons, bones, ligaments, and joints to make the correct diagnosis and treatment and review indications for referring patients to a referral clinic. • Distinguish degenerative, traumatic and idiopathic disorders of the spine, intervertebral disc, paresis and paralysis. • Determine the etiology of hoof and hoof diseases that result in irregularity and deformities in their structure and indications to refer patient to referral clinic. Distinguish appropriate shapes and models of horse shoes with different orthopedic diseases of horses. • Independently judge the clinical importance of timely correction of hooves and hoofs and apply basics of hoof corrections and horseshoeing. • Choose the option of using a neurological and/or orthopedic examination with the aim of establishing the correct diagnosis and treatment. • Distinguish between degenerative diseases of the spine, intervertebral disc, paresis, and paralysis, and judge the indication for referring the patient to a referral clinic. Determine the condition of the patient with head trauma and suggest further diagnostics and treatment.
3.55. ourse content broken down in detail by weekly class schedule (syllabus)	Lectures: 1.Orthopaedic examination of small animals 2.Diseases of muscles, tendons and ligaments 3.Diseases of joints 4.Treatment of bone fractures in small animals 5.Diagnostics of lameness in large animals 6.Diseases of muscles, tendons and tendon sheaths 7.Paralyses and paresis

	8.Diseases of hooves 9.Diseases of toes 10.Types of horseshoes and correction of hooves 11.Correction of toes 12.Neurological examination 13.Fractures and luxation of vertebrae 14.Diseases of intervertebral disc 15. Degenerative diseases of vertebral column/Head trauma Exercises: Practical training – small animal orthopaedic and neurological examination Practical training – orthopedic surgery and neurosurgery of dogs and cats Practical training – orthopedic surgery and neurosurgery of dogs and cats Practical training – equine orthopaedics Practical training – equine orthopaedics Practical training – equine orthopaedics Practical training – lameness in cattle

3.56. ormat of instruction:	☒ lectures ☐ seminars and workshops ☒ exercises (practicals) ☐ on line in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	3.57. Comments: Each student has 10 hours of seminar. Thematics will be in the field of recent equine and bovine orthopaedics.
3.58. tudent responsibilities			

3.59. creening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
	Class attendance	0.94	Research		Practical training	
	Experimental work		Report		activity	0.5
	Essay		Seminar essay	0.1	(other)	
	Tests	1.76	Oral exam	2.2	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	1. Lecture attendance Student must attend 15 hours of maximum 30 hours of lectures to gain minimal 3 points. The maximal number of points for lecture attendance is 6. Students can be absent in 50% of lectures. 2. Exercise attendance During the semester a student must attend 32 practicals hours (out of total 45 hours) in order to gain minimally 8,4 points during the semester. Students can be absent on 30% of hours of practicals. The maximal number of gained points from this evaluation element is 12. Practicals are divided in 5 programes: 1. Equine orthopedics- 6 hours 2. Equine orthopedics- 6 hours 3. Equine orthopedics- 6 hours 4. Small animal orthopaedic examination and neurological examination - 7 hours 5. Orthopedic surgery and neurosurgery of dogs and cats- 7 hours 6. Decision making in fracture management and neurologic examination/OR- 7 hours 7. Lameness in cattle- 6 hours 3. Active participation at practicals Student's participation at the exercises will be checked continuously for practicals 2,3,5 and 6.. Students can earn a maximum of 20 activity points through active participation in practicals, which correspond to 10 final course points, by completing the following tasks: The proper keeping of patient records during four practical sessions and active participation in patient care activities will be assessed. Students can earn a maximum of 20 points (up to 5 points per practical session). The minimum number of activity points required to obtain 5 final course points is 10 points. Student participation and performance during the practical sessions will be monitored and evaluated continuously.

	4. Mid term exams During the semester there will be three (3) mid term exams organised at the time of exercises, each containing eleven (11) problems or questions. Each correctly solved problem or correctly answered question is worth one (1) point. A student must gain at total of 21 points from 3 mid term exams (minimal 7 from each mid term exam) in order to earn minimal 20 final points (21 point multiply with 0.9696). The maximal number of points a student can gain from this evaluation element is 32 final points (33 point multiply with 0.9696). A student who does not gain minimally 21 points (7 from each exam) has a right to take up to 2 makeup mid term exams (only those which failed- less than 7 points). A student who passes the makeup mid term exam with minimally 7 correct answers has a right to take the final exam. The mid term exam are: a) Diagnosis of equine lameness b) Orthopedic examination of small animals c) Neurological examination 5. Final exam Minimal conditions for passing the first, second, third, forth and fifth (lecture attendance, seminars attendance, practicals attendance, practicals and seminars activity, mid term exams) evaluation element are summed up and they are worth 37.6 points all together. Maximum points to gain from all 5 elements is 60. Questions in the final exam will be put in a way that a student can answer in written and oral form. In the written form there will be 20 questions divided in 5 groups (20 points), 12 of which must be answered correctly in order to take the oral exam. The maximum number of points that can be gained at the oral exam is 20 points (five questions), where maximally 4 points can be gained for 1 correct answer (0-4). The minimal number of points a student must gain at the final exam is 24 (12 points minimally at written and 12 as well at oral exam). The maximal number of points on written exam together with oral exam can be 40 points. If student does not gain minimum 12 points on written exam one can not take oral exam. If student does not gain minimum 12 points in oral exam, one fails.

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**

	Teaching materials - MERLIN https://moodle.srce.hr/2025-2026/course/view.php?id=266778		web
	Handout materials		
	Selected chapters from: 1. Welch Fossum, T. (2018): Small Animal Surgery, 5th ed. 2. Auer, J.A., J.A. Stick, J.M. Kummerle, T. Prange (2019): Equine Surgery. 5th ed.		
2.156. Optional literature (at the time of submission of study programme proposal)	1. Ross, M.W., S.J. Dyson (2010): Diagnosis and management of lameness in the Horse. 2. Egger- Danner et al. (2014): ICAR – claw health atlas. 3. Kent Ames, N. (2013): Noordsy's Food Animal Surgery, 5th ed. 4. Brinker, Piermattei, and Flo's Handbook of Small Animal Orthopedics and Fracture Repair (all editions). 5. Johnston, S.A., K.M. Tobias (2018): Veterinary Surgery: Small Animal (2nd edition).		
2.157. Quality assurance methods that ensure the acquisition of exit competences	During the semester there will be three (3) mid term exams organised at the time of exercises each containing eleven (11) problems or questions. Each correctly solved problem or correctly answered question is worth one (1) point. A student must gain the total of 21 points from mid term exams (minimal 7 from each mid term exam) in order to earn minimal 20 points. (21 times 0.9696). The maximal number of points a student can gain from this evaluation element is 32 points. A student who does not gain minimal 21 points during the semester from mid term exam has a right to take a makeup mid term exam. The two makeup mid term exams will be organised upon completion of the teaching in the semester. To pass makeup mid term exam student has same criteria as for primary mid term exams.		
2.158. Other (as the proposer wishes to add)			

STATE VETERINARY MEDICINE

1. GENERAL INFORMATION			
1.49. Course teacher	Prof Krešimir Severin	2.53. Year of the study programme	5
1.50. Name of the course	State Veterinary Medicine	2.54. Credits (ECTS)	3,5
1.27. Associate teachers	Magdalena Palić, DVM, PhD, Univ. Mag. Med. Vet. Nikola Serdar, DVM	2.55. Type of instruction (number of hours L + S + E + e-learning)	15+30+0+0
1.28. Study programme (undergraduate, graduate, integrated)	Integrated	2.56. Expected enrolment in the course	
1.29. Status of the course	Compulsory course	2.57. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	10%, 2

2. COUSE DESCRIPTION	
3.60. Course objectives	The aim of the course is to introduce students to the structure and importance of veterinary activities through the legislative and regulatory framework of the Republic of Croatia and the European Union. Students will gain comprehensive knowledge in the areas of animal health protection, the implementation of veterinary public health measures, the improvement of animal reproduction, veterinary environmental protection, and the regulation and placement of veterinary medicinal products on the market, as well as official inspection supervision. Furthermore, the course will introduce the legal responsibilities, obligations, and duties of natural and legal persons regarding animal protection, including safeguarding their life, health, and welfare. This encompasses handling protocols and protection requirements during housing, rearing, transport, experimental use, and slaughter or humane killing. Upon successful completion of this course, students will be able to correctly interpret, apply, and independently implement laws and sub-law regulations in official veterinary administrative procedures and daily professional practice.
3.61. Course enrolment requirements and entry competences required for the course	Attended the course of Infectious Diseases in 11th semester.
3.62. Learning outcomes at the level of the programme to which the course contributes	Management of the Legal and Regulatory Framework in Veterinary Medicine Professional Communication and Stakeholder Advising Implementation of Administrative and Official Procedures Surveillance and Control of Infectious Diseases and Zoonoses (Public Health) Animal Welfare

3.63. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	• **Demonstrate knowledge of the relevant legislation related to veterinary activities in the Republic of Croatia and identify the relevant rules of the European Union's legal system in the legal field of veterinary medicine.** By acquiring knowledge in the area of relevant legislation related to veterinary activities in the Republic of Croatia and the structure of the European Union's legal system, students develop cognitive abilities that enable them to understand the areas of animal health and welfare protection, the role of veterinary professionals in public health, environmental protection, and the use of veterinary drugs. Students develop cognitive skills by connecting and comparing these areas through the horizontal (within national) and vertical (between national, European, and international) structure of the legal system. • **Explain the responsibilities and obligations of natural and legal persons regarding animal protection and the protection of their health.** This outcome, along with the development of student interest and responsibility towards learning, encourages the creation of one's own approach in explaining regulations to the stakeholders they bind**.** • **Use the acquired knowledge of administrative procedure to complete the appropriate official documentation related to veterinary activities and to draft minutes and a decision.** Drafting minutes and decisions, as well as completing official documentation, requires skills that are acquired through practical analytical work and independently entering relevant data based on previously provided material truth and factual situation. • **Recognize signs of possible diseases that require special attention or that need to be reported to the competent authority, recognize signs of possible zoonoses, as well as signs of abuse, and take appropriate actions, including notifying the competent authorities; collect, store, and transport samples for the purpose of testing the health status of animals or the health safety of products of animal origin.** The ability to recognize facts as the basis for determining material truth and factual situation is acquired by students through practical work by analyzing various events from previously conducted administrative procedures and the implementation of official procedures. • **Recognize suspicion and select control measures for infectious or parasitic diseases of interest to the Republic of Croatia and the EU.** Establishing suspicion or confirmation of diseases in categories A to E of the Animal Health Act and related EU Regulations requires professional and practical knowledge from students, which is acquired through the application of clinical examination and carcass dissection methods. The ability to quickly recognize key signs is a prerequisite for the prompt application of prescribed measures and effective disease control.
3.64. Course content broken down in detail by weekly class schedule (syllabus)	**Lectures (15)** • Introduction to the state veterinary medicine. Main fields of veterinary activities: animal health protection measures, implementation of veterinary public health measures, improvement of animal reproduction, veterinary protection of the environment, control of zoonosis and prevention of the occurrence of listed diseases. Terminology used in veterinary medicine i.e. veterinary activities. • The legal order - European Union (EU), EU treaties, Fundamental values of the European Union, The institutions of the EU; The legal order of the European Union, The legal sources of Union law (Regulations, Directives, Decisions), The legislative process in the EU; The World Organisation for Animal Health (OIE)

	• Current Union legislation on Animal Health; Listed diseases; Animal keepers and Operators, Veterinarians, Competent Authority; Official laboratories; Disease notification and Reporting system; Surveillance • Eradication programmes Category B and C diseases; Suspicion of certain diseases; Official confirmation of certain diseases; General criteria for the granting of disease-free status • Disease control measures for category A diseases; Contingency plans and simulation exercises; Use of veterinary medicinal products for disease prevention and control; Disease control measures in the event of suspicion; Disease control measures in the event of official confirmation of an outbreak • Administrative Procedure; Administrative and inspectional supervision; Veterinary inspector and border veterinary inspector; Authorised veterinarian • Animal protection; Fundamental provisions on animal protection; Prohibited conduct for the purpose of animal protection; Performing procedures on animals; Protection of animals at the time of killing • Veterinary activities implementation system; Establishment and removal from the register; Veterinary surgery and veterinary station; Authorised veterinary organisations; Control bodies; Veterinary practice; Veterinary hospital and veterinary clinic; Veterinary pharmacy; Croatian Veterinary Institute; Reporting on veterinary activities; Veterinary staff; Croatian veterinary chamber; Expenditure in the veterinary field • Veterinary medicinal products (testing of VMPs, placing of VMPs on the market, pharmacovigilance); Medicated feed; Residues of veterinary medicinal products **Seminars (24)** • Identification and non-comercial movment of dogs, cats and ferrets • Identification and registration of bovine animals; Identification and registration of pigs (eartags, animal passports, holding registers) – student presentations • Identification and registration of ovine and caprine animals; Identification and registration of of equidae (eartags, animal passports, holding registers) student presentations • Registration of establishments and certain types of operators; Record-keeping obligations; Traceability requirements; Movement of consignments within the Republic of Croatia; Certificate of health condition and place of origin of the animal; Veterinary check of holdings, Veterinary checks of consignments; Movement of consignments within the European union; General requirements for movements; Supplementary animal health requirements • Introduction of consignments from third countries; Border inspection post; Veterinary checks upon introduction; Refusing the introduction of a consignment; Controls on personal consignments; TRACES - Trade Control and Expert System • CITES (The Convention on International Trade in Endangered Species of Wild Fauna and Flora)-international trade of protected animal species • Disease control measures for category A diseases – student presentations • Eradication programmes Category B and C diseases – student presentations

<table>
<tr><td></td><td colspan="6">

Protection of wild animals; Protection of pet animals; Protection of animals in zoos; Protection of abandoned and lost animal (shelters-establishment, activities, animals in shelters)
Animal protection during keeping and breeding
Animal welfare on the farm – student presentations
Animal welfare during transport; Slaughter and stunning– student presentations
Animals used for scientific purposes; Authorisations of breeders, suppliers or users; Laboratory animals; Conditions for working with experimental animals; Experiment – Project

Exercises (6)

Veterinary Information Systems. VETIS - Central Veterinary Information System (farms, animals, measures), JRDŽ (Unified Register of Domestic Animals), Register of Establishments and Operators; Certification and digital health certificates; TRACES - Trade Control and Expert System (European system for tracking consignments of animals and products). Lysacan - Register of Dog Vaccinations Against Rabies. LABNAR - Laboratory Results Management System. Disease reporting and notification systems – European ADIS (Animal Disease Information System) and the national notification system.
Quality Management System in a Veterinary Organization. Management of medical documentation and triage (clinical logbook/ambulatory diary, informed owner consent, confidentiality); Inventory management and prescribing of medicines (traceability, expiration dates, prescription writing); Records of acquired and dispensed medicinal products containing narcotic drugs and psychotropic substances. Pharmacovigilance and adverse event reporting.

</td></tr>
<tr><td>3.65. Form at of instruction:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☒ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>3.66. omments:</td></tr>
<tr><td>3.67. Stud ent responsibilities</td><td colspan="6">Attendance at lectures, seminars and writing seminar essay</td></tr>
<tr><td rowspan="6">3.68. Scre ening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0.54</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Participation at seminars (other)</td><td>0.3</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>0.96</td><td>Oral exam</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>1.2</td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">
<table>
<tr><th>Types of activities</th><th>Minimal number of points</th><th>Maximal number of poin</th></tr>
</table>
</td></tr>
</table>

	Attending lectures	**3**	**6**
	6% of grade	15 lectures hours: one lecture hour is multiplied with 0.4, and a student must attend minimal 8 lecture hours	
	Attending seminars	**6.4**	**9.6**
	9.6% of grade	24 seminar hours – one seminar hour is multiplied with 0.4, and a student must attend minimal 20 seminar hours	
	Attending exercises	**1.6**	**2.4**
	2.4% of grade	6 exercise hours – one exercise hour is multiplied with 0.4, and a student must attend minimal 2 exercise hours	
	Participation at seminars and exercises	**5**	**10**
	10% of grade	Each student is obliged to prepare and present seminar work (Animal health protection measures of one disease) which will be assessed	
	Continuous knowledge checking	**20**	**32**
	32% of grade	- first preliminary exam 10-16 points (16 question, each question is worth 1 point) - second preliminary exam 10-16 points (16 questions each question is worth 1 point)	
	Final exam	**24**	**40**
	40% of grade	In order to take the final exam a student must gain minimal 36 points from attending and participation at lectures and seminars and from continuous knowledge checking. Written exam form 24 to 40 points A student gets 8 questions – each correct answer is worth 5 points.	

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and via other media)	The ABC of EU law - December 2016 edition, Directorate-General for Communication (European Commission), Borchardt, Klaus-Dieter	10	http://cadial.hidra.hr
	General Administrative Procedure Act, OFFICIAL GAZETTE NO. 47/09, 110/21	10	http://cadial.hidra.hr
	Animal Health Act, OFFICIAL GAZETTE NO. 152/22		

	Veterinary Act, OFFICIAL GAZETTE NO. 82/13, 148/13, 115/18, 52/21, 83/22, 152/22	10	http://cadial.hidra.hr
	Animal Protection Act, OFFICIAL GAZETTE NO. 102/17, 32/19, 78/24	10	http://cadial.hidra.hr
	Act on Veterinary Medicinal Products, Official Gazette No. 84/08, 56/13, 15/15, 32/19	10	http://cadial.hidra.hr
	Food Hygiene and Microbiological Criteria for Food Act, OFFICIAL GAZETTE NO. 83/22	10	http://cadial.hidra.hr
	State Inspectorate Act, OFFICIAL GAZETTE NO. 115/18, 117/21, 67/23, 155/23 Act on Official Controls and Other Official Activities Carried out in Accordance with the Regulations on Food, Animal Feed, Animal Health and Welfare, Plant Health and Plant Protection Products, OFFICIAL GAZETTE NO. 52/21	10	http://eur-lex.europa.eu
	Act on the Implementation of European Union Regulations on Animal Protection, OFFICIAL GAZETTE NO. 125/13, 14/14, 92/14, 32/19 Regulated Professions and Recognition of Foreign Professional Qualifications Act, OFFICIAL GAZETTE NO. 82/15 Regulation (EU) 2016/429 of the European Parliament and of the Council of 9 March 2016 on transmissible animal diseases and amending and repealing certain acts in the area of animal health ('Animal Health Law') Commission implementing regulation (EU) 2018/1882 of 3 December 2018 on the application of certain disease prevention and control rules to categories of listed diseases and establishing a list of species and groups of species posing a considerable risk for the spread of those listed diseases Commission delegated regulation (EU) 2020/689 of 17 December 2019 supplementing Regulation (EU) 2016/429 of the European Parliament and of the Council as regards rules for surveillance, eradication programmes, and disease-free status for certain listed and emerging diseases Commission implementing regulation (EU) 2020/690 of 17 December 2019 laying down rules for the application of Regulation (EU) 2016/429 of the European Parliament and of the Council as regards the listed diseases subject to Union surveillance programmes, the geographical scope of such		

	programmes and the listed diseases for which the disease-free status of compartments may be established Commission delegated regulation (EU) 2020/687 of 17 December 2019 supplementing Regulation (EU) 2016/429 of the European Parliament and the Council, as regards rules for the prevention and control of certain listed disease Commission delegated regulation (EU) 2019/2035 of 28 June 2019 supplementing Regulation (EU) 2016/429 of the European Parliament and of the Council as regards rules for establishments keeping terrestrial animals and hatcheries, and the traceability of certain kept terrestrial animals and hatching eggs Commission delegated regulation (EU) 2020/688 of 17 December 2019 supplementing Regulation (EU) 2016/429 of the European Parliament and of the Council, as regards animal health requirements for movements within the Union of terrestrial animals and hatching eggs Commission delegated regulation (EU) 2020/686 of 17 December 2019 supplementing Regulation (EU) 2016/429 of the European Parliament and of the Council as regards the approval of germinal product establishments and the traceability and animal health requirements for movements within the Union of germinal products of certain kept terrestrial animals Commission delegated regulation (EU) 2020/692 of 30 January 2020 supplementing Regulation (EU) 2016/429 of the European Parliament and of the Council as regards rules for entry into the Union, and the movement and handling after entry of consignments of certain animals, germinal products and products of animal origin Commission Implementing Regulation (EU) 2015/262 of 17 February 2015 laying down rules pursuant to Council Directives 90/427/EEC and 2009/156/EC as regards the methods for the identification of equidae (Equine Passport Regulation) Text with EEA relevance Commission Implementing Regulation (EU) No 577/2013 of 28 June 2013 on the model identification documents for the non-commercial movement of dogs, cats and ferrets, the establishment of lists of territories and third countries and the format, layout and language requirements of the declarations attesting compliance with certain conditions provided for in Regulation (EU) No 576/2013 of the European Parliament and of the Council Text with EEA relevance		

	2006/778/EC: Commission Decision of 14 November 2006 concerning minimum requirements for the collection of information during the inspections of production sites on which certain animals are kept for farming purposes (notified under document number C(2006) 5384) (Text with EEA relevance) Council Directive 98/58/EC of 20 July 1998 concerning the protection of animals kept for farming purposes Council Directive 2008/120/EC of 18 December 2008 laying down minimum standards for the protection of pigs Codified version) Council Directive 2008/119/EC of 18 December 2008 laying down minimum standards for the protection of calves Codified version) Council Directive 1999/74/EC of 19 July 1999 laying down minimum standards for the protection of laying hens Council Directive 2007/43/EC of 28 June 2007 laying down minimum rules for the protection of chickens kept for meat production (Text with EEA relevance) Council Directive 93/119/EC of 22 December 1993 on the protection of animals at the time of slaughter or killing Directive 2010/63/EU of the European Parliament and of the Council of 22 September 2010 on the protection of animals used for scientific purposes Text with EEA relevance Council Regulation (EC) No 1/2005 of 22 December 2004 on the protection of animals during transport and related operations and amending Directive1 64/432/EEC and 93/119/EC and Regulation (EC) No 1255/972 Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 Laying Down Health Rules as Regards Animal By-Products and Derived Products Not Intended for Human Consumption1 and Amending Regulation (EC) No 1774/2002 (Animal By-Products Regulation) Commission Regulation (EU) No 142/2011 of 25 February 2011 Implementing Regulation (EC) No 1069/2009 of the European Parliament and of the Council Laying Down Health Rules as Regards Animal By-Products and Derived Products Not Intended for Human Consumption and Implementing Council Directive 97/78/EC as Regards Certain Samples and Items Exempt from Veterinary Checks at the Border Under That Directive (OJ L 54, 26.2.2011, with all amendments) Commission Regulation (EU) No 749/2011 of 29 July 2011 Amending Regulation (EU) No 142/2011 Implementing Regulation (EC) No 1069/2009 of the European Parliament and of the Council Laying Down Health Rules as Regards Animal By-Products and Derived Products Not Intended for Human Consumption and Implementing Council Directive 97/78/EC as Regards		

	Certain Samples and Items Exempt from Veterinary Checks at the Border Under That Directive Regulation (EC) No 853/2004 of the European Parliament and of the Council of 29 April 2004 laying down specific hygiene rules for food of animal origin Regulation (EC) No 882/2004 of the European Parliament and of the Council of 29 April 2004 on official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules.		
2.159. Optional literature (at the time of submission of study programme proposal)			
2.160. Quality assurance methods that ensure the acquisition of exit competences	Anonymous student survey about all aspects of teaching.		
2.161. Other (as the proposer wishes to add)			

VETERINARY EPIDEMIOLOGY

1. GENERAL INFORMATION			
1.51. Course teacher	Dean Konjević, DVM, PhD, full professor	2.58. ear of the study programme	5th
1.52. Nam e of the course	Veterinary Epidemiology	2.59. redits (ECTS)	2,5
1.28. Asso ciate teachers	Marina Pavlak, DVM, PhD, full professor Denis Cvitković, DVM, PhD, associate professor	2.60. ype of instruction (number of hours L + S + E + e-learning)	4+0+26+3 (e-learning is part of 26 practical)
1.29. Study programme (undergraduate, graduate, integrated)	integrated	2.61. xpected enrolment in the course	
1.30. Statu s of the course	compulsory	2.62. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	10%
2. COUSE DESCRIPTION			
3.69. Cour se content (methodological units)	1. Basic principles of veterinary epidemiology, general epidemiological concept, objectives and tasks of veterinary epidemiology, methods of epidemiological diagnostics. 2. Classification, method of analysis. 3. Sampling, methods and sampling size calculation. 4. Independent work: Sample size estimation, Population estimation. 5. Characteristics of diagnostic tests, comparison of diagnostic tests, screening tests, interpretation of tests. 6. Observational studies. 7. Measures of association, measures of potential impact. 8. Independent work: Risk estimation and decision making. 9. Surveillance strategies, application of epidemiological methods in surveillance programs/strategies. 10. Independent work: decision making for surveillance strategy. 11. Simulation models.		

3.70. Learning outcomes	1. To explain and formulate the basic epidemiological concepts. 2. To collect, sort and classify the types of data. 3. To explain, compare and choose the sample methods and to calculate/estimate sample size. 4. To interprate and to evaluate diagnostic tests and to use them in the surveillance program. 5. to distinguish and to interpret the epidemiological studies as well as to interpret the measures of associations. 6. To explain, compare and choose the epidemiological studies in order to calculate the measures of associations and to interpret the risk. 7. To consider the use of epidemiological methods in implementation of preventive measures. 8. To support the epidemiological methods into the public and animal health care programme/surveillance/preventive actions. 9. To choose the epidemiological methods in biomedical research and decision making. 10. To make own study design. 11. To classify and to distinguish simulation methods and to explain the conceptual models.

3.71. Form of instruction:	x lectures ☐ seminars and workshops x exercises ☐ on line in entirety x partial e-learning ☐ field work	x independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	3.72. Comments:
3.73. Student responsibilities			

3.74. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
Class attendance	0,45	Research		Practical training	0,125
Experimental work		Report		Activity	0,25
Essay		Seminars		(other)	
Tests	0,8	Oral exam	1	(other)	
Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	Here is the evaluation table for the Veterinary epidemiology course which consists of 10 lecture hours and 20 exercise hours, and which is worth 2.5 ECTS points. Students are evaluated on the basis of the number of periods for the course and the gained model of evaluation. Points and activities which are evaluated for the Veterinary epidemiology course.

	Types of activities	**Activity**	**Value of 1 hour or activity**	**Minimal number of points**	**Maximal number of points**	**Maximal number of points**
	Attending lectures	4 hours	1.5	3	6	6
	Attedning exercises	26 hours	0.46	8	12	12
	Participation at exercises	Task solving - 10 points in total	1	5	10	10
	Continuous knowledge checking	Colloquium – 32 points in total	16	20	32	32
	Final exam	40 points in total	1	24	40	6
	Total			60	100	12

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and via other media)	Pfeiffer, D. (2009): Veterinary epidemiology; An introduction. Epidemiology Division Department of Veterinary Clinical Sciences, The Royal Veterinary College, University of London		available online at: http://www.rvc.ac.uk/about/our-people/dirk-pfeiffer https://www.researchgate.net/publication/305279557_Introduction_to_Veterinary_Epidemiology
	Risk analysis: Terrestrial Animal Health Code (2013). OIE		Available online at:

			http://www.oie.int/international-standard-setting/terrestrial-code/access-online/
2.162. Optional literature (at the time of submission of study programme proposal)	Triola. M. F: (1989): Elementary statistics, 4th edition. Benjamin/Cummings Publishing Company Inc.		
2.163. Quality assurance methods that ensure the acquisition of exit competences	Quality assurance methods that ensure the acquisition of exit competences be implemented through: presence at the lectures presence at the exercises activity during the exercises colloquiums final exam		
2.164. Other (as the proposer wishes to add)			

VETERINARY LEGISLATION AND FOOD SAFETY CONTROL

1. GENERAL INFORMATION			
1.53. Course teacher	Assist. Prof. Tomislav Mikuš	2.63. Year of the study programme	V
1.54. Name of the course	Veterinary Legislation and Food Safety Control	2.64. Credits (ECTS)	3,5
1.29. Associate teachers	Full Prof. Željka Cvrtila, Full prof. Nevijo Zdolec, Assist. prof. Tomislav Mikuš, teaching assistant Marta Kiš, PhD, teaching assistant Mladenka Vukšić, DVM	2.65. Type of instruction (number of hours L + S + E + e-learning)	28+17+0
1.30. Study programme (undergraduate, graduate, integrated)	Integrated	2.66. Expected enrolment in the course	
1.31. Status of the course	Compulsory elective subject	2.67. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
3.75. Course objectives	To familiarize students with the contemporary principles of organization and functioning of veterinary inspection in accordance with the Food act and EU legislation. The objective is to elaborate certain laws related to the veterinary inspection authority. Getting acquired with the regulations that enable the performance of veterinary activities in food safety and their proper application is the knowledge that will help students during the inspection work.
3.76. Course enrolment requirements and entry competences required for the course	The course can enroll only students of study track "Hygiene and technology of animal food and veterinary public health"
3.77. Learning outcomes at the level of the programme to which the course contributes	In the frame of veterinary public health and food safety to understand current laws related to the veterinary inspection and their application in the performance of veterinary activities.
3.78. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	By the completion of the course students should be able to: -know of the structure of the competent authority and the overall organization of veterinary inspection -distinguish between general and special tasks of veterinary controsl in consumers protection

<table>
<tr><td></td><td colspan="6">-interpret legislation connected to the veterinary controls in the food chain
-identify the responsibilities of veterinary inspection
-explain the importance of certification and labeling in terms of food safety
-consolidate the sample reports and expert opinions in the field of hygiene and technology of food of animal origin with the standards</td></tr>
<tr><td>3.79. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">1. Organization of veterinary inspections in food chain. 2. European food safety assurance system. 3. Veterinary controls and consumers protection. 4. Official controls. 5. Food fraud-legislation. 6. Legislation in meat hygiene. 7. Legislation in milk hygiene. 8. Fish products-legislation. 9. Sampling for official controls. 10. Legislation: eggs, honey, novel food, GMO. 11. Authorizations and responsibilities in food inspection, accreditation. 12. Legislation: protection of food origin 13. Food traceability, RASFF. 14. Regulations on food labelling.

Seminars:

1. Modernisation of meat inspection. 2. Registration and approval of food production facilities. 3. Regulation on animal welfare in slaughterhouse. 4. Regulation on animal origin by-products. 5. Legislation: protection of food origin, labelling. 6. Regulation on food contaminants.</td></tr>
<tr><td>3.80. Format of instruction:</td><td colspan="2">x lectures
x seminars and workshops
☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td colspan="2">3.81. Comments:</td></tr>
<tr><td>3.82. Student responsibilities</td><td colspan="6"></td></tr>
<tr><td rowspan="5">3.83. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0,63</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Activity during course</td><td>0,35</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>1,12</td><td>Oral exam</td><td>1,4</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
</table>

2.10. Grading and evaluating student work in class and at the final exam

ACTIVITIES	MINIMAL SCORE	MAXIMAL SCORE
Lecture attendance	**3**	**6**
28 hours of lectures (coefficient: 0,21)	Student must attend 14 hours of lectures in order to gain 3 points	28 x 0,21 = 6 points
Seminars attendance	**8**	**12**
17 hours of seminars (coefficient: 0,7)	student must attend 11 hours of seminars in order to gain 4 points	17 x 0,7 = 12 points
Activity at seminars	**5**	**10**
2 oral questions during seminars (2,5 points each) Seminar presentation (5 points)	2 correct answers on asked questions	
Continuous knowledge checking	**20**	**32**
1 written exams, 8 questions 1 question = 4 points	A student must give correct answers to 5 questions in order to gain 20 points	8 correct answers x 4 = 32 points
Final exam	**24**	**40**
Oral exam, 5 questions. 1 question = 8 points	A student must give correct answers to 3 questions in order to gain 24 points	5 correct answers x 8 = 40 points

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	Van der Meulen B., M. Van der Velde (2004): Food Safety Law in the European Union. An Introduction. European Food Law Institute serires. Wageningen Academic.	1	
	Reg EC 178/2002, Reg EC 852/2004, Reg EC 853/2004, Reg EC 2073/2005, Reg EC 2017/625, Reg EC 2019/624, Reg EC 2019/627		pdf
			pdf
2.165. Optional literature (at the time of submission of study programme proposal)	Selected national and EU food legislation.		
2.166. Quality assurance methods that ensure the acquisition of exit competences	During the course, continuous assessment shall be carried out by means of preliminary test and activities during seminars.		
2.167. Other (as the proposer wishes to add)			

LIST OF OBLIGATORY SUBJECTS – 6th STUDY YEAR

Obligatory Subjects – 6th study year

Diseases and Treatment of Dogs and Cats II

Diseases of Pet birds, Exotic and Laboratory Animals

Farm Animal Medicine

Forensic Veterinary Medicine

Field Service Clinic

Herd Health

Poultry Diseases

Veterinary Public Health

Veterinary Economics

DISEASES AND TREATMENT OF DOGS AND CATS II

1. GENERAL INFORMATION			
1.55. Course leader	Assoc.prof. Martina Crnogaj, PhD Course leader substitution: Ass.prof Iva Šmit PhD	2.68. Year of the study program	VI
1.56. Name of the course	Diseases and Treatment of Dogs and Cats II	2.69. Credits (ECTS)	3,5
1.30. Course teachers	**Teachers:** Full. prof. Mirna Brkljačić, PhD, Full prof. Juraj Grizelj, PhD, Full prof. Nada Kučer, PhD, Full prof. Nikša Lemo, PhD, Full prof. Martina Lojkić, PhD, Full prof. Albert Marinculić, PhD, Full prof. Vesna Matijatko, PhD, Full prof. Andreja Prevendar Crnić, PhD, Full prof. Nikica Prvanović, PhD, Full prof. Marko Samardžija, PhD, Full. prof. Marin Torti, PhD, Full prof. Silvijo Vince, PhD, assoc. prof. Martina Crnogaj, PhD, assoc. prof. Ivan Folnožić, PhD, assoc.prof. Jelena Gotić, PhD, assoc. prof. Ivana Kiš, PhD, assoc. prof. Franjo Martinković, PhD, assoc.prof. Iva Šmit, PhD assoc.prof. Branimira Špoljarić, PhD, asst., Ivan Butković, DVM, PhD, **Associate teachers:** Maša Efendić, DVM, PhD, Lea Grbavac, DVM, PhD, Filip Kajin, DVM, PhD, Ines Jović, DVM, PhD, Gabrijela	2.70. Type of instruction (number of hours L + S + E + e-learning)	L 0 S 15 E 30

	Jurkić Krsteska DVM, PhD, Ena Oster, DVM, PhD, Juraj Šavorić, DVM, PhD, PhD, Nikola Čudina, DVM, Tea Dodig, DVM, Nika Konstatinović, DVM, Katarina Marjanović, DVM, Elizabeta Pongrac, DVM, Nejra Puvača, DVM, Ivan Tomić, DVM		
1.31. Study programme (undergraduate, graduate, integrated)	Integrated	2.71. Expected enrolment in the course	
1.32. Status of the course	Compulsory elective	2.72. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	There is no online lectures.
2. COUSE DESCRIPTION			
3.84. Course objectives	The aim of this course is to increase the level of knowledge and skills of students in internal medicine, obstetrics, parasitic diseases and toxicology. Unlike previous subjects, the emphasis is on dogs and cats, which are the most common patients in everyday practice. Within these subjects, the most common diseases encountered in the daily work of veterinarians will be addressed.		
3.85. Course enrolment requirements and entry competences required for the course	Listening requirement: Passed the course Diseases and Treatment of dogs and cats I. Passed exam: Obstetrics and Reproduction II. Requirement for taking the exam: Passed exam: Diseases and Treatment of dogs and cats I Passed colloquium: Diseases and Treatment of dogs and cats II		
3.86. Learning outcomes at the level of the program to which the course contributes	Improved level of knowledge of less known diseases and improved diagnostic and therapeutic procedures as well as differential diagnostics in the area of small animal internal diseases, parasitology, obstetrics and toxicology.		
3.87. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Upon passing the examination students will be able to: 1. Take a focused anamnesis (internal medicine, gynecologic/neonatal, parasitological, toxicological – depending on the case) 2. Perform a clinical examination of a dog or cat 3. Create a problem list		

	4. Select appropriate diagnostic procedures based on the anamnesis and clinical examination findings 5. Collect samples for planned diagnostic procedures (hematology, biochemistry, cytology, histopathology, parasitology, toxicology tests) 6. Deliver samples to a specialized laboratory with all necessary information 7. Correctly interpret clinical and laboratory findings 8. Create a differential diagnosis list 9. Recognize emergency conditions in internal medicine, gynecology, parasitology, and toxicology in dogs and cats and determine stabilization measures 10. Identify internal, gynecological, parasitic, and toxicological diseases in dogs and cats where prevention and treatment are essential for both animal and human health 11. Distinguish conditions that can be managed in primary practice from those requiring specialist referral and plan a rational diagnostic approach for establishing a final diagnosis 12. Develop a treatment plan and follow-up schedule 13. Write an accurate and complete clinical record using professional terminology and prepare a report on the patient's condition in terms understandable to owners 14. Familiarize with strategies for effective communication with owners, considering emotional, ethical and economic aspects of diagnosis and treatment
3.88. Course content broken down in detail by weekly class schedule (syllabus)	Internal diseases: 26 hours: gastroenterology 3 hours, respiratory diseases 2 hours, oncology 3 hours, nephrology 3 hours, neurology 3 hours, emergency and critical care 3 hours, cardiology 3 hours, dermatology 3 hours, endocrinology 3 hours. Obstetrics: 6 hours: examination and gynecologic propaedeutics and neonatology 2 hours and gynecologic operations 4 hours. Toxicology: 5 hours: interactive work-up of clinical cases of poisoning. Parasitology: 8 hours: interactive work-up of parasitological clinical cases with differential diagnostics of parasitic diseases and therapy. INTERNAL DISEASES 1. Propedeutics of dogs and cats: sampling, diagnostic procedures, therapeutic procedures; 2. Clinical laboratory diagnostics: interpretation of haematological blood results, interpretation of biochemical blood results, cavity effusions; 3. Emergency veterinary medicine and intensive care: triage and ABC resuscitation, shock, access to a dyspneic patient, acute abdomen, monitoring of critical and intensive patients; 4.

	Cardiology: principles of diagnosis of heart disease, diseases of the heart valves, cardiomyopathy, arrhythmia; 5. Respiratory diseases: respiratory obstruction syndrome in brachycephalic breeds, tracheal collapse, chronic bronchitis in dogs, chronic bronchitis/asthma in cats, laryngeal paralysis; 6. Gastroenterology: principles of diagnosis of diseases of the digestive system, principles of therapy of diseases of the digestive system, acute pancreatitis, inflammatory intestinal disease, colitis; 7. Dermatology: principles of diagnosis of dermatological diseases, inflammation of the skin, allergic dermatitis, autoimmune skin diseases; 8. Urinary tract diseases: diagnosis of urinary tract diseases, acute renal failure, chronic renal failure, obstruction of the urethra; 9. Neurology: principles of diagnosis of neurological diseases, epilepsy, vestibular syndrome; 10. Endocrinology: hyperadrenocorticism, hypoadrenocorticism, hypothyroidism, diabetes mellitus; 11. Oncology: Principles of diagnosis of neoplastic diseases, principles of cytostatic therapy and cytostatic protocols for the most common neoplastic diseases, paraneoplastic syndrome, lymphoma. OBSTETRICS 1. Reproduction propedeutics and neonatology; 2. Obstetric surgery (ovaryectomy, ovaryhysterectomy, cesarean section) PARASITOLOGY 1. Most common parasites of the gastrointestinal tract of dogs and cats – taking samples, of fecal examination, parasite determination and treatment (isosporosis, giardiosis, toxocarosis, ancylostomosis, trichurosis, dipilidiosis, teniosis); 2. Preparing and sending the samples to laboratory for analysis; 3. Dehelmintization program in cubs; 4. Dehelmintization of adult animals; 5. Blood and tissue parasites – dirofilariosis, babesiosis (taking samples, parasitological diagnostics, treatment, prevention, vector control); 6. Leishmaniosis (clinical treatment, taking and sending samples to laboratory for analysis, treatment, prevention, vector control); 7. Ectoparasites as agents of pruritus and/or dermatitis (lice, fleas, *Notoedres*-mange, *Sarcoptes*-mange, demodicosis, *Otodectes cynotis*, cheyletiellosis); 8. Clinical treatment, parasitological examination of the skin and ear canal, determination of parasites; 9. Treatment and prevention.

<table>
<tr><td></td><td colspan="6">CLINICAL TOXICOLOGY OF DOGS AND CATS

1.Clinical toxicology and your first case; 2. Clinical cases of poisoning of dogs and cats (case reports – PowerPoint presentations in the form of conversatories) with pesticides (organophosphate compounds, carbamates, anticoagulants, dipyridyls, pyrethrins and pyrethroids, metaldehyde); 3. Clinical cases of poisoning of dogs and cats with heavy metals (lead, zinc); 4. Clinical cases of poisoning of dogs and cats with ethylene glycol (antifreeze), sodium chloride; 5. Clinical case reports (PowerPoint conversatory presentations): poisonous snakes and stings from Hymenoptera.</td></tr>
<tr><td>3.89. Format of instruction:</td><td colspan="2">c lectures
+ seminars and workshops
+ exercises
☐ online in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">+ independent assignments
☐ multimedia and the internet
+ laboratory
☐ work with mentor
☐ (other)</td><td colspan="2">3.90. Comments:
Within this course different formats of instruction will be employed. Due to the fact that most of the teaching units are case-based, diagnostic and therapeutic interventions seen and/or performed by students may vary between exercise groups.</td></tr>
<tr><td>3.91. Student responsibilities</td><td colspan="6"></td></tr>
<tr><td rowspan="6">3.92. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td></td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Activity at classes</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td></td><td colspan="5"></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6"></td></tr>
</table>

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	Teacher handouts if given. Noakes, D., T. Parkinson, G., England (2018): Veterinary Reproduction and Obstetrics, 10th Edition, Elsevier Health Sciences, W. B. Saunders Co Ltd, London, United Kingdom. England, G. (2011): BSAVA Manual of Canine and Feline Reproduction and Neonatology, British Small Animal Veterinary Association, Quedgeley, Gloucs, United Kingdom.		Chapter handouts
	Gupta, R.C. (2018): Veterinary Toxicology: Basic and Clinical Principles. 3rd Edition, Elsevier, Philadelphia, United States. Peterson, M. E., P. A. Talcott (2013): Small animal Toxicology, 3rd Edition, Elsevier Health Sciences, W. B. Saunders Co Ltd, London, United Kingdom. Poppenga, R. H., S.M. Gwaltney-Brant (2011): Small Animal Toxicology Essentials, Iowa State University Press. Arnes, AI, United States.		Chapter handouts
	Taylor, M. A., R. L. Coop (2015): Veterinary Parasitology, 4th Edition, Wiley-Blackwell, New York, United States. Bowman, D. (2013): Georgis' Parasitology for Veterinarians 10th Edition, W B Saunders Co Ltd., London, United Kingdom. Zajac, A. M. , G. A. Conboy (2012): Veterinary Clinical Parasitology, 8th Edition, Wiley-Blackwell, Arnes, AI, United States.		Chapter handouts
	Ettinger S. J., E. C. Feldman, E. Cote (2024): Textbook of Veterinary Internal Medicine Expert Consult, 9th Edition, Elsevier, Inc. St. Louis, Missouri, United States.		Chapter handouts

	Nelson R. W., Couto C. G. (2020): Small Animal Internal Medicine, 6th Ed., Mosby, St. Louis, United States.		
2.168. Optional literature (at the time of submission of study program proposal)			

2.169. Quality assurance methods that ensure the acquisition of exit competences

ACTIVITIES	COEFFICIENT	MINIMAL SCORE	MAXIMAL SCORE
Attendance seminars/exercise		**11**	**18**
15 hours of seminars + 30 hours of exercise	30% absences from seminars = 4 hours 30% of absences from exercise = 9 hours	the student must attend a **minimum of 11 hours of seminars** and **21 hours of exercises** to achieve 11 minimum points (5.5 +5.5)	
Activity at seminars/ exercises	**0,1667**	**5**	**10**
12 teaching units x 5 points (max), each exercise activity is evaluated with grades **1 to 5**	10:60=0,1667	5 : 0,1667 = 30 (the student must achieve a **minimum of 30 points** in class to achieve 5 minimum final points)	
Continuing monitoring of knowledge	**1,33**	**20**	**32**
1 colloquium x 24 questions 1 question = 1,33 points	32:24=1,33	20 : 1,33 = 15 Student has to answer **15 questions correctly** (5 from	

			parasitology, 5 from obstetrics, 5 from toxicology) to obtain 20 minimum points		
	Final exam	**1,33**	**24**		**40**
	30 questions 1 question = 1,33 points	40:30=1,33	24:1,33=18 Student has **to answer 18 questions correctly** to obtain 24 minimum points		
2.170. Other (as the proposer wishes to add)					

DISEASES OF PET BIRDS, EXOTIC AND LABORATORY ANIMALS

1. GENERAL INFORMATION			
1.57. Course teacher Course leader deputy	Assoc. prof. Maja Lukač, DipECZM Prof. Srebrenka Nejedli	2.73. Year of the study programme	6
1.58. Name of the course	**Diseases of pet birds, exotic and laboratory animals**	2.74. Credits (ECTS)	7
1.31. Associate teachers	Prof. dr. F. Božić, Assoc. prof. Franjo Martinković, Prof. dr. S. Nejedli, Prof. dr. J. Aladrović, Prof. dr. D. Horvatek Tomić, Assoc. Prof. dr. Ž. Gottstein, Prof. dr. A. Gudan Kurilj, , Assoc. prof. I. C. Šoštarić Zuckerman, Prof. Dr. Ivana Tlak Gajger, Prof. E. Gjurčević, Prof. dr. G. Gregurić Gračner, Assoc. prof. K. Matanović, Assoc. prof. Maja Lukač, Assist. Prof. Dražen Đuričić, G.Jurkić, PhD, DVM, L. Lozica, PhD, DVM, Emanuel Budicin, DVM	2.75. Type of instruction (number of hours L + S + E + e-learning)	L 50 + S 10 + E 30
1.32. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	2.76. Expected enrolment in the course	

1.33. Status of the course	Obligatory elective subject	2.77. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COURSE DESCRIPTION			
3.93. Course objectives	The course aims to educate students from several veterinary fields that relate mainly to exotic pets, but also to some free-living animals. Students will learn the handling, care, clinical propaedeutics, diseases and treatment of birds, rodents, reptiles, fish, and laboratory animals.		
3.94. Course enrolment requirements and entry competences required for the course	Students of integrated undergraduate and graduate study of veterinary medicine		
3.95. Learning outcomes at the level of the programme to which the course contributes			
3.96. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. To analyze the impact of the accommodation conditions, keeping and feeding of birds, other exotic, laboratory and aquarium animals on their health To distinguish natural from unnatural behavior of birds, exotic, laboratory and aquarium animals 2. To apply the appropriate procedures on clinical examination and diagnosis of disease 3. To recognize different diseases on the basis of clinical and histopathological findings 4. To choose drugs and methods of treatment and prevention of diseases 5. To suggest appropriate housing conditions, treatment and care of animals 6. To recommend the ways of nutrition and adequate food		
3.97. Course content broken down in detail by weekly class schedule (syllabus)	DISEASES OF PET AND AVIARY BIRDS 1. Anatomy of pet birds (bones of the skull, oropharynx, sternum, leg bones, flight muscles, crop, liver, ovary, feathers, sex determination); 2. Breeding of pet birds (select pairs for breeding, preparing to mate and nest, feeding during preparation for mating, feeding of nestling and fledgling birds); 3. Pet birds caging and nutritional requirements; 4. Avian behaviour (caging, boredom, anxiety, relationship bird - human); 5. Most common methods of preventing specific and nonspecific disease of birds (application of active and inactivated vaccines, prevention and intervention in order to prevent the occurrence of non-specific diseases); 6. Clinical recognition and interventions aimed at diagnosing disease (history, restraint of certain types of birds, clinical examination, diagnostic procedures, blood tests, basic haematology, chemical and cytological examinations, emergency procedures); 7. Bacterial and fungal diseases (bacterial diseases specific to pet birds (diversity in relation to poultry: clinically significant gram-negative bacteria, gram-positive bacteria, chlamydiosis, tuberculosis, megabacteriosis, aspergillosis and candidiasis), zoonosis; 8. Viral diseases (paramyxovirus infection, pox virus infection, beak and feathers disease, Polioma virus infection, proventricular dilatation disease); 9. Nonspecific		

	avian diseases (respiratory diseases, diseases of the genitourinary system, skin diseases, feather cover, beak, uropygial gland disease, metabolic diseases: diseases of the musculoskeletal system; neoplasia; toxicosis, trauma, injury, burns, fractures and dislocations); 10. Anaesthesiology and surgery of the birds; 11. Antibiotic therapy LABORATORY ANIMALS AND RODENTS 1. Anatomy and Physiology (mice, rats, guinea pigs and rabbits); 2. Basic care and caging; 3. Pharmacotherapy (specificity of drug therapy); 4. Diseases of mice (viral, bacterial, fungal, parasitic, nutritional-metabolic, neoplastic and other diseases); 5. Diseases of rats (viral, bacterial, fungal, parasitic, nutritional-metabolic, neoplastic and other diseases); 6. Guinea pig diseases (viral, bacterial, fungal, parasitic, nutritional, metabolic, other diseases); 7. Rabbit diseases (viral, bacterial, fungal, parasitic, nutritional-metabolic, neoplastic and other diseases); 8. Clinical examination (posture, application of drugs, diagnostic methods). REPTILES 1. Introduction (taxonomy, care and keeping, zoonoses and threats to public health); 2. Diseases (cardiology, dermatology, ophthalmology, neurology, neoplastic, infectious and parasitic diseases); 3. Specific techniques and procedures (anaesthesia, clinical pathology, radiology, diagnostic and clinical procedures, euthanasia and necropsy, treatment, orthopaedic surgery, soft tissue surgery) AQUARIUM AND TERARIUM ANIMALS DISEASES 1. Water (Environment, sweet, salty, brackish, chemistry, water quality, health status of aquatic animals); 2. Aquarium (planning, equipment, plants, algae, snails, etc.); 3. Basic biology of fish (special anatomical and physiological, food and feeding, breeding and cultivation, transport, adaptation, compatibility in the aquarium); 4. Healthy vs. sick (introduction to pathology, preventive measures, quarantine, disinfection of fish and plants, treatment, immunoprophylaxis); 5. Aquarium fish diseases (bacterial, viral, fungal, parasitic, metabolic and nutritional diseases, poor water quality, tumors, diseases caused by abiotic factors); 6. Specifics of treatment (methods, medications); 7. Vivarium (hot, cold, water equipment, plants and water chemistry); 8. Turtles (land, marsh, freshwater, marine species, health, disinfection and quarantine, recognition); 9. Keeping animals in vivarium (lizards, snakes, crabs, frogs, etc.).			
	X ☐ lectures	☐ independent assignments	3.99.	Comments:

<table>
<tr><td>3.98. Format of instruction:</td><td>X ☐ seminars and workshops
X ☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td>☐ multimedia and the internet
X ☐ laboratory
☐ work with mentor
☐ (other)</td><td colspan="4"></td></tr>
<tr><td>3.100. Student responsibilities</td><td colspan="6">Student must be present in at least 50% of hours of lectures, 70% of hours of seminars and 70% of hours of exercises, in each of these areas of teaching (aquaristic, laboratory animals and rodents, reptiles, birds).</td></tr>
<tr><td rowspan="6">3.101. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>1, 26</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>activities</td><td>0.7</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>2.24</td><td>Oral exam</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>2.8</td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td colspan="6"></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">During the semester, the student achieves a maximum of 6 points for 50 hours of lectures and at least 3 points for 25 hours (0.12 points per hour).
Student has a total of 10 hours of seminars, and can achieve at least 4 points for 7 hours of seminars or 6 points for presence in 10 seminars (0.6 points per hour of seminar).
The student participates in a total of 30 hours of exercises; for a maximum of 30 hours of practical exercise can achieve 6 points, and for at least 21 exercises can achieve 4 points (0.2 points per exercise).
For activities in seminars and exercises student can achieve a maximum of 10 points and at least 5 points.
Activity in seminars and exercises is mandatory and carried through successfully prepared and presented seminar, and to positively oriented response during exercises.

During the course students must pass the preliminary exam related to the aquaristic with at least 20 points, and maximum of 32 points (student answer 8 questions).

The final exam is written. Exam must be evaluated with a minimum of 24 points, and a maximum of 40 points. Student answers 40 questions.</td></tr>
<tr><td>2.11. Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
</table>

	3. Harrison, G. J., T. L. Lightfoot (2011): Clinical Avian Medicine, Vol I and II. Spix Publishing, USA 4. Campbell, T. (1995): Avian Hematology And Cytology. Iowa State University Press, Ames, Iowa 5. Andrews, C., A. Exell, N. Carrington (1998): The Manual Of Fish Health. Salamander book, London, New York 6. Carpenter, J., C. Marion (2017): Exotic Animal Formulary. W. B. Saunders Company, Toronto 7. Girling, S. J., P. Raiti (2019): BSAVA Manual of Reptiles, third edition. British Small Animal Veterinary Association, Gloucester. 8. O'Malley, B (2005): Clinical anatomy and Physiology of Exotic pets. Elsevier Saunders, London 9. Divers, S., D. Mader (2005): Reptile Medicine and Surgery 2nd Edition. Elsevier Saunders, St. Louis, Missouri 10. Saif, Y.M. (2003): Diseases of Poultry -11th edition, Blackwell Publishing Company 11. Barthold, S.W., Griffey, S.M., Percy, D.H. (2016): Pathology of Laboratory Rodents and Rabbits, Fourth Edition, John Wiley & Sons, Inc.	1 1 1 1 1 1 1	Online, pdf
2.171. Optional literature (at the time of submission of study programme proposal)	1. Mann, P., McInnes, E. (2011): Background Lesions in Laboratory Animals - 1st Edition - A Color Atlas, Saunders Ltd. 2. Prukner-Radovčić, E. (2010): Bolesti ptica kućnih ljubimaca, Medicinska naklada, Zagreb. 3. Obradović, J. (1997): Akvarij i terarij u kući. U: Vaši kućni ljubimci. (Smokvina-Boranić Čuča, ur), Nakladni zavod Znanje, Zagreb. 4. Grabarević, Ž., R. Sabočanec, (2002): Patologija laboratorijskih životinja, Skripta, Veterinarski fakultet, Zagreb. 5. Veterinarski priručnik, 6. izdanje (2012). V. Herak Perković, Ž. Grabarević, J. Kos (ur.), Medicinska naklada, Zagreb. 6. Journal articles		

6.12. Quality assurance methods that ensure the acquisition of exit competences	
6.13. Other (as the proposer wishes to add)	

FARM ANIMAL MEDICINE

1. GENERAL INFORMATION			
1.59. Course leader 1.1.1 Course leader substitution	Ivan Folnožić, assoc. professor Ozren Smolec, assoc. professor	2.78. Year of the study programme	6 th
1.60. ame of the course	Farm Animal Medicine	2.79. Credits (ECTS)	7
1.32. ssociate teachers	**Internal Diseases Clinic**: Damjan Gračner, full professor, Nikša Lemo, full professor Darko Grden, associated professor Jelena Gotić, associated professor Petra Bratić, teaching assistant **Surgery, Orthopaedics and Ophthalmology Clinic:** Ozren Smolec, full professor **Reproduction and Obstetrics Clinic**: Goran Bačić, full professor Marko Samardžija, full professor Juraj Grizelj, full professor Tugomir Karadjole, full professor Nikica Prvanović Babić, full professor Iva Getz, associated professor Martina Lojkić, full professor	2.80. Type of instruction (number of hours L + S + E + e-learning)	**13+30+47**

	Silvijo Vince, full professor Nino Maćešić, full professor Ivan Folnožić, associated professor Branimira Špoljarić, associated professor Ivan Butković, assistant professor Juraj Šavorić, senior teaching assistant Ivan Tomić, teaching assistant **Department of Microbiology and Infectious Diseases with Clinic:** Matko Perharić, assistant professor Nenad Turk, full professor **Department of radiology, ultrasound, and Physical Therapy**: Hrvoje Capak, associated professor **Department Parasitology and Parasitic Diseases with Clinic:** Albert Marinculić, full professor Franjo Martinković, associated professor **Department of General Pathology and Pathological Morphology**: Ivan Conrado Šoštarić-Zuckermann, associated professor		

	Doroteja Huber, assistant professor Lidija Medven Zagradišnik, assistant professor Ivana Mihoković Buhin, teaching assistant Iva Ciprić, teaching assistant **Department of poultry diseases with clinic:** Željko Gottstein, associated professor Danijela Horvatek Tomić, full professor Liča Lozica, senior teaching assistant **Department of Animal Behavior and Animal Welfare:** Kristina Matković, full professor **Department of Animal Nutrition and Dietetics:** Hrvoje Valpotić, full professor Željko Mikulec, full professor **Department of Pharmacology and toxicology** Frane Božić, full professor Andreja Prevendar Crnić, full professor Nikola Čudina, teaching assistant		
1.33. tudy programme	Integrated	2.81. Expected enrolment in the course	35

(undergraduate, graduate, integrated)			
1.34. tatus of the course	obligatory elective course	2.82. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	-
2. COUSE DESCRIPTION			
3.102. ourse objectives	INTERNAL DISEASES After attending this course, the candidate acquires skills and knowledge that enables him/her to employ clinical methods and interpret clinical and laboratory findings necessary for getting an accurate diagnosis of most frequently occurring internal diseases in farm animals. Likewise, the candidate should also be able to recognize conditions that require further specialist attention. Knowledge and skills acquired by attending this course make the candidate qualified for work in institutions dealing with health preservation in farm animals. Acquired knowledge is also considered a good foundation for taking further continuing education in specialist disciplines. SURGERY, ORTHOPEDICS AND OPHTHALMOLOGY Surgery, orthopedics, and ophthalmology within this educational course comprises diagnostic procedures and treatment methods which are carried out in specific farm conditions, at the same time bringing into account feasibility of those procedures as well as economic considerations. Considering that, farm animals are rarely treated in conditions provided by Clinic for surgery, orthopedics, and ophthalmology, one of our primary goals is to familiarize students with methods of diagnostics and treatment that can be employed in field and farm conditions. Some of elective procedures, especially those carried out in general anesthesia, will be demonstrated in working conditions at Surgery, Orthopedic and Ophthalmology Clinic. Students will be able to approach to farm animals in field conditions by protecting their own health at the same time, and to act in a manner that would provide beneficial effect on health of their patients. Considering numerous risks associated with performing, general anesthesia in field conditions (especially in ruminants), the students will master methods of sedation and all forms of local anesthesia. Basics of diagnostic procedures in ophthalmology and orthopedics that could be employed in field conditions will also be presented to those attending this course, and students will be able to correctly assess the situation and bring the decision about feasible treatment. With previously acquired knowledge in internal diseases of the digestive tract, students will be qualified to correctly decide about selecting the right method and performing surgical treatment in abdominal cavity of farm animals. In addition, students will gain a special set of skills and knowledge needed for managing external and internal injuries, as well as to treat lesions acquired secondary to localized infections. Finally, it is very important for the students to acquire knowledge that makes them qualified to perform various elective surgical procedures that are not directly associated with pathological conditions, and yet are of considerable economic importance and should be specifically performed by Doctor of Veterinary Medicine.	

	OBSTETRICS During this course, the students will be familiarized with specific features of mammary gland and lactation in certain domestic animals. They will be also familiarized with basics of farming management in swine reproduction. This includes indicators of breeding efficiency of sows, puberty in gilts and boars, as well as their introduction to reproduction. The students will be qualified to perform artificial insemination in swine without supervision and will be familiarized with providing care to suckling pigs until they are weaned. Furthermore, the objective of this course is to familiarize students with disorders in swine reproduction and measures that should be employed for their prevention and control. Students of this thematic unit will be taught about basic technics and methods employed during artificial insemination procedure. Practical classes will be held on *phantom* dummy, where students will be in opportunity to apply their theoretical knowledge. During attending this course, students will be familiarized with basic diagnostic tools for early pregnancy diagnosis and procedures employed for infertility treatment (estrus synchronization, treatment of ovarian cysts and other conditions causing infertility). Students will also be familiarized with physiology and pathology during puerperium in cattle and will be trained for handling puerperal period without supervision. INFECTIOUS DISEASES Students will have the opportunity to expand their regularly acquired knowledge about differential and objective diagnosis of infectious diseases in cattle. They will acquire knowledge that makes them qualified for interpretation of laboratory findings required for objective diagnosis of infectious diseases in cattle by methods officially dictated by legislations of Republic of Croatia. Students will also be informed about possibilities of conducting general prophylaxis and immunoprophylaxis in cattle held in intensive farming conditions. Students will have the opportunity to expand their regularly acquired knowledge about differential and objective diagnosis of infectious diseases in sheep and goats. They will acquire knowledge that makes them qualified for interpretation of laboratory findings required for objective diagnosis of infectious diseases in sheep and goats by methods officially dictated by legislations of Republic of Croatia. Students will also be informed about possibilities of conducting general prophylaxis and immunoprophylaxis in sheep and goats held in intensive farming conditions. Students will have the opportunity to expand their regularly acquired knowledge about differential and objective diagnosis of infectious diseases in swine. They will acquire knowledge that makes them qualified for interpretation of laboratory findings required for objective diagnosis of infectious diseases in swine by methods officially dictated by legislations of Republic of Croatia. Students will also be informed about possibilities of conducting general prophylaxis and immunoprophylaxis in swine held in intensive farming conditions. RADIOLOGY AND ULTRASOUND Students will be trained to correctly perform radiologic examination of foot regions and to interpret findings in most frequently occurring pathological changes.

	PARASITOLOGY Following completion of this course, students should be able to take a sample of feces in a correct manner and to examine the specimen for the presence of parasitic developmental stages. They would be also able to perform skin inspection and to correctly take a sample for examination, as well as to master technics of various forms of antiparasitic therapy. SELECTED CHAPTERS IN PATHOLOGY By practical approach, students will be more closely familiarized with issues in performing necropsy in farm animals. In this way the students will be familiarized with pathomorphological changes that are associated with significant and more frequently occurring diseases in cattle, swine, sheep, and goats and will be instructed how to differentiate one disease from another, as well as which tissues should be sampled and then sent for additional diagnostic tests to reach the final diagnosis. Special emphasis will be placed on pathomorphological changes and differential diagnosis in ruminants, considering that students during their regular classes in “General pathology and pathological morphology” usually have lesser number of necropsies performed on ruminants then those performed on swine. POULTRY Acquiring knowledge about the ways of production in all production categories of poultry, with main objective to preserve health within the population. FARM ANIMAL WELFARE Students will acquire knowledge about proper treatment of animals in production, which is considered very important in ensuring animal welfare. ANIMAL NUTRITION Students will acquire knowledge of preventing nutritional errors, which are often cause of metabolic diseases, and learn about characteristics of nutritional therapy in farm animals. PHARMACOLOGY At the very end of their formal higher education, students will have mastered the treatment of certain diseases of farm animals, especially because they will be able to see things in whole after everything they had been taught during the study. Special emphasis will be placed on how to properly dose drugs in group therapy by applying them in food and water for treatment and prevention of frequently occurring diseases in certain species of farm animals.

	TOXICOLOGY By acquired knowledge students will be qualified to recognize poisoning, to treat affected animal, be able to assess results of the treatment, and to properly sample material required for diagnostic tests, primarily for toxicological analysis. Moreover, students will be able to estimate possible losses caused by animal poisoning and to evaluate the results of chemical and toxicological analyses in case of presence of toxic residues (“Book of regulations”).
3.103. ourse enrolment requirements and entry competences required for the course	Students should be able to take the animal’s history, restrain it in a safe way and perform a general clinical examination. The student should be able to propose diagnostic examinations and understand the principles of the therapeutic approach which could be performed on the farm animal patients.
3.104. earning outcomes at the level of the programme to which the course contributes	Mastering the concepts in diagnosis and treatment of diseases of farm animals.
3.105. earning outcomes expected at the level of the course	**Cognitive Domain (Knowledge, Understanding, Analysis, Synthesis):** 1. Analyze the symptoms of internal diseases in farm animals and identify specific symptoms of these diseases 2. Choose appropriate therapeutic methods for the treatment of farm animals and evaluate the effectiveness of treatment based on the achieved results 3. Examine the guidelines for monitoring the work of a trained hoof trimmer and classify their applications in different situations 4. Differentiate types of mastitis, analyze the causes of their occurrence, and identify the conditions that contribute to their development 5. Analyze the tasks related to swine reproduction on the farm and assess reproductive efficiency 6. Explain the causes of infertility in cows and choose appropriate diagnostic and treatment methods 7. Differentiate the symptoms of infectious diseases in cattle, sheep, goats, and swine, identify potential causes of infectious diseases, and assess the risk of their occurrence under intensive production conditions 8. Differentially diagnose infectious diseases in cattle, sheep, goats, and pigs in intensive production based on epidemiological data and clinical findings 9. Choose material sampling methods and diagnostic procedures for the objective diagnosis of infectious diseases in cattle, sheep, goats, and swine in intensive production 10. Select an immunoprophylaxis program suitable for the specific intensive breeding of cattle, sheep, goats, and swine 11. Differentiate the radiological symptomatology of specific diseases

	12. Determine the success of treatment based on radiological findings 13. Diagnose invasive diseases in farm animals 14. Plan and select a preventive program for invasive diseases based on the specifics of the farms and the type of animals 15. Recognize and analyze the pathoanatomical changes characteristic of the most important diseases 16. Evaluate the effectiveness of poultry immunoprophylaxis 17. Analyze data and symptoms to recognize the potential occurrence of diseases in intensive poultry farming 18. Explain the basic principles of poultry reproduction 19. Describe diseases caused by improper feeding 20. Analyze the basics of preventive and therapeutic feeding and select appropriate methods in practice 21. Calculate the nutritional requirements for different diseases 22. Explain the specifics of preventing, treating, controlling, and suppressing enteral and respiratory diseases 23. Identify veterinary medicinal products used in the health control of broiler chickens, breeding and laying hens, and parent flocks 24. Describe the pharmacotherapeutic basics of controlling and treating bronchopneumonia in beef cattle 25. Explain the specifics of glucocorticoid application in the mammary gland and the use of drugs according to the MUMS principle (minor use minor species) 26. Identify symptoms of poisoning in certain animals 27. Evaluate the success of treating a poisoned animal 28. Determine the broader harmful consequences of poisoning in animals 29. Analyze the long-term effects of poisoning on animal health 30. Properly collect samples for toxicological analysis 31. Analyze the results of chemical-toxicological testing and act in accordance with the applicable legislation on toxins, metals, metalloids, and pesticide residues in food and animal feed **Affective Domain (Attitudes, Values, Emotional Approach to Learning):** 1. Identify critical points in animal handling (ethical aspects of animal handling) **Psychomotor Domain (Skills, Physical Activities, Tool Manipulation):** 1. Independently perform general and specialist clinical examinations 2. Properly sample material for laboratory analysis (blood, urine) when suspecting internal diseases in farm animals 3. Master methods of approaching and restraining farm animals in order to manage the process, performed by one or more assistants 4. Independently perform routine surgical procedures on the abdomen of farm animals

	5. Independently perform so-called "husbandry procedures" on pigs and sheep (or organize and supervise the execution of these procedures by veterinary technicians) 6. Independently perform functional hoof corrections 7. Independently examine the udder (palpation, inspection) 8. Perform a mastitis test, interpret the test results, and take milk samples for bacteriological testing 9. Independently organize and perform dehorning 10. Implement appropriate methods for estrus synchronization. 11. Perform artificial insemination on dairy farms and in the field 12. Diagnose early pregnancy through rectal examination and ultrasound 13. Monitor puerperium and introduce heifers into reproduction and lactation 14. Diagnose and treat ovarian cysts, endometritis, and other causes of infertility 15. Apply targeted treatment for infectious diseases in cattle, sheep, goats, and swine in intensive production 16. Implement general prophylactic measures to control and prevent infectious diseases in cattle, sheep, goats, and swine in intensive production 17. Apply various radiographic techniques 18. Perform post-mortem examination of farm animals 19. Properly sample material for histopathological and/or bacteriological testing when suspecting a specific disease 20. Master basic poultry breeding procedures 21. Independently perform poultry immunoprophylaxis procedures 22. Apply treatment procedures for poultry diseases in intensive production 23. Correctly dose medications in feed and drinking water for farm animals
3.106. ourse content broken down in detail by weekly class schedule (syllabus)	INTERNAL DISEASES Organic diseases. 1. Digestive tract diseases (acid indigestion, alkaline indigestion, abomasum dislocation, acute ruminal tympany, traumatic indigestion, esophago-gastric ulceration in swine, abomasum ulceration, altered positions of the intestines; bowel obstruction, peritonitis); 2. Diseases of the respiratory tract (hyperemia and pulmonary edema, pneumonia); 3. Cardiovascular diseases (endocarditis, pericarditis); 4. Diseases of the hematopoietic system (anemia, leukemia, leukopenia); 5. Urinary tract diseases (cystitis, renal failure/insufficiency, pyelonephritis); 6. Nervous system disorders (differential diagnostics); 7. Diseases of the integumentary system (skin diseases in ruminants and swine) Metabolic diseases. 8. Metabolic profile blood work 9. Ketosis and lipidosis, 10. Diseases associated with vitamin and trace mineral deficiency; 11. Osteodystrophy and tetany; 12. Medical management at the farm (measures for disease prevention, monitoring to establish prevalence of various problems and disorders on the farm, making vaccination and disease treatment protocol)

	SURGERY, ORTHOPEDICS AND OPHTHALMOLOGY 1. Approaching to farm animals, methods for distraction and restraint; 2. Applying sedation and local regional, infiltration and superficial anesthesia in farm animals within medical facility, and especially in field conditions. 3. Ophthalmological examination in farm animals; 4. Preforming certain procedures in abdominal surgery on farm animals (herniotomy, laparoruminotomy following Weingarth, laparoruminotomy following Goetz, surgical treatment of abomasum dislocation, castration by employing bloodless and surgical method); 5. Management of external and internal injuries and consequences of localized infections on available animals; 6. Lameness diagnostics in farm animals; 7. Functional hoof correction in small and large ruminants; 8. Diseases of cattle horns and decornuation; 9. Procedures of economic value performed in swine (tail docking and teeth clipping in piglets). 10. Caponization OBSTETRICS 1. Diseases of the mammary gland (specific features of mammary gland and lactation in specific farm animals, with special emphasis on small ruminants in farm breeding); 2. Management of swine reproduction; 3. Artificial insemination (techniques of artificial insemination and measures for its successful employment in field conditions); 4. Fertility management in dairy cows (measures for improvement of fertility in farm conditions, early diagnosis of pregnancy by rectal palpation and ultrasound examination, infertility treatment, estrus synchronization, treatment of ovarian cysts and endometritis along with other conditions causing infertility). 5. Puerperal period and introduction of young females to reproduction INFECTIOUS DISEASES 1. Infectious diseases of cattle in intensive farming (diagnostics and differential diagnostics of cattle infectious diseases in intensive production, measures performed for general and specific immunoprophylaxis, for infectious diseases, for cattle in intensive production). 2. Infectious diseases of goats and sheep in intensive farming, measures performed for general and specific immunoprophylaxis for infectious diseases in goats and sheep in intensive production). 3. Infectious diseases of swine in intensive farming, measures performed for general and specific immunoprophylaxis for infectious diseases in swine in intensive production) RADIOLOGY 1. Mobile radiographic devices. 2. Radiographic techniques for filming distal portions of the body. 3. Radiologic analysis and interpretation of findings associated with hoof pathological entities on thoracic and pelvic limbs PARASITLOLOGY

	1. Gastrointestinal nematodes in cattle, sheep, and goats; 2. Scabies in domestic ruminants; 3. Lung nematodes in domestic ruminants, 4. Diseases caused by protozoa in domestic ruminants; 5. Tapeworm and liver fluke infestations in domestic ruminants; 6. Other diseases caused by ectoparasites in domestic ruminants; 7. Parasitic diseases of swine. SELECTED CHAPTERS IN PATHOLOGY 1.Special aspects of employing necropsy as a diagnostic method in farm animals; 2. Familiarizing with pathomorphological features associated with more important and frequently occurring cattle diseases; 3. Familiarizing with pathomorphological features associated with more important and frequently occurring swine diseases; 4. Familiarizing with pathomorphological features associated with more important and frequently occurring diseases in sheep and goats. POULTRY 1. Poultry and wildfowl production system (breeding of the parent flock, reproduction, hatcheries, chick rearing for different purposes); 2. Poultry integration system (health protection, prevention of diseases of various etiology, breeding technology for gaining genetic features, which would protect the animal from incubation through period of production); 3. Methods for artificial insemination in poultry. FARM ANIMAL WELFARE 1. Animal welfare in context of farmer's regard for his animals. SELECTED CHAPTERS IN ANIMAL NUTRITION AND DIETETICS 1. Errors frequently made in farm animal nutrition (ruminants, swine, poultry); 2. Nutritional therapy. CLINICAL TOXICOLOGY 1. Clinical toxicology and your first case; 2. Clinical cases of farm animal pesticide poisoning (Power Point presentations of case reports: poisoning with organophosphates, carbamates, pyrethrins and pyrethroids); 3. Clinical cases of heavy metal poisoning in farm animals (lead, arsenic, iron and copper poisoning); 4. Clinical cases of ethylene glycol (antifreeze) and sodium chloride poisoning in farm animals; 5. Clinical cases of urea, nitrate and nitrite poisoning in farm animals; 6. Clinical cases of plant poisoning (oleander, hemlock and yew) and mycotoxin poisoning (estrogens, slaframine, fumonisins, trichothecenes); 7. Clinical cases of tick paralysis (Power Point presentation of case reports).		
3.107. ormat of instruction:	X lectures X seminars and workshops	☐ independent assignments ☐ multimedia and the internet	3.108. Comme nts:

<table>
<tr><td></td><td colspan="2">☐ exercises
☐ online in entirety
☐ partial e-learning
X field work</td><td colspan="2">☐ laboratory
☐ work with mentor
☐ other</td><td colspan="2"></td></tr>
<tr><td>3.109.
tudent responsibilities</td><td colspan="6">Students are obliged to attend at least 7 hours of lecture and 70 % of practicals (33 hours). Students are obliged to attend a minimum of 70 % of the seminar (21 hours).
A minimum of 5 (max. 10) points must be gained during practicals, which consists of the completion of a minimum of 3 (max. 6) positively evaluated assignments imposed by teacher and based on active participation during practicals (signed off by the teacher), 1 (max 2) field assignment and 1 (max 2) positive answer on short oral exams.</td></tr>
<tr><td rowspan="5">3.110.
creening student work
(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>1.26</td><td>Research</td><td>-</td><td>Practical training</td><td>-</td></tr>
<tr><td>Experimental work</td><td>-</td><td>Report</td><td>-</td><td>Activity</td><td>0.7</td></tr>
<tr><td>Essay</td><td>-</td><td>Seminar essay</td><td>-</td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>2.24</td><td>Oral exam</td><td>-</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>2.8</td><td>Project</td><td>-</td><td>(other)</td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">By attending lectures, the student gains 3-6 points (13 lecture hours; each lecture hour equals a 0.46 coefficient). Students must attend at least 7 lecture hours.
By attending practicals, the student gains 4-6 points (47 exercise hours; each exercise hour equals a 0.12671 coefficient). Students must attend at least 33 hours of practicals.
By attending seminars, the student gains 4-6 points (30 seminar hours; each exercise hour equals a 0.133 coefficient). Students must attend at least 21 hours of seminars.
The activity at the exercises and seminars is evaluated with 5-10 points; the activity will be evaluated through short oral exams, field tasks and practical assignments.
There will be a progress test performed during the semester consisting of 20 questions (clinical pharmacology and toxicology, nutrition, radiology, welfare, pathology, parasitology, infectious diseases, poultry) and performed in written form.
The progress test brings 32 points (each question equals a 1.06 points), 20 points being the minimum required to pass. Taking the progress test during the main term is compulsory (missing the main term needs to be justified).
3 additional progress test terms will be announced, as per agreement with students. (A passing grade for) the progress test is a requirement to register for the final exam. However, the progress test is not a requirement for a signature in the grade book. If the student fails the progress test 4 times, he/she needs to take the whole course over again. In case he/she doesn’t take the progress test or fails it 4 times, an additional term is possible if the student representative writes an official request to the respective Vice Dean. The Course leader makes the final decision.</td></tr>
</table>

At the final exam the student can score between 24 and 40 points. A minimum of 24 points must be achieved with the correct answers to 60% of the questions from each area. The knowledge test is written and consists of 30 questions from all areas (internal, obstetrics, surgery) and one correct answer brings 1,333 points.

The total sum of points achieved from the above-mentioned elements is expressed in the final mark (1 – 5), 1 being a failure.

Points	Grade
up to 59	1 (F) insufficient
60-68	2 (E) sufficient
69-76	2 (D) sufficient
77-84	3 (C) good
85-92	4 (B) very good
93-100	5 (A) excellent

2.11. Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
Noakes, D. E. et al. (2019): Veterinary Reproduction and Obstetrics. 10th edition, Elsevier. Constable, P. D., K. W. Hinchcliff, S. H. Done, W. Grünberg, O. M. Radostits (2017): Veterinary medicine : a textbook of the diseases of cattle, horses, sheep, pigs and goats. St. Louis, Mo. Elsevier.		
Robert S. Youngquist, Walter Threlfall (2007): Current Therapy in Large Animal Theriogenology, 2nd Edition. Saunders Elsevier.		
Lumb and Jones (1996): Veterinary anaesthesia, 3rd ed., Williams and Wilkins, Baltimore. Senger, P. L. (2012): Pathways to Pregnancy and Parturition. 3rd edition. Current Conceptions, Inc. Jackson, P. G. G. (2004): Handbook of Veterinary Obstetrics. Saunders W. B. Company.		

	James F. Zachary (2017): Pathologic Basis of Veterinary Disease. 6th edition, Elsevier. Straw, E. B., J. J. Zimmerman, S. D'Allaire, D. J. Taylor (2006): Diseases of swine. 9th edition, Blackwell Publishing. Jordan, F. et all.: Poultry Diseases, 5th ed., W. B. Saunders, 2001. Broom, D. M., A. F. Fraser (2007): Domestic Animal Behaviour and Welfare. 4th Edition. CAB International, Cambridge University Press, UK.		
	E.S.E. Hafez and B. Hafez (2013): Reproduction in Farm Animals. 7th Edition, Wiley.		
2.172. Optional literature (at the time of submission of study programme proposal)	Gordon, I. (1997): Controled Reproduction in Pigs. CAB International, UK. Murphy, F. A., E. P. J. Gibbs, M. C. Horzinek, M. J. Studdert (1999): Veterinary virology. Academic Press. Robert F. K. (2001): Viral Diseases of Cattle. Iowa University Press, Ames, Iowa. Pugh, D. G. (2002): Sheep and goat medicine. Saunders Company, Philadelphia. Nutrient Requirements of Swine: 10th Revised Edition, National Academy Press. Washington D. C. 1998. Nutrient Requirements of Dairy Cattle: 7th Revised Edition, National Academy Press. Washington D.C., 2001. Chamberlain, A. T., Wilkinson, J. M.: Feeding the Dairy Cow. Chalcombe Publications. Welton. 2002. Hill, J., A. H. Andrews: The expectant dairy cow. Chalcombe Publications. Welton. 2000. P. R. Greenough, A. D. Weaver (1997.): Lameness in Cattle, W. B. Saunders Company Bolz, W. O, Dietz (1985.) Lehrbuch der allgemeinen chirurgie fur Tierarzt. Ferdinand enke Stuttgart. M. E. Ensminger, J. E. Oldfield, W. W. Heinemann: Feeds and Nutrition (Second Edition). The Ensminger Publishing Company, USA, 1990 Veterinary Pharmacology and Therapeutics 6th ed. (Adams, H. R., L. E. McDonald, ur.). Iowa State University Press, Ames, 1995.		

	Gupta, R. C.: Veterinary Toxicology: Basic and Clinical Principles. Esevier, 2007. Osweiler, G.D.: Toxicology, Williams & Wilkins Philadelphia, Baltimor, 1996. http://www.ivis.org/library.asp, V. Baesley: Veterinary toxicology,1999 Strafuss A.C.: Necropsy, Procedures and basic diagnostic methods for practicing veterinarians. Chales C. Thomas, Springfield, Illinois, USA, 1988. King J. M., L. Roth, D. C. Dodd, M. E. Newson: The necropsy book, 3rd edition, Charles Louis Davis DVM Foundation, 2003 Kahn C. M: Merck Veterinary Manual, 9th edition, Merck &CO, 2005. Jones, T. C., R. D. Hunt, N. W. King: Veterinary pathology, 6th edition, Williams & Wilkins, 1997. Rollin, B. E. (1995): Farm animal welfare. Social, Bioethical and Research Issues. Iowa State University Press.
2.173. Quality assurance methods that ensure the acquisition of exit competences	Regular classes' attendance-checking, continuous student activity assessment during the entire semester; continuous knowledge checking (progress tests), regular student consultation, students' questionnaire.
2.174. Other (as the proposer wishes to add)	

FORENSIC VETERINARY MEDICINE

1. GENERAL INFORMATION			
1.61. Course teacher	Prof Krešimir Severin	2.83. Year of the study programme	6
1.62. Name of the course	Forensic veterinary medicine	2.84. Credits (ECTS)	
1.33. Associate teachers	Magdalena Palić, DVM, PhD, Univ. Mag. Med. Vet. Nikola Serdar, DVM	2.85. Type of instruction (number of hours L + S + E + e-learning)	10+0+35+0
1.34. Study programme (undergraduate, graduate, integrated)	Integrated	2.86. Expected enrolment in the course	10-30
1.35. Status of the course	Compulsory	2.87. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1, 10%

2. COUSE DESCRIPTION	
3.111. Course objectives	The course in Forensic Veterinary Medicine is designed to introduce students to this specialized field, emphasizing that legal medicine intersects with daily veterinary practice for all veterinary professionals, not just specialized experts. The primary objective of the course is to train students in the medico-legal assessment of disputable cases involving animals and animal products. Students will learn critical procedures required during event-scene investigations (site visits and fieldwork) and the essential protocols for securing credible material evidence. Furthermore, the curriculum enables students to construct comprehensive forensic veterinary expertise and effectively present their findings and expert opinions—both in written reports and through oral testimony—before courts and other regulatory bodies. Special emphasis is placed on clinical and pathological evaluation, training students to objectively determine pain, suffering, fear, and injuries resulting from animal neglect, abuse, or cruelty. Finally, the course provides essential knowledge regarding the legal and ethical responsibilities of veterinary staff, covering professional standards and the prevention of misconduct in veterinary practice.
3.112. Course enrolment requirements and entry competences required for the course	Attended the course of State Veterinary Medicine
3.113. Learning outcomes at the level of the programme to which the course contributes	**Legal and Professional Compliance**. Integrate substantive and procedural legislation (civil, criminal, and misdemeanor law) into veterinary practice, and execute formal requests from judicial, inspection, and regulatory bodies with high professional and ethical responsibility.

	Expert Witnessing and Reporting. Formulate, present, and defend independent, evidence-based expert opinions and legal reports, effectively distinguishing and applying the specific roles and communication protocols of an expert witness and a permanent court expert. **Forensic Diagnostics and Investigation.** Independently conduct event-scene investigations, perform forensic clinical examinations and necropsies to determine the cause and manner of death or injury, and process biological traces and material evidence using selected molecular and diagnostic methods. **Medico-Legal and Economic Valuation.** Synthesize clinical, public health, and animal production knowledge to assess the medico-legal aspects of animal diseases and determine the commercial, usable, and insurance value of animals in legal or pre-purchase procedures.
3.114. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. Analyze the substantive and procedural legislation of civil, litigation, and criminal law related to veterinary practice. By acquiring knowledge in the areas of interest in law, students develop cognitive abilities that enable them to understand the legal aspects of various areas of professional responsibility in veterinary practice and how they reflect on the protection of their legal interests. 2. Explain the responsibility of veterinary professionals when acting upon requests from judicial authorities, inspection oversight bodies, and legal or natural persons, while respecting the principles of professional ethics and independence in expert work. Compare the procedures of an expert witness (expert of fact / professional witness) and a permanent court expert witness during the provision of oral and written opinions, and critically evaluate the importance of professional ethics and objectivity when drafting expert forensic reports (expert witness findings and opinions). 3. Compare the actions of an expert witness and a permanent court expert in providing oral and written opinions and expert assessments (expertise). The method of providing findings and expert opinions as an expert witness and a permanent court expert requires the development of skills that, in addition to presenting professional rules, require the expression of attitudes, and sometimes assumptions, that are interdependent with existing facts and circumstances of the event. This outcome, along with the development of student interest and responsibility towards learning, encourages the expression of one's own opinion based on professional knowledge and scientific findings. 4. Know and assess the medico-legal and forensic aspects of the most significant diseases and disorders of animals. An indispensable part of the analysis of the medico-legal and forensic aspects of a disease or disorder of the physical and/or mental health of animals includes research motivation to find information and determine its relevance in relation to the element of judgment in the part of the procedure of determining the existence, age, science, and concealment. This outcome, along with the development of student interest and responsibility towards learning, encourages the expression of one's own opinion based on professional knowledge and scientific findings. 5. Relate acquired knowledge from clinical medicine, veterinary public health, and animal production and biotechnology with newly acquired knowledge in the field of forensic veterinary medicine. New knowledge in the field of veterinary medicine, placed in a legal context, results in higher awareness and responsibility among students in the performance of veterinary activities. Research based on the analysis of the specifics of forensic veterinary medicine encourages the acquisition of new specific knowledge.

	6. Assess the main elements for determining the value of animals in relevant legal and insurance procedures. Determining the value of an animal requires, in addition to assessing health status, determining the actual usability of animals with regard to purpose. The process of determining value requires students to analyze collected information and express an opinion on the relevance of the established factual situation, which is reflected in the development of skills in the affective domain. 7. Independently research and collect evidence or prepare reports on issues related to the scene of an event. Recognizing and properly handling material evidence from the scene of an event requires laboratory skills in which students independently process various biological traces. 8. Know the procedure for identifying vertebrates from the preparation of various biological samples to the performance of selected molecular methods. 9. Implement elements of forensic necropsy to determine the cause, mechanism, and manner of death in cases of suspected violent death. This outcome requires practical performance and analysis of photo documentation of archival items to acquire the skills needed to perform a forensic necropsy in cases of suspected violent death. 10. Conduct a basic forensic clinical examination of animals before purchase or when they may become the subject of legal proceedings. This outcome requires practical performance and analysis of photo and video documentation of archival items to acquire the skills needed to perform a forensic clinical examination.
3.115. Course content broken down in detail by weekly class schedule (syllabus)	**I. Legislation - legal aspect**: Introduction to forensic veterinary medicine. Definition and historical overview. Forensic veterinary medicine (Latin *medicina forensis veterinaria*) as an independent veterinary discipline. Forensic veterinary medicine and civil law (Civil Obligations Act, Civil Procedure Act). Defining things, warranty, damages, professional misconduct. Claims, litigation, hearings, submissions, litigation costs, deadlines, court records. Civil Procedure Act. Types of courts. Territorial and subject matter jurisdiction. Duties and liabilities of the witness of fact and expert witness. Inquests. Forensic veterinary medicine and the criminal law (Criminal Code). Criminal offence, intent and negligence. Fraud (fraudulent acts executed by simulation and dissimulation). Criminal offenses related to veterinarian activities, criminal offenses against human health (spreading and transmission of infectious diseases, careless inspection of meat intended for human nutrition). criminal offenses against the environment (pollution, endangering the environment by waste disposal, endangering the environment with installations, destruction of protected areas of natural resources, habitat destruction, killing or torturing animals, transmission of infectious animal diseases, production and sale of harmful agents for the treatment of animals, veterinary malpractice). Forensic veterinary medicine and the administrative law. Animal insurance. **II. Forensic veterinary pathology**: Forensic postmortem examination and report writing. Agony and death. Forensic aspects of postmortem changes and postmortem interval (basics of forensic entomology, botany, palynology and diatomology). Difference between antemortem and postmortem changes. Forensic aspects of injuries (mechanical damage - local and general effect (blunt force injuries - abrasions, contusions and lacerations; sharp force injuries – incised wounds (cuts,or slashes), stab wounds (puncture or penetrating wounds), bite injuries, firearms injuries, bone fissure and fractures, dislocation of joints; bleeding, bruises, hematomas, thrombosis and infarction) shock, blast, Crush syndrome. Asphyxia injuries - strangulation, choking and smothering, suffocation and crus asphyxia, poisonous gases, drowning. Physical injuries - thermal injuries, injuries caused by electricity. Nutritional injuries.). Forensic aspects of inflammation (acute - serous, catarrhal, purulent and fibrinous, and chronic granulomatous

	inflammation). Forensic aspects of adaptive cellular responses (atrophy, hypertrophy, hyperplasia, metaplasia and dysplasia). Bone and wound healing. Cell death determination. Collecting, handling, including security and safety of samples (evidence) for different diagnostic procedures. **III. Forensic veterinary expertise – Expertise:** Expert witness report. Court file, findings from court file, consideration, conclusions, opinions and forms of opinions. Independent and combined expertise. Witness of the fact, professional witness, expert witness. Conditions for providing expert witnesses duty. Duties and liabilities of the expert. Code of Ethics. Providing testimony of expert at the trial. Determination and judgment diseases and disorders in forensic veterinary medicine. Veterinary certificate (exercise in compiling and analyzing specific court cases). General principles of judgments of selected diseases and conditions in companion animals, equines, and livestock. Practical training on court and other cases. **IV. Site visits and fieldwork / Crime scene investigation:** Organization and management of the site. Liabilities in professional conduct of official persons (responsibility of police officers, court official persons, veterinary inspectors and veterinary staff) when collecting material evidence of biological origin under the provisions and principles of formal and substantive legal acts. Specific investigation at the scene. Recognizing, collecting, labeling and security / protection of biological traces and items that may serve as evidence (Chain of Custody - Chain of Evidence). Equipment and environmental conditions. Procedure of establishing and working laboratories for identification of biological traces (level of reliability regard to credibility of the material evidence). Collecting and securing procedures for material traces of biological origin (animal-various tissues, blood, urine, animal products). Investigation activities on the scene (clinical examination live animals, necropsy, analysis of blood traces, entomological analysis). **V. Identification of vertebrates:** The scope of application of the identification of vertebrates in forensic veterinary medicine. Classification of biological traces in respect to origin and requirements of veterinary medicine. Animal as a victim, witness and perpetrator. Specificity of identification requirements in case of protection and conservation of endangered species (CITES), issuance of certificate of pure breeding and Pedigree of breeding animals, analysis in inspection control of animal products or animal feed origin. Identification check (in internal trade or across the borders of the Republic of Croatia). Species identification, individual identification. Determination of animal origin (parental), parentage determination, population identification. Selection of identification methods according to their specificity and sensitivity in procedure requirements and sample quantity and quality. **VI. Conditions contrary to animal welfare:** Animal neglect (overfeeding, inadequate feeding, malnutrition, starvation, dehydration, inadequate conditions for keeping animals and inadequate animal care). Cruelty to animals (animal abuse, killing and torturing). Classification according to the type of insult: physical, psychological and sexual abuse. Injuries as a consequence of cruelty. Animal hoarding-Diogenes Syndrome (obsessive animal collecting). Munchausen syndrome. Animal fighting. Illegal animal killing and slaughter. Inadequate conditions of animal breeding and transportation. **VII. Forensic veterinary toxicology:** Defining the field of forensic toxicology. Investigation procedures related to poisoning. Veterinarian's duties and legal liabilities. Collaboration with the relevant authorities in animal poisoning cases. Ecotoxicology - court and other cases (environmental pollution, biological indicators). Overview of prohibited substances and methods in sport animals. Competition doping control procedure (prohibited list of chemicals, process of determining responsibility in the case of a positive finding).

	VIII. Behavioral Problems of Domestic Animals: Practical training on court and other cases related to: aggression, cribbing (aerophagia, windsucking), stall walking and weaving/ stall kicking, head shaking in horses; aggression, intersuckling in cattle. **IX. Responsibilities of veterinary profession:** Definition of responsibility. Compensation for material and non-material damage. Expert evaluation of professional misconduct. Determining causal link between professional failures and damage. Different responsibilities (responsibility of veterinarians, veterinary organizations, veterinary inspectors, persons engaged in animal transport and animal attendants for damages associated with animal transport).

3.116. Form of instruction:	☒ lectures ☐ seminars and workshops ☒ exercises ☐ on line in entirety ☐ partial e-learning ☐ field work	☒ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	3.117. Comments:	
3.118. Student responsibilities	Attendance at lectures, exercises and writing seminar essay			

3.119. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
	Class attendance	0.63	Research		Practical training	
	Experimental work		Report		(other)	
	Essay		Seminar essay	0.35	(other)	
	Tests	1.12	Oral exam		(other)	
	Written exam	1.4	Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam

Types of activities	Minimal number of points	Maximal number of po
Attending lectures	**3**	**6**
6% of grade	10 lectures hours: one lecture hour is multiplied with 0.6, and a student mus minimal 10 lecture hours	
Attending seminars	**9**	**12**

	12% of grade	30 seminar hours – one seminar hour is multiplied with 0.343, and a student must attend minimal 25 exercises hours	
	Participation at seminars	**5**	**10**
	10% of grade	Each student is obliged to prepare and present seminar work (the court case from the Department's archive) which will be assessed	
	Continuous knowledge checking	**20**	**32**
	32% of grade	- first preliminary exam 10-16 points (16 question, each question is worth 1 point) - second preliminary exam 10-16 points (16 questions each question is worth 1 point)	
	Final exam	**24**	**40**
	40% of grade	In order to take the final exam a student must gain minimal 36 points from attending and participation at lectures and seminars and from continuous knowledge checking. Written exam form 24 to 40 points A student gets 8 questions – each correct answer is worth 5 points.	

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and via other media)	MUNRO R., H.M.C. MUNRO (2008): Animal Abuse and Unlawful Killing: Forensic veterinary pathology. Elsevier, London.	1	
	BROOKS, J. W. (2018.): Veterinary Forensic Pathology, Volume 1. Springer International Publishing, Cham, Switzerland.	1	
	BROOKS, J. W. (2018.): Veterinary Forensic Pathology, Volume 2. Springer International Publishing, Cham, Switzerland.	1	
	COOPER J.E., M.E. COOPER (2007): Introduction to Veterinary and Comparative Forensic Medicine. Blackwell Publishing, Oxford.	1	
	BYRD, J. H., P. NORRIS, N. BRADLEY-SIEMENS (2020): Veterinary Forensic Medicine and Forensic Sciences. CRC Press, Taylor & Francis Limited, New York, USA.	1	
	Civil Obligations Act (Official Gazette, No. 35/05, 41/08, 125/11, 78/15, 29/18, 126/21, 114/22, 156/22, 155/23, 14/24)	10	http://cadial.hidra.hr
	Civil Procedure Act (Official Gazette, No. 53/91, 91/92, 58/93, 112/99, 88/01, 117/03, 84/05, 96/08, 123/08, 57/11, 148/11 – consolidated text, 25/13, 89/14, 70/19, 80/22, 114/22, 114/23, 14/24)	10	http://cadial.hidra.hr
	Criminal Code (Official Gazette, No. 125/11, 144/12, 56/15, 61/15, 101/17, 118/18, 126/19, 84/21, 114/22, 36/24)	10	http://cadial.hidra.hr

	Misdemeanour Act (Official Gazette, No. 107/07, 39/13, 157/13, 110/15, 70/17, 118/18, 114/22, 52/23)	10	http://cadial.hidra.hr
2.175. Optional literature (at the time of submission of study programme proposal)	COOPER, J. E, M. E. COOPER (2013): Wildlife Forensic Investigation: Principles and Practice. CRC Press, Boca Raton.		
2.176. Quality assurance methods that ensure the acquisition of exit competences	Anonymous student survey about all aspects of teaching.		
2.177. Other (as the proposer wishes to add)			

FIELD SERVICE CLINIC

1. GENERAL INFORMATION			
1.63. Course teacher	Assoc. prof. dr.sc. Darko Grden	2.88. Year of the study program	6th
1.64. ame of the course	Field Service Clinic	2.89. Credits (ECTS)	6
1.34. ssociate teachers	Multidisciplinary and case-oriented nature of this subject would include variable team of clinical veterinary surgeons, depending of case load. Clinical surgeons would involve teaching staff from Clinic for internal medicine, Clinic for obstetrics and reproduction, Clinic for surgery, orthopedics and ophthalmology and Department for microbiology and infectious diseases with clinic.	2.90. Type of instruction (number of hours + e-learning)	L + S + E 0+0+60+0
1.35. tudy program (undergraduate, graduate, integrated)	integrated	2.91. Expected enrolment in the course	
1.36. tatus of the course	obligatory	2.92. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
3.120. ourse objectives	In addition to the general objectives and tasks of educating future veterinary surgeons, a special objective within this course to enable students to do professional work in the diagnosis, curing and prevention of animal diseases in the field.
3.121. ourse enrolment requirements and entry competences required for the course	Attended all cases I - IX. semester

3.122. earning outcomes at the level of the program to which the course contributes	Acquiring the skills needed to perform the independent veterinary practices in the field condition.					
3.123. earning outcomes expected at the level of the course (4 to 10 learning outcomes)	Independently perform all diagnostic procedures including methods of clinical examination in conditions of field work. Taking samples from the live patients or cadavers which would enable material for all types of laboratory tests. Perform all obstetrical procedures that can be performed well in the conditions of fieldwork and routine gynecological and andrological exams for all aspects of clinical reproductive practice. Perform all surgical procedures adapted to conditions of fieldwork and thorough clinical examination of all kinds of internal diseases on farm.					
3.124. ourse content broken down in detail by weekly class schedule (syllabus)	Students may participate in the field-based component of the course Field service clinic in the 11th semester after obtaining a passing grade in the course Field service clinic in the 10th semester and after completing all clinical courses. For the implementation of practical field-based training in veterinary organizations, the course coordinator and the supervisors of the daily field training, together with the heads of the veterinary organizations, must ensure a sufficient number of patients from the fields of small animal practice, farm animal practice, and equine practice, on which students can further develop their acquired knowledge and skills. Course teachers and teaching associates must base the delivery of the course on students' practical work with patients under field conditions. During the field-based training in the 11th semester, students perform procedures as independently as possible and acquire the skills prescribed within each of the courses that constitute the Field service clinic course. The objective of the course is to provide students with individual practical experience in applying the knowledge acquired during their studies, while further deepening their knowledge and developing practical skills through field-based work. The knowledge and skills acquired through practical work should provide a foundation for independent professional work in veterinary organizations engaged in field-based veterinary practice.					
3.125. ormat of instruction:	☐ lectures ☐ seminars and workshops ☒ exercises ☐ on line in entirety ☐ partial e-learning		☒ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☒ field work		3.126. Comments:	
3.127. tudent responsibilities	Keeping high biosecurity and animal welfare standards according to previous knowledge from clinical subjects and according to strict instructions from course leaders					
3.128. creening student work *(name the proportion of ECTS credits for each*	Class attendance	2	Research		Practical training	2
	Experimental work		Report		Activity	2
	Essay		Seminar essay		(other)	
	Tests		Oral exam		(other)	

activity so that the total number of ECTS credits is equal to the ECTS value of the course)	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	descriptive assessment		
2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Complete obligatory literature for all clinical subjects i.e. Reproduction of domestic animals, internal diseases of domestic animals, surgery, orthopedics and ophthalmology of domestic animals and infectious diseases of domestic animals (please see course description for each subject)		
2.178. Optional literature (at the time of submission of study program proposal)	Complete additional literature for all clinical subjects i.e. reproduction of domestic animals, internal diseases of domestic animals, surgery, orthopedics and ophthalmology of domestic animals and infectious diseases of domestic animals (please see course description for each subject)		
2.179. Quality assurance methods that ensure the acquisition of exit competences	All students would be evaluated for each case. Complete case load would be documented in student notebook, that needs to be presented any time during field work and after it, when requested. All data in student notebook should be verified and signed by clinical teacher responsible for that specific case and practical work.		
2.180. Other (as the proposer wishes to add)			

HERD HEALTH

1. GENERAL INFORMATION			
1.65. Course teacher	Prof. dr. sc. Goran Bačić	2.93. Year of the study programme	6
1.66. Name of the course	**Herd Health**	2.94. Credits (ECTS)	1
1.35. Associate teachers	Teachers from Animal Nutrition and Dietetics, Animal Hygiene, Behaviour and Welfare, Microbiology and Infectious Diseases, Veterinary Economics and Epidemiology, Surgery, Ortopaedics and Ophtalmology, Reproduction and Obstetrics and Internal Medicine	2.95. Type of instruction (number of hours L + S + E + e-learning)	1+0+14+0
1.36. Study programme (undergraduate, graduate, integrated)	integrated	2.96. Expected enrolment in the course	
1.37. Status of the course		2.97. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
3.129. Course objectives	Getting students acquainted with basic principles of Herd Health and Production Management. Special attention is to be focused on practical appliance of acquired knowledge and experience. Attendants who finish the course should be able to detect and recognise most problems on farm, and fix some of them using acquired knowledge. For the rest they should ask for help (usually from more experienced veterinarians). General competence: training attendants for team work, improving their communicative skills. Specific competence: introducing to basic Herd Health principles, introducing to basic epidemiologic principles based on practical data collecting and researching without processing and analysing them, detecting of basic cause and effect relations of the most important farm diseases, noticing of specific advantages and disadvantages of environmental and housing factors to herd health, mastering of basic nutrition principles, comprehending of basic reproduction principles pointing out veterinary and technical procedures, equipment and animal manipulation, mastering of regular milking procedures, development and improvement of new milking protocols, detecting of metabolic disorders and veterinary procedures for those,		

	detecting of lameness and veterinary procedures, skills and procedures at appearance of infectious diseases on farms, getting acquainted with specific features of herd health at other farm animals (pigs, sheep, goats).
3.130. Course enrolment requirements and entry competences required for the course	Completed all obligatory Courses in first IX semesters
3.131. Learning outcomes at the level of the programme to which the course contributes	To be able independently complete the farm visit, evaluate most important aspects of herd health on farm (nutrition, housing, hygene, metabolic, infectious and noninfectious diseases, reproduction and mastitis problems and lameness. Interview with the farmer about his wishes and plans for the future of the farm Complete the farm report with present state, future plans and veterinarian recommendation for the improvement Regular follow ups and evaluations Continuous data collecting
3.132. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	**1. General outcomes** - Team work - Comunication skills between veterinarian and farmers **2. Specific outcomes** - Basic principles of Herd health - Basic epidemiologic knowledge – practical on-farm data collection and data analisys - Risk factors for farm animal diseases (cause, prevention and treatment) - Specific hygene and accommodation factors effects on herd health - Basic nutrition principles - Basic reproduction principles – technical skills and animal manipulation - Basic milking procedures and protocols - Basic metabolic disorders and prevention - Basic lameness problems and prevention

	- Basic principles with infectious diseases and vaccination - Basic principles and specific factors of herd health in pigs, sheeps and goats
3.133. Course content broken down in detail by weekly class schedule (syllabus)	**1 hour introduction lecture (usually in October)** **2 times 5 hour, 1 time 4 hour farm visits (usually in October, November and December, each month one farm visit)**

3.134. Format of instruction:	X lectures ☐ seminars and workshops exercises ☐ on line in entirety ☐ partial e-learning X field work	☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	3.135. Comments: Farm visit of 3 different farms (small family farm, mid size dairy farm, and large industrial dairy operation (500+ cows)
3.136. Student responsibilities	Student can miss one farm visit (30% of total farm visits		

3.137. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
Class attendance	**0,18**	Research		Practical training	**0,10**
Experimental work		Report			
Essay		Seminar essay		(other)	
Tests	**0,32**	Oral exam	0,40	(other)	
Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	12. Radostits OM: Herd Health – Food Animal Production Medicine 3rd Edit. WB Saunders Comp. 2001.		
	1. Brandt A, JPTM Noordhuizen, YH Schukken: Herd Health and Production Management in Dairy Practice. Wageningen Pers. 2001.		
	2. Materials from lectures and seminars and the course websites		

2.181. Optional literature (at the time of submission of study programme proposal)	https://www.coursera.org/learn/dairy-production?		
2.182. Quality assurance methods that ensure the acquisition of exit competences	The course is made of 1 lecture hours and 3 farm visits 5 hours each. Lectures and farm visits are mandatory. Evaluation elements are: 1. Attending lectures and farm visits 2. Result of continuous knowledge checking (2 preliminary exams) 3. Result at the final exam In order to take the final exam a student must gain minimal 32 points from attending lectures, exercises and continuous knowledge checking, Continuous knowledge checking Min 14 (2 X 7) correct answers to 20 questions = 22 points Max 20 (2 X 10) correct answers to 20 questions = 32 points (coefficient 1.60) Final exam Min 9 correct answers on 15 questions = 24 points Max 15 correct answers to 15 questions = 40 points (coefficient 2.66) A student must satisfy minimal conditions from EACH OF THE THREE FIELDS, that means a student who attended lectures regularly and gained the maximal number of points, but has markedly bad results at continuous knowledge checking cannot take the final exam. In the table there are criteria for getting a mark, i.e. up to the minimal criteria the grade is 1 (F), and the maximal number is grade 5 (A). Other grades and within the range. Points Grade -59 1(F) 60-68 2(E) 69-76 2(D) 77-84 3(C)		

	85-92 93-100	4(B) 5(A)
2.183. Other (as the proposer wishes to add)		

POULTRY DISEASES

1. GENERAL INFORMATION			
1.67. Course teacher	Assoc. prof. Željko Gottstein	2.98. Year of the study programme	6
1.68. Name of the course	Poultry diseases (253998)	2.99. Credits (ECTS)	5,5
1.36. Associate teachers	Full prof. Danijela Horvatek Tomić, Assoc. prof. Maja Lukač, Liča Lozica, PhD,DVM, Emanuel Budicin, DVM	2.100. Type of instruction (number of hours L + S + E + e-learning)	25+20+30
1.37. Study programme (undergraduate, graduate, integrated)	integrated	2.101. Expected enrolment in the course	
1.38. Status of the course	Obligatory	2.102. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
3.138. Course objectives	The aim of the course is to acquire knowledge on occurrence and spreading, clinical detection, pathological changes, diagnostics and treatment of diseases as well as preventive procedures needed for field work.
3.139. Course enrolment requirements and entry competences required for the course	
3.140. Learning outcomes at the level of the programme to which the course contributes	Student will successfully interconnect gained knowledge from fields of technology, nutrition, hygiene and diseases of poultry what will serve them to successfully perform prevention and cure in the field.
3.141. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	- Recognize poultry diseases of infectious and noninfectious ethiology - Assessing technology principles and poultry health protection be able to independently organize health control on poultry holdings in defined area - Independently analyze serology and other diagnostic procedure results and recommend and apply immunoprotection measures - Independently select and apply appropriate treatment and control procedures with aim to protect and control specific diseases, especially zoonosis. - Perform necropsy and select appropriate samples for further diagnostic procedures.

3.142. Course content broken down in detail by weekly class schedule (syllabus)	Lectures: 1 Introduction to intensive poultry production (Poultry production in the world and Croatia, improvement trend and differences between farm and extensive poultry production, application of organic and "free range" production principals, comparison between poultry and other animal productions), Preventive principles in wider terms Choice of genetic basis as precondition for a successful production, genetic resistance, adaptability to new environmental circumstances, genotypic-ambient interaction, chromosome deviations, lethal defects and genetic factors of mortality, oligenic determined diseases and deformities, domestication, mistakes in nutrition as precondition of disease appearance, production technology, housing as precondition for animal production and welfare), Preventive principles in narrower terms (Immunoprophylaxis, growth of causative agents and ways of spreading, immunity of bird (specific and nonspecific), immunity defects, factors damaging immunity, vaccination, treatment as preventive measure, stress conditions (environment, nutrition, social stress, incubation), adaptability syndrome, metabolic changes of immunity, stress alleviation, diagnostics as prevention, hygienic, sanitary and administrative measures and welfare of poultry), 2 Viral diseases- Paramyxovirosis, 3 Orthomyxovirosis, turkey rhinotracheitis, 4 Infectious bronchitis, infectious laryngoitracheitis, fowlpox, 5 Infectious bursal disease, chicken infectious anaemia, 6 Marek disease and other lymphoprolipherative diseases (leucosis/sarcoma complex and reticuloendotheolisis), 7 Adenovirus infections, avian encephalomyelitis, 8 Turkey Coronavirus enteritis, picornavirus infections, reovirus infections, 9 Bacterial zoonoses, 10 Salmonella and other *Enterobacteria* infections, 11 Pasteurellosis and related diseases (The most important bacterial diseases specific for poultry and game birds, especially the ones which can endanger the human health at the same time. Systems of bacterial disease transmission and their role in aetiological complex of multi causal diseases, and procedures for prevention of such disease outbreaks. Ways of treatment without use of harmful medicaments), 12 Fungal and protozoan diseases (Aspergillosis, candidiasis, dactyloriosis, favus, coccidiosis), 13 Metabolic diseases, diseases of skeleton and muscles, Ascites-hydropericard Seminars: 1. Immune system of poultry, immunosuppression and Gumboro associated diseases (Inclusion body hepatitis, Gangrenous dermatitis, Haemorrhagic enteritis of turkey, necrotic enteritis, ulcerative enteritis), 2. Pathogenesis of respiratory diseases (structure of the respiratory system, pathogenesis of respiratory diseases, Paramyxovirus infections different from PMV-1) and prevention of lymphoprolipherative diseases, 3. Other viral infections (avian nephritis, astrovirus infections, transmissible viral proventiculitis, rotavirus infections, Arbovirus infections) and viral infections of waterfowl (Duck viral hepatitis, Duck viral enteritis, Haemorrhagic nephritis enteritis of geese, Parvovirus infection of waterfowl, Circovirus infection of waterfowl, hepatitis B), 4. Mycoplasma infections (*Mycoplasma gallisepticum , Mycoplasma meleagridis, Mycoplasma iowae, Mycoplasma synoviae*) and other bacterial infections of respiratory system (bordetellosis, Infectious Coryza, *Gallibacterium anatis*), 5. Other bacterial infections (Prevention of salmonella, Listeria infections, Enterococcus infections, Erysipelas, Stphylococcosis, Pseudomonas infections, Avian Intestinal Spirochetosis, Probiotics and prebiotics in diseases prevention in poultry, Microbiome), 6. Mycoses and mycotoxicoses (Dactylariosis, Cryptococcosis, Zygomycosis and toxicoses caused by trichothecenes, ochratoxins, aflatoxins, deoxynivalenol (DON,

<table>
<tr><td></td><td colspan="6">vomitoxin), fuminosins, fusarochromanone, cyclopiazonic acid, oosporein, citrinin, zearalenon, moniliformin, rubratoxin, ergotism), diseases caused by mistakes in nutrition, metabolic and developmental diseases (Diseases cause by water scarcity, unbalanced electrolytes, diseases caused by avitaminosis, sudden death syndrome, cannibalism, feather pecking, “round heart” and aorta rupture at turkey) 7. Parasitic diseases (Cestodes, Trematodes, Nematodes, Trichomoniasis, Histomoniasis (Blackhead), Hexamitiasis, external parasites and pests), 8. Field cases, 9. Field cases, 10. Field cases,

Exercises: 1 Introduction to poultry necropsy, 2 Necropsy, 3 Necropsy, 4 Necropsy, 5 Necropsy, 6 Hatchery egg cull analysis, 7 Bacteriology lab, 8 Virology lab, 9 Principles of vaccination and blood sampling, 10 Molecular lab, 11 Biosecurity 12 Field trip – broiler farm, 13 Field trip – egg layer farm, 14 Field trip - hatchery</td></tr>
<tr><td>3.143. Format of instruction:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☒ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☒ laboratory
☐ work with mentor
☐ (other)</td><td>3.144. Comments:</td></tr>
<tr><td>3.145. Student responsibilities</td><td colspan="6">Student must be present in at least 50% of lectures, 80% of seminars and 80% of exercises.</td></tr>
<tr><td rowspan="6">3.146. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0,99</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Activity (other)</td><td>0,55</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td>2,2</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>1,76</td><td>Project</td><td></td><td>(other)</td><td></td></tr>
</table>

	Activity	Min. number of points	Max. number of points
2.10. Grading and evaluating student work in class and at the final exam	**Lecture attendance** 25 hours (XI semester)	**3** 3/0,24 = 13 hours of lecture	**6** 6/25 = 0,24 (coefficient for 1 hour of lecture attandance)
	Seminar attendance 20 hours (XI semester)	**4** **maximum 30% absence (7 hours)** 13 hours of seminars obligatory	**6** 6/20 = 0,3 (coefficient for 1 hour of seminar attandance)
	Exercises attendance 30 hours (XI semester)	**4** **maximum 30% absence (10 hours)** 20 hours of practicals obligatory	**6** 6/30 = 0,2 (coefficient for 1 hour of exercise attandance)

Activity on seminars and exercises 10 points[1]	**5** Minimum 3 points on seminars (0,5 for seminar + 2,5 for answers on exit colloquium during 8 seminars (8x0,3)) + Minimum 2 points on exercises (1 point for activity (10x0,1) and 1 point for answers (10x0,1))	**10** Maximum 6 points on seminars (1 point for seminar + 5 points for answers on exit colloquium during 10 seminars (10x0,5)) + Maximum 4 points on exercises (2 points for successfully finished practicals (15x0,133) and 2 points for answers (15x0,133))
Continuous assessment 32 points[2]	**20** Minimum 6,25 answers x 3,2 points	**32** Maximum 10 answers x 3,2 points
Final exam (40 points[3])	**24** 24/1 = 24 (coefficient 1)	**40** 40/40 = 1 (coefficient 1)
Σ [4]	**60**	**100**

[1] – For activity on seminars and exercises student can get max. 10 points and min. 5 points. Activity on seminars is obligatory and is graded according to successfully prepared and held seminar and for positively oriented answers with min. 3 points and max. 6 points (for positive answers on 5 written questions 0,1 points can be given, and for 5 answers it is total 0,5 points per seminar, with minimum of 3 positive answers during 8 seminars. Students without positive answers give oral answers to

	two questions). For given seminar presentation minimum 0,5 and maximum 1 point. Student must collect 2,5 points for written questions and 0,5 points for given seminar. For activity on exercises (successfully performed practical part) student can get max 2 points (on 15 practicals can get 0,133 points), and minimum 1 point (on 10 practicals 0,1 point). Also for positive answers can get max 2 points (on 15 practicals can get 0,133 points per answers), and minimum 1 point (on 10 practicals 0,1 point). [2] – Continuous assessment brings min. 20 and max. 32 points during colloquium, in which for 10 questions student can get min. 20 and max. 32 points (1 positive answer is 3,2 points). [3] – Oral exam gives 24 to 40 points. Student answers 10 questions, and for 1 question can get 4 points. Student can aply for the final exam with min 36 points. [4] – Final grade is defined quantitatively, with numeric point scale and a grade corresponding to that scale, from 1 to 5. With grade 1 (one) student is graded if she/he didn't pass the course, i.e. he failed on the exam. For each student its attendance and activity is registered in its personal form, together with its success on the colloquium, what teacher uses to form final grade. *Points* *Grade* do 59 1(F) 60-76 2 (D,E) 77-84 3 (C) 85-92 4 (B) 93-100 5 (A)

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Swayne, D. E. et all. (2020): Diseases of poultry. 14th ed., Wiley-Blackwell, USA.		Electronic media
	Boulianne, M.L. et al. (2013): Avian Disease Manual. AAAP, SAD.		Electronic media
	Brugère-Picoux J., J.P. Vaillancourt, M. Bouzouaia, D. Venne, H.L. Shivaprasad (2015): Manual of Poultry Diseases. AFAS, Paris, France.	1	

2.184. Optional literature (at the time of submission of study programme proposal)	1. Abdul-Aziz, T., H.J. Barnes (2018.): Gross Pathology of Avian Diseases: Text and Atlas. AAAP, SAD. 2. Abdul-Aziz, T.,O.J. Fletcher, H.J. Barnes (2016.): Avian Histopathology. AAAP, SAD. 3. Dinev, I. (2014): CEVA Handbook of Poultry Diseases vol. 1. CEVA, France. 4. Dinev, I. (2014): CEVA Handbook of Poultry Diseases vol. 2. CEVA, France. 5. Dinev, I. (2010): Diseases of Poultry a Colour Atlas, 2nd ed., CEVA, France. 6. Selected papers and internet materials.
a. Quality assurance methods that ensure the acquisition of exit competences	Student questionnaire
b. Other (as the proposer wishes to add)	

VETERINARY PUBLIC HEALTH

1. GENERAL INFORMATION			
1.69. Course teacher	Assist. Prof. Tomislav Mikuš	2.103. Year of the study programme	V
1.70. ame of the course	Veterinary Public Health	2.104. Credits (ECTS)	7
1.37. ssociate teachers	Full Prof. Željka Cvrtila, Full Prof. Nevijo Zdolec, Assist. Prof. Tomislav Mikuš, teaching assistant Marta Kiš, PhD, teaching assistant Mladenka Vukšić, DVM Full Prof. Marina Pavlak Full Prof. Anamaria Ekert Kabalin, Passoc. prof. Sven Menčik, PhD, assoc. Prof. Maja Maurić Maljković, PhD prof. Željko Mikulec, PhD, assoc. prof. Hrvoje Valpotić, PhD, prof. Tomislav Mašek, PhD prof. Kristina Matković, PhD, assoc. prof. Mario Ostović, PhD prof. prof. Ljubo Barbić, PhD, assoc. prof. Vladimir Stevanović, PhD prof. Frane Božić PhD, prof. Andrea. Prevendar Crnić, PhD, Ena Oster, DVM, Mladenka Vukšić, DVM	2.105. Type of instruction (number of hours L + E + S + e-learning)	42+16+32
1.38. tudy programme (undergraduate, graduate, integrated)	integrated	2.106. Expected enrolment in the course	

1.39. tatus of the course	Compulsory elective subject	2.107. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	20 %
2. COUSE DESCRIPTION			
3.147. ourse objectives	FOOD HYGIENE AND TECHNOLOGY Dates of veterinary public health in the wider sense of the word can be defined as a veterinary practice in the protection of human health (or as in veterinary public health). In the administrative, however, the sense of veterinary public health can be defined as a veterinary practice in the implementation of regulations in the field of veterinary and health surveillance of foods, especially with regard to the protection of human health against diseases of animals and their raw materials and products can be transmitted to humans. The main task of Veterinary Public Health is coordinating the participation of veterinary medicine in the practice of public health and preventive medicine. Security strategy in function of processing and transport and quality control of foods is possible on the basis of the HACCP concept (Engl. Hazard Analysis Critical Control Points), ie, risk assessment and critical control points. In the context of ensuring safety and quality of food is particularly important role of good manufacturing practice (GMP concepts) within the SQA-concept, which includes the quality, safety and acceptability of foods on the market. In the management of product safety priority should be given to the active mediation before the inspection. To familiarize students with facilities for processing meat and other foods, as well as storage systems, cooling and freezing for the purpose of education in the field of health and safety factors and improving the quality of food of animal origin. The aim of veterinary-sanitary control is the protection of human health, preventing the spread of infectious and parasitic diseases of animals and the protection of the economic interests of consumers. The goal of the veterinary-sanitary control in the production, processing, storage and transport of foods eliminated from consumers dangers that may arise eating rotten and health harmful, or faulty medical supplies. Foods are an ideal environment for the proliferation of microorganisms and can be carrier of various diseases, particularly zoonoses, but also those that are just transferred store. May include specific causes of bacterial poisoning people and the microorganisms that its biochemical activity can lead to the creation of various toxic substances. It follows that the hygienic quality of the total valuation basis foodstuffs. The aim is to familiarize students with the regulations governing the proper conduct of veterinary-sanitary activities in this segment (Veterinary Act, Food Act, Consumer Protection Act and the regulations which are based on these laws). ANIMAL HUSBANDRY Getting acquainted with modern methods used in evaluation of sustainability of certain production systems. Gathering knowledge about genetic basis of characteristics that are most important for quality of animal products. Gathering knowledge about the possibilities of changing genetic basis which is responsible for the animal product quality characteristics. NUTRITION Explain the influence of chemical composition and amount on characteristics of animal products. Define approved possibilities of manipulation with the quality of animal products by interventions in feeding. Inform students with EU legislative concerning the using of feedstuffs and feed additives. Feed additives in Croatian legislative (NN 26/98). The		

	concept of food chain in modern world. Explain which deleterious substances could enter food chain and adversely effect human health. Inform students with current scientific advances in GMO field. ANIMAL HYGIENE, ENVIRONMENT AND ETHOLOGY Adverse impact of certain factors (the way of accommodation, size of space, rough handling during transfer, inadequate way of separating calves from their mother, cutting tails and teeth, inadequate transport, etc.) on the welfare of animals in group systems (occurrence of stress, pain, suffering) and measures and methods for their prevention. Health aspects related to microbiological contamination of water - hydro infection, inorganic and organic compounds, occurring in water disinfection, MDK. Modern processes and alternative methods of disinfection; effective environmentally acceptable disinfectants new generation, the basic rules of disinfection and factors affecting performance. Treatment and disposal of the waste and animal fecal matter in order to prevent and control diseases, particularly zoonoses. The use of modern insecticides to combat pests that molest and transmitters of a number of infectious and parasitic diseases, particularly zoonoses. Mechanical and physical measures to prevent the entrance of rodents in enclosed rooms. Choice of means to combat rodents. Precautions against possible contact and the harmful effects of toxins in foods of animal origin. ZOONOSES Gaining knowledge about the importance of zoonotic foodborne. Repetition of previously acquired knowledge in general epidemiology. Understanding the specifics of the spread of infectious diseases through products and raw materials of animal origin depending on their agent. Gaining knowledge about the basics of diagnosis of infectious diseases, as well as the implementation of measures to prevent the spread and prevention of zoonoses spreading food. PARASITOLOGY Parasitology and parasitic diseases enables students for understanding the biology, morphology and determination of endoparasites as a ethiological factor of foodborn zoonoses. The student will be capable: to distinguish and make identification of each group of parasites and each parasite and their developmental stages among the group; understanding the epidemiology of parasitic diseases and pathogenesis caused by parasites and parasitic developmental stages; developing laboratory and diagnostic skills in the preparation and examination of a range of specimens for diagnosis and identification of parasites and their developmental stages; demonstrate knowledge and practical skills in therapy and control of foodborn parasitic diseases. PHARMACOLOGY and TOXICOLOGY Residues of veterinary drugs (pharmacologicaly active substances) in food animals, milk, eggs and honey. Determination of withdrawal time folowing the procedure (algorithm): NOEL (no observable effect level), ADI (acceptable daily intake), MRL (maximum residue limits) and dinamic of depletion of residues from target tissue. Categorisation of pharmacologicaly active substances and auxiliary materials in two groups (regarding MRL). Residua and sublethal effects of xenobiotics and some esential compaunds. Laboratory instrumental analysis in the context of veterinary public health, contaminants and resida of chemicals, monitoring and validation of methods. Legislation.

3.148. ourse enrolment requirements and entry competences required for the course	The requirement for routing: Passed courses Hygiene and Food Technology and courses Quality Control and hygienic Quality of Food; Veterinary Legislation in Food Safety
3.149. earning outcomes at the level of the programme to which the course contributes	Acquired knowledge and skills are deepen until the specialist knowledge in the field of food security and enable students to work independently in the control and monitoring of biological, chemical and physical contaminants in raw materials and products and in the food chain. In addition, students are introduced to the concepts of production control (HACCP) and prerequisite programs. Also students connect knowledge in the field of animal hygiene, animal husbandry and nutrition, and put them in the context of the food chain. Special attention is given to the zoonosis control and monitoring of residues of veterinary drugs in the food of animal origin.
3.150. earning outcomes expected at the level of the course (4 to 10 learning outcomes)	- knowledge-term veterinary public health and the modern conception of veterinary control in the production and trade of food, explain the role of veterinary medicine in the protection of human health and evaluate the hygienic, technological and veterinary requirements for building and equipping facilities for the production of food and the production and sale of foods according to national and EU standards; identify hazards and risks in the production and distribution of food of animal origin - propose appropriate measures to improve the yield and quality of products in a specific animal production system and evaluate and propose the most appropriate way of exploiting breeding animals considering their fentypic genotypic characteristics -knowledge of xenobiotics and essential substances that may be present in animal foodstuff and through adverse effects on human health and connect the adverse effect on reproduction with certain xenobiotics, to link the occurrence of neoplasia with adverse effects, to connect immunotoxicity with adverse effects of individual xenobiotics or more - identify suspected zoonosis that primarily transmitted through products and raw materials of animal origin and to identify important risk factors in the transmission of zoonoses through products and raw materials of animal origin - choose the method of sampling materials and diagnostic procedures to objectively diagnose zoonoses transmitted through products and raw materials of animal origin - apply the procedures of general prophylaxis to protect against zoonoses transmitted through products and raw materials of animal origin, to assess the risk of disease in humans and recommend measures for the control and prevention of zoonoses transmitted through products and raw materials of animal origin - understand the biology, development, pathogenesis and paths of parasitism caused by foods of animal origin. - independently assess the benefit of economically exploitable animals for food production based on conditions in individual technological stages of production - propose appropriate sanitation measures in order to preserve the health of animals and humans and select the appropriate veterinary care waste in order to protect the environment and prevent the occurrence of diseases of animals and humans - conduct laboratory diagnosis and interpret the findings.
3.151. ourse content broken	FOOD HYGIENE AND TECHNOLOGY

down in detail by weekly class schedule (syllabus)	1. Significance and sphere of veterinary activity in public health (Definition of the veterinary public health. Veterinary activity in the field of public health. Food hygiene and control systems according to the concept “from farm to table”. Directives of the EU relative to the veterinary requirements in the production and trade of foodstuffs). The structure and activity of the Veterinary and Food Safety Office 2. Modern concepts of the veterinary-sanitary control in the production and trade of foodstuffs (Risk assessment in the function of ensuring the safety and quality of food. Risk management in the area of food safety. Risk communication. Application of HACCP concept in the production facilities. Prerequisite programs (GMP, GVP, GHP) in the strategy of food and nutrition safety. Quality deregulation in the application of good manufacturing practice). 3. Management of foodstuff quality and safety (Quality management systems in the food industry. Quality assurance. Approach to marketing management. Trends of organisation of the foodstuff production and control (monitoring) from the aspect of production and quality control management. Production management and organisation of the quality control of foodstuffs from the aspect of their safety, quality and acceptability. 4. Hygienic-technological and veterinary-sanitary conditions of construction and arrangement of food production facilities (Facilities for slaughter of ungulates, equidiae, poultry and rabbits. Facilities for treatment and cutting of meat of slaughter animals and game. Cooling and freezing plants, and facilities for storage of foodstuffs of animal origin. Facilities for meat processing and production facilities for foodstuffs of animal origin. Milk processing facilities). 5. Biological, chemical and physical contaminants in the nutritional chain. (Risk evaluation. Risk and risk assessment in epidemiology. Risk assessment methods - qualitative and quantitative approach. Risk and supervision, targeted supervision, risk-based supervision. Microbiological risk assessment. Risk management. "Hidden risks" . Contamination of foodstuffs with enteric pathogenic bacteria and residues of harmful substances. Systemic control of residues of harmful substances in animal products. Health safety of foodstuffs under the conditions of industrial production and modern procedures of processing and preservation with abundant use of additives) 6. Alimentary infections and intoxications (Bilogical risks. Food-borne spoilage microorganisms). 7. Food production in family farms (Production of foodstuffs in family farms, legal regulations, and veterinary-sanitary control. Ecological production). 8. Food fraud ANIMAL HUSBANDRY 1. Risk factors and their relationship in different animal productions systems (the definition of certain risk factors in intensive, extensive and ecological production; methods for analysis the relationship between risk factors in animal production; elimination of risk factors in animal production). 2. Genetic basis of animals and its impact on quality of animal products (methods of population and molecular genetics in quality evaluation of animal products); 3. Methods and effects of selection of animals concerning quality of meet, milk eggs and other products (the definition of breeding and selection goals concerning quality of animal products) NUTRITION 1. Influence of animal nutrition on the quality of animal products (meat quality; milk quality; egg quality; functional feed and nutraceuticals); Feed additives (approved feed additives; forbidden feed additives);

	2. Deleterious substances in animal products (microorganisms; mycotoxins; heavy metals; hormones; pesticides; biogenic amines). Genetically modified feed (types of genetically modified feed; using of genetically modified feed) ANIMAL HYGIENE, ENVIRONMENT AND ETHOLOGY 1. Economic well-being usable animals for food production (the impact of environmental and breeding and technological factors on animal welfare) 2. The hygiene of drinking water (drinking water quality and health risks; legislation) 3. Disinfection in public health (types, methods and implementation of the disinfection measures to safeguard human and animal health), 3. Veterinary Waste - health risk (faeces and animal matter), Insect pests of importance in public health (modern procedures and alternative methods for controlling harmful insects), Pest Control in Public Health (rodent control procedures in manufacturing plants and warehouses of food of animal origin). ZOONOSES 1. Foodborne zoonosis (zoonoses caused by bacteria - salmonellosis, botulism, kampilobacteriosis, shigellosis, *E. coli* infections, brucellosis, tuberculosis, anthrax, listeriosis, Q fever, zoonoses caused by prions (GSE - Creutzfeldt-Jakob disease). 2. Fundamentals of diagnostics and control of zoonoses in our country and in the world. PARASITOLOGY 1. *Toxoplasma* sp. 2. *Sarcocystis* sp. 3. *Taenia* sp. 4. *Cysticercus celullosae* 5. *Cysticercus bovis* 6. *Alaria* sp. 7. Family Anisakidae 8. *Trichinella* sp. 9. *Giardia* sp. 10. *Cryptosporidium* sp. 11. *Echinococcus* sp. 12. Family Ascaridae 13. Visceral larva migrans 14. Strongiloidiasis PHARMACOLOGY and TOXICOLOGY 1. Rezidue veterinary drugs; 2. Residues; Sublethal effects of xenobiotics and some essential compounds 3. Analytical toxicology in veterinary public health.						
3.152. ormat of instruction:	x lectures x seminars and workshops x exercises ☐ on line in entirety x partial e-learning x field work		x independent assignments ☐ multimedia and the internet x laboratory ☐ work with mentor ☐ (other)		3.153. Comments:		
3.154. tudent responsibilities	Students are required to attend all forms of teaching the subject.						
3.155. creening student work	Class attendance	1,26	Research		Practical training		
	Experimental work		Report		**Activities**	**0,7**	

(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)	Essay		Seminar essay		(other)	
	Tests	2,24	Oral exam	2,8	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam

TYPES OF ACTIVITIES	**COEFFICIENT**	**MINIMAL NUMBER OF POINTS**	**MAXIMUM NUMBER OF POINTS**
Attending lectures	**0,142**	3	6
The total of 42 lecture hours	6:42=0,142	3:0,142=21 a student must gain minimal 3 points In order to gain minimal 3 points a student must attend 21 lecture hours.	
Attending exercises	**0,18**	**4**	**6**
Total of 32 exercise hours	6:32=0,18	4 : 0,18 = 22 a student must attend 22 exercise hours In order to gain the minimal number of points (4), a student must attend 22 exercise hours.	
Attending seminares	**0,42**	**4**	**6**
Total of 16 seminar hours	6:16= 0,38	4 : 0,42 = 11 a student must attend 11 seminar hours To achieve the minimum number of points (4), the student must be present at 10 hours of seminars.	
Participation at exercises and seminars	**1**	**5**	**10**
10 question = 10 answers	10:10=1	5:1=5 a student must gain minimal 5 points **(student must answer a minimum of 5 questions to achieve 5 minimum points)**	

	Continuous knowledge checking	**4; 1**	**20**	**32**
	1 colloquium = 8 questions 1 question = 4 points	32:8=4 32:32=1	20:4=5 20:1=20 (student must achieve a minimum of 20 points / answer a minimum of 5 questions / to achieve a minimum of 20 points)	
	Final exam	**1**	**24**	**40**
	Written exam 20 questions 1 question = 2 points	40:40=1	24:1=24 a student must gain minimal 24 points (student must gain a minimum of 24 points / answer 12 questions / to achieve 24 minimum points	

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and via other media)	Codex alimentarius (2003): Food Hygiene Basic Text. Food and Agricultural Organization of the United Nations. World health organization. Reprinted 2005.		
	Gupta, R. C. (2007): Veterinary toxicology. Basic and clinical principles. AP, 2007		
	Ninios, N., J. Lunden, H. Korkeala, M. Fredriksson-Ahoma (2014): Meat inspection and control in the slaughterhouse. Wiley Blackwell		
	Ray, B., A. Bhunia (2014): Fundamental Food Microbiology. 5th edition. CRC Taylor & Francis, SAD		
	Urquhart, G.M., J. Armour, J.L. Duncan, A.M. Dunn, F.W. Jennings (1987): Veterinary Parasitology, Essex.		
	Thrusfield, M.V. (2007): Veterinary epidemiology – selected chapters		
	Zdolec, N. (2016): Fermented Meat Products: Health Aspects. CRC Taylor & Francis, SAD.		
	Webster, J (ed) (2011): Management and Welfare of Farm Animals. 5th edition. Wiley-Blackwell.		
2.185. Optional literature (at the time of submission of study programme proposal)	Regulations EC related to food hygiene, food safety, official controls, eu regulations related to food hygiene, food safety, official controls, and implementing regulations: COMMISSION REGULATION (EC) No 2073/2005 on microbiological criteria for foodstuffs		

	REGULATION (EC) No 178/2002 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety REGULATION (EC) No 852/2004 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the hygiene of foodstuffs REGULATION (EC) No 853/2004 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL laying down specific hygiene rules of food of animal origin REGULATION (EU) 2017/625 of the European Parliament and of the Council of 15 March 2017 on official controls and other official activities performed to ensure the application of food and feed law, rules on animal health and welfare, plant health and plant protection products REGULATION (EU) 2019/627 of 15 March 2019 laying down uniform practical arrangements for the performance of official controls on products of animal origin intended for human consumption in accordance with Regulation (EU) 2017/625 of the European Parliament and of the Council EFSA Scientific Opinions on the public health hazards (https://www.efsa.europa.eu/en/publications) White Paper on Food Safety (2002)
2.186. Quality assurance methods that ensure the acquisition of exit competences	Assessment during exercises and seminars
2.187. Other (as the proposer wishes to add)	

VETERINARY ECONOMICS

1. GENERAL INFORMATION			
1.71. Course teacher	Denis Cvitković. DVM, PhD, Associate Professor	2.108. Year of the study programme	6th
1.72. Name of the course	**Veterinary economics**	2.109. Credits (ECTS)	2,5
1.38. Associate teachers	Marina Pavlak, DVM, PhD, full professor Dean Konjević, DVM, PhD, full professor	2.110. Type of instruction (number of hours L + S + E + e-learning)	10+0+20+0
1.39. Study programme (undergraduate, graduate, integrated)	integrated	2.111. Expected enrolment in the course	60
1.40. Status of the course	compulsory	2.112. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
3.156. Course objectives	1. Differentiate basic economy terms. 2. Explain the laws of production and economic success indicators. 3. Interpret criteria in decision analysis. 4. Differentiate and classify costs. 5. Make veterinary calculations. 6. Explain economic methods of loss assessment due to animal disease. 7. Interpret economic assessment procedures in animal health protection programs and decision making. 8. Model a systematic animal health protection program.
3.157. Course enrolment requirements and entry competences required for the course	Requirements for enrolement into year 6. Completion and passed exam of the course Veterinary Epidemiology
3.158. Learning outcomes at the level of the programme to which the course contributes	Improving the economics of animal health in the field circumstances
3.159. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. Interpret basic economic terms. 2. Explain the laws of production and economic success indicators. 3. Explain and interpret criteria in decision analysis.

	4. Recognize and assign costs. 5. Make veterinary calculations. 6. Apply economic methods of loss assessment due to animal disease. 7. Apply economic assessment procedures on animal health protection programs and decision making. 8. Draft a systematic animal health protection program.

3.160. Format of instruction:	× lectures × seminars and workshops × exercises ☐ on line in entirety ☐ partial e-learning × field work	× independent assignments × multimedia and the internet ☐ laboratory × work with mentor × business intelligence	3.161.
3.162. Student responsibilities	attending lectures, attending exercises, writing seminar works, participation in exercises and seminars, continuous knowledge checking, final exam		

3.163. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
Class attendance	**0,45**	Research		Practical training		
Experimental work		Report		(other)		
Essay		Seminar essay	**0,25**	(other)		
Tests	**0,80**	Oral exam	0,50	(other)		
Written exam	0,50	Project		(other)		

2.10. Grading and evaluating student work in class and at the final exam

Points and activities evaluated and marked for the <u>Veterinary economics</u> course

Types of activities	**Description of activities which are evaluated**	**1 hour or 1 activity value**	**Minimal number of points**	**Maximal number of points**
Attending lectures	10 hours	0.6	3	6
Attending exercises	20 hours	0.6	8	12
Participation at exercises	2 seminar papers	5	5	10

Continuous knowledge checking	15 preliminary exams with 2 or 3 questions*	2 or 3	20	32
Final exam	It is worth 40 ** points in total	8	24	40
Total		5	60	100

*each correct answer is worth 1 point.

**The final exam contains 5 theoretical questions. Each question is worth 8 points.

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	Rushton, J. (2009): The Economics of Animal Health and Production. CABI.	2	Internet pdf
2.188. Optional literature (at the time of submission of study programme proposal)	Nordhaus W. D., Samuelson P .A. (2006): Economics. Cram101 Incorporated		
2.189. Quality assurance methods that ensure the acquisition of exit competences	attending lectures, attending exercises, writing seminar works, participation in exercises and seminars, continuous knowledge checking, final exam		
2.190. Other (as the proposer wishes to add)			

LIST OF ELECTIVE SUBJECTS

Elective Subjects

Advanced Diagnostics and Therapy of the Diseases of the Digestive System of Dogs and Cats
Agricultural Economics and Rural Development
Anatomy of Laboratory Animals
Animal Dietetics
Archaeozoology
Assisted Reproduction in Veterinary Medicine
Autochthonous Meat Products
Autochthonous Dairy Products
Biological Traces and Evidences in Forensic Veterinary Medicine
Biology and Conservation of Marine Mammals
Biology and Ecology of Predators
Breeding and Husbandry of Rabbits and Cage Pets
Carcass Quality at the Slaughter Line
Clinical Physiology
Clinical Anatomy
Comparative Odontology
Comparative Anatomy of Skeletal System
Comparative Mucosal Immunology
Comparative Nutrition
Conservation and Management of Endangered Species
Cynology and Felinology
Cytometry in Clinical Veterinary Medicine
Diseases of Honeybees in Contemporary Production
Emerging Infectious Diseases
English for Academic purposes I
English for Academic purposes II
Feed Additives - Health Modulators
Fish Morphology
Fishery
Fundamentals of Agronomy
Fundamentals of Ecologic Livestock Breeding
Fundamentals of Holistic Medicine
Fundamentals of Physics for Diagnostics Methods
Fundamentals of Scientific Research

Game Zoology
Hunting and Nature Protection
Hygienic Quality of Game Meat
Hygiene and Quality of Poultry Meat
Hygiene and Quality of Fish Meat
Management and Marketing in Veterinary Practice
Natural Compounds in Veterinary Medicine
Organic Production of Poultry and Game Birds
Parasitic Zoonotic Diseases
Physiology of Birds
Physiology of Amphibians and Reptiles
Pigeon Keeping and Breeding
Positive Impact of Animals on Human Health
Reptile Morphology
Selected Chapters in Biomedical Physics for Veterinarians
Selected Chapters in Aquaculture
Specific Anatomical Structures of the Locomotor Apparatus of the Horse
Sport and Working Animals
Structure and Function of Cell
Technology in Poultry Production
The Role of Veterinarians at Organic Farms
Tumors of Domestic Animals: Molecular Basics and Specificities of Selected Tumor Types
Veterinary Emergency and Critical Care Medicine
Veterinary Cytology
Veterinary Clinical Microbiology
Veterinary Nuclear Medicine
Veterinary Ethics
Wildlife Diseases
Zoonoses

ADVANCED DIAGNOSTICS AND THERAPY OF THE DISEASES OF THE DIGESTIVE SYSTEM OF DOGS AND CATS

1. COURSE DECRIPTION – GENERAL INFORMATION			
1.73. Course teacher	Course leader: Assoc. Prof. Iva Šmit Course leader substitution: Assoc.Prof. Martina Crnogaj	2.113. Year of study	6
1.74. Name of the course	Advanced Diagnostics and Therapy of the Diseases of the Digestive System of Dogs and Cats	2.114. Credit value (ECTS)	2
1.39. Associate teachers	Prof. Dražen Vnuk, , Assoc. Prof. Martina Crnogaj, Ines Jović, DVM., Tea Dodig, DVM, Elizabeta Pongrac, DVM, Katarina Marjanović, DVM	2.115. Type of instruction (number of hours L+S+E+e-learning)	10 (online)+11 (online)+4+0
1.40. Study programme (undergraduate, graduate, integrated)	integrated	2.116. Expected enrolment in the course	
1.41. Status of the course	elective	2.117. Level of use of e-learning (1, 2, 3 level), percentage of instruction in the course on line (20% maximum)	

2. COURSE DESCRIPTION	
3.1. Course objectives	Gastrointestinal diseases of dogs and cats are very common in veterinary medicine. That is why there is a need for acquiring of knowledge and skills in this field. The aim of this course is learning methods and skills that will enable students for autonomous work.
3.2. Enrolment requirements and required entry competences for the course	-
3.3. Learning outcomes at the level of the study programme to which the course contributes	After finished course student will be able to diagnose and treat most common gastrointestinal diseases in dogs and cats.

3.4. Expected learning outcomes at the level of the course (4-10 learning outcomes)	Clinical assessement of gastrointestinal patient Diagnosis and treatement of acute and chronic gastrointestinal diseases Assessement of laboratory findings Endoscopy of gastrointestinal tract					
3.5. Course content broken down in detail by weekly class schedule (syllabus)	4. Clinical assessement of gastrointestinal patient 2. Menaging the patient with acute vomiting/diarrhea 3. Managing the patient with chronic vomiting/diarrhea 4. Ascites and punction of the abdomen, specimen analisis 5. Laboratory tests 6. AFAST 7. Advanced diagnostic of pancreas diseases (TLI, PLI) 8. Introduction in endoscopy 9. Esophagoscopy10. Gastroscopy with specimen collection 11. Duodenoscopy with specimen collection 12. Colonoileoscopy with specimen collection 13. Endoscopic removing of foreign body 14. Diagnostic laparotomy 15. Surgical treatement of esophageal diseases 16. Surgical treatement of stomach diseases 17. Surgical treatement of small and large intestine diseases 18. Surgical treatement of liver and pancreas					
4.1. Type of instruction	☒ lectures ☒ seminars and workshops ☒ exercises ☐ online in entirety ☐ mixed e-learning ☐ field work	☐ independent study ☐ multimedia and the internet ☐ laboratory ☐ work with the mentor ☐ (other)	4.2. Comments:			
4.3. Student responsibilities	Class attendance Workshop attendance Class and workshop activity Continuous knowledge testing Final seminar essay					
4.4. Screening of student's work (specify the proportion of ECTS credits for each activity so that the total number of CTS credits is equal to the credit value of the course)*:*	Class attendance	0,36	Research		Practical training	
	Experimental work		Report		Activity	0,2
	Essay		Seminar essay	0,8	(Other-- describe)	
	Tests	0,64	Oral exam		(Other— describe)	
	Written exam		Project		(Other— describe)	
12.1. Grading and evaluation of student work over the course of instruction and at a final exam	Written seminar.					
12.2. Required literature (available at the library and via other media)	**Title**				**Number of copies at the library**	**Availability via other media**

	Teacher handouts, if given.		
	Canine & Feline Gastroenterology (Washabau, R.J., Day, M.J.) Elsevier Saunders, St. Louis, USA		Chapter handouts
	Small Animal Internal Medicine (Nelson, R. W., Couto, C. G., ur.), (2019), 6th ed, Mosby Elsevier, St. Louis, USA.		Chapter handouts
	Textbook of Veterinary Internal Medicine - Diseases of the Dog and Cat (Ettinger, S. J., Feldman, E. C.), 9th ed.(2023), Saunders Elsevier, St. Louis, USA.		Chapter handouts
2.12. Optional literature (at the time of the submission of the study programme proposal)			
2.13. Methods of monitoring quality that ensure acquisition of exit competences	Attendance at a minimum of 5h lectures (out of a total of 10h) is required for signature. Attendance at a minimum 9 hour of seminar (out of a total of 11h) is required for signature. Attendance at a minimum of 3 h of exercise (out of a total of 4h) is required for signature. Justified absences are compensated by preparing seminar papers in agreement with the course leader.		

AGRICULTURAL ECONOMICS AND RURAL DEVELOPMENT

1. GENERAL INFORMATION			
1.75. Course teacher	Assist. Prof. Denis Cvitković	2.118. Year of the study programme	3th
1.76. Name of the course	**Agricultural Economics and Rural Development**	2.119. Credits (ECTS)	2
1.40. Associate teachers	Marina Pavlak, DVM, PhD, professor Dean Konjević, DVM, PhD, assistant professor	2.120. Type of instruction (number of hours L + S + E + e-learning)	10 + 0 + 20
1.41. Study programme (undergraduate, graduate, integrated)	integrated	2.121. Expected enrolment in the course	
1.42. Status of the course	elective	2.122. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
4.5. Course objectives	1. Explain the meaning of the basic economic terms 2. Explain the relation between rural area and agriculture, as well as the rational of integral and sustainable development of rural area 3. present different theories of agricultural development, general economic, agricultural, regional and rural policy 4. prepare the students for appropriate participation in preparing and implementation of the rural area and agricultural development 5. prepare the students for the appropriate economic analysis methods implementation		
4.6. Course enrolment requirements and entry competences required for the course	Completed courses: Animal hygiene, Environment, behavior and animal welfare, General nutrition, Applied nutrition, Animal breed characteristics, Animal husbandry and animal production		
4.7. Learning outcomes at the level of the programme to which the course contributes	To be aware of economic and social environment in which veterinarians work, appropriately responding to challenges. To be aware of personal limitations. To be able to find for professional advice, help and support.		
4.8. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After the successfully completed course and passed exam, student will be able: • to analyse and clarify the longterm tendencies in the rural area and agricultural development in Croatia • to participate in creating and implementing rural development and agricultural projects • to interpret measures of agricultural policy		

<table>
<tr><td></td><td colspan="6">• to compile planned and actual calculations
• to compute and interpret the business success indicators</td></tr>
<tr><td>4.9. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">DAY 1. (6 hours)
Definition of basic terms, Macroeconomic aggregations, Rural area and its activities

DAY 2. (6 hours)
Agriculture and rural development, Agriculture development theories, Placement of agriculture in economy development

DAY 3. (6 hours)
The tasks of agriculture, Agricultural structure and socio-economical traits of agricultural enterprises

DAY 4. (6 hours)
Agricultural policy, Trends in agricultural development,

DAY 5. (6 hours)
Basic traits and trends in plant production, Basic traits and trends in animal production</td></tr>
<tr><td>4.10. Format of instruction:</td><td colspan="3">× lectures
☐ seminars and workshops
× exercises
☐ on line in entirety
☐ partial e-learning
× field work</td><td colspan="2">× independent assignments
× multimedia and the internet
☐ laboratory
× work with mentor
× business intelligence (other)</td><td>4.11. Comments:</td></tr>
<tr><td>4.12. Student responsibilities</td><td colspan="6">attending lectures, attending exercises, writing seminar works, participation in exercises and seminars, continuous knowledge checking, final exam</td></tr>
<tr><td rowspan="5">4.13. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0,36</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>0,2</td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>0,64</td><td>Oral exam</td><td>0,4</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>0,4</td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">Grading and evaluation: class attendance, tests, seminar essays, exam</td></tr>
</table>

<table>
<tr><td></td><td>Final exam: written and oral
<table>
<tr><th>Activity</th><th>Minimal score</th><th>Maximal score</th></tr>
<tr><td>Class attendance</td><td>3</td><td>6</td></tr>
<tr><td>Exercise attendance</td><td>8</td><td>12</td></tr>
<tr><td>Seminar essay</td><td>5</td><td>10</td></tr>
<tr><td>Tests</td><td>20</td><td>32</td></tr>
<tr><td>Final exam</td><td>24</td><td>40</td></tr>
<tr><td>Total</td><td>60</td><td>100</td></tr>
</table></td></tr>
<tr><td rowspan="2">2.11. Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>1. Barkley. A., Barkley. P. (2016): Principles of Agricultural Economics, second edition. Routledge, Oxford, UK.</td><td></td><td>internet</td></tr>
<tr><td>2.14. Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">1. Bijman,. J., Muradian, R., Schurmann, J. (2016): Cooperatives, Economic Democratization and Rural Development. Edward Elgar. Cheltenham, UK.

2. Martinho, V. (2015): The Agricultural Economics of the 21st Century. Springer. Cham, Switzerland.</td></tr>
<tr><td>2.15. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">Monitoring class attendance, tests, seminar essays, final exam</td></tr>
<tr><td>2.16. Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

ANATOMY OF LABORATORY ANIMALS

1. GENERAL INFORMATION			
1.77. Course teacher	Assoc. Prof. Mirela Pavić Vulinović Deputy: Full Prof. Damir Mihelić	2.123. Year of the study programme	2nd year
1.78. Name of the course	Anatomy of Laboratory Animals	2.124. Credits (ECTS)	2
1.41. Associate teachers	Assist. Prof. Ivan Alić; teaching assistant Lucija Devčić, PhD, DVM; teaching assistant Mirna Mandić Čukman, DVM	2.125. Type of instruction (number of hours L + S + E + e-learning)	6 L + 8 S (on-line) + 16 E
1.42. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	2.126. Expected enrolment in the course	30
1.43. Status of the course	Elective	2.127. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	Merlin
2. COURSE DESCRIPTION			
4.14. Course objectives	Introduce students to the basics of anatomy most commonly used laboratory animals		
4.15. Course enrolment requirements and entry competences required for the course	Completed courses "Anatomy with organogenesis of domestic animals I", "Anatomy with organogenesis of domestic animals II" and "Anatomy with organogenesis of domestic animals III".		

4.16. Learning outcomes at the level of the programme to which the course contributes	The acquisition of knowledge of the body's anatomy and comparative anatomy of small rodents, which are used as laboratory animals and pets as a basis for the superstructure of pathology and clinical sciences in further study.	
4.17. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1.Overcoming basic principles sectional techniques of laboratory animals 2.Describe the basic structure of the body most commonly used laboratory animals 3.Identify the basic characteristics of comparative anatomical structure of laboratory animals and to compare them with the anatomy of domestic animals 4.Connect knowledge with future professional work in scientific and technical laboratories.	
4.18. Course content broken down in detail by weekly class schedule (syllabus)	1. Structure of the chicken egg. The embryonic development of chicken embryos); 2. Experimental strains of mice and rats (strains of experimental mice and rats, homozygous and heterozygous animals; getting highly related strains of laboratory animals); 3. Anatomy of laboratory animals (mammary gland of the mouse and rat, brown adipose tissue, the digestive organs of the mouse, rat and guinea pigs; respiratory organs of the mouse, rat and guinea pigs; urinary-genital organs of the mouse, rat and guinea pigs; circulatory organs of the mouse, rat and guinea pigs; endocrine glands of mouse, rat and guinea pig, mouse brain, rats and guinea pigs; blood sampling of the mouse, rat and guinea pigs); 4. Reproduction and Embryology laboratory animals Common anatomical characteristics of rats, mice, hamsters, guinea pigs and rabbits - 2 hours Section of the rat: skin, locomotor system, mammary gland - 4 hours Section of the rat: abdominal cavity, digestive organs, pancreas, liver, spleen - 4 hours Section of the rat:pelvic cavity, urogenital organs - 2 hours Section of the rat: thoracic cavity, pleura, respiratory organs, the heart, large blood vessels - 4 hours Section of the rat head and neck, nose and mouth, brain 2 hours	1. Structure of the chicken egg. The embryonic development of chicken embryos (structure of the chicken egg; preembryonal development of chicken embryos, embryonal development of chicken embryos; bloodstream of the chicken embryo allantoic circulation of chicken embryos; chicken embryos amnion, yolk sac of the

		chicken embryo, allantoic sac of the chicken embryo ductus omphaloenteri cus of the chicken embryos); 2. experimental strains of mice and rats (strains of experimental mice and rats, homozygous and heterozygous animals; getting highly related strains of laboratory animals); 3. Anatomy of laboratory animals (mammary gland of the mouse and rat, brown adipose tissue, the digestive organs of the mouse, rat and guinea pigs; respiratory organs of the mouse, rat and guinea pigs;

		urinary-genital organs of the mouse, rat and guinea pigs; circulatory organs of the mouse, rat and guinea pigs; endocrine glands of mouse, rat and guinea pig, mouse brain, rats and guinea pigs; blood sampling of the mouse, rat and guinea pigs); 4. Reproduction and Embryology laboratory animals (breeding of laboratory animals; vaginal plug; preembryonal mouse development, the embryonic development of the mouse, the mouse fetal development, fetal membrane

		mouse, mouse placenta, skeletal development of the mouse). Common anatomical characteristics of rats, mice, hamsters, guinea pigs and rabbits - 2 hours Section of the rat: open skin, locomotor system, mammary gland - 4 hours Section of the rat: opening the abdominal cavity, digestive organs, pancreas, liver, spleen - 4 hours Section of the rat: opening the abdominal cavity, digestive organs, pancreas, liver, spleen, - 4 hours Section of the rat urogenital

<table>
<tr><td></td><td colspan="6"></td><td>organs - 4 hours
Section of the rat: opening the thoracic cavity, pleura, respiratory organs, the heart, large blood vessels - 4 hours
Section of the rat head and neck, nose and mouth, brain 4 hours
Structure of the chicken embryo - 4 hours</td></tr>
<tr><td>4.19. For
mat of instruction:</td><td colspan="2">X lectures
X seminars and workshops
X exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">X independent assignments
X multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td colspan="2">4.20. Com
ments:</td><td></td></tr>
<tr><td>4.21. Stu
dent responsibilities</td><td colspan="6">Students are expected to attend lectures and dissection exercises and prepare cadavers according to course instructions.</td><td></td></tr>
<tr><td rowspan="4">4.22. Scr
eening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0.36</td><td>Research</td><td></td><td>Practical training</td><td></td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Students activity at exercises</td><td>0.2</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>0.64</td><td>(other)</td><td></td><td></td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td>0.8</td><td>(other)</td><td></td><td></td></tr>
</table>

<table>
<tr><td></td><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">Student requirements are defined in the Regulations on the Integrated Undergraduate and Graduate Study of Veterinary Medicine. Given the above, the student must acquire a minimum number of points from all assessment elements in order to take the final exam. A student can justifiably be absent from up to 50% of the lectures and 30% of the practicals.
The course has 6 hours of lectures. The student has to attend at least 3 hours of lectures.
The course has 8 hours of seminars. The student has to attend at least 5 hours of seminars.
The course has 16 hours of practicals. The student has to attend at least 11 hours of practicals.
<table>
<tr><th>Type of activity</th><th>Minimum number of points</th><th>Maximum number of points</th></tr>
<tr><td>Lecture attendance</td><td>3</td><td>6</td></tr>
<tr><td>Practical training attendance</td><td>8</td><td>12</td></tr>
<tr><td>Participation in the practical training</td><td>5</td><td>10</td></tr>
<tr><td>Tests / Seminar essay</td><td>20</td><td>32</td></tr>
<tr><td>Oral exam</td><td>24</td><td>40</td></tr>
<tr><td>Total</td><td>60</td><td>100</td></tr>
</table></td></tr>
<tr><td>2.11. Required literature (available in the library and via other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td></td><td colspan="3">Popesko, P., V. Rajtova, J. Horak: Atlas anatomie malyh laboratornych zvierat, 1 Kralik, Morča. Priroda. Bratislava, 1990</td><td></td><td></td></tr>
<tr><td></td><td colspan="3">Popesko, P., V. Rajtova, J. Horak: Atlas anatomie malyh laboratornych zvierat, 1 Myš, Chrček zlaty. Priroda. Bratislava, 1990.</td><td></td><td></td></tr>
<tr><td></td><td colspan="3">Komarek, V., L. Malinovsky, L. Lemež (1982.): Anatomia avium domesticorum et embryologia galii. Priroda. Bratislava</td><td></td><td></td></tr>
</table>

2.17. Optional literature (at the time of submission of study programme proposal)	Simeons, P: Course on laboratory animal science 1997: Comparative anatomy of laboratory rabbits and rodents. Department of Morphology, Faculty of Veterinary Medicine, University of Gent. Belgium. 1997. Zutphen, L. F. M. van, V. Baumans, A. C. Beynen: Principles of laboratory animal science. Elsevier, Amsterdam. Netherlands. 1993. Hebel, R., M. W. Stromberg: Anatomy and embriology of the laboratory rat. BioMed Verlag, Worthsee, Germany. 1986.
2.18. Quality assurance methods that ensure the acquisition of exit competences	Regularly conducting continunous assessement of the students knowledge.
2.19. Other (as the proposer wishes to add)	

ANIMAL DIETETICS

1. GENERAL INFORMATION			
1.79. Course teacher	Full Professor Hrvoje Valpotić	2.128. Year of the study programme	5th year
1.80. Name of the course	Animal Dietetics	2.129. Credits (ECTS)	2,0
1.42. Associate teachers	Full Professor Željko Mikulec (vice course leader), Maja Loborec, DVM, Sunčica Heštera, DVM	2.130. Type of instruction (number of hours L + S + E + e-learning)	5 L +5 S + 20 E
1.43. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	2.131. Expected enrolment in the course	
1.44. Status of the course	Elective	2.132. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
4.23. Course objectives	The course objective is to show students the newest findings in clinical nutrition and animal dietetics that has not been sufficiently covered in obligatory courses, and ensure the students' acquired knowledge skills and competences as an important factor in the prevention of a significant number of diseases as well as a support of basic therapy in the treatment of companion and farm animals.
4.24. Course enrolment requirements and entry competences required for the course	
4.25. Learning outcomes at the level of the programme to which the course contributes	• synthesize current knowledge about the role of nutrition in animal health • assess the implications of inadequate nutrition on performance and disease occurrence
4.26. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	• to implement adequate diets in certain stages of life • to assess the suitability of feeding strategies during certain diseases and levels of production • to know the influence of nutrition in decision making in veterinary practice

<table>
<tr><td>4.27. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Lectures (5 hours):
• Dietetics in veterinary medicine, terminology, nutritional status
• Deficiency of certain nutrients
• Feeding in various stages of life
• Feeding of sick animals
Seminars (5 hours):
• Evaluation of nutritional status (feed, laboratory analyses)

Exercises (20 hours):
• Dogs and cats (gestation and lactation, performance animals, senior animals, growing animals, diseases)
• Horses (foals, sport horses, senior animals, diseases, colics)
• Preventive and clinical nutrition of ruminants (metabolic diseases)
• Pig dietetics (deficiencies of certain nutrients, metabolic disorders)
• Poultry dietetics (deficiencies of certain nutrients.)
• Laboratory animal dietetics (influence of fiber on occurence of certain diseases, rodent diabetes)</td></tr>
<tr><td>4.28. Format of instruction:</td><td colspan="3">X lectures
X seminars and workshops
X exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">X independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>4.29. Comments:</td></tr>
<tr><td>4.30. Student responsibilities</td><td colspan="6"></td></tr>
<tr><td rowspan="6">4.31. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0,36</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Participation at exercises</td><td>0,2</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>0,64</td><td>Oral exam</td><td>0,8</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td></td><td colspan="5"></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6"></td></tr>
<tr><td>2.11. Required literature (available in the library and via other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
</table>

	Pibot, P., V. Biourge, D. Elliott (2006): Encyclopedia of canine clinical nutrition, Aniwa SAS, France		
2.20. Optional literature (at the time of submission of study programme proposal)	Case, L. P., D. Carey, D. Hirakawa, L. Daristotle (2000): Canine and feline nutrition, second edition. Mosby, St. Louis, Missouri, USA. Fekete, S. (2008): Veterinary nutrition and dietetics. Pro Scientia Veterinaria Huncarica. Budapest, Hungary. Hand M., C. Thatcher, R. Remillard, P. Roudebush (2000): Small Animal Clinical Nutrition 4th Edition. Walsworth Publishing Company, Marceline, Missouri, USA.		
2.21. Quality assurance methods that ensure the acquisition of exit competences			
2.22. Other (as the proposer wishes to add)			

ARCHAEOZOOLOGY

1. GENERAL INFORMATION			
1.81. Course teacher	Assistant Prof Ivan Alić; Deupty: Full Prof. Tajana Trbojević Vukičević	2.133. Year of the study programme	2nd year, 4th semester
1.82. Name of the course	ARCHAEOZOOLOGY	2.134. Credits (ECTS)	2
1.43. Associate teachers	Full Prof. Tajana Trbojević Vukičević; teaching assistant Magdalena Kolenc, PhD, DVM; teaching assistant Kim Korpes, PhD, DVM; teaching assistant Iva Matijević, DVM	2.135. Type of instruction (number of hours L + S + E + e-learning)	10+5+15
1.44. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	2.136. Expected enrolment in the course	
1.45. Status of the course	Elective	2.137. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	Merlin
2. COUSE DESCRIPTION			
4.32. Course objectives	Students will get inside the basic archaeozoological methods, learn to determine skeletal elements and taxonomic affiliation, learn to classify animal's age and sex based on tooth eruption and attrition and long bones epiphysis fusing/unfusing, learn to evaluate animals withers height and biomass, know how to recognize basic taphonomical processes on animal bones, recognize and distinguish traces on bones: chewing marks, disarticulation and butchering traces, animal bones and horns processing into tools and ornaments and learn to write archaeozoological results and insert it into entire archaeological report.		
4.33. Course enrolment requirements and entry competences required for the course	Completed courses "Anatomy with organogenesis of domestic animals I" and "Anatomy with organogenesis of domestic animals II", finished attendance at course "Anatomy with organogenesis of domestic animals III". The		

	advantage of enrollment will have those students who have passed pre-requisites courses with very good or excellent grade. **Maximum number of students: 20**
4.34. Learning outcomes at the level of the programme to which the course contributes	After successful completion of the courses, students will be familiar with the application of basic anatomical science to other professions and scientific disciplines.
4.35. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Following successful completion of the course, students will be able to: **define** archaeozoology and taphonomy; **identify** bone elements, taxonomic affiliation, basic pathological changes and taphonomical traces on animal bone remains from the archaeological sites; **choose** ways of estimation of animals age, sex, withers height and biomass based on its skeletal remains; **interpret** archaezoological findings; **design** archaeozoological analysis to the entire archaeological report from a specific site.
4.36. Course content broken down in detail by weekly class schedule (syllabus)	1. Introduction to archaeozoology (definition and objectives of archaeozoology, historical development and the division of archaeozoology, domestication and its effect to the morphology of the mammal bones); 2. Basics of skeletal system of mammals and birds (complementing knowledge gained from comparative osteology of mammals and birds; determination of skeletal elements and taxonomic affiliation); 3. Laboratory processing of archaeological materials (preparation, marking and preservation of animal bone remains, quantification of samples (MNI, NISP), determining the age and sex, identification of pathological changes in the bones, teeth and horns of animals); 4. Basics of osteometry (measures on the bones, osteometric indices, estimate height and biomass of animals); 5th Taphonomy (definition of taphonomy, identification of taphonomic changes and time of their creation, marks on the bones, bone and horn processing to tools and jewelry); 6. Interpretation of archaeozoological findings in the archaeological report (writing report, bones storage, archiving documents of archaeozoological samples). **Lectures:** Introduction to archaeozoology (2 hours); Primary and secondary archaeozoological analysis (2 hours) Introduction to taphonomy (2 hours); The basics of the skeletal system of fish (2 hours) Interpretation of archaeozoological findings (2 hours) **Seminars:** Comparative anatomy of skeleton of birds (2 hours) Comparative anatomy of fish skeletal system (1 hour); Comparative anatomy of skeleton of rodents (1 hour);

	Taphonomy (1 hour); **Exercises:** Determination and quantification of samples (5 hours) Osteometry and osteometric indexes (3 hours) Evaluation of animals age, gender, withers height and biomass (3 hours) Identification of the pathological and taphonomic changes (2 hours) Writing reports, filing of documents (2 hours)					
4.37. Format of instruction:	☒ lectures ☒ seminars and workshops ☒ exercises ☐ on line in entirety ☐ partial e-learning ☐ field work		☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)		4.38. Comments:	
4.39. Student responsibilities	Presence at lectures and exercises, activity in exercises, write a seminar essay, passed preliminary exam and final written exam.					
4.40. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	**0,36**	Research		Practical training	
	Experimental work		Report		Activity	**0,2**
	Essay		Seminar essay		(other)	
	Tests	**0,64**	Oral exam		(other)	
	Written exam	**0,80**	Project		(other)	
2.10. Grading and evaluating student work in class and at the final exam	Attending lectures 3-6 points; attending exercises 8-12 points; participation at exercise 5-10 points; continous knowledge checking, preliminary exam 20-32 points; seminar essay 12-20 points; final written exam 12-20 points.					

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	HILLSON, S. (1986): Teeth. Cambridge, Cambridge University Press.		
	HILLSON, S. (1992): Mammal Bones and Teeth: An Introductory Guide to Methods of Identification. Institute of Archaeology, London.		
	O'CONNOR, T. (2000): The archaeology of animal bones. Sutton Publishing Limited, Great Britain.		

	REITZ, E. J., E. S. WING (1999): Zooarchaeology. Cambridge University Press, Cambridge, United Kingdom.		
	SCHMID, E. (1972): Atlas of animal bones for prehistorians, archaeologists and Quaternary geologists. Elsevier Publishing Company, Amsterdam-London-New York.		
2.23. Optional literature (at the time of submission of study programme proposal)	KUŽIR, S. (2002): Arheozoološko istraživanje kostiju i zubiju životinja badenske kulture s lokaliteta Vučedol. Znanstveni magistarski rad, Veterinarski fakultet Sveučilišta u Zagrebu, Zagreb. KUŽIR, S. (2006): Utjecaj načina uzimanja hrane na morfofunkcionalna svojstva kostiju čeljusnog luka slatkovodnih riba“. Disertacija. Veterinarski fakultet Sveučilišta u Zagrebu. Zagreb. KUŽIR, S. (2014): Ribe u arheozoologiji. Tafonomija.(Web predavanje, u pripremi).Veterinarski fakultet Sveučilišta u Zagrebu. TRBOJEVIĆ VUKIČEVIĆ, T. (2002): Osteometrijska analiza arheoloških ostataka dugih kostiju goveda na Vučedolskom kompleksu. Znanstveni magistarski rad, Veterinarski fakultet Sveučilišta u Zagrebu, Zagreb. TRBOJEVIĆ VUKIČEVIĆ, T. (2006): Arheozoološka i tafonomska istraživanja eneolitičkog goveda Vučedola. Diseracija. Veterinarski fakultet Sveučilišta u Zagrebu, Zagreb. TRBOJEVIĆ VUKIČEVIĆ, T. (2012): Arheozoologija. Mrežno predavanje: http://www.vef.unizg.hr/doc-sec/arheozoologija/arheozoologija.pdf. Veterinarski fakultet Svečilišta u Zagrebu, Zagreb		
2.24. Quality assurance methods that ensure the acquisition of exit competences	Grading of active participation in the practical training, one preliminary test, one seminar essay and final written exam.		
2.25. Other (as the proposer wishes to add)			

ASSISTED REPRODUCTION IN VETERINARY MEDICINE

1. GENERAL INFORMATION			
1.83. Course teacher	Prof. Martina Lojkić, PhD	2.138. Year of the study programme	6th (XI semester)
1.84. Name of the course	**Assisted reproduction in veterinary medicine**	2.139. Credits (ECTS)	2
1.44. Associate teachers	prof. Juraj Grizelj, PhD; prof. Silvijo Vince, PhD; prof. Nikica Prvanović Babić, PhD; assoc. prof. Iva Getz, PhD; assoc. prof. Branimira Špoljarić, PhD; asist. prof. Ivan Butković, PhD, DVM, Juraj Šavorić, PhD, DVM, Ivan Tomić, DVM	2.140. Type of instruction (number of hours L + S + E + e-learning)	5+10+15
1.45. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	2.141. Expected enrolment in the course	10
1.46. Status of the course	Elective	2.142. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
4.41. Course objectives	The course is focused on application of embryotransfer in farm animals: superovulatory treatment, embryo flushing, evaluation of embryos, transfer of embryos to recipients. Students will also be acknowledged with application of other biotechnologies such as collection of oocytes for fertilization in vitro (transvaginal ultrasound guided ovum pick up, laparoscopic aspiration), in vitro production of bovine embryos, embryo biopsy and sexing, embryo evaluation, cryopreservation of embryos and regulations related to international trade of embryos.		

<table>
<tr><td>4.42. Course enrolment requirements and entry competences required for the course</td><td colspan="3">Farm Animals and Horses</td></tr>
<tr><td>4.43. Learning outcomes at the level of the programme to which the course contributes</td><td colspan="3">The course contributes to higher competences in the field of animal breeding. Assisted reproductive technologies like artificial insemination, superovulation, in vitro fertilization, embryo transfer has been introduced to overcome reproductive problems, to increase the number of offspring from selected female’s and to reduce the generation intervals in farm animals. This advanced reproductive technology provides a powerful tool for rapid change in animal population. As these technologies will play an important role in future perspective for efficient reproductive performance in livestock, this course presents an important part in education of new generation of students.</td></tr>
<tr><td>4.44. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="3">Acknowledgment with application of assisted reproduction in veterinary medicine
Selection of donor and recipient cows in MOET
Synchronization of donor and recipient cows
Transfer of embryos in recipients</td></tr>
<tr><td>4.45. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="3">1. Introduction to assisted reproductive technologies; 2. Embryo Transfer in cattle (selection and management of donor and recipient cows, superovulation, A.I., flushing, isolation and evaluation of embryos, embryo transfer); 3. Embryo Transfer in small ruminants (synchronization and superovulation of donors and recipients, superovulatory response, mating and A.I., flushing, isolation and evaluation of embryos, laparoscopic transfer of embryos); 4. Embryo Transfer in mare (synchronization, mating and A.I. of donor mares, flushing, isolation and evaluation of embryos, synchronization and management of recipients, transfer of embryos); 5. In vitro production of embryos (source of oocytes : slaughterhouse ovaries, OPU, in vitro maturation of oocytes, in vitro fertilization, semen preparation for IVF, in vitro culture. 6. Evaluation of embryos; 7. Cryopreservation of embryos, 8. Introduction to advanced biotechnologies (embryo sexing, embryo splitting, transgenesis, cloning), 9. Preservation of endangered and indigenous animals, Cryobank.</td></tr>
<tr><td>4.46. Format of instruction:</td><td>X lectures
X seminars and workshops
X exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td>☐ independent assignments
☐ multimedia and the internet
X laboratory
☐ work with mentor
☐ (other)</td><td>4.47. Comments:</td></tr>
<tr><td>4.48. Student responsibilities</td><td colspan="3">Students are obliged to participate lectures, seminars and exercise.</td></tr>
</table>

4.49. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0,36	Research		Practical training	0,2
	Experimental work		Report		(other)	
	Essay		Seminar essay	0,64	(other)	
	Tests		Oral exam		(other)	
	Written exam	0,8	Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	All forms of instruction are obligatory to students. The students are evaluated according to activity and written seminars. Course will be finished with a written exam.

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and via other media)	Noakes, D. E., T. J. Parkinson and G. C. W. England (2009): Veterinary reproduction & obstetrics, 9th edition. W. B. Saunders Company Ltd.		
	Seidel, G. E., .S. M. Seidel (1991): Training manual for embryo transfer in cattle. FAO		
	Pugh D. G., N. Baird (2020): Sheep and Goat Medicine. Saunders		
	Samper, J. C. (2009): Equine breeding management and artificial insemination. 2nd ed. Saunders		
	Phillips, P., M. Jahnke (2016): Embryo Transfer (Techniques, Donor and Recipients). Vet Clin Food Anim 32, 365-385.		

2.26. Optional literature (at the time of submission of study programme proposal)	Moore S.G.,J.F. Hasler (2017): A 100-Year Review: Reproductive technologies in dairy science. J. Dairy Sci. 100, 10314–10331. Nasar et al. (2008): A Review of Reproductive Biotechnologies and Their Application in Goat. Biotechnology 7, 371-384. Mellado, M. (2016): Goat Husbandry: Reproductive Management. Chapter in: Reference Module in Food Science

	Gibbons, A., M. Cueto (2011): Embryotransfer in Sheep and Goat – A Training Manual. Bariloche experimental station, National institute for agricultural technology, Argentina: 11-57.
2.27. Quality assurance methods that ensure the acquisition of exit competences	Students will be monitored during the complete education process. They have obligatory seminars and final exam.
2.28. Other (as the proposer wishes to add)	

AUTOCHTHONOUS MEAT PRODUCTS

1. GENERAL INFORMATION			
1.85. Course teacher	Full Prof. Željka Cvrtila	2.143. Year of the study programme	V/VI
1.86. Name of the course	Autochthonous Meat Products	2.144. Credits (ECTS)	2
1.45. Associate teachers	Full Prof. Željka Cvrtila, Full Prof. Nevijo Zdolec, Assist. Prof.Tomislav Mikuš, teaching assistant Marta Kiš, PhD, teaching assistant Mladenka Vukšić, DVM	2.145. Type of instruction (number of hours L + S + E + e-learning)	5+15+6
1.46. Study programme (undergraduate, graduate, integrated)	integrated	2.146. Expected enrolment in the course	
1.47. Status of the course	elective	2.147. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	20%

2. COURSE DESCRIPTION	
4.50. Course objectives	The subject gives an additional knowledge related to specific parameters of the production of autochthonous meat products. Student will be able to evaluate traditional products, as well as to perform the education of food business operators. This knowledge is applicable in upgrading of traditional production and provides procedures for veterinary inspection of autochthonous production.
4.51. Course enrolment requirements and entry competences required for the course	The course can enroll only students of study track "Hygiene and technology of animal food and veterinary public health"
4.52. Learning outcomes at the level of the programme to which the course contributes	Upon the completion of the course the student will complement his/her knowledge in obligatory subject Food Hygiene and Technology. The subject shall further clarify specific parameters of the production of autochthonous meat products.

4.53. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	By the completion of the course students should be able to: - understand the specifics of production of autochthonous meat products - determine microbiological quality of autochthonous meat products, - determine sensory evaluation of autochthonous meat products, - educate the producers of autochthonous meat products - improve the production of autochthonous meat products
4.54. Course content broken down in detail by weekly class schedule (syllabus)	- Autochthonous production (specific parameters of production, raw materials technology, veterinary control) - Minimal hygienic standards (microbiological standards and control of sanitation) - Ripening of meat products (microbiota of fermented meat products; additives and spices) - Evaluation of products quality (standardisation, sensory features) - Indigenous microbiota of traditional meat products - Plant construction and equipment - Autochthonous meat products of Croatia

4.55. Format of instruction:		4.56. Comments:
x lectures x seminars and workshops x exercises ☐ on line in entirety x partial e-learning ☐ field work	☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	

4.57. Student responsibilities	

4.58. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
Class attendance	0,36	Research		Practical training		
Experimental work		Report		Activities during course	0,2	
Essay		Seminar essay		(other)		
Tests	0,64	Oral exam	0,8	(other)		
Written exam		Project		(other)		

2.10. Grading and evaluating student work in class and at the final exam	ACTIVITIES	MINIMAL SCORE	MAXIMAL SCORE
	Lecture attendance	**3**	**6**

5 hours of lectures (coefficient: 1,2)	Student must attend 2,5 hours of lectures in order to gain 3 points	5 x 1,2 = 6 points
Exercise attendance	**4**	**6**
6 hours of exercises (coefficient: 1)	student must attend 4 hours of exercises in order to gain 4 points	
Seminars attendance	**4**	**6**
15 hours of seminars (coefficient: 0,4)	student must attend 10 hours of seminars in order to gain 4 points	
Activity at exercises and seminars	**5**	**10**
4 oral questions during exercises (1 points each) 3 oral questions during seminars (1 points each) Seminar presentation (3 points)	5 correct answers on asked questions	
Continuous knowledge checking	**20**	**32**
1 written exams, 8 questions 1 question = 4 points	A student must give correct answers to 5 questions in order to gain 20 points	8 correct answers x 4 = 32 points

	Final exam	**24**	**40**
	Oral exam, 10 questions. 1 question = 4 points	A student must give correct answers to 6 questions in order to gain 24 points	10 correct answers x 4 = 40 points

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and via other media)	Zdolec, N. (2017): Fermented Meat Products: Health Aspects. CRC Taylor & Francis, USA	10	pdf

2.29. Optional literature (at the time of submission of study programme proposal)	Professional and scientific papers related to traditional meat products.
2.30. Quality assurance methods that ensure the acquisition of exit competences	During the course, continuous assessment shall be carried out by means of preliminary test and activities during exercises and seminars.
2.31. Other (as the proposer wishes to add)	

AUTOCHTONOUS DAIRY PRODUCTS

1. GENERAL INFORMATION			
1.87. Course teacher	Full Prof. Nevijo Zdolec	2.148. Year of the study programme	5, 6
1.88. Name of the course	Autochtonous Dairy Products	2.149. Credits (ECTS)	2
1.46. Associate teachers	Full Prof. Željka Cvrtila, Full Prof. Nevijo Zdolec, Assist. Prof. Tomislav Mikuš, teaching assistant Marta Kiš, PhD, teaching assistant Mladenka Vukšić, DVM	2.150. Type of instruction (number of hours L + S + E + e-learning)	6+13+11
1.47. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	2.151. Expected enrolment in the course	
1.48. Status of the course	Elective subject	2.152. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	20%
2. COUSE DESCRIPTION			
4.59. Course objectives	After completing the course, students will complete the previously acquired knowledge from compulsory subject Food Hygiene and Technology. The course explains in detail the individual parameters in the evaluation of indigenous dairy products. Thus, students will be able to independently assessing and educating producers of local dairy products. Their knowledge is specific and applicable to matters relating to the improvement of indigenous production, veterinary inspection and supervision of production and trade of indigenous dairy products.		
4.60. Course enrolment requirements and entry competences required for the course	The course can enroll only students of orientation "Hygiene and technology of animal food and veterinary public health"		
4.61. Learning outcomes at the level of the programme to which the course contributes	Knowing the specifics of hygiene and quality of autochtonous Croatian cheeses.		

<table>
<tr><td>4.62. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="3">- Know the laws and regulations of local products and the minimum standards of hygiene in milk processing
- Explain the characteristics and meaning of autochthonous cheese, cream, butter and fermented dairy products in households in the traditional manner adapted to modern requirements of national and EU legislation
- Vary zootechnical and sanitary conditions for the production of the domestic and EU standards
- Interpret the results of the chemical analysis and hygienic quality of milk of which the dairy products</td></tr>
<tr><td>4.63. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="3">Lectures – 6 hours
Indigenous production (production characteristics of indigenous foods, meaning indigenous production environment EU legislation indigenous products, the impact of local products in the promotion of tourism and national cultural characteristics) - 2 hours
Minimum standards of hygiene in milk processing (microbiological standards for milk, milk products and the control of the equipment in the indigenous production) - 2 hours
The quantity and composition of milk for the indigenous production (economically justified need milk production in indigenous production and the optimum composition of milk according to the purpose for certain products) Facilities and hygiene standards in OPG (zootechnical and sanitary conditions for the indigenous production to domestic and EU standards) - 2 hours

Seminars – 13 hours
Specifics of the indigenous microflora of dairy products - 2 hours
Quality labels: originality, geographical origin and guaranteed traditional specialty in protecting traditional cheese production – 3 hours
Traditional production of cream, butter and fermented dairy products - 4 hours
Production of the famous Croatian indigenous soft, polutvdih and hard cheese (soft cheese, cottage cheese and sour cream, cooked cheeses, Istria, Dalmatia, island, continental cheeses, etc.) - 4 hours

Exercises – 11 hours (6 hours field exercises)
Milk processing in OPG (optimization of volume and heat treatment of milk (thermization, pasteurization), equipment and machinery-field exercises - 6 hours
Quality: originality, geographical origin and traditional specialty guaranteed in the local cheese production.
Comparison of sensory properties and process technology – 3 hours
Specifics of the indigenous microflora of dairy products. Sanitation on the Farm – 2 hours</td></tr>
<tr><td rowspan="2">4.64. Format of instruction:</td><td>x☐ lectures
x☐ seminars and workshops
x☐ exercises
☐ on line in entirety</td><td>x☐ independent assignments
☐ multimedia and the internet
x☐ laboratory
☐ work with mentor
☐ (other)</td><td>4.65. Comments:</td></tr>
<tr><td colspan="3"></td></tr>
</table>

	x☐ partial e-learning **x☐ field work**					
4.66. Student responsibilities						
4.67. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0,36	Research		Practical training	
	Experimental work		Report		Activities	0,2
	Essay		Seminar essay		(other)	
	Tests	0,64	Oral exam	0,8	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam

TYPES OF ACTIVITIES	KOEFICIJENT	MINIMAL NUMBER OF POINTS	MAXIMUM NUMBER OF POINTS
Attending lectures	**1**	**3**	**6**
The total of 6 lecture hours, online	6:6=1	3:1=3 The student must attend 3 lecture hours in order to gain minimal 3 points Each particular lecture hour is summed as 1 point	The student must attend 6 lecture hours in order to gain maximal 6 points
Attending exercises	**0.55**	**4**	**6**
Total of 11 exercise hours (6 hours field excercise)	6:11=0,55	4:0,55=7 The student must attend 7 exercise hours in order to gain minimal 4 points Each particular exercise hour is summed as 0.43 point	
Attending at seminares	**0.46**	**4**	**6**
Total of 13 seminar hours	6:13=0.46	4: 0,46 = 8,6(9) The student must attend 9 seminar hours in order to gain minimal 4 points	

			Each particular seminar hour is summed as 0.39 point	
	Activity at exercises and seminares		**5**	**10**
	Seminare prepared and held = 3 points Oral answers to exercises = 4 points (4x1) Oral answers to seminares= 3 points (3x1)		5:1=5 The student gain minimal 5 points (oral answers at exercises and seminares)	
	Continuous knowledge checking		**20**	**32**
			During the course, continuous knowledge will be evaluated by 1 preliminary written exams. The minimal number of points a student must gain is 20 (5 questions). In case a student answers less than 5 questions correctly at a preliminary exam, he/she must retake the preliminary.	
	Final exam		**24**	**40**
			The final exam comprises all results gained from attending lessons. The exam is oral. At the oral exam a student answers 10 questions. One correct answer is worth 4 points. Minimal number of points is 24and the student must answer	

<table>
<tr><td></td><td></td><td>correctly minimal 6 questions (24 points).</td><td></td></tr>
<tr><td>Final evaluation</td><td></td><td>60</td><td>100</td></tr>
<tr><td></td><td></td><td>Regardless of a fact that a student gained the number of points from the first four evaluation elements on the basis of makeup preliminary exam or not, the same rules are valid for forming the final mark. The final mark is formed on the basis of total sum from all five evaluation elements, according the following table.
<table>
<tr><td>Points Grade</td><td></td></tr>
<tr><td>up to 59</td><td>1 (F)</td></tr>
<tr><td>60-68</td><td>2 (E)</td></tr>
<tr><td>69-76</td><td>2 (D)</td></tr>
<tr><td>77-84</td><td>3 (C)</td></tr>
<tr><td>85-92</td><td>4 (B)</td></tr>
<tr><td>93-100</td><td>5 (A)</td></tr>
</table></td><td></td></tr>
</table>

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Harbutt, J. (2015): World Cheese Book. Dorling Kindersley Limited, London, UK		
	Bulletin of the Dairy Federation 369/2001. Cheeses in all their Aspects		

	Ramalho Ribeiro, J. M. C., A. E. M. Horta, C. Mosconi, A. Rosati (2006): Animal products from the Mediterranean area. Wageningen Academic Publishers, Wageningen, NL. (selected papers)		
	Other available literature in the Department		
	Material from lectures		
2.32. Optional literature (at the time of submission of study programme proposal)	Harbutt, J.: Svjetska enciklopedija sira. Naklada Fran, Zagreb, 2000 Kozačinski, L., V. Dobranić, I. Filipović, N. Zdolec, B. Njari, Ž. Cvrtila Fleck, B. Mioković (2015): Laboratorijske vježbe iz higijene i tehnologije hrane. Filipović, I. i V. Dobranić (ur.). Veterinarski fakultet Sveučilišta u Zagrebu; INTERGRAFIKA. Udžbenici Sveučilišta u Zagrebu Tratnik, Lj. (1998): Mlijeko – tehnologija, biokemija i mikrobiologija. Udžbenik Sveučilišta u Zagrebu. Hrvatska mljekarska udruga. Zagreb		
2.33. Quality assurance methods that ensure the acquisition of exit competences			
2.34. Other (as the proposer wishes to add)			

BIOLOGICAL TRACES AND EVIDENCES IN FORENSIC VETERINARY MEDICINE

1. COURSE DECRIPTION – GENERAL INFORMATION			
1.89. Course teacher	Prof Krešimir Severin	2.153. Year of study	6
1.90. Name of the course	Biological traces and evidences in forensic veterinary medicine	2.154. Credit value (ECTS)	1
1.47. Associate teachers	Assist Magdalena Palić, univ. mag. med. vet.	2.155. Type of instruction (number of hours L+S+E+e-learning)	2+4+7+2
1.48. Study programme (undergraduate, graduate, integrated)	Integrated	2.156. Expected enrolment in the course	10-30
1.49. Status of the course	Elective course	2.157. Level of use of e-learning (1, 2, 3 level), percentage of instruction in the course on line (20% maximum)	2, 10%
2. COURSE DESCRIPTION			
4.68. Course objectives	The goal of the subject is to introduce students of veterinary medicine to the branch of forensic veterinary medicine that deals with the identification of biological evidence, procedures to preserve evidence and the level of credibility of results concerning analytical procedures and acquired knowledge, skills and competences to be able to independently assess and make complex decisions in the case of claims submitted by the judicial authorities, the inspection and legal or natural persons.		
4.69. Enrolment requirements and required entry competences for the course	Examinations passed of all courses including 10th Semester.		
4.70. Learning outcomes at the level of the study programme to which the course contributes	○ apply the acquired knowledge (of anatomy, histology, pathology, molecular biology, administrative procedures and inspection control, Civil, Misdemeanour and Criminal procedure in forensic veterinary medicine) with newly acquired ones (identification of biological traces) in the field of forensic veterinary medicine to use in veterinary medicine ○ positive effects on expertise and competence of future veterinary staff in dealing on requests by judicial authorities, inspection control, legal and natural persons		
4.71. Expected learning outcomes at the	○ higher expertise and attention to the actions which is aimed at identification of biological traces in forensic veterinary medicine		

level of the course (4-10 learning outcomes)	○ knowledge of formal and material legislation of Civil, Misdemeanour and Criminal Act ○ ability to identify the origin of biological traces from various animal species considering morphological / histological characteristics ○ ability to use the most appropriate molecular techniques considering demands for identification and material traces ○ knowledge of the professional witness and expert witness duties in report writing and giving evidence in court ○ represent the opinions about the laboratory reports considering laboratory models (quality assurance level: Government-funded dedicated wildlife DNA forensics facility, Private forensic genetic facility offering wildlife DNA services, University or institutional research facility with separated forensic laboratory space, Multi-use research laboratory) and used methods (validated / non validated)
4.72. Course content broken down in detail by weekly class schedule (syllabus)	**Lectures (2)** ○ Application of biological traces identification in forensic veterinary medicine; official (responsible) person obligation in collecting material biological traces pursuant to the provisions and principles of formal (Misdemeanour Act and Criminal Code) and material legal acts (Veterinary Act, Nature Protection Act, Animal Protection Act) **Seminars (4)** ○ Classification of biological traces due to the origin and demands of veterinary medicine (traces of animal origin - tissue, hair, feathers, animal products, animal feed - including traces of plant origin). ○ Processing and dealing of court case (Misdemeanour and/or Criminal procedure) where the animal is considered as victim, as witness, as perpetrator; Specificity of identification requirements in case of protection and conservation of endangered species, issuance of certificate of pure breeding and Pedigree of breeding animals, analysis in inspection control of animal products or animal feed origin. **Exercises (7)** ○ Collecting, labelling and insuring of biological traces by official persons; responsibility of police officers, court official persons, veterinary inspectors and veterinary staff. ○ Selection of identification methods according to their specificity and sensitivity, procedure demands, quantity and quality of biological traces; Morphological and histological methods of tissue identification (bones, muscles, feathers, hairs), gas chromatography techniques (forensic population based on fatty-acid profile), molecular methods (analysis of mitochondrial and nuclear DNA genetic markers; most commonly used genetic markers in forensic veterinary medicine in order to determine species from different specimens or individual identification within a species / breeds including determination of geographic origin e.g. STR short tandem repeats-SSR simple sequence repeats, RFLP – restriction fragment lenght polymorphism, SNP - single nucleotide polymorphism) and immunohistochemical methods of tissues and cells identification. ○ Credibility of forensic analytical method data relating to laboratory quality assurance level and used methods (validated / non validated) ○ Special requirements in writing records, opinions, court expertise (expert witness report) **E-learning (2)**

	Court case example, interactive review of selected cases from the moment of biological trace “material trace” collection → setting request for identification → transport of sample to forensic laboratory (laboratory for DNA analysis) → providing storage of sample and traceability control → result of requested analytic methods → interpretation of results → writing expert witness report → to the status of "material evidence".					
4.73. Type of instruction	☒ lectures ☒ seminars and workshops ☒ exercises ☐ online in entirety ☒ mixed e-learning ☐ field work		☒ independent study ☒ multimedia and the internet ☐ laboratory ☐ work with the mentor ☐ (other)		4.74. Comments: Through the VEF-LMS we will provide expert witness reports and publications to students	
4.75. Student responsibilities	Attendance at lectures, seminars and exercises and writing seminar essay					
4.76. Screening of student’s work (specify the proportion of ECTS credits for each activity so that the total number of CTS credits is equal to the credit value of the course)*:*	Class attendance	0.18	Research		Practical training	
	Experimental work		Report		Class activity	0.1
	Essay		Seminar essay	0.40	(Other--describe)	
	Tests	0.32	Oral exam		(Other—describe)	
	Written exam		Project		(Other—describe)	

12.3. Grading and evaluation of student work over the course of instruction and at a final exam

Types of activities	Minimal number of points	Maximal number of points
Attending lectures, seminars, exercises, e-Learning	**10**	**15**
15% of grade	15 hours: one hour is multiplied with 1, and a student must attend minimal 1 hours	
Seminar essay	**10**	**20**
20% of grade	Each student is obliged to prepare and present seminar work which will be assessed	
Class activity	**12**	**25**
25% of grade	Participation in the discussion of presented court cases.	
Final exam	**24**	**40**

	40% of grade	In order to take the final exam a student must gain minimal 36 points from attending and participation at lectures, seminars, exercises, e-Learning and from continuous knowledge checking. Seminar essay form 24 to 40 points A student gets 5 questions – each correct answer is worth 8 points.	

	Title	Number of copies at the library	Availability via other media
12.4. Required literature (available at the library and via other media)	Linacre A. (2009): Forensic Science in Wildlife Investigations. CRC Press, Boca Raton.	2	-
	Merck M.D. (2007): Veterinary Forensics, Blackwell Publishing, Oxford.	2	-
	Civil Procedure Act , OFFICIAL GAZETTE NO. 148/11	10	http://cadial.hidra.hr
	Criminal Code , OFFICIAL GAZETTE NO. 125/11, 14/11	10	http://cadial.hidra.hr
2.35. Optional literature (at the time of the submission of the study programme proposal)	Cooper J.E., M.E. Cooper (2007): Introduction to Veterinary and Comparative Forensic Medicine. Blackwell Publishing, Oxford.		
2.36. Methods of monitoring quality that ensure acquisition of exit competences	Anonymous student survey about all aspects of teaching.		

BIOLOGY AND CONSERVATION OF MARINE MAMMALS

1. GENERAL INFORMATION			
1.1. Course teacher	Prof. Martina Đuras	1.6.Year of the study programme	5th
1.2.Name of the course	Biology and Conservation of Marine Mammals	1.7.Credits (ECTS)	2.5
1.3.Associate teachers	Prof. Tomislav Gomerčić, Kim Korpes, DVM, Magdalena Kolenc, DVM	1.8.Type of instruction (number of hours L + S + E + e-learning)	10L + 16P + 10S + 4 e-learning S
1.4.Study programme (undergraduate, graduate, integrated)	Integrated study	1.9.Expected enrolment in the course	30
1.5.Status of the course	elective	1.10.Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	10%
2. COUSE DESCRIPTION			
2.1.Course objectives	The goal of this course is to provide the students with knowledge that is fundamental for understanding the biology of marine mammals and conservations measurements for this endangered species. Veterinarians are important participants of national surveillance programs where knowledge on the morphology, physiology and ecology of these animals is acquired.		
2.2.Course enrolment requirements and entry competences required for the course			
2.3.Learning outcomes at the level of the programme to which the course contributes			
2.4.Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Following the completion of the course the student will be able: 1. to identify and list marine mammals 2. to explain the differences of terrestrial and marine mammals 3. to list and explain anatomical and physiological adaptations of mammals to the aquatic life 4. to list and explain scientific methods in marine mammal research 5. to act according to the legal acts of marine mammal conservation and the national *Protocol for reporting of injured/sick or dead protected sea animals* 6. to design and propose a community engaged project in the field of marine mammal conservation		

<table>
<tr><td>2.5.Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Course content:
1. Systematic and evolution of marine mammals (Ceatacea ,Pinnipedia, Sirenia).
2. Habitat differences of terrestrial and marine mammals.
3. Physiological adaptations of mammals to the aquatic life
4. Functional morphology of marine mammals
5. Research, status and conservation of marine mammals in the Adriatic Sea
Community engaged learning in marine mammal conservation.</td></tr>
<tr><td rowspan="2">2.6.Format of instruction:</td><td colspan="2">x lectures
x seminars and workshops
x exercises
☐ on line in entirety
x partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td colspan="2">2.7. Comments:</td></tr>
<tr><td colspan="4"></td><td colspan="2"></td></tr>
<tr><td>2.8.Student responsibilities</td><td colspan="6">Students are obliged to attend the classes and to complete a seminar.</td></tr>
<tr><td rowspan="6">2.9.Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>YES</td><td>Research</td><td></td><td>Practical training</td><td>YES</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>activity (other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>YES</td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td>YES</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>YES</td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td colspan="6"></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">-</td></tr>
<tr><td rowspan="4">2.11. Required literature (available in the library and via other media)</td><td colspan="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">Mazzariol, S., B. Cozzi, C. Centelleghe (2015): Handbook for Cetaceans' Strandings. Massimo Valdina, Milano.</td><td>YES</td><td>Merlin</td></tr>
<tr><td colspan="4">Martina Đuras, Darinka Škrtić, Tomislav Gomerčić: Collection of morphological specimen of endangered species. Faculty of Veterinary Medicine University of Zagreb.</td><td></td><td>http://www.vef.hr/dolphins/anatomija_dupina/</td></tr>
<tr><td colspan="4"></td><td></td><td></td></tr>
</table>

2.12.Optional literature (at the time of submission of study programme proposal)	Published scientific and professional articles on the research of marine mammals in the Adriatic Sea (http://intranet.vef.hr/dolphins/radovi/popis.htm)
2.13.Quality assurance methods that ensure the acquisition of exit competences	
2.14.Other (as the proposer wishes to add)	

BIOLOGY AND ECOLOGY OF PREDATORS

1. GENERAL INFORMATION			
1.91. Course coordinator	Prof. dr. sc. Josip Kusak The substitute of course coordinator: Prof. dr. sc. Tomislav Gomerčić	2.158. Year of the study programme	The third year
1.92. Name of the course	Biology and ecology of predators	2.159. Credits (ECTS)	2
1.48. Associate teachers	Prof. dr. sc. Josip Kusak Prof. dr. sc. Tomislav Gomerčić Assoc. prof. dr. sc. Magda Sindičić Assist. Ira Topličanec	2.160. Type of instruction (number of hours L + S + E + e-learning)	L=8; S=4; E=18
1.49. Study program (undergraduate, graduate, integrated)	Integrated undergraduate and graduate studies	2.161. Expected enrolment on the course	
1.50. Status of the course	Elective	2.162. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	20% (six hours e-learning lectures and two hours of direct lectures)
2. COUSE DESCRIPTION			
4.77. Course objectives	The aim is to give students the right perspective of the ecological role of organisms that are on the top of food pyramid, including their evolution and existence in the balance with the prey species. The course is a specific extension of the course «Zoology», and specifically of the section «basic ecology». The goal is to make clear to students those predators have their ecological role in keeping the ecosystem in balance. Humans are also close to the top of the food chain, and they do interfere with predators through direct competition resulting in extermination of many predator populations. In addition to Carnivores (bear, wolf, lynx), analyzed are sea mammals, birds of prey, and carnivorous fishes. Understanding of mutual relation of predators and their prey, population dynamics and size regulation, and role for humans is useful for modern veterinarian.		

<table>
<tr><td>4.78. Course enrolment requirements and entry competences required for the course</td><td colspan="6">The subject Biology and ecology of predators is at the third year of the Veterinary medicine study. Requirements for enrolment are that students have completed the subject Zoology and can use English by speaking and writing it.</td></tr>
<tr><td>4.79. Learning outcomes at the level of the programme to which the course contributes</td><td colspan="6">- recognizing predation at different trophic levels
- knowing biological features of predatory species</td></tr>
<tr><td>4.80. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">- evaluate the possibilities of research in captivity
- explain that predators may be the objects of hunting, but also as pet animals
- understand interactions of predators and prey using simulation models of food chains
- understand the value of large carnivores for the stability and diversity of ecosystems</td></tr>
<tr><td>4.81. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Status and importance of organisms at the top of food pyramid. Mechanisms of population size regulation; 2. Large predators of Croatia: Carnivora: bears, wolf, lynx, and Mediterranean monk seal: Cetacea: dolphins; Birds of prey, Reptiles; Amphibians, Fresh water and marine predatory fish, Invertebrate predators: Insects, Echinodermata, 3. Study of brown bears in Croatia: status and characteristics of Croatian population. 4. Study of wolves in Croatia: status and characteristics of Croatian population. 5. Study of lynxes in Croatia: status and characteristics of Croatian population. 6. Methods of study of large carnivores: study ex-situ and in-situ, methods of capturing, handling, marking, sampling, and tracking. Use of radiotelemetry. Practical work in the Zoo and in the field.</td></tr>
<tr><td rowspan="2">4.82. Format of instruction:</td><td colspan="2">☒ lectures
☒ seminars and workshops
☒ exercises
☐ online in entirety
☒ partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☒ work with mentor (in the case of having less than ten students enrolled)
☐ (other)</td><td colspan="2">4.83. Comments:</td></tr>
<tr><td colspan="4"></td><td colspan="2"></td></tr>
<tr><td>4.84. Student responsibilities</td><td colspan="6">Attending lectures, seminar, and field work. Preparing, presenting, and defending one seminar.</td></tr>
<tr><td rowspan="6">4.85. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0.2</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Activity (other)</td><td>0.2</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>1.0</td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td>0.6</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
</table>

<table>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="3">During the course, students do participate discussing presented and other related examples. They prepare a seminar paper, which is orally presented and graded. Continuous knowledge checking and an exam in form of oral presentation of prepared seminar.</td></tr>
<tr><td rowspan="7">2.11. Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>All study material available in Power point format</td><td></td><td>Files on Merlin</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>2.37. Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">Odum, E. (1988): Fundamentals of ecology,USA.
Jedrzejewski, W. and B. Jedrzejewska (1998). Predation in vertebrate communities. The Białowieża Primeval Forest as a case study. Berlin, Springer-Verlag, 450 str.
Melis,Claudia, Bogumiła Jedrzejewska, Marco Apollonio Kamil A. Barton, Włodzimierz Jedrzejewski, John D.C. Linnell, Ilpo Kojola, Josip Kusak, Miha Adamic, Simone Ciuti, Ivan Delehan, Ihor Dykyy, Krešimir Krapinec, Luca Mattioli, Andrey Sagaydak, Nikolay Samchuk, Krzysztof Schmidt, Maryna Shkvyrya, Vadim E. Sidorovich, Bernadetta Zawadzka and Sergey Zhyla, 2009. Predation has a greater impact in less productive environments: variation in roe deer, Capreolus capreolus, population density across Europe. Global Ecology and Biogeography 18: 724–734.</td></tr>
<tr><td>2.38. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">Attendance to classes, seminar work and exam.</td></tr>
<tr><td>2.39. Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

BREEDING AND HUSBANDRY OF RABBITS AND CAGE PETS

1. GENERAL INFORMATION			
1.93. Course teacher	Maja Maurić Maljković, PhD, Associate Professor	2.163. Year of the study programme	3rd
1.94. Name of the course	**Breeding and Husbandry of Rabbits and Cage Pets**	2.164. Credits (ECTS)	2
1.49. Associate teachers	Anamaria Ekert Kabalin, PhD, Full Professor Sven Menčik, PhD, Associate Professor Ivan Vlahek, PhD, Assistant Professor, Aneta Piplica, PhD Niko Popović, VMD	2.165. Type of instruction (number of hours L + S + E + e-learning)	3L + 2E + 25S(as e-learning)
1.50. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	2.166. Expected enrolment in the course	-
1.51. Status of the course	elective	2.167. Level of application of e-learning (level 1, 2, 3), percentage of online instruction	2, 80%
2. COUSE DESCRIPTION			
4.86. Course objectives	Getting knowledge necessary for identification of certain rabbit breeds, as well as types of furbearing animals and cage pets. Adoption of fact about uses of rabbits and furbearers, exhibitions, methods and systems of breeding. Getting theoretical and practical skills necessary for animal handling and treating. Adoption of basic of genetics in the fur production, the basics of making business and investment plan with respect to the possibility of placing products on the market.		
4.87. Course enrolment requirements and entry competences required for the course	-		

<table>
<tr><td>4.88. Learning outcomes at the level of the programme to which the course contributes</td><td>Acquiring knowledge about certain breeds of rabbits and types of furbearing animals and cage pets, methods of breeding for production purposes or as pets, handling and treatment of animals (breeding, offspring handling, marking, grading on exhibitions, recognition of disease, etc).</td></tr>
<tr><td>4.89. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td>After successfully completion of the course students will be able to:
- explain the difference between rabbit and hare, as well as main characteristics of furbearers and cage pets
- identify the category and breed of rabbits and type of fur-animals or cage pets
- learn how to handle and treat animals
- apply their knowledge in breeding of cage pets (rabbit, mouse, rat, guinea pig, hamster, chinchilla, degu)
- organize farm production
- assess the effectiveness of rabbit meat production</td></tr>
<tr><td>4.90. Course content broken down in detail by weekly class schedule (syllabus)</td><td>
<table>
<tr><th>Methodological unit / course content</th><th>class schedule (lectures + exercises + seminars + e-learning)</th></tr>
<tr><td>Introduction to the production of rabbits and fur animals (Production in the Republic of Croatia and the world. Products and other uses of rabbits.)</td><td>0,5 L + 2 S(e-learning)</td></tr>
<tr><td>Origin and breeds of rabbits (Large, midsize and small (toy) breeds of normal fur. Long-haired and short-haired breeds of rabbits. Hybrids. Choosing a breed for specific orientation of the production.)</td><td>0,5 L + 2 S (e-learning)</td></tr>
<tr><td>Farming systems (Housing, necessary equipment and tools. Acquisition breeding material.)</td><td>4 S(e-learning)</td></tr>
<tr><td>Breeding rabbits (Breeding methods. Handling with young animals. Fattening of rabbits. Principles of genetics for fur production. Marking rabbits. Keeping records of breeding.)</td><td>0,5 E + 4 S(e-learning)</td></tr>
<tr><td>The plan of supply and demands on the market (Orientation of production with respect to the needs of the market. Basics of business and investment plan. Placement of the products. Competitiveness on the domestic market.)
Rabbit as a pet and a model for research in biomedicine. Exhibitions.</td><td>4 S(e-learning)</td></tr>
<tr><td>Production and breeding of Chinchillas (Chinchilla origin and types. Principles of genetics in the inheritance of coat color. Systems of breeding and production. Economical production.)</td><td>0,5 L + 0,5 E+ 2 S(e-learning)</td></tr>
<tr><td>Production and breeding of Mink (Origin and types of Mink. Farming systems and production.)</td><td>0,5 L + 0,5 E + 2 S(e-learning)</td></tr>
</table>
</td></tr>
</table>

	Production and breeding of Nutria (Origin and types of Nutria. Systems of breeding and production.)	0,5 L + 2 S(e-learning)
	Breeding of different cage-pets (rabbit, mouse, rat, guinea pig, hamster, degu)	0,5 L + 0,5 E + 3 S(e-learning)

4.91. Format of instruction:	☒ lectures ☒ seminars and workshops ☒ exercises ☐ on line in entirety ☒ partial e-learning ☐ field work	☐ independent assignments ☒ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	4.92. Comments: -

4.93. Student responsibilities	Student obligations are defined with the Regulations on the integrated undergraduate and graduate study of veterinary medicine. Students are required to attend classes (according to the mentioned Regulation) and **prepare seminar** before taking the final (written) exam.					
4.94. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0,1	Research		Practical training	
	Experimental work		Report		Activity	0,1
	Essay		Seminar essay	0,3	(other)	
	Tests		Oral exam		(other)	
	Written exam	0,5	Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam

Writing and submitting of seminar before taking final (written) exam.
Students can achieve a maximum of 50 points from final exam. The final grade is based on obtained points.

Points	Grade
< 30	1 – F
31 – 34	2 – E
34,5 – 38	2 – D
38,5 – 42	3 – C
42,5 – 46	4 – E
46,5 – 50	5 – A

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	McNitt, J. I., N. M. Patton, P. R. Cheeke, S. D. Lukefahr (2000): Rabbit Production. Interstate Publishers, Inc. Danville, Illinois.	1 book in Deparment library	no
	web pages about breeding of rabbits, furbearers and different types of cage pets		yes
2.40. Optional literature (at the time of submission of study programme proposal)			
2.41. Quality assurance methods that ensure the acquisition of exit competences	Students' work will be monitored through conversations (on lectures, exercises, and their online activity via LMS (on seminars). At the end of teaching the knowledge of students will be verified by a final (written) exam.		
2.42. Other (as the proposer wishes to add)			

CARCASS QUALITY AT THE SLAUGHTER LINE

1. GENERAL INFORMATION			
1.95. Course teacher	Full Prof. Nevijo Zdolec	2.168. N	5, 6
1.96. Name of the course	Carcass Quality at the Slaughter Line	2.169. Credits (ECTS)	2
1.50. Associate teachers	Full Prof. Željka Cvrtila Full Prof. Nevijo Zdolec Assist. Prof. Tomislav Mikuš teaching assistant Marta Kiš, PhD, teaching assistant Mladenka Vukšić, DVM	2.170. Type of instruction (number of hours L + E + S + e-learning)	8 + 8 + 10
1.51. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	2.171. Expected enrolment in the course	
1.52. Status of the course	Elective subject	2.172. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	20%
2. COUSE DESCRIPTION			
4.95. Course objectives	After audit of the course, student will complete one's own already acquired knowledge of the obligatory subject Food Hygiene and Technology. The subject describes in details the individual parameters of quality evaluation of the slaughterhouse-processed carcasses according to meat yield. Thus, the students will acquire basic knowledge, which they will be able to use when attending a licensed course with the Ministry of Agriculture and Forestry for graders (classifiers) of carcass quality after slaughtering processing. The acquired knowledge is specific and applicable in activities performed by licensed graders (classifiers) of carcass quality after slaughtering processing.		
4.96. Course enrolment requirements and entry competences required for the course	The course can enroll only students of orientation "Hygiene and technology of animal food and veterinary public health"		
4.97. Learning outcomes at the level of the programme to which the course contributes	Knowing the specifics of meat quality at slaughter within the activities of veterinary public health and food safety.		

<table>
<tr><td>4.98. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="3">- interpret assessment procedures and evaluation of carcasses
- explain the grade of beef, pig and sheep carcasses after slaughter process
- know the score and calculate the yield of meat ("leanness") to the trimmed carcasses of pigs and know the evaluation of the quality of beef and sheep carcasses
- distinguish between objectives and tasks of evaluation quality carcass</td></tr>
<tr><td>4.99. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="3">Lectures 8

• Aims and tasks of evaluation of quality of the slaughterhouse-processed carcasses (Reasons for need of quality evaluation of the processed carcasses). - 2 h
• Procedures of evaluation of carcasses, development of procedures, and world and national legal regulations (Historical review of the carcass evaluation and legal provisions). 3 h
• Development of quality evaluation of the slaughterhouse-processed animals (Perspectives of development of quality evaluation according to meat yield in domestic animals). – 3 h

Excersises 8
• Evaluation and calculation of meat yield ("meatiness") of the processed hog carcasses (Procedures that make a constituent part of the hog carcass evaluation after slaughtering processing, in particular, mathematical models).- 2 h
• Evaluation of cattle carcasses after slaughtering processing -2 h
• Evaluation of pig carcasses after slaughtering processing -2 h
• Evaluation of sheeps and goats carcasses after slaughtering processing (Procedures that make a constituent art of the cattle carcass evaluation). -2 h

Seminares 10
• Evaluation of cattle carcasses after slaughtering processing (Procedures that make a constituent part of the cattle carcass evaluation). -4 h
• Evaluation of pig carcasses after slaughtering processing (Procedures that make a constituent part of the pig carcass evaluation).- 4 h
• Evaluation of sheeps and goats carcasses after slaughtering processing (Procedures that make a constituent art of the cattle carcass evaluation). -2 h</td></tr>
<tr><td>a. Format of instruction:</td><td>x lectures
x seminars and workshops
x exercises
☐ on line in entirety</td><td>x independent assignments
☐ multimedia and the internet
☐ laboratory</td><td>b. Comments:</td></tr>
</table>

	x partial e-learning ☐ field work		☐ work with mentor ☐ (other)			
c. Student responsibilities	Students are required to attend all forms of teaching the subject.					
d. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0.36	Research		Practical training	
	Experimental work		Report		Activities	0.2
	Essay		Seminar essay		(other)	
	Tests	0.64	Oral exam	0,8	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam

TYPES OF ACTIVITIES	KOEFICIJENT	MINIMAL NUMBER OF POINTS	MAXIMUM NUMBER OF POINTS
Attending lectures	**0,75**	**3**	**6**
The total of 8 lecture hours	6:8=0,75	3:0,75=4.28 The student must attend 4 lecture hours in order to gain minimal 3 points Each particular lecture hour is summed as 0,75 point	The student must attend 8 lecture hours in order to gain maximal 6 points
Attending exercises	**0.75**	**4**	**6**
Total of 8 exercise hours	6:8= 0.75	4:0.75=5 The student must attend 5 exercise hours in order to gain minimal 4 points Each particular exercise hour is summed as 0.75 point	
Attending at seminares	**0.6**	**4**	**6**
Total of 10 seminar hours	6:10=0.6	4:0.6=7	

			The student must attend 7 seminar hours in order to gain minimal 4 points Each particular seminar hour is summed as 0.6 point	
	Activity at exercises and seminares		**5**	**10**
	Seminare prepared and held = 3 points Oral answers to exercises = 4 points (4x1) Oral answers to seminares= 3 points (3x1)		5:1=5 The student gain minimal 5 points (oral answers at exercises and seminares)	
	Continuous knowledge checking		**20**	**32**
			During the course, continuous knowledge will be evaluated by 1 preliminary written exams. The minimal number of points a student must gain is 20 (5 questions). In case a student answers less than 5 questions correctly at a preliminary exam, he/she must retake the preliminary.	
	Final exam		**24**	**40**
			The final exam comprises all results gained from attending lessons. The exam is oral. At the oral exam a student answers 10 questions. One correct answer is worth 4 points.	

<table>
<tr><td></td><td></td><td></td><td>Minimal number of points is 24and the student must answer correctly minimal 6 questions (24 points).</td><td></td></tr>
<tr><td></td><td>Final evaluation</td><td></td><td>60</td><td>100</td></tr>
<tr><td></td><td></td><td></td><td>Regardless of a fact that a student gained the number of points from the first four evaluation elements on the basis of makeup preliminary exam or not, the same rules are valid for forming the final mark. The final mark is formed on the basis of total sum from all five evaluation elements, according the following table.
<table>
<tr><td>Points Grade</td><td></td></tr>
<tr><td>up to 59</td><td>1 (F)</td></tr>
<tr><td>60-68</td><td>2 (E)</td></tr>
<tr><td>69-76</td><td>2 (D)</td></tr>
<tr><td>77-84</td><td>3 (C)</td></tr>
<tr><td>85-92</td><td>4 (B)</td></tr>
<tr><td>93-100</td><td>5 (A)</td></tr>
</table></td><td></td></tr>
<tr><td>2.11. Required literature (available in the library and via other media)</td><td colspan="2">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td></td><td colspan="2">Whittemore, C. T., I. Kyriazakis (2006): Whittemore's Science and Practice of Pig Production. Blackwell Publishing Ltd, UK.</td><td></td><td></td></tr>
</table>

	Lazzaroni, C., S. Gigli and D. Gabiña (2007): Evaluation of carcass and meat quality in cattle and sheep. Wageningen Acedemic Publishers, Wageningen, The Netherlands		
	Material and notes from the lectures		
	Regulations governing the determination of the quality of these categories and classes and half carcasses		
2.43. Optional literature (at the time of submission of study programme proposal)			
2.44. Quality assurance methods that ensure the acquisition of exit competences			
2.45. Other (as the proposer wishes to add)			

CLINICAL PHYSIOLOGY

1. GENERAL INFORMATION			
1.97. Course teacher	Assoc. prof. Lana Pađen, PhD, DVM	2.173. Year of the study programme	4
1.98. Name of the course	**Clinical Physiology**	2.174. Credits (ECTS)	2
1.51. Associate teachers	Prof. Jasna Aladrović, PhD, DVM	2.175. Type of instruction (number of hours L + S + E + e-learning)	15L+ 15E
1.52. Study programme (undergraduate, graduate, integrated)	integrated	2.176. Expected enrolment in the course	10
1.53. Status of the course	elective	2.177. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	-
2. COUSE DESCRIPTION			
4.100. Course objectives	The aim of the course is to prepare students for clinical diagnosis by referring them to research and laboratory procedures that are tailored to specific production cycle and mode of exploitation of production animals. Clinical Physiology gives students an insight into the importance of determining reference intervals of hematological and biochemical parameters in a representative sample and factors that could affect the information contained herein. It instructs students on the importance of clinical enzymology associated with a particular physiological status such as intensive growth and fattening, pregnancy, lactation, and other specific production circumstances. Lectures direct the student to connect the physiological concepts and introduce them to the methodology of scientific research. The organism is seen as a system and physiology is interpreted as systemic clinical physiology. Exercises are used for better understanding of laboratory procedures in the sampling, processing and analytics. Students develop independence in interpreting the results of hemograms and biochemical analyses.		
4.101. Course enrolment requirements and entry competences required for the course	Attended lectures of Physiology of Domestic Animals I and II		

<table>
<tr><td>4.102. Learning outcomes at the level of the programme to which the course contributes</td><td colspan="3">Ability to consolidate theoretical knowledge and practical skills in preclinical veterinary medicine related to certain physiological status of animals: growth and fattening, pregnancy, lactation.

Understanding of applied techniques and diagnostic procedures in determining the health status of animals in various production cycles.</td></tr>
<tr><td>4.103. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="3">Apprehension of physiological processes taking place during animal production.

Determining laboratory tests of choice for application during specific production cycles and different breeding methods.

Sampling techniques for obtaining various samples for animal health management.

Practical experience in laboratory analyses.</td></tr>
<tr><td>4.104. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="3">1. Intracellular regulation, communication within and between cells.
2. Homeostatic mechanisms during growth, gravidity, lactation, milk, meat and egg production.
3. Neuroendocrine regulation, interaction between nervous and hormonal system, stimulation and inhibition.
4. Enzymatic regulation.
5. Mechanisms of stimulation and inhibition of enzymatic reactions.
6. Metabolic status.
7.Alterations of metabolic pathways.
8. Biomarkers of oxidative stress.
9. Oxidation and antioxidative reactions.
10. Production and function of reactive oxygen and nitrogen metabolites, macromolecular damage and its repair.
11. Assessment of organ systems metabolism: bones, heart, kidney, liver, udder, muscles.
12. Metabolic profile and enzymes in specific physiological processes.</td></tr>
<tr><td>a. Format of instruction:</td><td>☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td>☒ independent assignments
☐ multimedia and the internet
☒ laboratory
☐ work with mentor
☐ (other)</td><td>a. Comments:</td></tr>
<tr><td>b. Student responsibilities</td><td colspan="3">Students are obligated to attend all forms of instructions. They are expected to prepare a seminar, independently, with teachers' instructions. During exercises students individually perform hematological and biochemical blood tests.</td></tr>
</table>

b. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0,3	Research		Practical training	0,6
	Experimental work		Report	0,3	(other)	
	Essay		Seminar essay		(other)	
	Tests	0,3	Oral exam	0,5	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	The student performs oral test during the classes, and upon finishing each chapter of syllabus. Final exam is also oral.		
2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	FELDMAN, B. F., J. G. ZINKL, N. C. JAIN (Eds.) (2000): Schalm's Veterinary Hematology. 5th ed., Lippincott Williams & Wilkins, Philadelphia.	1	
	KANEKO, J. J., J. W. HARVEY, M. L. BRUSS (Eds.) (1997): Clinical Biochemistry of Domestic Animals. 5th ed., Academic Press, San Diego, London, Boston, New York, Sydney, Tokyo, Toronto.	1	
	KERR, M. G. (2004): Veterinary Laboratory Medicine: Clinical Biochemistry and Haematology. 2nd ed., Blackwell Science Ltd., Oxford.	1	
2.46. Optional literature (at the time of submission of study programme proposal)	PAYNE, J. M., S. PAYNE (1987): The Metabolic Profile Test. Oxford University Press, Oxford, New York, Tokyo. HALLIWELL, B., J. M. C. GUTTERIDGE (1999): Free Radicals in Biology and Medicine. 3rd ed., Oxford University Press, Oxford. FELDMAN, E. C., R. W. NELSON, C. REUSCH, J. C. SCOTT-MONCRIEFF, E. N. BEHREND (2015): Canine and Feline Endocrinology. 4th ed., Elsevier Saunders, St. Louis.		
2.47. Quality assurance methods that ensure the acquisition of exit competences	Students anonymous poll		
2.48. Other (as the proposer wishes to add)			

CLINICAL ANATOMY

1. GENERAL INFORMATION			
1.99. Course teacher	Assistant Prof. Ivan Alić; Deputy Full Prof. Martina Đuras	2.178. Year of the study programme	3rd year, 5th semester
1.100. Name of the course	Clinical Anatomy	2.179. Credits (ECTS)	2
1.52. Associate teachers	Full Prof. Martina Đuras, Full Prof. Srebrenka Nejedli, Associate Prof. Mirela Pavić Vulinović, teaching assistant Magdalena Kolenc, PhD, DVM; teaching assistant Kim Korpes, PhD, DVM; teaching assistant Ante Plećaš, PhD, DVM; teaching assistant Nikolina Škvorc, PhD, DVM; teaching assistant Mirta Vučković, PhD, DVM; teaching assistant Filip Kajin, PhD, DVM; teaching assistant Mirna Mandić Čukman, DVM; teaching assistant Iva Matijević, DVM	2.180. Type of instruction (number of hours L + S + E + e-learning)	10 L + 20 P
1.53. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	2.181. Expected enrolment in the course	
1.54. Status of the course	Elective	2.182. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	Merlin
2. COUSE DESCRIPTION			
4.105. Course objectives	Following successful completion of the course, students will be able to identify the major clinically important structures of the domestic mammals and explain their anatomical relationships. Acquired knowledge will facilitate to follow clinic courses.		
4.106. Course enrolment	Completed courses “Anatomy with organogenesis of domestic animals I”, “Anatomy with organogenesis of domestic animals II” and “Anatomy with organogenesis of domestic animals III”.		

<table>
<tr><td>requirements and entry competences required for the course</td><td colspan="3"></td></tr>
<tr><td>4.107. L
earning outcomes at the level of the programme to which the course contributes</td><td colspan="3">Following successful completion of the course, students will be able to apply acquired knowledge on clinical anatomy of domestic mammals during preclinical and clinical courses.</td></tr>
<tr><td>4.108. L
earning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="3">Following successful completion of the course, students will be able to:
17. list and describe major clinically important anatomical structures of domestic mammals
18. compare fixed anatomical organs with the same in live animals
19. discuss normal and pathological position of organs
20. demonstrate approach to the animals
21. apply anatomical nomenclature in clinical courses</td></tr>
<tr><td>4.109. C
ourse content broken down in detail by weekly class schedule (syllabus)</td><td colspan="3">Lectures: Clinical Anatomy of the head and neck (2 hours), Clinical Anatomy of the thorax (2 hours), Clinical Anatomy of the abdomen (2 hours), Clinical Anatomy of the forelimb (2 hours) and Clinical Anatomy of the hindlimb (2 hours).

Practicals:
A) Dissection room (Anatomy, Histology and Embryology):
Clinical Anatomy of the head and neck (2 hours), Clinical Anatomy of the thorax (2 hours), Clinical Anatomy of the abdomen (2 hours), Clinical Anatomy of the forelimb (2 hours) and Clinical Anatomy of the hindlimb (2 hours)

B) Clinic for Internal Disease:
Clinical Anatomy of the horses (3 hours), Clinical Anatomy of the ox (2 hours), Clinical Anatomy of the small ruminants (2 hours) and Clinical Anatomy of the carnivores (3 hours).</td></tr>
<tr><td>4.110. F
ormat of instruction:</td><td>☒ lectures
☐ seminars and workshops
☒ practicals
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td>☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>4.111. Comments:</td></tr>
<tr><td>4.112. S
tudent responsibilities</td><td colspan="3">The course has 10 hours of lectures and 20 hours of practicals. The student has to attend at least 5 hours of lectures (50%) and 14 hours of practicals (70%). Student requirements are defined in the Regulations on the Integrated Undergraduate and Graduate Study of Veterinary Medicine (2022). Given the above, the student must acquire a minimum number of points from all assessment elements in order to take the final exam. Article 41: a student can justifiably be absent from up to 50% of the lectures and 30% of the practicals.</td></tr>
</table>

4.113. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0.5	Research		Practical training	0.5
	Experimental work		Report		(other)	
	Essay		Seminar essay		(other)	
	Tests		Oral exam	1.0	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	Active student participation in the practical training will be graded during regular practicals. Identification and explanation of clinically important anatomical structures on the cadaver as well as on the live animals will be graded during the final oral exam.

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	KÖNIG, H. E., H.-G. LIEBICH (2007): Veterinary anatomy of domestic mammals, Textbook and colour atlas. 3rd Ed. Schattauer, Stuttgart, New York.		

2.49. Optional literature (at the time of submission of study programme proposal)	BOJD, J. S. (2001): Color Atlas of Clinical Anatomy of the Dog & Cat. 2nd Ed. Mosby, Edinburgh, London, New York, Oxford, Philadelphia, St Louis, Sydney, Toronto. COLVILLE, T., J. M. BASSERT (2002): Clinical Anatomy & Physiology for Veterinary Technicians. Mosby. CONSTANTINESCU, G. M. (1991): Clinical Dissection Guide for Large Animals. Mosby, St Louis, Baltimore, Boston, Chicago, London, Philadelphia, Sydney, Toronto.
2.50. Quality assurance methods that ensure the acquisition of exit competences	Grading of active participation in the practical training, one preliminary tests and final oral exam.
2.51. Other (as the proposer wishes to add)	The course „Clinical Anatomy“ has 20 hours of practicals; 50% (10 hours) of practicals are clinical practicals on live animals and should be organised in smaller groups.

COMPARATIVE ODONTOLOGY

1. GENERAL INFORMATION			
1.101. Course teacher	Prof. Zdravko Janicki PhD, DVM	2.183. Year of the study programme	5
1.102. Name of the course	Comparative Odontology	2.184. Credits (ECTS)	1
1.53. Associate teachers	Assoc Prof. Dean Konjević, Dipl. ECZM	2.185. Type of instruction (number of hours L + S + E + e-learning)	10+0+5
1.54. Study programme (undergraduate, graduate, integrated)	Integrated	2.186. Expected enrolment in the course	
1.55. Status of the course	Elective course	2.187. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
4.114. Course objectives	The aim of these lectures and seminars is to fulfil the student's knowledge in the field of comparative odontology and to form experts capable for prevention of dental pathologies and for adequate and reliable age estimation, as a part of management and population research.
4.115. Course enrolment requirements and entry competences required for the course	
4.116. Learning outcomes at the level of the programme to which the course contributes	1. to upgrade and stimulate critical evaluation of the observed changes on the animal teeth and their causes 2. to fulfil previously acquired knowledge on age estimation 3. to improve wildlife conservation and creation of management plans 4. to improve knowledge on characteristics of animal bites
4.117. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. acquire knowledge on characteristics of shape and structure of fish, amphibian, reptile and wild mammal dentition. 2. ability to identify animal at the level of family according to the characteristics of teeth 3. ability to understand feeding related characteristics of the teeth and evolutional adaptation 4. ability to recognize and reconstruct dental pathologies 5. ability to implement knowledge on different methods of age evaluation 6. to understand growth and reparation characteristics of permanently growing teeth

<table>
<tr><td>4.118. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Lectures (10)
1. Evolution and morphology of teeth of animals
2. Function and replacement of teeth
3. Characteristics of fish dentition
4. Characteristics of amphibian dentition
5. Characteristics of reptile dentition
6. Characteristics of mammal dentition I – monotremes, marsupials, cetacea
7. Characteristics of mammal dentition II – carnivores, herbivores, omnivores
8. Characteristics and pathology of teeth of permanent growth
9. Dental pathology
10. Age evaluation according to teeth characteristics

Excercises (5)
1. Bite characteristics – force, additional impacts
2. Trends in mammalian dentiton - relation between phylogenetic position and tooth development
3. Recognizing animal dentition and extracted teeth, skull inspection and recording the observed characteristics
4. Dental pathology
5. Tooth based age evaluation in animals – dental wear, tooth sections</td></tr>
<tr><td>4.119. Format of instruction:</td><td colspan="3">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☒ laboratory
☒ work with mentor
☐ (other)</td><td>4.120. Comments:
If possible, a visit to skull collection of Croatian Natural History Museum is anticipated.</td></tr>
<tr><td>4.121. Student responsibilities</td><td colspan="6"></td></tr>
<tr><td rowspan="5">4.122. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0.18</td><td>Research</td><td></td><td>Practical training, activity</td><td>0.10</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>0.32</td><td>Oral exam</td><td>0.40</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
</table>

<table>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="3">Class attendance: 20% (attendance at lectures – 13.3%, seminars - 2.7%, exercises – 4%)
Exercise activity (participation in the discussion): 30% of grade
Seminar (preparation, presentation, participation in discussion; instructions will be given at class): 10% of grade
Oral exam: 40% of grade</td></tr>
<tr><td rowspan="6">2.11. Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>1. Miles, A. E. W., C. Grigson (1990): Colyer's variations and diseases of the
teeth of animals, revised edn. Cambridge University Press, Cambridge</td><td>Department Library - 1</td><td>0</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>2.52. Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">1. Verstraete, F. J. M. (1999): Self assesment colour review of veterinary dentistry. Manson Publishing/The Veterinary Press, London
2. Wagenknecht, E. (1984): Alters-bestimmung des Erlegten Wildes. Neumann-Neudamm, Melsungen
3. Pindborg, J. J. (1970): Pathology of the dental hard tissues. Munskgaard, Copenhagen</td></tr>
<tr><td>2.53. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">Oral exam.</td></tr>
<tr><td>2.54. Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

COMPARATIVE ANATOMY OF THE SKELETAL SYSTEM

1. GENERAL INFORMATION			
1.103. Course teacher	Assistant Prof Ivan Alić; Deupty: Full Prof. Tajana Trbojević Vukičević	2.188. Year of the study programme	2nd year, 3rd semester
1.104. Name of the course	Comparative Anatomy of the Skeletal System	2.189. Credits (ECTS)	2
1.54. Associate teachers	Full Prof. Tajana Trbojević Vukičević; teaching assistant Magdalena Kolenc, PhD, DVM; teaching assistant Kim Korpes, PhD, DVM; teaching assistant Iva Matijević, DVM	2.190. Type of instruction (number of hours L + S + E + e-learning)	10+20+0
1.55. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	2.191. Expected enrolment in the course	
1.56. Status of the course	Elective	2.192. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	Merlin
2. COUSE DESCRIPTION			
4.123. Course objectives	Students will complete knowledge of comparative morphology, identify osteological features of thoracic and pelvic limb bones of wildlife animals, differentiate bone elements, and morphologically compare the bones of thoracic and pelvic limb of the game.		
4.124. Course enrolment requirements and entry competences required for the course	Completed courses “Anatomy with organogenesis of domestic animals I” and “Anatomy with organogenesis of domestic animals II”. **Maximum number of students: 20**		
4.125. Learning outcomes at the level of the programme to which the course contributes	After successful completion of the courses, students will be able to apply acquired knowledge during the courses primarily associated with hunting, but also some preclinical subjects such as pathology and pathological morphology.		

<table>
<tr><td>4.126. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">Following successful completion of the course, students will be able to: repeat the basic features of the bones of thoracic and pelvic limbs of animals; identify macromorphological features of thoracic and pelvic limbs bones of red deer, roe deer, wild boar, wolf, fox, hare and brown bear; differentiate the morphologic characteristics of limb bones of animals; compare the bones of thoracic and pelvic limbs of domestic animals and wildlife.</td></tr>
<tr><td>4.127. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">1. Basic features of thoracic limb bones of animals: red deer, roe deer, wild boar, wolf, fox, hare, brown bear.
2. Basic features of the pelvic limb girdle bones of animals: red deer, roe deer, wild boar, wolf, fox, hare, brown bear. 3. Basic features of the pelvic limb bones of animals: red deer, roe deer, wild boar, wolf, fox, hare, brown bear
Lectures:
Basic features of thoracic limb bones of animals: red deer, roe deer, wild boar, wolf, fox, hare, brown bear (5 hours);
Basic features of the pelvic limb bones of animals: red deer, roe deer, wild boar, wolf, fox, hare, brown bear (5 hours);
Exercises:
Basic features of zonopodium (scapula, clavicula) of animals thoracic limb (2 hours)
Basic features of stylopodium (humerus) and zeugopodium (ossa antebrachii) of animals thoracic limb (3 hours)
Basic features of zonopodium (os coxae) of animals pelvic limb (2 hours)
Basic features of stylopodium (os femoris) and zeugopodium(ossa cruris) of animals pelvic limb (3 hours)
Basic features of autopodium (basipodium, metapodium and acropodium) of thoracic and pelvic limb (5 hours)</td></tr>
<tr><td>4.128. Format of instruction:</td><td colspan="3">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>4.129. Comments:</td></tr>
<tr><td>4.130. Student responsibilities</td><td colspan="6">Presence at lectures and exercises. Activity in exercises. Passed preliminary exam and final oral exam.</td></tr>
<tr><td rowspan="4">4.131. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0,36</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Activity</td><td>0,2</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>0,64</td><td>Oral exam</td><td>0,8</td><td>(other)</td><td></td></tr>
</table>

	Written exam		Project		(other)	
2.10. Grading and evaluating student work in class and at the final exam	Attending lectures 3-6 points; attending exercises 8-12 points; participation at exercise 5-10 points; continous knowledge checking, preliminary exam 20-32 points; final, oral exam 24-40 points.					
2.11. Required literature (available in the library and via other media)	**Title**				**Number of copies in the library**	**Availability via other media**
	HILLSON, S. (1992): Mammal Bones and Teeth: An Introductory Guide to Methods of Identification. Institute of Archaeology, London.					
	KÖNIG, H. E., H.-G. LIEBICH (2007): Veterinary anatomy of domestic mammals, Textbook and colour atlas. 3rd Ed. Schattauer, Stuttgart, New York.					
	SCHMID, E. (1972): Atlas of animal bones for prehistorians, archaeologists and Quaternary geologists. Elsevier Publishing Company, Amsterdam-London-New York.					
2.55. Optional literature (at the time of submission of study programme proposal)	BABIĆ, K., D. MIHELIĆ. T. TRBOJEVIĆ VUKIČEVIĆ (2002): Komparativna anatomija koštanog sustava sisavaca i ptica. Skripta za internu upotrebu, Veterinarski fakultet Sveučilišta u Zagrebu, Zagreb. NICKEL, R., A. SCHUMMER, E. SEIFERLE (1986): The Anatomy of the Domestic Animals. Vol. 1: The Locomotor System of the Domestic Mammals, Verlag Paul Parey, Berlin-Hamburg.					
2.56. Quality assurance methods that ensure the acquisition of exit competences	Grading of active participation in the practical training, one preliminary tests and final oral exam.					
2.57. Other (as the proposer wishes to add)						

COMPARATIVE MUCOSAL IMMUNOLOGY

1. GENERAL INFORMATION			
1.105. Course teacher	Associate prof. Daniel Špoljarić, PhD	2.193. Year of the study programme	3
1.106. Name of the course	Comparative Mucosal Immunology	2.194. Credits (ECTS)	2
1.55. Associate teachers	Full prof. Maja Popović Nikolić Džolan, PhD Associate prof. Daniel Špoljarić, PhD	2.195. Type of instruction (number of hours L + S + E + e-learning)	L15 (9+6 e-learning)+5 S+10 E
1.56. Study programme (undergraduate, graduate, integrated)	integrated	2.196. Expected enrolment in the course	
1.57. Status of the course	elective	2.197. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	20%

2. COUSE DESCRIPTION	
4.132. Course objectives	Students will be able to recognize and understand the basic principles of mucosal immunology within veterinary medicine and public health.
4.133. Course enrolment requirements and entry competences required for the course	
4.134. Learning outcomes at the level of the programme to which the course contributes	1 Identify and define the meaning of mucosal immunology in the context of veterinary medicine and public health. 2. Define, describe and interpret the development and affiliation specific mucosal immunity in animals of veterinary interest. 3. Allocate the necessary knowledge to demonstrate the use of cellular and molecular methods for evaluating the protective ability of mucosal immunity in domestic animals.
4.135. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. Consider the meaning of mucosal immunology in the context of veterinary medicine and public health. 2. Connect content objects with prior knowledge of basic veterinary immunology, and critical set in the evaluation of future knowledge gained from internal and infectious diseases. 3. Distinguish development and special affiliation mucosal immunity in animals of veterinary interest. 4. Identify opportunities and achievements of cellular and molecular methods for the evaluation of protective mucosal immunity ability.
4.136. Course content broken down in detail by weekly class schedule (syllabus)	1. Immunobiology mucosa (Mucous historical aspects of immunology. Structure and function of mucosal barrier. Histocitology and topography characteristics of mucosal immune system (MIS). Nonspecific and specific defense mucosal surfaces. Differentiation, resignification and homing of immune cells of lymphatic tissue of the mucous membranes. Immunoglobulins mucosa. Cytokines mucosa. Adhesion molecules mucosal lymphocytes.

<table>
<tr><td></td><td colspan="6">Interactions of epithelial and immune cells of the mucous membranes. Induction and regulation of mucosal immune responses. Adhesion of bacteria to mucosal surfaces. Immunity and infection of the mucosa membranes. Oral tolerance. Immunodeficiency and mucosal immunity. Allergic response of the MIS.).
2. Ontogenesis and phylogenesis mucosal immunity (Prenatal and postnatal systemic and local immunization. Nonspecific and specific manipulation of the MIS. Stress as exogenous and endogenous modulator of mucosal immunity).
3. Mucosal immunomodulation (Ontogeny of mucosal immunity. Phylogenetic development of the MIS).
4. Methods for evaluation of mucosa immunocompetence.</td></tr>
<tr><td>4.137. Format of instruction:</td><td colspan="3">☐ lectures
☐ seminars and workshops
☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>4.138. Comments:</td></tr>
<tr><td>4.139. Student responsibilities</td><td colspan="6">Attending lectures, seminar and lab exercises. Preparing for lab from materials on Merlin. Preparing, presenting and defending one seminar.</td></tr>
<tr><td>4.140. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td colspan="6"><table>
<tr><td>Class attendance</td><td>0.36</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>activity (other)</td><td>0,2</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>0,64</td><td>Oral exam</td><td>0,8</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
</table></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">During the session of the “Comparative mucosal immunology” course a student must attend 8 hours of lectures in order to gain 3 minimal points. The maximal number of points gained from this evaluation element is 6 points. During the session of the “Comparative mucosal immunology” course a student must attend 4 hours of seminars in order to gain 4 minimal points during the semester. The maximal number of points gained from this evaluation element is 6 points. During the session a student must attend 8 hours of practices in order to gain 4 minimal points during the semester. The maximal number of points gained from this evaluation element is 6 points. During the session at the time of seminars and practices the student must solve specified problems from 5 seminar lessons and 10 exercise lessons, and he/she gains the lecturer’s signature for that. Each correctly done and signed seminar or exercise lesson is worth 2 point. At seminars and exercises a student can gain the total of 30 points. For preparation of a seminar work during seminar lessons the student earns 5 additional points. During the session a student must gain the total of 20 points in order to earn minimal 5 points. The maximal number of points gained from this evaluation element is 10. During the session seven preliminary exams will be organized at the time of exercises. During rounds will be organized one colloquium at the time of exercise of the 35 tasks or questions. Each correctly answered question or task is worth 1 point. Within this element it is possible</td></tr>
</table>

to achieve a maximum of 35 points. From student must achieve 22 points in order to achieve a minimum of 20 points. A student who does not gain minimal 22 points from preliminary exams during the session, has a right to a makeup preliminary exam containing teaching material from all programme exercises, which will be organized upon completion of the lessons in that session. The total number of points at the preliminary exam is 35. A student who passes the makeup preliminary exam with more than 50 % correct answers has right to take the final exam. The minimal conditions for passing at the first, second, third, fourth and five evaluation elements will be summed up and they will be worth a total of 36 points. In order to take the final exam a student should gain the stated 36 points. The final exam starts with a student's short analysis of results gained from the five types of activities of continuous knowledge checking. Questions in the final exam will be put in a way that a student can answer in writing. The maximum number of points that can be gained from the final exam is 60 points. A student must show at least a sufficient knowledge at the final exam regardless of gained number of points from the first five evaluation elements, which could be higher than 36. The minimal number of points a student must gain at the final exam is 36 in order to gain minimal number of 24 points. In case a student does not satisfy at the final part of the exam, the lecturer determines time for re-examination. Regardless of a fact that a student gained the number of points from the first four evaluation elements on the basis of makeup preliminary exam or not, the same rules are valid for forming the final mark. The final mark is formed on the basis of total sum from all six evaluation elements, according the following table. The final mark is expressed in terms of quantity by a numeric value and by a grade in accordance with points value, from 1 to 5. Student who didn't succesfully master the course programme is marked by 1. Mark 1 stands for unsufficient achievement.

Points	*Grade*
up to 59	1 (F)
60-68	2 (E)
69-76	2 (D)
77-84	3 (C)
85-92	4 (B)
93-100	5 (A)

2.11. Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
1 Valpotić, I., Božić, F., Vlahović, K., Popović, M., Brkljačić, M., Valpotić, H., Pavlak, M. (2014): Immunomodulation in domestic animals. Faculty of Veterinary Medicine, University of Zagreb.		

2.58. Optional literature (at the time of submission of study programme proposal)	
2.59. Quality assurance methods that ensure the acquisition of exit competences	Continuous oral and written checking of acquired knowledge
2.60. Other (as the proposer wishes to add)	

COMPARATIVE NUTRITION

1. GENERAL INFORMATION			
1.107. Course teacher	Full professor Tomislav Mašek	2.198. Year of the study programme	4th
1.108. Name of the course	Comparative Nutrition	2.199. Credits (ECTS)	1
1.56. Associate teachers	Full professor Željko Mikulec, Sunčica Heštera, DVM	2.200. Type of instruction (number of hours L + S + E + e-learning)	5+6+4
1.57. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	2.201. Expected enrolment in the course	
1.58. Status of the course	Elective	2.202. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	2nd level, 10%

2. COUSE DESCRIPTION	
4.141. Course objectives	The course objective is to show students the strategy of feeding and digestive physiology with emphasis on the comparative approach and ensure the students' acquired knowledge, skills and competencies are adequate to evaluate and make complex decisions in planning and implementing various types of animal feeding
4.142. Course enrolment requirements and entry competences required for the course	
4.143. Learning outcomes at the level of the programme to which the course contributes	• synthesize current knowledge about nutrition and physiology of all animals • assess the implications of the strategy of nutrition, the physiology of the digestive system and the diversification of animals to make decisions in veterinary practice
4.144. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Compare the anatomical characteristics of the digestive system in various species of domestic and wild animals. Compare the digestion and metabolism of the digestive system in various species of domestic and wild animals. Evaluate how the digestive physiology of wild animals can contribute to the breeding and nutrition of domestic animals. Compare the diets of different human populations and those of humans and animals.

<table>
<tr><td>4.145. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Lectures (4 hours):
• The evolution and ecology of feeding strategies, autoenzimatic digestion, aloenzimatic digestion, classification of animals according to the strategy of nutrition and physiology of the digestive system, Hoffman division (concentrate selectors, pasture, mixed) and criticism (the effect on physical properties of feed in the rumen, stratification and diversification of herbivores)
• Fermentation: fore-stomach (ruminants and non-ruminants, birds), post-gastric (cecum, colon, cecum and colon), mutual comparison, the advantages and disadvantages, the distribution of species according to the site of fermentation and body mass, the theory of extinct species
Seminars (4 hours):
• Implications of Hoffman division and feeding of animals in ZOO, the implications of Hoffmann in farm animal rations
• Animals as models in nutrition science
Exercises (5 hours):
• Specific strategies and unusual examples (birds with a high proportion of fiber in feed - Hoatzin, kolobos monkeys, for-gut fermentation, hippopotamus), hibernation
E-classes (2 hours):
• Nutrition of wild animals and modern human (caveman diet, the ratio of intake of cholesterol and fatty acids n3/n6)</td></tr>
<tr><td>4.146. Format of instruction:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☒ exercises
☐ online in entirety
☐ mixed e-learning
☐ field work</td><td colspan="2">☐ independent study
☒ multimedia and the internet
☐ laboratory
☒ work with the mentor
☐ (other)</td><td>4.147. Comments:</td></tr>
<tr><td>4.148. Student responsibilities</td><td colspan="6"></td></tr>
<tr><td rowspan="6">4.149. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0.05</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td>0.2</td><td>(other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>0.5</td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td>0.25</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td></td><td colspan="5"></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6"></td></tr>
</table>

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	Cheeke, PR, Dierenfeld ES (2010) Comparative animal nutrition and metabolism, CABI		
2.61. Optional literature (at the time of submission of study programme proposal)			
2.62. Quality assurance methods that ensure the acquisition of exit competences			
2.63. Other (as the proposer wishes to add)			

CONSERVATION AND MANAGEMENT OF ENDANGERED SPECIES

1. GENERAL INFORMATION			
1.109. Course coordinator	Prof. dr. sc. Josip Kusak The substitute of course coordinator: prof. dr. sc. Tomislav Gomerčić	2.203. Year of the study program	the first
1.110. Name of the course	Conservation and management of endangered species	2.204. Credits (ECTS)	1
1.57. Course teachers	Prof. dr. sc. Josip Kusak Prof. dr. sc. Tomislav Gomerčić Assoc. prof. dr. sc. Magda Sindičić Assoc. prof. dr. sc. Daniel Špoljarić Assist. Ira Topličanec	2.205. Type of instruction (number of hours L + S + E + e-learning)	L=0; S=0; P=15
1.58. Study program (undergraduate, graduate, integrated)	integrated	2.206. Expected enrolment in the course	15
1.59. Status of the course	Facultative (elective)	2.207. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	20% (three hours)
2. COUSE DESCRIPTION			
4.150. Course objectives	The aim is to give students the ecological and sociological perspective of conservation of rare and endangered species. The course is a specific extension of the course «Zoology», and specifically of the section «basic ecology». Rare and endangered species do deserve special attention. Legal protection is typically basic but not sufficient mean to secure the species survival. Analyzed are the mechanisms of complex management that include all human-interest groups, with positive and negative attitude towards the species in concern. The		

	examples of need for such complex management are species like bear, wolf, lynx, dolphins, monk seals, birds of prey including fish eating birds. International and Croatian models are discussed. Mutual understanding of all interest groups for the role of each species is to be stimulated. The role of veterinarians is exemplified		
4.151. Course enrolment requirements and entry competences required for the course	none		
4.152. Learning outcomes at the level of the programme to which the course contributes	**1. evaluate** key threats of animals by taxonomic groups **2. select** optimal conservation measures for certain species		
4.153. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	**1. distribute** animal species according to IUCN threat categories **2. recognize** interest groups in management of certain species **3. understand** procedures of involving interest groups and methods of public surveys **4. set up** elements of species management plan		
4.154. Course content broken down in detail by weekly class schedule (syllabus)	IUCN – Caring for the Earth, World conservation strategy, Importance of selected environments, Influences of man through animal production. Croatian situation – causes of big diversity of species and landscapes. Terrestrial and aquatic ecosystems. State and perspectives for Croatian rare species – large carnivores as examples. Presentations and discussions of state and management of brown bear, wolf, and lynx in Croatia. Worldwide situation. International conventions, public interest, economic value, and the role of course teachers in large carnivore research and management. Social aspects of endangered conservation. Methods of «human dimension surveys» and application of data to species management. International actions and role of Croatia on worldwide level. Examples of reintroductions of bears and lynx in Europe, and wolves in America. Bear management plan for Croatia. Wolf management plan for Croatia. Lynx management plan for Croatia. Features and implementation * Attached bellow in the form of Table.		
4.155. Format of instruction:	☐ lectures ☐ seminars and workshops ☒ exercises ☐ on line in entirety ☒ partial e-learning (20%)	☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	4.156. Comments:

	☐ field work					
4.157. Student responsibilities	Attending lectures, preparing from materials on LMS, preparing, presenting and defending the seminar					
4.158. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	**0,18**	Research		Practical training	
	Experimental work		Report		**Activity** (other)	**0,1**
	Essay		Seminar essay		(other)	
	Tests	**0,32**	Oral exam		(other)	
	Written exam	0,40	Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	During the course students do participate discussing the real situations with rare species conservation. They prepare a seminar paper which is orally presented and graded. Continuous knowledge checking and an exam in form.		
2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Majić-Skrbinšek, A. (ed.) 2005. Lynx management plan for Croatia. Državni zavod za zaštitu prirode, Zagreb	10+WEB	
	Štrbenac, A., Đuro Huber, J. Kusak, A. Majić-Skrbinšek, A. Frković, Ž. Štahan, J. Jeremić-Martinko, S. Desnica, and P. Štrbenac. 2005. Wolf management plan for Croatia. Državni zavod za zaštitu prirode.	10+WEB	
	Huber, Đ., Z. Jakšić, A. Frković, Ž. Štahan, J. Kusak, D. Majnarić, M. Grubešić, B. Kulić, M. Sindičić, and A. M. Skrbinšek. 2008. Brown bear management plan for the Republic of Croatia. Ministarstvo regionalnog razvoja, šumarstva i vodnoga gospodarstva, Uprava za lovstvo.	10+WEB	
2.64. Optional literature (at the time of submission of study programme proposal)	John H. Postlethwait, Janet L. Hopson (1989): The nature of life. USA Odum, E. (1988): Fundamentals of ecology, USA Sinauer Associates Inc, Massachusetts, USA Pimac, R. B. (1995): A primer of conservation biology. Sinauer Associates Inc, Massachusetts, USA		

2.65. Quality assurance methods that ensure the acquisition of exit competences	Attendance of seminars and exam.
2.66. Other (as the proposer wishes to add)	-

CYNOLOGY AND FELINOLOGY

1. GENERAL INFORMATION			
1.111. Course teacher	Assoc prof Niksa Lemo	2.208. Year of the study programme	4
1.112. Name of the course	Cynology and Felinology	2.209. Credits (ECTS)	2,0
1.58. Associate teachers	/	2.210. Type of instruction (number of hours L + S + E + e-learning)	20 L, 10 E
1.59. Study programme (undergraduate, graduate, integrated)	Undergraduate	2.211. Expected enrolment in the course	
1.60. Status of the course	active	2.212. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1
2. COUSE DESCRIPTION			
4.159. Course objectives	The goal of the course in Cynology is to enable interested students become well-acquainted with the particular characteristics of thoroughbred dog varieties in terms of breed variation and the specifics of inheritance, breeding, and training.		
4.160. Course enrolment requirements and entry competences required for the course	/		
4.161. Learning outcomes at the level of the programme to which the course contributes			
4.162. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	During the course of the semester, students become acquainted with the biological origins of dogs; this knowledge will help them in the understanding future patients, observing specific symptoms, harmonization of treatment and easiest talking with owner about dogs caring. Felinology, as part of lecture, is very important in introducing cat as companion animal, which has had been natural character of beast trough the thousand years living in human surrounding area, and cats did not change natural instincts in that period. Knowledge and skills from Felinology will help to all students in work with cats as patients, examination and treatment of cats, and easiest talking with owner. In		

	this collegium student learn about specific vocabulary as part of veterinary medicine, these skills will help them in understanding of literature. Developing of vocabulary abilities are divided in oral and written level.
4.163. Course content broken down in detail by weekly class schedule (syllabus)	1.The origin of the dog (biological origin of the dog, ties with other canides today, the coming together of humans and dogs, the role of the dog in primitive society, the development of breeds through the history of society, the role of the dog in today's society); 2. The physical build of dogs in the eyes of a cynologist (cynological anatomical terminology, special cynological terms for characteristic shapes of the teeth, nose, ears, tail, legs, paws, breast, fur, color, etc. Changes during the development of a young dog, aging, age determination); 3. dog breeding (Fundamentals of inheritance, the sexual cycle, mating , pregnancy, birth, congenital defects among puppies, inherited defects in physical build, inherited nervous conditions, inherited eye diseases, inherited behavioral defects, various other inherited conditions, the inheritance of color. Breeding methods for related and unrelated dogs); 4. Dog hygiene (natural method of hygiene maintenance, hygiene maintenance for dogs who live in the household, brushing, combing, washing, clipping, trimming, common mistakes in dog hygiene, the performance of waste functions, environmental hygiene) and accommodation of dogs (accommodating a dog in a house or apartment, in a garden or courtyard, in a kennel; types and dimensions of living quarters, veterinary-hygienic attitudes about kennels, transportation of dogs); 5. Feeding dogs (natural foods, the influence of humans on the diet of dogs, the influence of diet on health, harmful substances commonly found in dog food, dog food ingredients, number of meals, and preparation of food. The influence of food preparation on its hygienic and nutritional value; 6. Pure-bred dogs (the concept of pure-bred varieties, pedigrees, cynology, dog-lovers, kennel clubs, cynological work, the division of breeds into morphological characteristics, the division of breeds according to work capabilities, the division of breeds according to FCI classifications, Croatian dog breeds, most common foreign breeds in Croatia);

	7. Training and Education (nervous system, senses, reflexes, learned or associative actions, methods of creating associative actions, application in training and education, estimating the nature of individual dogs; 8. Dog judging at open shows (introduction of way of judge's work during valorization of dog's standard); 9. Judging working abilities of dogs (introduction of characteristic of working breeds); 10. Visit to international dog show (observing the most successful dogs in many different breeds); 11. The Origin of the domestic cat (biological origin of the cat, ties with other felines today, the coming together of humans and cats); 12.The Physical build of cat (anatomical terminology for characteristic shapes of the teeth, nose, ears, tail, legs, paws, breast, fur, color, etc. Specific cat senses and reflex; 13. Felinology organizations and expositions, cat breeds (purebred, pedigrees, dividing breeds depends of morphological characteristic, European domestic breeds, exotic breeds); 14. Cat hygiene and feeding (hygiene of cat, environment hygiene, feeding); 15. International cat show (observing the most successful cats in many different breeds);		
4.164. Format of instruction:	☐ lectures ☐ seminars and workshops ☐ exercises ☐ on line in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	4.165. Comments:
4.166. Student responsibilities			

4.167. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance		Research		Practical training	
	Experimental work		Report		(other)	
	Essay		Seminar essay		(other)	
	Tests		Oral exam		(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam			
2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	1. Bauer, M. (2000): Kinologija I – uzgoj, njega i hranidba pasa; udžbenik, vlastito izdanje, Zagreb		
	2. Bauer, M. (1985): Pas moj prijatelj, priručnik, Sveučilišna naklada Liber, Zagreb		
	3. Bauer, M., T.Babić (1994): Knjiga o mački, priručnik, vlastita naklada, Zagreb		
2.67. Optional literature (at the time of submission of study programme proposal)	1. Taylor, D. (1989): Vaš pas, priručnik, Mladost, Zagreb 2. Pugnetti, G. (1983): Sve o psima, priručnik, Mladost, Zagreb 3. Willis, M. B. (1984): Zuchtung des Hundes. Verlag Eugen Ulmer, Stuttgart 4. Meyer, H. (1983): Ernahrung des Hundes. Verlag Eugen Ulmer, Stuttgart 5. Taylor, D. (1989): Vaša mačka, priručnik, Mladost, Zagreb		

2.68. Quality assurance methods that ensure the acquisition of exit competences	
2.69. Other (as the proposer wishes to add)	

CYTOMETRY IN CLINICAL VETERINARY MEDICINE

1. GENERAL INFORMATION			
1.113. Course teacher	Full prof. Maja Popović Nikolić Džolan, PhD	2.213. Year of the study programme	2
1.114. Name of the course	Cytometry in Clinical Veterinary Medicine	2.214. Credits (ECTS)	2
1.59. Associate teachers	Full prof. Maja Popović Nikolić Džolan, PhD Associate prof. Daniel Špoljarić, PhD	2.215. Type of instruction (number of hours L + S + E + e-learning)	0+15S (9+6 e-learning)+15E
1.60. Study programme (undergraduate, graduate, integrated)	integrated	2.216. Expected enrolment in the course	
1.61. Status of the course	elective	2.217. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	20%

2. COUSE DESCRIPTION	
4.168. Course objectives	Students will be able to recognize and understand the basic principles of flow cytometry as a modern analytical methods for quantitative and qualitative analysis of animal cells within the cell population of interest.
4.169. Course enrolment requirements and entry competences required for the course	
4.170. Learning outcomes at the level of the programme to which the course contributes	1 Students will be able to recognize and understand the contemporary aspects of flow cytometry within veterinary medicine and public health. 2. Understand and apply different methods of sampling, preparation and processing of samples for structural analysis by flow cytometry, depending on the type of samples of animal origin.
4.171. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. Understand and apply different methods of sampling, preparation and processing of samples for flow cytometry analysis function depending on the type of samples of animal origin. 2. Know prepare protocols work in laboratories for processing, preparation and analysis of samples of animal origin flow cytometer. 3. Know and apply the routine / daily check of linearity, optical flow and system flow cytometer. 4. Check the accuracy of the apparatus for flow cytometry using the fluorescent microsphere suspension.
4.172. Course content broken down in detail by weekly class schedule (syllabus)	Basic principles of flow cytometry as a modern analytical methods for quantitative and qualitative analysis of animal cells within the cell population of interest. Historical development of flow cytometry of multidisciplinary scientific method to the independent laboratory discipline and its application in the world and in Croatia as part of clinical cytology and cytogenetics of interest in veterinary medicine and public health. Physico-chemical and

<table>
<tr><td></td><td colspan="6">molecular immune principles of flow cytometry. Differentiation of membrane molecules (CD markers). Immunophenotyping of cells of animal origin (application -specific antibodies for differentiation of membrane and/or intracellular antigens). Cytometric analysis of structural cells of animal origin (intracellular cell properties, size, shape, granularity, content of nucleic acids, chromosome analysis). Flow cytometric analysis of the function of cells of animal origin (measurement of the mouth of Ca+2 into the cell, the measurement of the polarization of the cell membrane, the pH inside the cell, determining the phagocytic capacity of cells, measuring the intensity of oxidative stress, intracellular cytokine determination, determination of cell cycle, determining the proliferative capacity of the tumor). Cytometric analysis of different types of cell samples of animal origin (peripheral blood, bone marrow, lymph nodes aspirated fragments, swabs, washings, solid tissue prepared in the form of suspension cells, semen, excrement, meat, milk). Methods of sampling, preparation and processing of samples for analysis by flow cytometry, depending on the type of samples of animal origin.</td></tr>
<tr><td>4.173. Format of instruction:</td><td colspan="3">☐ lectures
☐ seminars and workshops
☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="3">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td></td><td colspan="6">4.174. Comments:</td></tr>
<tr><td>4.175. Student responsibilities</td><td colspan="6">Attending seminar and lab exercises. Preparing for lab from materials on Merlin. Preparing, presenting and defending one seminar.</td></tr>
<tr><td rowspan="6">4.176. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0.36</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Activity (other)</td><td>0,2</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>0,64</td><td>Oral exam</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>0,8</td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">During the session of the “Cytometry in clinical veterinary medicine” course a student must attend 12 hours of seminars in order to gain 4 minimal points during the semester. The maximal number of points gained from this evaluation element is 6 points. During the session of the “Cytometry in clinical veterinary medicine” course a student must attend 12 hours of practials in order to gain 8 minimal points during the semester. The maximal number of points gained from this evaluation element is 12 points. During the session at the time of seminars and practices the student must solve specified problems from 15 seminar lessons and 15 exercise lessons, and he/she gains the lecturer’s signature for that. Each correctly done and signed seminar or exercise lesson is worth 1 point. At seminars and exercises a student can gain the total of 30 points. For preparation of a seminar work during seminar lessons the student earns 5 additional points. During the session a student must gain the total of 18 points in order to earn minimal 5 points. The maximal number of points gained from this evaluation element is 10. During rounds will be organized one colloquium at the time of exercise of the 35 tasks or</td></tr>
</table>

questions. Each correctly answered question or task is worth 1 point. Within this element it is possible to achieve a maximum of 35 points. From student must achieve 22 points in order to achieve a minimum of 20 points. A student who does not gain minimal 22 points from preliminary exams during the session, has a right to a makeup preliminary exam containing teaching material from all programme exercises, which will be organized upon completion of the lessons in that session. The total number of points at the preliminary exam is 35. A student who passes the makeup preliminary exam with more than 50 % correct answers has right to take the final exam. The minimal conditions for passing at the first, second, third and fourth evaluation elements will be summed up and they will be worth a total of 36 points. In order to take the final exam a student should gain the stated 36 points. The final exam starts with a student's short analysis of results gained from the four types of activities of continuous knowledge checking. Questions in the final exam will be put in a way that a student can answer in writing. The maximum number of points that can be gained from the final exam is 60 points. A student must show at least a sufficient knowledge at the final exam regardless of gained number of points from the first four evaluation elements, which could be higher than 36. The minimal number of points a student must gain at the final exam is 36 in order to gain minimal number of 24 points. In case a student does not satisfy at the final part of the exam, the lecturer determines time for re-examination. Regardless of a fact that a student gained the number of points from the first four evaluation elements on the basis of makeup preliminary exam or not, the same rules are valid for forming the final mark. The final mark is formed on the basis of total sum from all six evaluation elements, according the following table. The final mark is expressed in terms of quantity by a numeric value and by a grade in accordance with points value, from 1 to 5. Student who didn't succesfully master the course programme is marked by 1. Mark 1 stands for unsufficient achievement.

Points	*Grade*
up to 59	1 (F)
60-68	2 (E)
69-76	2 (D)
77-84	3 (C)
85-92	4 (B)
93-100	5 (A)

2.11. Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
Popovic, M., K. Vlahović (2014): Handbook of Clinical Cytometry course in veterinary medicine: Application of flow cytometry in veterinary medicine. Faculty of Veterinary Medicine, University of Zagreb.		

2.70. Optional literature (at the time of submission of study programme proposal)			
2.71. Quality assurance methods that ensure the acquisition of exit competences	Continuous oral and written checking of acquired knowledge		
2.72. Other (as the proposer wishes to add)			

DISEASES OF HONEYBEES IN CONTEMPORARY PRODUCTION

1. GENERAL INFORMATION			
1.1. Course teacher	Assoc. Professor Krešimir Matanović	1.6.Year of the study programme	5th and 6th
1.2.Name of the course	Diseases of Honeybees in Contemporary Production	1.7.Credits (ECTS)	1
1.3.Associate teachers	Full Prof. Ivana Tlak Gajger, Assoc. Professor Krešimir Matanović, Valerija Benko, PhD, DVM	1.8.Type of instruction (number of hours L + S + E + e-learning)	6+2+7+0
1.4.Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate university study of veterinary medicine	1.9.Expected enrolment in the course	
1.5.Status of the course	Elective	1.10.Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	razina 1 *on line* 10%
2. COUSE DESCRIPTION			
2.1.Course objectives	Course is predicted for students who wants expand general knowledge about beekeeping and for better understanding role of veterinarians in recognition and eradication of honey bee diseases. From abilities is provided acquisition modern ways of beekeeping, honey bee products obtaining, including artifical production of qeens, artificial insemination and production of swarms.		
2.2.Course enrolment requirements and entry competences required for the course	Completed exam in Biology and Pathology of Beneficial Insects.		

<table>
<tr><td>2.3.Learning outcomes at the level of the programme to which the course contributes</td><td colspan="3">Course is following an obligatory course Biology and pathology of beneficial insects. Attending this course enable for diagnostic labarotory and field work at array of rearing honeybee colonies, production of swarms, queens and honeybee products.</td></tr>
<tr><td>2.4.Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="3">- Define place and role of veterinarian in recognation and eradication of honeybee diseases
- Apply achieved knowledge in biology and pathology for obtain quality and hygenic approved honeybee products
- Participate in work with artificial queens and swarms production.</td></tr>
<tr><td>2.5.Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="3">Lectures (6):
- Role of veterinarians in intensive beekeeping production
- Effects of selection on productivity and health of honeybee colonies
- Honeybee products and apitherapy
- Honeybee products and apitherapy

Seminars (2):
- Honeybee diseases which are eradicated according legislation directives, “new diseases”
- Asian yellow leg hornet (Vespa velutina)

Exercises (7):
- Examination of honeybee colony
- Artificial rearing of queens
- Artificial insemination of queens
- Biological and molecular methods of honeybee diseases diagnostic</td></tr>
<tr><td rowspan="2">2.6.Format of instruction:</td><td>☒ lectures
☒ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☒ field work</td><td>☐ independent assignments
☐ multimedia and the internet
☒ laboratory
☐ work with mentor
☐ (other)</td><td>2.7.Comments:</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>2.8.Student responsibilities</td><td colspan="3">Active attending and participation at lectures (50%), seminars (70%), exercises and field work (70%). Accessing to continuous knowledge checking and final exam.</td></tr>
</table>

2.9.Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0.18	Research		Practical training	
	Experimental work		Report		Activity on exercises and seminars	0.1
	Essay		Seminar essay	**0.32**	(other)	
	Tests		Oral	0.40	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam			
2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	1. Vidal-Naquet, N. (2015): Honeybee Veterinary Medicine: Apis mellifera L. 5m Publishing Benchmark House, Sheffield, UK. 2. Laidlaw, H. H. (2005): Production of queens and pacage bees. The hive and the honey bee (ed. J. M. Graham). Dadant and Sons, Illinois, USA. 3. Tlak Gajger, I. (2021): Honeybee Diseases in Modern Production. University of Zagreb Faculty of Veterinary Medicine, Zagreb.	1	
	4. PP presentations of lectures, seminars and exercises		LMS
2.12.Optional literature (at the time of submission of study programme proposal)	1. Connor, L. J., R. Muir (2012): Bee – sential: a field guide. Wicwas Press, Michigan, USA. 2. Iatridou, D., L. Pohl, I. Tlak Gajger, N. De Briyne, A. Bravo, J. Saunders (2019): Mapping the teaching of honeybee veterinary medicine in the European Union and European Free Trade Area. Vet. Rec. Open 6:e000343. doi:10.1136/ vetreco-2019-000343		

2.13.Quality assurance methods that ensure the acquisition of exit competences	Final exam – oral. Monitoring the attendance of lectures, seminars and exercises, the success on the final oral exam.
2.14.Other (as the proposer wishes to add)	Anonymous student questionare.

EMERGING INFECTIOUS DISESASES

1. GENERAL INFORMATION			
1.115. Course teacher	Prof. Zrinka Štritof	2.218. Year of the study programme	6th
1.116. Name of the course	Emerging infectious disesases	2.219. Credits (ECTS)	2
1.60. Associate teachers	prof. Vilim Starešina, PhD; prof. Nenad Turk, PhD; prof. Ljubo Barbić, PhD; assoc. prof Suzana Hađina, PhD; assoc. prof Josipa Habuš, PhD; assoc. prof Vladimir Stevanović, PhD; assist. prof Matko Perharić, PhD	2.220. Type of instruction (number of hours L + S + E + e-learning)	28 + 0 + 2 + 0 = 30
1.61. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	2.221. Expected enrolment in the course	
1.62. Status of the course	Elective (optional)	2.222. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	0
2. COUSE DESCRIPTION			
4.177. Course objectives	Students gain knowledge about emerging infectious diseases of animals that are not present in Croatia and the region but are characterized by the rapid expansion and cause great economic losses. Knowledge of these diseases is important because today's highly intense international transport of animals, animal products, raw materials, vectors and humans potentially increases the likelihood emergence of these diseases. Good knowledge of emerging diseases, their surveillance, control and eradication complements and enhances the competence of veterinary experts.		
4.178. Course enrolment requirements and entry competences required for the course	Domestic animal infectious diseases course completion (passed exam).		
4.179. Learning outcomes at the level of the	Capability of recognizing infectious nature of disease (based on history and signalment).		

<table>
<tr><td>programme to which the course contributes</td><td>Awareness of possibility of dealing with emerging infectious disease (history taking)

Knowledge of presence of emerging diseases in various geographical areas.

Familiarity with available diagnostic methods.</td></tr>
<tr><td>4.180. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td>After successfully mastering the course students will be able to :

- suspect emerging infectious diseases
- identify factors that may lead to the appearance of emerging infectious diseases
- apply temporary measures to prevent the spread of emerging infectious diseases
- choose proper methods in order to diagnose the emerging infectious diseases
- apply the procedures of general prophylaxis
- connect the proper legal provisions with the case of occurrence of certain emerging infectious diseases
- recommend measures for the control and prevention of emerging infectious diseases that are not legally regulated</td></tr>
<tr><td>4.181. Course content broken down in detail by weekly class schedule (syllabus)</td><td>Curse content

<table>
<tr><th>Hours</th><th>TEACHING AND THEME (lectures, seminars)</th></tr>
<tr><td></td><td>Lectures</td></tr>
<tr><td>2</td><td>Introduction to emerging domestic animal infectious diseases</td></tr>
<tr><td>2</td><td>Dourine</td></tr>
<tr><td>2</td><td>Sheep and goat pox, Crimean Congo fever</td></tr>
<tr><td>2</td><td>Epizootic lymphangitis</td></tr>
<tr><td>2</td><td>Contagious bovine pleuropneumonia</td></tr>
<tr><td>2</td><td>Rinderpest</td></tr>
<tr><td>2</td><td>Peste of small ruminants</td></tr>
</table>
</td></tr>
</table>

2	Contagious pleuropneumonia of goats	
2	Rift valley fever	
2	Glanders	
2	Dermatofilosis, Lumpy skin disease	
2	Anaplasmosis	
2	Contagious agalactia of sheep and goats	
2	Lumpy skin disease	
	Exercises	
2	Eastern and western equine encephalomyelitis	

4.182. Format of instruction:	x lectures ☐ seminars and workshops x exercises ☐ on line in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	4.183. Comments:
4.184. Student responsibilities			

4.185. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
Class attendance	0,8	Research		Practical training		
Experimental work		Report		Class activities		
Essay		Seminar essay		(other)		
Tests		Oral exam	1,2	(other)		
Written exam		Project		(other)		

2.10. Grading and evaluating student work in class and at the final exam

TYPES OF ACTIVITIES	MINIMAL NUMBER OF POINTS	MAXIMAL NUMBER OF POINTS
Attending lectures	**40**	**58**
(28 lecture hours)		18:14=1.28 (per excercise hour)
	(a student must attend 14 lecture hours in order to gain minimal 40 points)	(for maximum of 58 points, student has to attend 28 seminar hours)
Attending excercises	**0**	**2**
(2 exercise hours)		
		(a student gains 2 points for attending an excercise)

Final exam	**20**	**40**
(oral exam with 5 questions) 1 question = 8 points	(**a student must gain a minimum of 4 points to each question** to obtain a minimum of 20 points at the final exam)	
Total	**60**	**100**

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	Radostits, O. M., C. C. Gay, K. W. Hinchcliff, P.D. Constable (2011): A textbook of the disease of cattle, horses, sheep, pigs and goats. 10th edition. Saunders Elsevier	3	
	https://www.woah.org/en/what-we-do/animal-health-and-welfare/animal-diseases/		
2.73. Optional literature (at the time of submission of study programme proposal)	Spickler, A. R., J. A. Roth (2008): Emerging and exotic diseases of animals. 3rd edition. Iowa State University, College of Veterinary Medicine, Ames, Iowa, USA		
2.74. Quality assurance methods that ensure the acquisition of exit competences			
2.75. Other (as the proposer wishes to add)			

ENGLISH FOR ACADEMIC PURPOSES I

1. GENERAL INFORMATION			
1.117. Course teacher	Dubravka Vilke-Pinter, Ph.D.	2.223. Year of the study programme	2
1.118. Name of the course	English for academic purposes I	2.224. Credits (ECTS)	4
1.61. Associate teachers		2.225. Type of instruction (number of hours L + S + E + e-learning)	8 hours of L + 40 hours of S (of which 12 hours of e-learning) + 12 hours of E
1.62. Study programme (undergraduate, graduate, integrated)	University Integrated Undergraduate and Graduate Study Programme Veterinary Medicine	2.226. Expected enrolment in the course	
1.63. Status of the course	elective	2.227. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
4.186. Course objectives	The course English for Academic Purposes I is specifically designed for its target group, namely students of veterinary medicine. The primary objective of the course is to develop students overall written and oral competence in English, enabling them to communicate effectively in a professional context. Particular emphasis is placed on the analysis of professional literature. A range of texts from diverse sources, including textbooks, professional and scientific journals, popular magazines, and web-based materials, is analyzed to familiarize students with different types of discourse. Students are introduced to texts representing a variety of genres, differing in content, function, style, and form (e.g., summaries, reports, discussions, and essays), as well as to the language structures typically used in technical texts.		

	Students develop their skills in text organization through paragraph and essay writing. Particular emphasis is also placed on the development of oral proficiency, including the ability to present, interpret, and synthesize information, follow complex lines of argument, and participate effectively in meaningful discussions.
4.187. Course enrolment requirements and entry competences required for the course	
4.188. Learning outcomes at the level of the programme to which the course contributes	The course focuses on assisting students in developing the skills to speak and write effectively and fluently in an English speaking academic setting. By getting acquainted with the different types of discourse, in particular of that of academic English and the discourse characteristic of the field of veterinary medicine, students improve and develop their ***overall*** academic performance as well as the skills of reading research ***literature***. A particular focus is also put on attaining oral proficiency, that is, presenting, interpreting and connecting thoughts as well as following complex lines of arguments and taking part in meaningful discussions.
4.189. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Having successfully completed this course students will be able 1. to recognize and distinguish between different types of academic writing (e.g., professional and scientific papers, reports, summaries, and presentations). 2. to apply the skills needed to analyze the structural and functional features of different formats of writing in English. 3. to identify, access, and use information from a range of sources, such as online academic databases and scientific or professional journals. 4. to develop understanding of the relations between constituent parts of the text and various language means to achieve text cohesion. 5. to participate in discussions, follow continuous argument and deliver a well structured presentation under the supervision of the language teacher.
4.190. Course content broken down in detail by weekly class schedule (syllabus)	Aims and subject of the course. The ***concept*** of English for academic purposes (EAP) vs. general English. Main characteristics of academic register. Types of professional and academic texts: scientific papers, professional papers, reports, summaries, presentations, essays, projects and their main characteristics. Reading with comprehension. Reading skills and techniques: skimming, scanning, reading for detail. Information organisation. Topic sentences, supporting sentences. Key

	words. Structure and organisation of academic texts. Main parts of an academic paper. Essays and reports. Achieving cohesion (in a sentence, paragraph, whole text). Review of the basic types of cohesive devices and their function in academic texts: expressing time relations, causality, contrast. Defiinitions, simple definitions, academic definitions. Studying different information sources. Research papers in online databases (PubMed, Web of Science, etc.). Using literature; Quoting; Paraphrasing. Data interpretation. Stating facts/expressing opinions. Generalisations. Cautious reasoning. Data interpretation. Interpreting graphical presentations. Classifications and exemplification. Oral presentations. Planning a presentation. Identifying goals and aims of presentations. Providing feedback on presentations.

4.191. Format of instruction:	☐ lectures ☐ seminars and workshops X ☐ exercises X ☐ on line in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	4.192. Comments:
4.193. Student responsibilities			

4.194. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
Class attendance	0,18	Research		Practical training		
Experimental work		Report		Class participation	0,10	
Essay		Seminar essay		(other)		
Tests		Oral exam	0,32	(other)		
Written exam	0,40	Project		(other)		

2.10. Grading and evaluating student work in class and at the final exam		**Assessment elements**

	Overall grade elements	9. class attendance 10. class participation 11. continual assessment 12. final exam		
	Lectures attendance **Exercises attendance**	8 hourly classes	Minimum number of points required: 2 Students must attend at least 4 hourly classes to achieve minimum number of points	Maximum number of points: 3
		12 hourly classes	Minimum number of points required: 3 Students must attend at least 8 out of 12 hourly classes to be awarded minimum number of points.	Maximum number of points: 5
	Seminar attendance	40 hourly classes	Minimum number of points required: 6 Students must attend at least 28 out of 40 hourly classes to be awarded minimum number of points.	Maximum number of points: 10

	Class participation		Minimum number of points required: 5 Students must earn at least 5 out of 10 points by actively participating at classes. In each class, students complete various assigmenents and can earn 1 point per class (coefficient: 10/60 = 0,17).	Maximum number of points 10	
	Continual assessment		Minimum number of points required: 20 Students deliver their oral presentations.	Maximum number of points: 32	
	Final exam		Minimum number of points required: 24 After reading an original academic paper of their own choice, students write a reading report, which they present at the oral part of the exam.	Maximum number of points: 40	
	Final grade	Final grade is based on performance in 4 grading elements. Students are entitled to take the final exam if they have earned the minimum number of points for each of the assessed elements (total of 36 points).			

<table>
<tr><td rowspan="2">2.11. Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>VILKE-PINTER, D. (2019): English for Academic Purposes (Part 1). Reading materials. Each student receives his/her copy of the class materials.</td><td>3</td><td></td></tr>
<tr><td>2.76. Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">BENESCH, S. (2001): Critical English for Academic Purposes. Lawrence Erlbaum Coffin, New Jersey.
BYRD, P., J. MURPHY (2006): Essentials of Teaching Academic Oral Communication (English for Academic Success). Houghton Mifflin, Boston.
GLENDINNING, E.,B. HOLMSTROM (2004): English for Academic Purposes: Study Reading. Cambridge University Press, Cambridge.
JORDAN, R. (1999): Academic Writing Course. Study Skills in English, Collins ELT, London.
MC BRIDE, D.E.(2002): Learning veterinary terminology. Mosby, St. Louism Missouri.
MC CORMACK, J. (2005): English for Academic Study. Garnet Publishing Ltd, Reading.
PORTER. D., C. BLACK (2007): Check your vocabulary for academic English. A & C Black Publishers Ltd., London.
Wallace M. J. (2004): Study Skills in English: Cambridge University Press., Cambridge.</td></tr>
<tr><td>2.77. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3"></td></tr>
<tr><td>2.78. Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

ENGLISH FOR ACADEMIC PURPOSES II

1. GENERAL INFORMATION			
1.119. Course teacher	Dubravka Vilke-Pinter, Ph.D.	2.228. Year of the study programme	2
1.120. Name of the course	English for academic purposes II	2.229. Credits (ECTS)	4
1.62. Associate teachers		2.230. Type of instruction (number of hours L + S + E + e-learning)	8 hours of L + 40 hours of S (of which 12 hours of e-learning) + 12 hours of E
1.63. Study programme (undergraduate, graduate, integrated)	University Integrated Undergraduate and Graduate Study Programme Veterinary Medicine	2.231. Expected enrolment in the course	
1.64. Status of the course	elective	2.232. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
4.195. Course objectives	The course English for Academic Purposes II is a continuation of English for Academic Purposes I, but it can also be taken as an independent course. This integrated skills course develops both academic language and study skills that students need for effective communication in an academic setting, as well as for reading veterinary medical literature. The course aims to develop students understanding of the structural patterns and features of scientific discourse. To enhance participants academic language skills, a wide range of authentic written and spoken academic texts from various sources (including manuals, professional and academic journals, and online databases) is used. Special emphasis is placed on extracting information from written texts, as well as on developing participants written competence, namely, the skills and strategies required to produce different forms of writing (summaries, essays, reports, etc.).		

	Emphasis is also placed on the development of oral skills and strategies required for effective participation in meaningful discussions and for delivering clear, well-structured presentations independently.
4.196. Course enrolment requirements and entry competences required for the course	
4.197. Learning outcomes at the level of the programme to which the course contributes	The course focuses on helping students develop the skills needed to speak and write effectively and fluently using a standard academic register of English. Students develop familiarity with academic discourse and improve their knowledge of language used generally in science and, more specifically, in the field of veterinary medicine. By attending this course, students enhance their overall academic performance and acquire the skills required for the independent and efficient use of relevant professional literature, as well as for fluent participation in an English-speaking professional setting.
4.198. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Having successfully completed this course students will learn how 1. to analyze various types of academic writing and develop an understanding of their structural and functional characteristics. 2. to locate and use professional literature relevant to the discipline including scientific papers accessed through online databases 3. to compose various types of professional writing in English, using knowledge of discourse structures, organizational conventions, and commonly used academic English terminology 4. to compose and deliver well structured and coherent oral presentations 5. ***to recognize various oral functional styles, comprehend extended lines of argument,*** and engage in discussions using academically appropriate language
4.199. Course content broken down in detail by weekly class schedule (syllabus)	Analysis of the structure of academic and technical text. Correct usage of language devices used to achieve text cohesion. Topics: Health and causative agents of diseases. Control and eradication of diseases. Topics: Zoonoses (Rabies; Foot and mouth disesase; Anthrax; BSE; Swine fever; Avian influenza; Malaria, etc.). Writing skills: Essay: Structure of the essay. Topics: Farm animals. Laboratory animals. Interpretation of data: Interpreting graphical

	forms of presentations. Summary: Structure of a summary. Writing an effective summary. Oral presentations: Developing oral skills. Planning oral presentations. Goals and aims of presentations. Analysis of various presentations. Delivering presentations. Types and methods of communication. Error anlysis. Topics. Laboratory animals. Delivering presentations. Practising presentation skills. Discussion: argumentative speech. Topics: Cloning. Genetic engineering: benefits and perspectives. Students' presentations. Topics: Endangered species. Protection of endangered species. Students' presentations. Error anlysis. Topics: Small animals. Pets. Keeping pets. Working animals. Surveys, questionnaires and projects. Reports. Legal language. Legislative norms in veterinary medicine; Coping with translation problems; Negative transfer from Croatian.					
4.200. Format of instruction:	☐ lectures ☐ seminars and workshops X ☐ exercises X ☐ on line in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	4.201. Comments:			
4.202. Student responsibilities						
4.203. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0,18	Research		Practical training	
	Experimental work		Report		Class participation	0,10
	Essay		Seminar essay		(other)	
	Tests		Oral exam	0,32	(other)	
	Written exam	0,40	Project		(other)	
2.10. Grading and evaluating student work in class and at the final exam		**Assessment elements**				

	Overall grade elements	13. class attendance 14. class participation 15. continual assessment 16. final exam		
	Lectures attendance **Exercises attendance**	8 hourly classes	Minimum number of points required: 2 Students must attend at least 4 hourly classes to achieve minimum number of points.	Maximum number of points: 3
		12 hourly classes	Minimum number of points required: 3 Students must attend at least 8 out of 12 hourly classes to be awarded minimum number of points.	Maximum number of points: 5
	Seminar attendance	40 hourly classes	Minimum number of points required: 6 Students must attend at least 28 out of 40 hourly classes to be awarded minimum number of points.	Maximum number of points: 10

	Class participation		Minimum number of points required: 5 Students must earn at least 5 points out of maximum 10 by actively participating at classes. At each class, students complete various assigmenents for which they can earn 1 point per class (coefficient 10/60 = 0,17).	Maximum number of points 10	
	Continual assessment		Minimum number of points required: 20 Students deliver their oral presentations.	Maximum number of points: 32	
	Final exam		Minimum number of points required: 24 After reading an original academic paper of their own choice, students write a reading report, which they present at the oral part of the exam. .	Maximum number of points: 40	

	Final grade	Final grade is based on performance in 4 grading elements. Students are entitled to take the final exam if they have earned the minimum number of points for each of the evaluated elements (total of 36 points).	

2.11. Required literature (available in the library and via other media)	Title	**Number of copies in the library**	**Availability via other media**
	Vilke-Pinter, D. (2019). English for Academic Purposes (Part 2). Reading materials. Each student receives his/her copy of the materials.	3	

2.79. Optional literature (at the time of submission of study programme proposal)	• BENESCH, S. (2001): Critical ***English*** for ***Academic*** Purposes. Lawrence Erlbaum Coffin, New Jersey. • ***BYRD, P., J. MURPHY (2006): Essentials of Teaching Academic Oral Communication*** (English for ***Academic*** Success). Houghton Mifflin, Boston. • GLENDINNING, E.,B. HOLMSTROM (2004): English for Academic Purposes: Study Reading. Cambridge University Press, Cambridge. • JORDAN, R. (1999): Academic Writing Course. Study Skills in English, Collins ELT, London. • MC BRIDE, D.E.(2002): Learning veterinary terminology. Mosby, St. Louism Missouri. • MC CORMACK, J. (2005): English for Academic Study. Garnet Publishing Ltd, Reading. • ***PORTER***. ***D***., C. BLACK (2007): Check your vocabulary for academic English. A & C Black Publishers Ltd., London. • Wallace M. J. (2004): Study Skills in English: Cambridge University Press., Cambridge.
2.80. Quality assurance methods that ensure the acquisition of exit competences	
2.81. Other (as the proposer wishes to add)	

FEED ADDITIVES - HEALTH MODULATORS

1. GENERAL INFORMATION			
1.121. Course teacher	Full Professor Željko Mikulec, DVM, PhD	2.233. Year of the study programme	3rd
1.122. Name of the course	Feed Additives - Health Modulators	2.234. Credits (ECTS)	1
1.63. Associate teachers	Full Professor Tomislav Mašek (vice course leader), Full Professor Hrvoje Valpotić, Maja Loborec, DVM	2.235. Type of instruction (number of hours L + S + E + e-learning)	3L + 2S +10E
1.64. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	2.236. Expected enrolment in the course	
1.65. Status of the course	Elective	2.237. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	2nd level, 10%

2. COUSE DESCRIPTION	
4.204. Course objectives	The course objective is to show students the newest informations about manufacturing and application of feed additives and ensure the student's acquired knowledge, skills and competences are adequate to evaluate and make complex decisions in field of application of different essential and nonessential feed additives and dietetic preparations
4.205. Course enrolment requirements and entry competences required for the course	
4.206. Learning outcomes at the level of the programme to which the course contributes	• synthesize current knowledge about different feed additives • assess the implications of feed additives application in modern animal production
4.207. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	• to classify feed additives according to its composition and way of using • to assess the suitability of certain feed additives in different animal production systems • knowledge of influence of certain feed additives on animal health

4.208. Course content broken down in detail by weekly class schedule (syllabus)	**Lectures (3 hours):** • Introduction (Feed-food chain. World's trends in food and feed quality and safety.) • Feed additives – importance and classification (The role of additives. Essential and nonessential additives. Micro and macro additives.) **Seminars (2 hours):** • Antibiotics (Antibiotic use in animal feed – in the past and nowdays.) **Exercises (10 hours):** • Extramural work - visit to feed aditive factory • Essential microadditives (Vitamins. Microminerals. Synthetic aminoacids.) • Probiotic preparations (Probiotics. Prebiotics. Simbiotics. Fitobiotics.) • Enzymes (Enzymes in monogastric animal feeding. Enzymes in ruminant feeding. Production and types of multienzyme preparations.) • Antioxidants (Antioxidant function and types. The role of antioxidants in animal and human nutrition.) • Emulsifiers (Function and types of emulsifiers.) • Pigments (Production and types of pigments.) • Flavours (Function and types of flavours.) • Acidifiers (Organic acids as feed acidifiers. The purpose and applying of acidifiers.) • Tannins (Tannins – antinutritive compounds or additional mean of therapy.) • Effect of nutraceuticals on the health status of animals and humans. (Current additives in diets of animals and people. Effect of nutraceutics on the immune response of animals and humans.)

4.209. Format of instruction:	☒ lectures ☒ seminars and workshops ☒ exercises ☐ on line in entirety ☐ partial e-learning ☒ field work	☒ independent assignments ☒ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	4.210. omments:

4.211. Student responsibilities						
4.212. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	**0,18**	Research		Practical training	
	Experimental work		Report		**Activity**	**0,20**
	Essay		Seminar essay		(other)	
	Tests	**0,32**	Oral exam	**0,40**	(other)	
	Written exam		Project		(other)	

<table>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="3">Written final exam</td></tr>
<tr><td rowspan="7">2.11. Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>Adams C. A. (1999.): Nutricines. Food components in health and nutrition. Nottingham University Press, Nottingham</td><td></td><td></td></tr>
<tr><td>Adams C. A. (2002.): Total Nutrition. Feeding animals for health and growth. Nottingham University Press, Nottingham</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>2.82. Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">Caygill J. C., Mueller-Harvey I.(1999.):Secondary Plant Product, Antinutritional and beneficial actions in animal feeding. Notthingham University Press.
Boothe D. M. (1997.): Nutraceuticals in Veterinary Medicine. Part I. Definitions and Regulations. The Compendium 19 (11), 1248-1255.
Boothe D. M.(1998): Nutraceuticals in Veterinary Medicine. Part II. Safety and Efficacy. The Compendium 20 (1), 15-21.</td></tr>
<tr><td>2.83. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3"></td></tr>
<tr><td>2.84. Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

FISH MORPHOLOGY

1. GENERAL INFORMATION			
1.1. Course teacher	Assoc. Professor Krešimir Matanović (Deputy course teacher: Full Professor Emil Gjurčević)	1.6.Year of the study programme	5th
1.2.Name of the course	Fish morphology	1.7.Credits (ECTS)	2
1.3.Associate teachers	Full Professor Emil Gjurčević, Full Professor Snježana Kužir, Assoc. Professor Krešimir Matanović, Lucija Devčić, Assistant, DVM,PhD	1.8.Type of instruction (number of hours L + S + E + e-learning)	0+10+20+0
1.4.Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate university study of veterinary medicine	1.9.Expected enrolment in the course	10
1.5.Status of the course	elective	1.10.Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1
2. COUSE DESCRIPTION			
2.1.Course objectives	The aim of this course is to introduce students with the morphological variability of fish as well as histological structure of fish organ systems.		
2.2.Course enrolment requirements and entry competences required for the course	Completed compulsory course "Biology and Pathology of Aquatic Organisms". Prerequisite for exam: passed exam in the compulsory course “Biology and Pathology of Aquatic Organisms”. Limited enrollment of 10 students.		
2.3.Learning outcomes at the level of the programme to which the course contributes	The subject is an upgrade of morphological subjects (anatomy, histology and embryology of domestic animals) in terms of macro and micro morphology of fish. At the same time, the subject is the upgrade of an obligatory course Biology and pathology of aquatic organisms.		

2.4.Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	By successfully mastered the material of the subjects, the student will be able to: - designate and define the basic elements of the macroscopic structure of fish tissues and organs; - designate and define the basic elements of the microscopic structure of fish tissues and organs; - compare the structure of certain organs in different fish species; - identify and analyze the histological slides of various organs and tissues; - explain the structure and development of fish.
2.5.Course content broken down in detail by weekly class schedule (syllabus)	1 Introduction (teaching rules, systematic of fish); 2 Peculiarities of the body shape due to swimming manners; 3 Characteristics of teleost skeletal system and support system of cartilaginous fish. Histological characteristics of fish muscle (a division of muscle, contractile characteristics); 4 Histological characteristics of the digestive system of fish due to the diet (mouth and pharynx, esophagus; stomach, intestine, spiral intestine in cartilaginous fish; pyloric endings; liver, pancreas); 5 Circulatory system (heart of cartilaginous fish; heart of teleost; gills circulation, blood elements); 6 Histological characteristics of the gill of teleost and cartilaginous fish, breathing in cartilaginous fish; breathing in teleost, lungfish; 7 Histological structure of fish bladder; gas gland; oval; 8 Urinary system (opistonefros, histology of the kidney, the difference in the structure of the kidney of marine and freshwater fish); 9 Histology of reproductive system (ovaries, type of fish ovarian, oogenesis, testes, type of testes; spermatogenesis; genital canal); 10 Nervous System (anterior, middle and posterior brain, spinal cord, brain nerves, peripheral nerves, autonomic nervous system); 11 Sensory and electric organs (eye, eye shape and types; structure of the eyeball, eye adjustment to the amount of light, the inner ear, the labyrinth; otoliths; Weber's body; olfactory organ, lateral line; sensory buds; electroreceptors, electric organs); 12 Histology of the endocrine system (pituitary, pineal gland; urophysis; thyroid; ultimobranchial gland; interrenal gland; chromafin cells, the endocrine part of the pancreas); 13 Skin and scales (epidermis and epidermal glands, dermis, scales and forms of scales, poisonous gland; the color of the body; chromatophores and their types; pigments of chromatophores; mechanism of changes the color of the body); 14 Bioluminescence (luminous bodies; structures of luminous organs; alveolar and sac-like luminous bodies; visceral light organs, bacterial and chemical bioluminescence). **Seminars:** - Basics of fish systematic, body shape, skin and scales - Musculoskeletal System - Digestive System

<table>
<tr><td></td><td colspan="3">- Circulatory System
- Respiratory System
- Urinary System
- Reproductive System
- The nervous system, sensory and electric organs
- Endocrine System
- Swim bladder

Exercises:
- Species characteristics (5)
- Histology of skin, pigment cells and the scales (2)
- Anatomy and histology of bone and muscle histological characteristics (2)
- Parts of the digestive tube and histological characteristics of the gastrointestinal tract (2)
- The heart and blood vessels (histological characteristics), cellular components of blood and preparation of a blood smear (3)
- Histological characteristics of gills (1)
- Structure and histological characteristics of a kidney (1)
- Histology of genital system (1)
- The brain, spinal cord, eye, otoliths (1)
- The pituitary gland, endocrine part of the pancreas (1)
- Histological structure of the swim-bladder, a gas glands, oval (1)</td></tr>
<tr><td rowspan="2">2.6.Format of instruction:</td><td>☐ lectures
X seminars and workshops
X exercises
☐ on line in entirety</td><td>☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>2.7.Comments:</td></tr>
<tr><td colspan="2"></td><td>The introduction of Merlin for the course.
During the exercises, students use microscopes, which determines the size of the group at 10 students.</td></tr>
</table>

	☐ partial e-learning ☐ field work		

2.8.Student responsibilities	Students are obliged to attend 70% of seminars and exercises (during the course, student may miss up to 30% of seminars (3h) and 30% of exercises (6h)). Students are obliged to participate in seminar activity. Students are obliged for active participation in the course performance. Student's activity will be observed through 20 h of exercises.

2.9.Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
	Class attendance	0.50	Research		Practical training	
	Experimental work		Report		Activity	0,20
	Essay		Seminar essay	0.50	(other)	
	Tests		Oral	0.80	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	Regular attendance at classes and activity during the exercises are prerequisites for taking the oral exam. The final grade consists of the grade of the seminar work (50%) and the oral answer (50%).

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	FERGUSON, H. W. (2006.): Systemic pathology of fish: A text and atlas of normal tissues in teleosts and their responses in disease. Scotian Press, London. UK	1	
	GENTEN, F., E. TERWINGHE, A. DANGUY (2009.): Atlas of Fish Histology. Science Publisher, Enfield, Jersey, Plymouth. USA	1	
	PP of lectures and excercises		LMS

2.12.Optional literature (at the time of submission of study programme proposal)	TAKASHIMA, F., T. HIBIYA (1995.): An atlas of fish histology: normal and pathological features. Gustav Fischer Verlag. New York.

2.13.Quality assurance methods that ensure the acquisition of exit competences	Registering students' attendance and success in carrying out of their duties (Associate teachers / Course teacher). Students' performance analysis in course (Course teacher). Student questionnaire on the quality of the course organization (Quality Assurance /Couse teacher) Examination is used as an instrument to evaluate individual course outcomes by the associate teachers / course teacher. The content of exam is reassessed periodically in order to assure compliance with the course outcomes.
2.14.Other (as the proposer wishes to add)	It is necessary to introduce e-learning. It is necessary to supply required mandatory and additional literature.

FISHERY

1. GENERAL INFORMATION			
1.1. Course teacher	Assoc. Professor Krešimir Matanović	1.6.Year of the study programme	5th and 6th
1.2. Name of the course	Fishery	1.7.Credits (ECTS)	1
1.3. Associate teachers	Full Professor Emil Gjurčević, Assoc. Professor Krešimir Matanović	1.8.Type of instruction (number of hours L + S + E + e-learning)	3+4+8+0
1.4. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate university study of veterinary medicine	1.9.Expected enrolment in the course	5
1.5.Status of the course	Elective	1.10.Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	level 1 online instruction 10%
2. COUSE DESCRIPTION			
2.1.Course objectives	The course is anticipated for students who wish to enlarge their general knowledge of fishery in Croatia as well as in the world. Therefore, the aim of the course is to introduce students to tools, techniques and regulations in fishery, and with management practice in the open waters.		
2.2.Course enrolment requirements and entry competences required for the course	Completed exam in Biology and Pathology of Aquatic Organisms		
2.3.Learning outcomes at the level of the programme to which the course contributes	The course represents synthesis of previous veterinary disciplines and presents knowledge in the field of fishery. This course is linked to obligatory course Biology and Pathology of Aquatic Organisms and elective course Selected Chapters in Aquaculture. Upon the course completion, students will be qualified for work in fishery.		
2.4.Learning outcomes expected	o Distinguish major fish species and other aquatic organisms of commercial importance in fisheries o Interpret Regulations relating to marine and freshwater fisheries		

<table>
<tr><td>at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">o Distinguish the tools and techniques of fisheries
o Analyze key physical and chemical parameters of water quality
o Explain the role of veterinarians in protecting the aquatic environment</td></tr>
<tr><td>2.5.Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Lectures (3)
○ Fish essentials (fishery, aquaculture)
○ Water and health status of fish (sending of water samples for laboratory examinations; water quality monitoring)
○ Asphyxia
○ Systematic of marine fish important for fishery

Exercises (8)
○ Work in the field of freshwater fishery
○ Sport fisheries
○ Tools and techniques of fisheries
○ Health status of fish

Seminars (4)
○ Legislative and other regulations related to fishery
○ Systematic of freshwater fish important for fishery
○ Artificial reefs</td></tr>
<tr><td rowspan="2">2.6.Format of instruction:</td><td colspan="2">☒ lectures
☒ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☒ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td colspan="2">2.7.Comments:</td></tr>
<tr><td colspan="4"></td><td colspan="2"></td></tr>
<tr><td>2.8.Student responsibilities</td><td colspan="6">Attendance of lectures (50%), exercises and seminars (70%); active participation at exercises and seminars; continuous assessment.</td></tr>
<tr><td rowspan="3">2.9.Screening student work (name the proportion of ECTS credits for each activity so that the total number of</td><td>Class attendance</td><td>0.18</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Participation at exercises</td><td>0.1</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>0.32</td><td>(other)</td><td></td></tr>
</table>

ECTS credits is equal to the ECTS value of the course)	Tests		Oral exam	0.40	(other)	
	Written exam		Project		(other)	
2.10. Grading and evaluating student work in class and at the final exam						

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	ANDREWS, C., A. EXELL, N. CARRINGTON (1988): The mannual of fish health. Salamander book, London, New York.	1	
	ROBERTS, R. J. (2001): Fish pathology. W. B. Saunders. London.	1	
	PP presentations of lectures and exercises		MERLIN
	KOTTELAT, M., J. FREYHOF (2007): Handbook of European freshwater fishes. Kottelat, Cornol, Switzerland and Freyhof, Berlin.		DIGITAL
	CORTAY, G., P. DURANTEL, P. MAITRE, M. SAINTON (1999): The practical guide to fishing. Könemann, Cologne.	1	
2.12.Optional literature (at the time of submission of study programme proposal)	ALABASTER, J. S. (1977): Biological monitoring of inland fisheries. Applied Science Publishers. ALABASTER, J. S., R. LLOYD (1980): Water quality criteria for freshwater fish. Butterworths. HART, P. J. B., J. D. REYNOLDS (2002): Handbook of Fish Biology and Fisheries. Volume 2: Fisheries. Blackwell Publishing. MILES, T. (2000): The guide to coarse fishing. Lorenz Books, London.		
2.13.Quality assurance methods that ensure the acquisition of exit competences	Final exam – oral. Monitoring the attendance of lectures, seminars and exercises, the success on the final oral exam.		
2.14.Other (as the proposer wishes to add)			

FUNDAMENTALS OF AGRONOMY

1. GENERAL INFORMATION			
1.123. Course teacher	Željko Pavičić, DVM, PhD, Full Professor	2.238. Year of the study programme	II
1.124. Name of the course	Fundamentals of agronomy	2.239. Credits (ECTS)	2,5
1.64. Associate teachers	Gordana Gregurić Gračner, PhD, Associate Professor; Mario Ostović, PhD, Assistant Professor	2.240. Type of instruction (number of hours L + S + E + e-learning)	L 12+ S 11+ E 7
1.65. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	2.241. Expected enrolment in the course	
1.66. Status of the course	Elective course	2.242. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
4.213. Course objectives	Livestock and crop production constitute a production unit which is expressed not only by their organic connection, but also with their spatial location. Therefore, the aim of course is that the students acquire knowledge on the impact of weather and climate on plant's life, biological crops and yield, the natural laws on the basis of which a yield could be produced, as well as on the compaction of soil by the antropogenic influence. In the center of discussion is agrotehnicque in all of its aspects and management systems in plant production. Special attention is paid to the ecologic (organic) and sustainable agriculture, so students will gain the knowledge on how to preserve the environment, clean air and soil, drinking water and associated quality of food.
4.214. Course enrolment requirements and entry competences required for the course	Passed compulsory course Environment, Animal Behaviour and Welfare with minimum grade 4 (B). Mentor type of teaching, up to 3 students.
4.215. Learning outcomes at the level of the programme to which the course contributes	Understanding of agroecological fundamental facts in plant production
4.216. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After successful completion of the course the student will be able to: -explain the impact of weather and climate effects on plant life

<table>
<tr><td></td><td colspan="3">-recognize differences in soils and describe soil treatment methods
-describe nutrients proceedings in soil
- evaluate the right time for planting and distinguish sowing methods
- explain the natural laws on the basis of which a yield could be produce
- illustrating the ways for saving and storing agricultural products
- define the principles of organic and sustainable agricultural production</td></tr>
<tr><td>4.217. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="3">1 Introduction to agronomy (Basic elements for organic life; Atmospheric impact on plants in general; Weather and climate, Natural ecosystems; Water as ecological factor);
2 Soil (Soil definition, character and function; Basic characteristics if main soil types; Soil and vegetation relation; Soils in Croatia); Land cultivation (Definition and tasks; Traditional and modern approach of land cultivation; Effects of cultivation to physical characteristics and processing in soil; Basic and additional land cultivation; Land cultivation systems);
3 Plants feeding and plants nutrients (Nutrients proceedings in soil; Fertilization; Fertilizers);
4Sowing (Seeds; Field crop seeds characteristics; Preparation of seed for sowing; Quantity determination of seeds for sowing; Sowing types; Sowing time);
5 Crops care (Abiotic and biotic negative factors; Systematic division of crop care grips: Sequence of crop care grips; Veiling of production areas);
6 Weeding (Weed concept and definition; Weeding measures);
7 Harvest, storing and conservation of agricultural products (Grain crops; Root and tuberous crops; Stern crops);
8 Plant production systems (Crop rotation; Free crop shift ; Monocrop);
9 Biological agronomy (Biological agronomy directions; Scientific principles of biological agronomy; Legislative regulation on biological agronomy);
10 Maintainable agronomy (General notion about land cultivation in terms of maintainable agronomy; Ecologically balanced measures of managing in maintainable agronomy; Water managing in different plant production systems).</td></tr>
<tr><td>4.218. Format of instruction:</td><td>X lectures
X seminars and workshops
X exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td>☐ independent assignments
X multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>4.219. Comments:
Practical training will be done at Hunting and education polygon Črnovšćak with technique and on 5, 5 hectares arable land owned by Department of Game Biology, Pathology and Breeding</td></tr>
<tr><td>4.220. Student responsibilities</td><td colspan="3">1. attending lectures
2. attending exercises
3. attending seminars
4. participation at exercises and seminars
5. continuous knowledge checking</td></tr>
</table>

	6. final exam					
4.221. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0,45	Research		Practical training	
	Experimental work		Report		Participation at exercises and seminars	0,25
	Essay		Seminar essay		Final (oral) exam	1,00
	Tests	0,80	Oral exam		(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam

Type of activities	Minimal number of points	Maximal number of points
Attending lectures	3	6
Attending exercises	4	6
Attending seminars	4	6
Participation at exercises and seminars	5	10
Continuous knowledge checking	20	32
Final exam	24	40
Total	**60**	**100**

2.11. Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
Panda, S. C. (2012): Agronomy. Agrobios (India), Jodhpur.		
Pearson, C. J., R. L. Ison (1997): Agronomy of grassland systems. 2nd edition. Cambridge University Press, New York, USA.		
Sheaffer, C. C., K. M. Moncada (2012): Introduction to agronomy: food, crops, and environment. 2nd edition. Delmar, Cengage Learning, USA.		

2.85. Optional literature (at the time of submission of study programme proposal)

2.86. Quality assurance methods that ensure the acquisition of exit competences

Type of activities	Minimal number of points	Maximal number of points
Attending lectures (12 hours)	**3** (coefficient 0,5) 3/0,5 = 6 lecture hours	**6** 6/12 = 0,5 (coefficient 0,5)

	(a student must attend minimal 6 lecture hours in order to gain minimal 3 points)	
Attending exercises (7 hours)	**4** (coefficient 0,86) 4/0,86 = 5 exercise hours (a student must attend minimal 5 exercise hours in order to gain minimal 4 points)	**6** 6/7 = 0,86 (coefficient 0,86)
Attending seminars (11 hours)	**4** (coefficient 0,55) 4/0,55 = 7 seminar hours (a student must attend minimal 7 seminar hours in order to gain minimal 4 points)	**6** 6/11 = 0,55 (coefficient 0,55)
Participation at exercises and seminars (10 points[1])	**5** 5/1 = 5 (coefficient 1) (a student must collect minimal 5 points in order to gain minimal 5 points)	**10** 10/10 = 1 (coefficient 1)
Continuous knowledge checking (8 bodova[2])	**20** 20/4 = 5 (coefficient = 4) (a student must collect minimal 5 points in order to gain minimal 20 points)	**32** 32/8 = 4 (coefficient = 4)
Final exam (40 bodova[3])	**24** 24/1 = 24 (coefficient 1) (a student must collect minimal 24 points in order to gain minimal 24 points)	**40** 40/40 = 1 (coefficient 1)
Total	**60**	**100**

[1]-10 points (writting of the report from field exercises (4 points)+preparation of seminar work during semestar (3 points if in PP additional 3 points)

<table>
<tr><td></td><td>[2]-8 points (8 questions, every correct answer worth 1 point)
[3]-40 points (written exam - 8 questions/ for every question 2 points for „sufficient“ answer, 3 points for „good“, 4 points for „very good“, 5 points for „excellent“)

Final grade:
The final grade is formed on the basis of total sum of acieved points according to:
<table><tr><td>Points</td><td>Grade</td></tr><tr><td>up to 59</td><td>1 (F)</td></tr><tr><td>60-68</td><td>2 (E)</td></tr><tr><td>69-76</td><td>2 (D)</td></tr><tr><td>77-84</td><td>3 (C)</td></tr><tr><td>85-92</td><td>4 (B)</td></tr><tr><td>93-100</td><td>5 (A)</td></tr></table></td></tr>
<tr><td>2.87. Other (as the proposer wishes to add)</td><td></td></tr>
</table>

FUNDAMENTALS OF ECOLOGIC LIVESTOCK BREEDING

1. GENERAL INFORMATION			
1.125. Course teacher	Professor Kristina Matković, PhD	2.243. Year of the study programme	II
1.126. Name of the course	Fundamentals of Ecologic Livestock Breeding	2.244. Credits (ECTS)	2
1.65. Associate teachers	Professor Željko Pavičić, PhD; Associate Professor Mario Ostović, PhD; Associate Professor Gordana Gregurić Gračner, PhD	2.245. Type of instruction (number of hours L + S + E + e-learning)	L 10 + S 10 + E 10
1.66. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	2.246. Expected enrolment in the course	
1.67. Status of the course	Elective course	2.247. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
4.222. Course objectives	In this course, the students have possibility to meet basic characteristics of domestic animal breeding in ecologic production, and the role of veterinary activities in this relatively new branch of agricultural production. Therefore, they gain knowledge on law regulations in ecologic livestock breeding, animal species and breeds acceptable for ecologic production, methods of breeding, animal housing and feeding, effects of ecologic production on the environment, health protection and animal treatment, as well as veterinary-sanitary control of foodstuff of animal origin in ecologic production. Better competencies in ecologic livestock breeding can be accomplished by vertical integration of this area through specific course in the postgraduate study.		
4.223. Course enrolment requirements and entry competences required for the course			
4.224. Learning outcomes at the level of the	- knowledge on law regulations in ecologic livestock breeding - knowledge on animal species and breeds acceptable for ecologic production - basic knowledge on breeding methods, and animal housing and feeding in ecologic production		

<table>
<tr><td>programme to which the course contributes</td><td colspan="6">- basic knowledge on the effects of ecologic production on the environment and vice versa
- basic knowledge on health protection and animal treatment, as well as veterinary-sanitary control of foodstuff of animal origin in ecologic production</td></tr>
<tr><td>4.225. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">Upon completion of the course, the students will be able to:
- describe law regulations in ecologic livestock breeding
- enumerate animal species and breeds acceptable for ecologic production
- describe breeding methods, and animal housing and feeding in ecologic production
- discuss impact of ecologic production on the environment and vice versa
- explain specifics of health protection and animal treatment, as well as veterinary-sanitary control of foodstuff of animal origin in ecologic production</td></tr>
<tr><td>4.226. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">1. Introduction; 2. Animal species and breeds, and size of ecologic livestock production in Croatia and worldwide; 3. Animal breeding procedures in ecologic production; 4. Environmental effects of ecologic livestock production; 5. Size of area required for animal breeding in ecologic production; Maximum number of animals per hectare related to tolerable production of nitrogen in manure; 6. Permitted sanitary agents in ecologic production; 7. Animal transport in ecologic production; 8. Voluminous and concentrated feeds for livestock feeding in ecologic production; 9. Feeding specifics of particular animal species in ecologic production; 10. Meal composition in ecologic production; 11. Health protection and animal treatment specifics in ecologic production; 12. Hygienic regularities of animal products in ecologic production; 13. Rules on general declaration of ecologic products.</td></tr>
<tr><td rowspan="2">4.227. Format of instruction:</td><td colspan="2">X lectures
X seminars and workshops
X exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td colspan="2">4.228. Comments:</td></tr>
<tr><td colspan="4"></td><td colspan="2"></td></tr>
<tr><td>4.229. Student responsibilities</td><td colspan="6">1. attending lectures
2. attending exercises
3. attending seminars
4. participation at exercises and seminars
5. continuous knowledge checking
6. final exam</td></tr>
<tr><td rowspan="3">4.230. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is</td><td>Attending lectures</td><td>0.12</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Attending seminars</td><td>0.12</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Attending excersises</td><td>0.12</td></tr>
</table>

equal to the ECTS value of the course)	Continuous knowledge checking	0.64	Oral exam (final exam)	0.80	Participation at exercises and seminars	0.20
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam

Type of activities	Minimal number of points	Maximal number of points
attending lectures	3	6
attending seminars	4	6
attending exercises	4	6
participation at exercises and seminars	5	10
continuous knowledge checking	20	32
final exam	24	40
Total	**60**	**100**

2.11. Required literature (available in the library and via other media)

Title	**Number of copies in the library**	**Availability via other media**
1. Andersen, A. B. (2000): Science in agriculture: advanced methods for sustainable farming. 2nd edition. Acres, USA.		Online
2. Dawkins, M. S., R. Bonney, Eds. (2008): The future of animal farming: renewing the ancient contract. Blackwell Publishing, USA.		
3. Dupree, G. (2010): Homeopathy in organic livestock production. Acres, USA.		
4. Ekarius, C. (1999): Small-scale livestock farming: a grass-based approach for health, sustainability, and profit. Storey Publishing, LLC, MA, USA.		
5. Fossel, P. V. (2014): Organic farming: how to raise, certify, and market organic crops and livestock. Voyageur Press, USA.		
6. Paajanen, T. (2011): The complete guide to organic livestock farming: everything you need to know about natural farming on a small scale (Back-to-basics farming). Atlantic Publishing Group, Ocala, Florida, USA.		
7. Thistlethwaite, R., J. Dunlop (2015): The new livestock farmer: the business of raising and selling ethical meat. Chelsea Green Publishing, USA.		

2.88. Optional literature (at the time of submission of study programme proposal)

Online literature

2.89. Quality assurance methods that ensure the acquisition of exit competences	

Types of activities	Minimal number of points	Maximal number of points
Attending lectures (10 hours)	**3** 3/0.6 = 5 lecture hours (min.)	**6** 6/10 = 0.6 (coefficient for attending 1 lecture hour)
Attending seminars (10 hours)	**4** 4/0.6 = 7 seminar hours (min.)	**6** 6/10 = 0.6 (coefficient for attending 1 seminar hour)
Attending exercises (10 hours)	**4** 4/0.6 = 7 exercise hours (min.)	**6** 6/10 = 0.6 (coefficient for attending 1 exercise hour)
Participation at seminars and exercises (7 points[1])	**5** 5/1.43 = 4 (coefficient 1.43) (a student must earn 4 points in order to gain minimal 5 points)	**10** 10/7 = 1.43 (coefficient 1.43)
Continuous knowledge checking (8 points[2])	**20** 20/4 = 5 (coefficient = 4) (a student must earn 5 points in order to gain minimal 20 points)	**32** 32/8 = 4 (coefficient = 4)
Final exam (40 points[3])	**24** 24/1 = 24 (coefficient 1) (a student must earn 24 points in order to gain minimal 24 points)	**40** 40/40 = 1 (coefficient 1)
Total	**60**	**100**

[1]-7 points (preparation of the seminar paper during semestar 4 points, if the seminar is held at the PP additional 3 points)
[2]-8 points (8 questions, every correct answer is worth 1 point)
[3]-40 points (oral exam - 8 questions/ for every question 2 points for „sufficient“ answer, 3 points for „good“, 4 points for „very good“, 5 points for „excellent“)

<table>
<tr><td></td><td>The final grade is made on the basis of total sum of gained points as follows:<table><tr><th>Points</th><th>Grade</th></tr><tr><td>up to 59</td><td>1 (F)</td></tr><tr><td>60-68</td><td>2 (E)</td></tr><tr><td>69-76</td><td>2 (D)</td></tr><tr><td>77-84</td><td>3 (C)</td></tr><tr><td>85-92</td><td>4 (B)</td></tr><tr><td>93-100</td><td>5 (A)</td></tr></table></td></tr>
<tr><td>2.90. Other (as the proposer wishes to add)</td><td></td></tr>
</table>

FUNDAMENTALS OF HOLISTIC MEDICINE

1. GENERAL INFORMATION				
1.127. Course teacher	Assoc. Prof. Zoran Vrbanac, DECVSMR, DACVSMR	2.248. Year of the study programme	3.
1.128. Name of the course	Fundamentals of Holistic Medicine	2.249. Credits (ECTS)	2
1.66. Associate teachers	Assoc. Prof. Zoran Vrbanac, DECVSMR, DACVSMR, Assist. Prof. Hrvoje Capak, Ana Javor, DVM, PhD, Barbara Mratović, DVM, Nikola Čudina, DVM	2.250. Type of instruction (number of hours + e-learning)	L + S + E	15L+15E
1.67. Study programme (undergraduate, graduate, integrated)	Undergraduate	2.251. Expected enrolment in the course	35
1.68. Status of the course	Elective course	2.252. Level of application of e-learning (level 1, 2, 3), percentage of online instruction	43%
2. COUSE DESCRIPTION			
4.231. Course objectives	The aim of the course is to familiarize students with the holistic approach to animal health and disease and its differences in comparison with the conventional veterinary medical model. The course covers the fundamental areas of holistic medicine, including acupuncture, phytotherapy, and natural healing factors. Special emphasis is placed on the critical appraisal of scientific evidence regarding their efficacy and safety, as well as on their integration into contemporary veterinary practice in accordance with the principles of evidence-based veterinary medicine and animal welfare.		
4.232. Course enrolment requirements and entry competences required for the course	-		
4.233. Learning outcomes at the level of the programme to which the course contributes	Students will gain an understanding of the main systems of holistic veterinary medicine, including acupuncture, phytotherapy, and natural healing factors.		

4.234. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. Students will be able to explain the differences between holistic and conventional approaches to health and disease. 2. Students will gain an understanding and ability to criticaly evaluate three major holistic medicine systems: acupuncture, natural healing factors and phytotherapy. 3. Students will comprehend the scientific principles underlying acupuncture and its clinical applications. 4. Students will gain insight on how to integrate holistic medicine practices into everyday clinical practice, enhancing patient care.					
4.235. Course content broken down in detail by weekly class schedule (syllabus)	1. Introduction to Holistic Medicine 2. Traditional Chinese Veterinary Medicine 3. Acupuncture Techniques (use of needles, electroacupuncture, laser acupuncture, and other techniques) 4. Scientific Basis and Clinical Application of Acupuncture 5. Natural Healing Factors in Veterinary Medicine 6. Possibilities and Significance of Phytotherapy 7. Integration of Holistic Medicine into Everyday Clinical Practice					
4.236. Format of instruction:	x lectures seminars and workshops x exercises ☐ on line in entirety x partial e-learning ☐ field work	☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	4.237. Comments:			
4.238. Student responsibilities	-					
4.239. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	**0.8**	Research		Practical training	**0.4**
	Experimental work		Report		(other)	
	Essay		Seminar essay		(other)	
	Tests		Oral exam	**0.8**	(other)	
	Written exam		Project		(other)	
2.10. Grading and evaluating student work in class and at the final exam	Oral exam (preparation and presentation of a seminar paper)					

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Schoen, A.M., S.G. Wynn : Complementary and Alternative Veterinary Medicine, Principles and Practice,Mosby, St.Louis, 1998.		
	Schoen, A.M. : Veterinary acupuncture, II ed., Mosby, St.Louis,2001.		

	Wynn, S.G, Foufgere B. (2007): Veterinary herbal medicine. Mosby Elsevier. St Louis		
	Millis, D.L., D. Levine, R.A. Taylor: Canine Rehabilitation and Physical Therapy. Second edition. Elsevier, Philadelphia, 2014		
2.91. Optional literature (at the time of submission of study programme proposal)	Wynn, S. G., S. Mardsen (2003): Manual of natural veterinary medicine, science and tradion. Mosby, St. Louis		
2.92. Quality assurance methods that ensure the acquisition of exit competences	-		
2.93. Other (as the proposer wishes to add)	-		

FUNDAMENTALS OF PHYSICS FOR DIAGNOSTICS METHODS

1. GENERAL INFORMATION			
1.129. Course teacher	Assoc. prof. Pašić Selim	2.253. Year of the study programme	3.
1.130. Name of the course	Fundamentals of Physics for Diagnostics Methods	2.254. Credits (ECTS)	2
1.67. Associate teachers		2.255. Type of instruction (number of hours L + S + E + e-learning)	20 + 10 + 0 + 0
1.68. Study programme (undergraduate, graduate, integrated)	Integrated	2.256. Expected enrolment in the course	
1.69. Status of the course	Elected	2.257. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1

2. COUSE DESCRIPTION	
4.240. Course objectives	The aim of the course is to develop an understanding of the physical principles of ultrasound, X-ray, NMR diagnostic devices and thermography. Thus, students can understand, which kind of diagnostic technique can be used for imaging of certain (properties) tissue, where it gives the best results, and limits of diagnostic technique presented.
4.241. Course enrolment requirements and entry competences required for the course	
5. Learning outcomes at the level of the programme to which the course contributes	1. independently use appropriate laboratory equipment and conducts critical analyzes of laboratory test results, with an understanding of applied techniques and diagnostic procedures in veterinary medicine
5.1. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. describe diagnostic devices according to purpose and performance 2. understanding the essence and differences of basic diagnostic methods based on their physical foundations 3. describe the advantages and disadvantages of individual diagnostic methods 4. compare methods of image diagnostics according to resolution and contrasts
5.2. Course content broken down in detail by weekly class schedule (syllabus)	Basic and physical quantities and their mathematical representation in diagnostic methods (measurement; SI; notation; examples of mathematical expressions in the description of physical quantities: the ratios, the reciprocal value, logarithms, exponential functions, graphing, calculus, trigonometry, statistics); Waves and oscillations (wave equation, harmonic oscillations, damped oscillations, resonance) **(2 lectures)**

	Ultrasound-waves diagnostic (basic physics of ultrasound, ultrasound transducers and probes; echoscope systems, functioning, resolution, resolution limits; Doppler effect; imaging based on the principle of the Doppler effect, the application of ultrasound in the diagnosis, issues of ultrasound diagnostic) **(2 lectures)** X-ray techniques (sources and properties of X-rays; indicators of X-ray radiation, X-ray machines; tomography, angiography) **(2 lectures)** Physical fundamentals of magnetic-resonance imaging (microscopic characteristics related to magnetic resonance imaging; interaction of nuclei with constant RF and magnetic fields, magnetic nuclei in our body; macroscopic magnetization, chemical shift, relaxation time, structure and dynamics of tissue observed by MRI; gradient magnetic field; pulse sequences, building images, resolution methods, choice of contrast in the picture - choice T1 or T2 relaxation time, functional MR imaging, basic considerations of in vivo spectroscopy, biological effects of strong magnetic fields) **(2 lectures)** Thermography (thermal imaging application in veterinary medicine, thermography). Contrast agents in diagnostic (types and properties of contrast agents, the choice of contrast agents to observe the structure and dynamics of tissue). **(2 lectures)** **Seminar papers of students (10 seminars)**

5.3. Format of instruction:	☒ lectures ☒ seminars and workshops ☐ exercises ☐ on line in entirety ☐ partial e-learning ☐ field work	☒ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	5.4. Comments:

5.5. Student responsibilities						
5.6. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	**0,36**	Research		Practical training	
	Experimental work		Report		**Activity** (other)	**0,2**
	Essay		Seminar essay	**0,0**	(other)	
	Tests	**0,64**	Oral exam	0,8	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	D. J. Dowsett, P. A. Kenny, R. E. Johnston: The Physics of Diagnostic Imaging, Chapman & Hall Medical, London, 1998.	1	
	Westbrook, C. Kaut: MRI in practice, Blackwell Science, Oxford, 1993	1	

	POPARA, N, S. PAŠIĆ, L. BAJIĆ(2025): Velocity measurement using the classic Doppler effect and its application in medicine, Matematičko-Fizički list, LXXVI 1, 7-11	0	Internet
	PAŠIĆ, S., A. KLOBUČAR (2023): How does an ultrasound diagnostic device measure distances in tissue? Matematičko-fizički list, 74, 82-85.	0	Internet
	Introduction to the medical imaging and physical principles of X-ray diagnostics, internal script (https://moodle.srce.hr/)	0	Internet
	Ultrsound diagnostics, internal script, (https://moodle.srce.hr/)	0	Internet
2.94. Optional literature (at the time of submission of study programme proposal)	Russell K. Hobbie, Bradley J. Roth: Intermediate Physics for Medicine and Biology, Springer, 2006.		
2.95. Quality assurance methods that ensure the acquisition of exit competences	Grading and evaluating student work in class and at the final exam		
2.96. Other (as the proposer wishes to add)			

FUNDAMENTALS OF SCIENTIFIC RESEARCH

1. GENERAL INFORMATION			
1.131. Course teacher	Marinko Vilić, DVM, PhD, Full Professor	2.258. Year of the study programme	4th (fourth)
1.132. Name of the course	Fundamentals of Scientific Research	2.259. Credits (ECTS)	2
1.68. Associate teachers	Ivona Žura Žaja, DVM, PhD, Associate Professor Dražen Đuričić, DVM, PhD, Assistant Professor	2.260. Type of instruction (number of hours L + S + E + e-learning)	8+4+18
1.69. Study programme (undergraduate, graduate, integrated)	integrated	2.261. Expected enrolment in the course	
1.70. Status of the course	elective	2.262. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
5.7. Course objectives	- to teach students the basic principles of scientific work - to motivate students to find and read research papers relevant to their field and write scientific articles
5.8. Course enrolment requirements and entry competences required for the course	
5.9. Learning outcomes at the level of the programme to which the course contributes	This course is essential for the scientific student education and their enrolment in the Faculty scientific work.
5.10. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	The students should be able to: - search medical information on the web - formulate scientific hypothesis - prepare a research proposal - analyse and present results of research - cite the source of information used in research - write scientific article
5.11. Course content broken down in detail by weekly class schedule (syllabus)	1. Science and scientific research. 2. Scientific areas (field and disciplines). Scientific research in regard to research methods as well as to the level and aim of investigation. Hypothesis. Experiments. Materials (samples) for experiments. Methods used in experiments. 3. Structure of medical literature 4. Original scientific paper. Scientific style used in scientific

	paper. Structure (chapters) and content of an original scientific paper. 5. Scientific publication 6. Publishing of results of experiments. 7. Searching scientific information on the web. 8. Presentation of results of experiments. 9. Citing references. 10. Searching for relevant journal articles referring to the problem of study. 11. Organization (structure) and analysis of content of original scientific paper and graduation thesis.					
5.12. Format of instruction:	X lectures X seminars X exercises ☐ on line in entirety ☐ partial e-learning ☐ field work		☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)		5.13. Comments:	
5.14. Student responsibilities	It is not allowed to be absent at all format of instructions. In case of an excused absence, the student must take a preliminary exam					
5.15. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0.36	Research		Practical training	
	Experimental work		Report		Activity	0.2
	Essay		Seminar essay	0.36	(other)	
	Tests	0.64	Oral exam		(other)	
	Written exam	0.8	Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	Maximal number of points	Minimal number of points
1. attending lectures	6	3
2. exercises	36	20
3. seminars	18	13
4. final exam	40	24

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	MARUŠIĆ, M. (2008): Principles of Research in Medicine. Medicinska naklada, Zagreb.		
	GASTEL, B., R. A. DAY (2016): How to Write and Publish a Scientific Paper. 8th ed., Greenwood, Santa Barbara, California.		

2.97. Optional literature (at the time of submission of study programme proposal)	

2.98. Quality assurance methods that ensure the acquisition of exit competences	1. Continuous knowledge checking 2. Final exam
2.99. Other (as the proposer wishes to add)	

GAME ZOOLOGY

1. GENERAL INFORMATION			
1.133. Course teacher: leader/deputy	Associate professor Magda Sindičić, DVM, MSc, PhD	2.263. Year of the study programme	2nd
1.134. Name of the course	Game Zoology	2.264. Credits (ECTS)	2
1.69. Associate teachers	Professor Alen Slavica DVM, PhD, Prof Zdravko Janicki, Assistant professor Magda Sindičić, DVM, PhD	2.265. Type of instruction (number of hours L + S + E + e-learning)	4L+26E
1.70. Study programme (undergraduate, graduate, integrated)	Integrated	2.266. Expected enrolment in the course	
1.71. Status of the course	Elective	2.267. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	level 1

2. COUSE DESCRIPTION	
5.16. Course objectives	By attending the elective course Game Zoology students will gain basic knowledge on peculiarities of morphology, biology, life characteristics and specific habits of majority of game species in Croatia. This knowledge is fundamental to attend tuition from Game Breeding and Management and Wildlife Diseases, located in the higher semesters. The acquired knowledge represents connection that enables further education according to the principles of vertical integration. In the practical part of this course students will gain necessary knowledge for further improvement of skills for successful species age and sex evaluation, and estimation of breeding and economic value of game animals. This specific knowledge is the base for further education in the field of practical forensics, and enabled attendants to recognize game species and body parts. Furthermore, this course facilitate students with acquirement of game animals' life habits, social structure and hierarchy in nature, representing in the same time the base for understanding of peculiarities of breeding technologies (natural and farm) of large and small game. Obtained knowledge is further an ethologic fundament that enables understanding and fulfillment of animal welfare during the keeping and manipulation of game species. In know-how sense it is necessary craft for development of specific skills for game manipulation (catching, immobilization, transport, etc.), assessment of wildlife age and condition of certain species, estimation of therapeutic dose and reduction of risks for personnel. From the epizootiological point of view it is necessary to understand dispersion and migration of wildlife with the goal to reduce interactions with livestock.

<table>
<tr><td>5.17. Course enrolment requirements and entry competences required for the course</td><td colspan="6">None</td></tr>
<tr><td>5.18. Learning outcomes at the level of the programme to which the course contributes</td><td colspan="6">Whit this program, students acquire the skills necessary to develop the ability to estimate the age, gender and economic value of all types of game animals. At the same time it is the basis for further training in identifying wildlife species and its parts for the expertise with which the veterinarians encounter in practice. Also these classes through programs that inform students about life habits, social structure and hierarchy of wild species in nature is the basis of understanding the specifics later farming technology (natural or farm) large and small game.</td></tr>
<tr><td>5.19. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">1. Identify and group all kinds of game species in Croatia by legal, technical and scientific categories
2. Judged the most important characteristics of mammals and birds classes that include all kinds of wildlife in Croatia
3. Correctly estimate the economic value of all (small and large) game species in Croatia
4. Categorize big game species with regard to gender and age
5. Identify traces of wildlife in nature
6. Distinguish protected from unprotected species of game birds</td></tr>
<tr><td>a. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">1. Introduction (establishment of game zoology in Croatia; game taxonomy; mammals; artiodactyls); 2. Ruminants: Deer (mammals: morphology and biology, antlers, Plesiometacarpalia and Telemetacarpalia, red deer, roe deer); 3. Ruminants: Family Bovidae (morphology and biology; horns: chamois, mouflon, ibex, vertical and seasonal migration); 4. Determination (Bovidae and Cervidae: recognition of game body parts, sex and age determination; teeth morphology in vertebrates); 5. Omnivores and carnivores: Suidae and Ursidae (morphology and biology; wild boar; brown bear); 6. Lagomorphs and rodents (Leporidae: brown hare; rabbit; differences in dentition; Rodentia: dormice; beaver; morphology and biology; hibernation); 7. Carnivores (Family Canidae: red fox; jackal; gray wolf; family Felidae: wild cat; lynx); 8. Family Mustelidae (stone marten, pine marten, weasel, badger, predation); 9. Feathered game (morphology and biology, taxonomy; hens: field hens – pheasant, quail, partridge, forest hens: caprecaillie, Eurasian black grouse, Ptarmigan, hazel grouse; waterfowls: wild ducks, wild goose; water hens; woodcocks; pigeons; unprotected species).</td></tr>
<tr><td>b. Format of instruction:</td><td colspan="3">X lectures
seminars and workshops
X exercises
☐ on line in entirety
partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
X multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>c. Comments:
-</td></tr>
<tr><td>d. Student responsibilities</td><td colspan="6">Class attending obligations; lectures (50%), exercise (80%)</td></tr>
<tr><td>e. Screening student work (name the proportion of</td><td>Class attendance</td><td>0.36</td><td>Research</td><td>-</td><td>Practical training</td><td></td></tr>
<tr><td></td><td>Experimental work</td><td>-</td><td>Report</td><td>-</td><td>Activity</td><td>0.2</td></tr>
</table>

ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)	Essay	-	Seminar essay	-	(other)	-
	Tests	0.64	Oral exam	-	(other)	-
	Written exam	0.8	Project	--	(other)	-

2.10. Grading and evaluating student work in class and at the final exam	Evaluating elements: 1. Attending lectures 2. Attending exercises 3. Seminar essay 4. Commitment 5. Knowledge shown on final exam

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and via other media)	Blüchel, K. G. (1997): Game and Hunting – volume 2. Könemann Verlagsgesellschaft mbH, Köln, Germany	1	Dept. library, Dept. web page
	Prior, R. (1995): The Roe Deer, Conservation of a Native Species. Swan Hill Press, Shrewsbury, UK	1	Dept. library, Dept. web page
	Whitehead, G. K. (1993): The Whitehead Encyclopedia of Deer. Swan Hill Press, Shrewsbury, UK	1	Dept. library, Dept. web page

2.100. Optional literature (at the time of submission of study programme proposal)	1. Cabanau, L. (2001): Wild Boar in Europe. Könemann, Köln, Germany 2. Denuc, J. P. (2001): Snipe and Woodcock. Könemann, Köln, Germany 3. Bubenik, G. A., A. B. Bubenik (1990): Horns, Pronghorns, and Antlers. Springer-Verlag, New York Inc., USA
2.101. Quality assurance methods that ensure the acquisition of exit competences	Assessment during practical classes, independent seminary, assessment via e-quiz
2.102. Other (as the proposer wishes to add)	None

HUNTING AND NATURE PROTECTION

1. GENERAL INFORMATION			
1.135. Course teacher	Professor Zdravko Janicki, DVM, MSc, PhD	2.268. Year of the study programme	4th, 5th
1.136. Name of the course	Hunting and Nature Protection	2.269. Credits (ECTS)	2
1.70. Associate teachers	Professor Alen Slavica, Professor Dean Konjević, Assistant professor Magda Sindičić, DVM, PhD	2.270. Type of instruction (number of hours L + S + E + e-learning)	4L+26E
1.71. Study programme (undergraduate, graduate, integrated)	University Integrated Undergraduate and Graduate Study Programme Veterinary Medicine	2.271. Expected enrolment in the course	
1.72. Status of the course	Elective	2.272. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	None
2. COUSE DESCRIPTION			
5.20. Course objectives	Absolved courses in the curriculum " Hunting and nature protection " which elaborates topics from hunting methodologies and technologies, processes the shot game and manipulate the traffic from venison students acquire the necessary basic knowledge on hunting management and protection of natural habitats, as well as special knowledge which enables them to acquire the hunting diploma recognized by CHA (Croatian Hunting Association). Students who are in track ' Veterinary public health and food hygiene ', as well as the students oriented to track ' Farm animals and horses ' get to know the specifics of the exploitation, processing and trade in wildlife and its parts for the purposes of hunting and veterinary inspection. Such programs not only to be rounded knowledge and skills acquired complete a similar undergraduate amenities, but complements the knowledge of the legal provisions that regulate the cultivation and utilization of wildlife in accordance with ZOL (Hunting Act). It is assumed that students would develop their professional knowledge consideration to specific situation on the ground, consideration of legislation in the light of economic hunting practices, and rapid integration into all activities of veterinary supervision and inspection.		
5.21. Course enrolment requirements and entry competences required for the course	None		
5.22. Learning outcomes at the level of the	The curriculum of the course" Hunting and environmental protection" in eight semester deals with hunting legislation, methods of hunting and hunting technology, and provides guidance on the proper (sustainable) game management and conservation of biodiversity in all types of habitats in the Republic of Croatia. Students are		

programme to which the course contributes	familiarized with the procedures after the game was shot (evisceration) and ways of handling and transport of meat of game animals. Thus the students who enrolled this elective course educated about the specifics in the exploitation, processing and trade in game animals and its parts for the needs of the meat industry and the hunting and veterinary inspection. Such programs not only to be rounded knowledge and skills acquired complete a similar undergraduate amenities, but complements the knowledge of legislative provisions such specific cultivation and exploitation of game management and breeding. The students are trained to implement and hunting management in order to preserve the original living communities. The laying of the elective course Hunting and environmental protection, and after completion of the compulsory subjects" Management and Breeding" which is heard in the VII semester, participants recognized national hunting exam and they are entitled to receive a diploma from hunting Croatian Hunting Association.
5.23. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	7. Appoint and define the legal regulations related to hunting and nature protection 8. Evaluate the basic requirements for capability evaluation of habitat and hunting grounds 9. Forming plan skilled technical and economic regulation of hunting grounds (areas) 10. Formulate nature protection requirements in preparing the HMP (hunting-economic fundamentals) and the basics of game management in the NP and NPs (national parks and nature parks) 11. Handle hunting weapons and safe shooting 12. Proper choose the technique of hunting with regard to the type of game, the obligation of using hunting dogs and the number of participants in the hunt 13. Demonstrate the proper procedure with the shot game 14. Properly assessments of the trophies of big game species
a. Course content broken down in detail by weekly class schedule (syllabus)	1. Evolution of hunting (Definition of hunting; Development of hunting through human history; Present-time hunting, Customs and ethics in hunting); 2. Regulations (Hunting Law; Law on Nature Protection; Hunt, hunting season and poaching; Law on Weapons); 3. Technical objects and instruments in the hunting grounds (Raised stand and hunting screen; Solid traps for live-trapping, Transport cages and boxes; Nets for live-trapping; Agriculture mechanization; Maintenance); 4. Hunting methods (Individual hunting; Hunting in groups; Traps and poisons; Safety measures in hunting); 5. Hunting dogs (Hunting with dogs; Classification of hunting dogs); 6. Non-conventional methods of hunting (Falconry, Archery, Trapping, Hunting ‘’par force’’), 7. Venison (Procedure with shot game; Shooting of game and outage of venison; Wounding and partial bleeding; Cooling; Transport),

	8. Hunting weapons (Fire-arms; Hunting ammunition; Hunting optics; Safe handling, keeping and transporting of the weapons); 9. Essential ballistic (Inner, outer and on target ballistic; Types of projectiles, velocity and game biomass; Types of gun-powder); 10. Marking the game (Marking and tracking the game in rearing and transport); 11. Trophy evaluation (Trophies through human history; Term trophy – definition; Trophies according to the species; CIC; Economical value, International transport).					
b. Format of instruction:	X lectures X seminars and workshops X exercises ☐ on line in entirety X partial e-learning ☐ field work		☐ independent assignments X multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)		c. Comments:	
					-	
d. Student responsibilities	Attending lectures (50%), exercise (75%)					
e. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0.36	Research	-	Practical training	
	Experimental work	-	Report	-	**Activity**	**0.2**
	Essay	-	Seminar essay	-	(other)	-
	Tests	-	Oral exam	0.8	(other)	-
	Written exam	0,64	Project	--	(other)	-
2.10. Grading and evaluating student work in class and at the final exam	Evaluating elements: 1. Attending lectures 2. Attending exercises 3. Practical work 4. Commitment 5. Knowledge shown on final exam					
2.11. Required literature (available in the library and via other media)	**Title**				**Number of copies in the library**	**Availability via other media**

	S. D. Schemnitz et all (1980): Wildlife Management Techniques Manual (4th Edition), The Wildlife Society, Washington, USA	1	Dept. library, Dept. web page
	Bluchel et all (1997): Game and Hunting (Vol. I & II), Imago Publishing Ltd, Germany	1	Dept. library, Dept. web page
	D. J. Crump et all (2007): Into the wilderness (Special Edition), The National Geographic Society, Washington, USA	1	Dept. library, Dept. web page
2.103. Optional literature (at the time of submission of study programme proposal)	1. H. Angele t all (1985): Havens of the Wild, RDS & Pegasus Association, Orbis Publishing, London, UK 2. Rossignol C., Caccivio A (1999): Guide to Hunting Dogs, Konemann VerlagsgesellschaFT MbH, Germany 3. A. E. Hartink (1998): Encyclopedia of shotguns & other game guns, REBO Productions, The Netherlands 4. K. Davies (1992): The better shot, Quiller Press, Shrewsbury, England		
2.104. Quality assurance methods that ensure the acquisition of exit competences	Assessment during practical classes, assessment via e-quiz		
2.105. Other (as the proposer wishes to add)	None		

HYGIENE AND QUALITY OF GAME MEAT

1. GENERAL INFORMATION			
1.137. Course teacher	Assist. Prof. Tomislav Mikuš	2.273. Year of the study programme	V/VI
1.138. Name of the course	Hygiene and Quality of Game Meat	2.274. Credits (ECTS)	2
1.71. Associate teachers	Full Prof. Željka Cvrtila, Full Prof. Nevijo Zdolec, Assist. Prof. Tomislav Mikuš, teaching assistant Marta Kiš, PhD, teaching assistant Mladenka Vukšić, DVM	2.275. Type of instruction (number of hours L + E + S + e-learning)	11+5+10
1.72. Study programme (undergraduate, graduate, integrated)	integrated	2.276. Expected enrolment in the course	
1.73. Status of the course	elective	2.277. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	20%

2. COUSE DESCRIPTION	
5.24. Course objectives	The aim of the subject is to make the students well acquainted with all the matters relative to the hunted and bred game, either large or small game and game birds, and in particular with the procedures applied in the processing of their meat. The acquired knowledge is specific and applicable in the procedures of veterinary control of hunted (and bred) game and their meat, particularly with respect to hunted and bred game handling, storage, processing and cutting of game meat, and possibilities of production of game meat products.
5.25. Course enrolment requirements and entry competences required for the course	The course can enroll only students of study track "Hygiene and technology of animal food and veterinary public health"
5.26. Learning outcomes at the level of the programme to which the course contributes	Knowing the specifics of hygiene and quality of game meat within the activities of veterinary public health and food safety.
5.27. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	By the completion of the course students should be able to: - interpret the results of testing of hygienic quality of game meat - know the legislation in the field of hunted and/or wild game hygiene

	- differ the type of game farming: hunted and/or wild game - explain the organization of veterinary controls in processing, storage and transport of game meat
5.28. Course content broken down in detail by weekly class schedule (syllabus)	1. Composition of game meat (physical and chemical properties, chemical composition, and biological value of game meat). 2. Legal regulations and legislation (Laws and by-laws). 3. Hunted and bred game and their meat (Large and small game and game birds). 4. Storage, treatment and cutting of game meat (Evaluation of game meat quality). 5. Game meat products (Different types of meat products) 6. Game welfare during transport and slaughtering

5.29. Format of instruction:	x lectures x seminars and workshops x exercises ☐ on line in entirety x partial e-learning ☐ field work	☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	5.30. Comments:
5.31. Student responsibilities	Students are required to attend all forms of teaching the subject.		

5.32. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
Class attendance	0,36	Research		Practical training		
Experimental work		Report		Activites	0,2	
Essay		Seminar essay		(other)		
Tests	0,64	Oral exam	0,8	(other)		
Written exam		Project		(other)		

2.10. Grading and evaluating student work in class and at the final exam

ACTIVITIES	MINIMAL SCORE	MAXIMAL SCORE
Lecture attendance	**3**	**6**
11 hours of lectures (coefficient: 0,55)	Student must attend 6 hours of lectures in order to gain 3 points	11 x 0,55 = 6 points
Exercise attendance	**4**	**6**

5 hours of exercises (coefficient: 1,2)	student must attend 3 hours of exercises in order to gain 4 points		
Seminars attendance	**4**	**6**
10 hours of seminars (coefficient: 0,6)	student must attend 7 hours of seminars in order to gain 4 points		
Activity at exercises and seminars	**5**	**10**
10 oral questions (1 points each)	5 correct answers on asked questions		
Continuous knowledge checking	**20**	**32**
1 written exams, 8 questions 1 question = 4 points	A student must give correct answers to 5 questions in order to gain 20 points	8 correct answers x 4 = 32 points	
Final exam	**24**	**40**
Oral exam, 10 questions. 1 question = 4 points	A student must give correct answers to 6 questions in order to gain 24 points	10 correct answers x 4 = 40 points	

2.11. Required literature (available in the library and via other media)	**Title**		**Number of copies in the library**	**Availability via other media**
	D.S. Collins, R. J. Huey (2015): Gracey's Meat hygiene. 11th edition. A John Wiley & Sons, Ltd., Publication, 2015.			pdf
	Paulsen P., A. Bauer, F. J. M. Smulders (2017): Game meat hygiene. Wageningen Academic.			pdf
2.106. Optional literature (at the time of submission of study programme proposal)	Professional and scientific papers related to the game meat hygiene.			
2.107. Quality assurance methods that ensure the acquisition of exit competences	Assessment during exercises and seminars			
2.108. Other (as the proposer wishes to add)				

HYGIENE AND QUALITY OF POULTRY MEAT

1. GENERAL INFORMATION			
1.139. Course teacher	Full Prof. Nevijo Zdolec	2.278. Year of the study programme	V/VI
1.140. Name of the course	Hygiene and quality of poultry meat	2.279. Credits (ECTS)	2
1.72. Associate teachers	Full Prof. Željka Cvrtila, Full Prof. Nevijo Zdolec, Assist. Prof. Tomislav Mikuš, teaching assistant Marta Kiš, PhD, teaching assistant Mladenka Vukšić, DVM	2.280. Type of instruction (number of hours L + E + S + e-learning)	4+14+8
1.73. Study programme (undergraduate, graduate, integrated)	integrated	2.281. Expected enrolment in the course	
1.74. Status of the course	elective	2.282. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	20%

2. COUSE DESCRIPTION	
5.33. Course objectives	Scope of the subject is to broaden the previously acquired knowledge in the field of veterinary-sanitary inspection of poultry meat. It enables further education of post-graduate students for their future expert work in the field of veterinary-sanitary inspection of poultry meat. By a thorough approach to evaluation of quality and shelf life of poultry meat it will be possible to acquire knowledge and skills needed for subsequent management of production and quality of poultry meat.
5.34. Course enrolment requirements and entry competences required for the course	The course can enrol only students of orientation "Hygiene and technology of animal food and veterinary public health"
5.35. Learning outcomes at the level of the programme to which the course contributes	Knowing the specifics of hygiene and quality of poultry meat within the activities of veterinary public health and food safety.
5.36. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	- know the technological process of slaughtering of poultry - to distinguish certain categories of poultry meat and poultry meat products - explain the meaning of veterinary inspection (control and / or monitoring) of poultry meat - interpret the results of microbiological examination of poultry

5.37. Course content broken down in detail by weekly class schedule (syllabus)	1. Organisation of the production process (Technological process of the slaughtering processing of poultry. Technological errors of the post mortem aetiology on poultry meat. Possibilities of cross-contamination of poultry meat with food-borne microorganisms). 2. Evaluation of quality of poultry meat on the slaughtering line (Welfare at the time of slaughter, Veterinary-sanitary inspection of poultry meat. Evaluation of the hygienic quality of poultry meat for human consumption. Classification and categorisation of poultry meat). 3. Poultry meat quality (Impact of slaughter welfare on poultry meat quality, Evaluation of freshness and shelf life of poultry meat. Microbiological analysis of poultry meat). 4. Poultry meat products (Shelf life and sensor evaluation of quality of the poultry meat products. Boneless poultry meat. Comminuted meat and comminuted poultry meat products. Sausages, dry-cured products, cans and finished products).

5.38. Form of instruction:	x lectures x seminars and workshops x exercises ☐ on line in entirety x partial e-learning ☐field work	x independent assignments ☐ multimedia and the internet x laboratory ☐ work with mentor ☐ (other)	5.39. Comments:
5.40. Student responsibilities	Students are required to attend all forms of teaching the subject.		

5.41. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
	Class attendance	0.36	Research		Practical training	
	Experimental work		Report		Activity	0.2
	Essay		Seminar essay		(other)	
	Tests	0.64	Oral exam	0.8	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	TYPES OF ACTIVITIES	COEFFICIENT	MINIMAL NUMBER OF POINTS	MAXIMUM NUMBER OF POINTS
	Attending lectures	**1.5**	**3**	**6**
	The total of 4 lecture hours	6:4=1.5	3:1,5=2 In order to gain minimal 3 points a student must attend 2 lecture hours. Attending one lecture hour is evaluated 1.5 point	
	Attending exercises	**0,42**	**4**	**6**
	Total of 14 exercise hours		4:0,42 = 10	

			a student must attend 10 exercise hours In order to gain the minimal number of points (4), a student must attend 11 exercise hours.		
	Attending seminares	**0,75**	**4**	**6**	
	Total of 8 seminar hours	6:8=0,75	4:0,75= 5 a student must attend 5 seminars In order to gain the minimal number of points (4), a student must attend 4 seminars. Attending one seminar hour is evaluated 0.75 point.		
	Participation at Exercises and seminars		**5**	**10**	
	Seminare prepared and held = 3 points Verbal response during exercises = 4x1 point Positive verbal response during seminars = 3x1 point		a student must gain minimal 5 points Correct oral responses during exercise and seminars. At exercises and seminars, the student can be asked or call for an answer.		
	Continuous knowledge checking	**1**	**20**	**32**	
	1 colloquium 8 questions 1 question = 4 points	32:32=1	a student must gain minimal 20 points During the course continuous knowledge checking will be done with 1 preliminary exam (8 questions). Each correct answer is worth 4 points. The student must answer minimum 5 questions to gain minimal 20 points. In case a student answers less than 5 questions at a preliminary exam, he/she must retake the preliminary exam, which will be organised in the end of round.		
	Final exam	**1**	**24**	**40**	
	Oral exam 10 questions 1 question = 4 points	40:40=1	a student must gain minimal 24 points The final exam covers all the results of monitoring activities during class. The exam is oral. Students should answer on 10 questions. The correct answer is scored with 4 points. The minimum number of points is 24.		

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	Galanakis, C. M. (2019): Sustainable Meat Production and Processing. Academic Press, London, UK.		PDF
	Gregory, N. G. (2007): Animal Welfare and Meat Production, 2nd Edition. CABI International, Oxfordshire, UK	1 copy	
	Herenda, D. C., D. A. Franco (1996): Poultry diseases and meat hygiene. Iowa State University Press, 1996.	1	
	Mead, G. C. (2004): Poultry meat processing and quality. Woodhead Publishing Limited, Cambridge, UK.		PDF
	Richardson, G.C. Mead (eds) (1999): Poultry meat science. CABI Publishing, Oxfordshire, UK.	1	
	Material and notes from lectures		
2.109. Optional literature (at the time of submission of study programme proposal)	Pearson, A. M., T. R. Dutson (1995): Advances in Meat Research - Volume 10 HACCP in Meat, Poultry and Fish Processing. Blackie Academic & Professional, Glasgow, UK. Sossidou, E., E. Szucs (2007): Farm animal welfare, environment & Food Quality interaction studies. Welfood partners, Hellas. Kerry, J. P., D. Ledward (2009): Improving the sensory and nutritional quality of fresh meat. Woodhead Publishing Limited, Cambridge, UK. Kerry, J. P., J. F. Kerry (2011): Processed meats Improving safety, nutrition and quality. Woodhead Publishing Limited, Cambridge, UK. Webster, J.(2011): Management and Welfare of Farm Animals – The UFAW Farm Handbook.Wiley-Blackwell Publishing, USA. Directives EU Humane Slaughter Association Publications		
2.110. Quality assurance methods that ensure the acquisition of exit competences	Assessment during exercises and seminars		
2.111. Other (as the proposer wishes to add)			

HYGIENE AND QUALITY OF FISH MEAT

1. GENERAL INFORMATION			
1.141. Course teacher	Full Prof. Nevijo Zdolec	2.283. Year of the study programme	V/VI
1.142. Name of the course	Hygiene and Quality of Fish Meat	2.284. Credits (ECTS)	2
1.73. Associate teachers	Full Prof. Željka Cvrtila, Full Prof. Nevijo Zdolec Assist. Prof. Tomislav Mikuš, teaching assistant Marta Kiš, PhD, teaching assistant Mladenka Vukšić, DVM	2.285. Type of instruction (number of hours L + E + S + e-learning)	9+6+12
1.74. Study programme (undergraduate, graduate, integrated)	integrated	2.286. Expected enrolment in the course	
1.75. Status of the course	elective	2.287. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	20%

2. COUSE DESCRIPTION	
5.42. Course objectives	After audit of the course, a student will complete one's own already acquired knowledge of the major, obligatory subject Hygiene and technology of foodstuffs. The subject explains in details individual parameters of evaluation of health safety of fish. Thus, the students will be able to perform independently the evaluation of the safety of fish with the use of modern methods of evaluation of the quality, freshness, shelf life and hygienic quality of fish. The acquired knowledge is specific and applicable in activities related with veterinary inspection and control in the production and trade of fish, and with veterinary public health.
5.43. Course enrolment requirements and entry competences required for the course	The course can enrol only students of orientation "Hygiene and technology of animal food and veterinary public health"
5.44. Learning outcomes at the level of the programme to which the course contributes	Knowing the specifics of hygiene and quality of fish within the activities of veterinary public health and food safety

<table>
<tr><td>5.45. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">After successfully completing this course the student will be able to:
- know the composition and properties of fish
- distinguish certain categories of fish
- interpret the results of microbiological analysis of fish
- explain the significance of the findings of parasites, heavy metals and other chemical constituents in assessing the health of fish</td></tr>
<tr><td>5.46. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">1. Fish as food product (Composition and properties of fish. Categorisation of fish).
2. Welfare of fish and influence on quality of fish meat.
3. Evaluation of shelf life of fish (Stunning of fishes. Post-mortem changes in fish (sensory, autolytical, bacterial changes, lipid oxidation and hydrolysis). Influence of the storage temperature on the quality of fish (fresh, frozen, salted and smoke-treated fish, comminuted fish meat); Evaluation of fish quality.
4. Microbiological quality of fish and fish products (Microbiological procedures in the evaluation of the fish freshness. Natural microflora of fish. Specific spoilage microorganisms. Contamination of fish with pathogenic bacteria).
5. Safety and hygienic quality of fish (Fish parasites as causal organisms of zoonoses. Procedures for determination of the presence of larvae of Anisakis spp. Chemical risks. Finding of heavy metals in fish. Histamine. Biotoxins. Ciguatoxin.)</td></tr>
<tr><td>5.47. Format of instruction:</td><td colspan="2">x lectures
x seminars and workshops
x exercises
☐ on line in entirety
x partial e-learning
☐field work</td><td colspan="2">☐ independent assignments
x multimedia and the internet
x laboratory
x work with mentor
☐ (other)</td><td colspan="2">5.48. Comments:</td></tr>
<tr><td>5.49. Student responsibilities</td><td colspan="6">Students are required to attend all forms of teaching the subject.</td></tr>
<tr><td rowspan="6">5.50. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0.36</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Activities</td><td>0.2</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>0.64</td><td>Oral exam</td><td>0.8</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="2">TYPES OF ACTIVITIES</td><td>COEFFICIENT</td><td colspan="2">MINIMAL NUMBER OF POINTS</td><td>MAXIMUM NUMBER OF POINTS</td></tr>
</table>

	Attending lectures	0.67	3	6
	The total of 9 lecture hours	6:9=0.6667	a student must gain minimal 3 points In order to gain minimal 3 points a student must attend 5 lecture hours. Attending one lecture hour is evaluated 0.66 point	
	Attending exercises	**1**	**4**	**6**
	Total of 6 exercise hours	6:6=1	4 : 1 = 4 a student must attend 5 exercise hours Attending one exercise hour is validated 1 point. In order to gain the minimal number of points (4), a student must attend 4 exercise hours.	
	Attending seminares	**0.5**	**4**	**6**
	Total of 12 seminar hours	6:12=0,5	4:0,5 = 8 a student must attend 8 seminar hours Attending one seminar hour is validated 0.5point. To achieve the minimum number of points (4), the student must be present at 10 hours of seminars.	
	Participation at exercises and seminars	**1**	**5**	**10**
	Seminare prepared and held = 3 points Verbal response during exercises = 4x1 point Positive verbal response during seminars = 3x1 point	10:10=1	a student must gain minimal 5 points (Correct oral responses during exercise and seminars - During exercises and seminars, students may be asked or call for a response)	
	Continuous knowledge checking		**20**	**32**
	1 colloquium 8 questions	32:32=1	a student must gain minimal 20 points	

	1 question = 4 points		During the course continuous knowledge checking will be carried out by one colloquium (8 questions). Each correct answer carries 4 points. The student must answer at least 5 questions, thereby defining a minimum number of points (20) that a student must collect. If student answered less than five questions retake colloquium will be organized at the end of rounds	
	Final exam		**24**	**40**
	Oral exam 10 questions 1 question = 4 points	40:40=1	a student must gain minimal 24 points The final exam covers all the results of monitoring activities during class. The exam is oral. Students should answer on 10 questions. The correct answer is scored with 4 points. The minimum number of points is 24,	

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and via other media)	Borda, D., A. I. Nicolau, P. Raspor (2018): Trends in Fish Processing Technologies. Taylor & Francis Group, Boca Raton, U.S.A.		PDF
	Hall, G. M. (2011): Fish Processing – Sustainability and New Opportunities. Wiley-Blackwell, Chichester, UK.		PDF
	Garcia Pinillos, R. (2018): One Welfare A Framework to Improve Animal Welfare and Human Well-being. CABI International, Oxfordshire, UK.		PDF
	Huss, H. H. (1995): Quality and quality changes in fresh fish. FAO Fisheries Technical paper – 348 Food and agricultural organization of the United Nations, Rome	1	
	Huss., H.H. (2004): Assesment and management of seafood safety and quality. FAO, Rome.	1	
	Wootten, R., D.C. Cann (2001): Round worms in fish. Torry research station. Torry advisory note No. 80. FAO/SIFAR	1	

2.112. Optional literature (at the time of submission of study programme proposal)	Pearson, A. M., T. R. Dutson (1995): Advances in Meat Research - Volume 10 HACCP in Meat, Poultry and Fish Processing. Blackie Academic & Professional, Glasgow, UK. (PDF) Martin, R. E., E. Pain Carter, G. F. Jr. Flick, L.M. Davis (2000): Marine and Freshwater Products Handbook.Technomic Publishing CO., Inc. Lancaster, Pennsylvania, U.S.A. (1 copy) Von Der Emde, G., J. Mogdans, B.G. Kapoor (2004): The Senses of Fish. Kluwer Academic Publishers, Dordrecht, The Netherlands. (1 copy)
2.113. Quality assurance methods that ensure the acquisition of exit competences	Assessment during exercises and seminars
2.114. Other (as the proposer wishes to add)	

MANAGEMENT AND MARKETING IN VETERINARY PRACTICE

1. GENERAL INFORMATION			
1.143. Course teacher	Denis Cvitković, DVM, MBA, PhD, assistant professor	2.288. Year of the study programme	6th
1.144. Name of the course	**Management and Marketing in Veterinary Practice**	2.289. Credits (ECTS)	2
1.74. Associate teachers	Marina Pavlak, DVM, PhD, full professor Dean Konjević, DVM, PhD, associate professor	2.290. Type of instruction (number of hours L + S + E + e-learning)	10+0+20+0
1.75. Study programme (undergraduate, graduate, integrated)	integrated	2.291. Expected enrolment in the course	30
1.76. Status of the course	elective	2.292. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
5.51. Course objectives	Enable students to start with autonomous management of veterinary practice
5.52. Course enrolment requirements and entry competences required for the course	Requirements for enrolement into year 5
5.53. Learning outcomes at the level of the programme to which the course contributes	Students become qualified for autonomous management of veterinary practice.
5.54. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Managing the veterinary practice staff Managing the clients Real estate selection Computer utilization in veterinary practice Marketing the practice and the profession Fee setting and collection Selfmanagement

5.55. Course content broken down in detail by weekly class schedule (syllabus)	DAY 1. (6 hours) Veterinary service organization (organization, organizational science development, veterinary activities organization models, other countries' experiences); Management and leadership (leadership and management, situational leadership, motivation, organizational climate, acknowledgement, resposibility, standards, rewards, clarity, team spirit); Client management (practice area, population, animals, staff to client relationship, vet to client relations, how clients are choosing a vet, practice procedure and clients); Staff management (Phylosophy and style, analysis of the needs, activities analysis and development, staff recruitment, salaries and cariere development, leading new employees, practice for new employees, motivating employees, conflict management); DAY 2. (6 hours) Real estate selection – management (practice location, real estate property management, size and structure of the building, space requirements, maintaining a good appearance; Computer utilization in veterinary practice (the role of computerization in a veterinary practice, analysis of needs for computerization, software alternatives, hardware alternatives, personnel support, feasibility analysis for computerization); Marketing the practice and the profession (professional marketing, professional marketing techniques, specific marketing techniques); How to buy or sell a practice (buying a practice, selling a practice, negotiable items, closing the deal); DAY 3. (6 hours) Starting a practice (who should start a practice, when to start a practice, where to start a new practice, what type of practice to start); Fee setting and collection (fee setting, fair fees, methods for setting fees, cash vs. credit, communicating fees to clients); Utilization of the veterinary technician (education of animal technicians, utilization of the technician, guidelines for hiring and keeping a veterinary technician); The practice manager (the professional staff, personnel management, purchasing, financial accountability, choosing a practice manager); DAY 4. (6 hours) Practice and the law (selecting an attorney, the standard of skill and care, work contracts and restrictive covenants, malpractice, professional corporations and partnerships, premises liability, liability for acts of and to employees, assistance from clients); Practice and personal protection (insurance, financial planning, retirement planning); Financial aspects of practice management (a look at financial statements, financial statement analysis, financial management systems); DAY 5. (6 hours)

	Managing yourself (managing your job, managing your time, managing yourself); Inventory, prescriptions and equipment (inventory control, ordering drugs and supplies, arrangement of inventory, pricing drugs, dispensing medications, prescription writing, controlled substances, drug and product information, equipment); Patient death and dying (the human – companion animal bond, progressive illness and euthanasia, facilitating client grief, ten grief facilitation skills)					
5.56. Format of instruction:	× lectures ☐ seminars and workshops × exercises ☐ on line in entirety ☐ partial e-learning × field work		× independent assignments × multimedia and the internet ☐ laboratory × work with mentor × business intelligence		5.57. Comments:	
5.58. Student responsibilities	attending lectures, attending exercises, writing seminar works, participation in exercises and seminars, continuous knowledge checking, final exam					
5.59. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0,36	Research		Practical training	
	Experimental work		Report		(other)	
	Essay		Seminar essay	0,2	(other)	
	Tests	0,64	Oral exam	0,4	(other)	
	Written exam	0,4	Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam

Grading and evaluation: class attendance, tests, seminar essays, exam

Final exam: written and oral

Activity	Minimal score	Maximal score
Class attendance	3	6
Exercise attendance	8	12
Seminar essay	5	10
Tests	20	32
Final exam	24	40

	Total	60	100	

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	Shilcock, M., Stutchfield, G. (2003): Veterinari practice management, a practical guide. Elsevier Science Limited, Edinburgh, United Kingdom.	3	
	Mc Curin, M. D. (1988): Veterinary Practice Management. J.B. Lippincott Company, Philadelphia, Pennsylvania.	3	

2.115. Optional literature (at the time of submission of study programme proposal)	
2.116. Quality assurance methods that ensure the acquisition of exit competences	Monitoring class attendance, tests, seminar essays, final exam
2.117. Other (as the proposer wishes to add)	

NATURAL COMPOUNDS IN VETERINARY MEDICINE

1. GENERAL INFORMATION			
1.145. Course teacher	Associate professor Kristina Starčević	2.293. Year of the study programme	1-6
1.146. Name of the course	Natural Compounds in Veterinary Medicine	2.294. Credits (ECTS)	2
1.75. Associate teachers	Assistant professor Luka Krstulović	2.295. Type of instruction (number of hours L + S + E + e-learning)	L-12+S-12+E-6
1.76. Study programme (undergraduate, graduate, integrated)	integrated	2.296. Expected enrolment in the course	
1.77. Status of the course	elective	2.297. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
5.60. Course objectives	**Natural Compounds in Veterinary Medicine deals with groups of organic compounds which were only partially described in the Medical chemistry course. The objective of this course is to expand student's knowledge on basic organic chemistry which is needed for attending and understanding Biochemistry in Veterinary Medicine, Physiology of Domestic Animals and other** courses during the Veterinary medicine studies, which demand knowledge of structure and chemistry of biologically important chemical compounds. Knowledge of important natural compounds their actions and biosynthesis will allow easier comprehension of the chemical changes that occur in animal and plant organisms.
5.61. Course enrolment requirements and entry competences required for the course	
5.62. Learning outcomes at the level of the programme to which the course contributes	Learning outcomes at the level of the programme: 8. Understanding the basic science on which veterinary medicine is based 9. Research: the ability to search the literature, databases and other information sources, the ability to design and conduct experiments in the field of veterinary medicine, to interpret results and draw conclusions and the ability of use laboratory equipment and make critical analysis of test results 10. Practical skills: the ability of consolidation of the theoretical knowledge and practical skills within the fields of veterinary medicine 11. Complementary skills: the ability to conduct independent research and work in a team, the ability of presenting the results – oral and in writing

5.63. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Learning outcomes at the level of the course: Ater successful completion of the course the student will be able to: 1. differentiate main groups of natural compounds – secondary metabolites; 2. compare the structure and action of secondary metabolites; 3. compare biosynthetic and laboratory formation of important natural compounds: 4. independently use methods for the extraction of compounds from natural sources; 5. propose method for the separation of compounds based on their properties.					
5.64. Course content broken down in detail by weekly class schedule (syllabus)	Definition and differentiation of secondary metabolites. Biosynthesis, laboratory synthesis, properties and action of natural compounds: vitamins, terpenes, carbohydrates, steroids, alkaloids. Methods for separation and identification of natural compounds, examples of laboratory and industrial synthesis, application in human and veterinary medicine. Isolation of caffeine. Spectrophotometric determination of lycopene from tomato juice.					
5.65. Format of instruction:	■ lectures ■ seminars and workshops ■ exercises ☐ on line in entirety ☐ partial e-learning ☐ field work		☐ independent assignments ☐ multimedia and the internet ■ laboratory ☐ work with mentor ☐ (other)		5.66. Comments:	
5.67. Student responsibilities	1. attending lectures 2. attending exercises 3. participation at exercises					
5.68. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0.36	Research		Practical training	
	Experimental work	0.2	Report		Activity	0.64
	Essay		Seminar essay		(other)	
	Tests		Oral exam	0.8	(other)	
	Written exam		Project		(other)	
2.10. Grading and evaluating student work in class and at the final exam	Oral exam – oral presentation of the seminar paper					

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	1. M. M. Bloomfield. Chemistry and the living organism, Wiley and sons, New York	1	No
	2. Chemistry of Natural Compounds, materials for laboratory exercices	1	Yes

13.			
2.118. Optional literature (at the time of submission of study programme proposal)	1. A. E. Osbourn, V. Lanzotti, Plant-derived Natural Products Synthesis, Function, and Application, Springer, London. 2. R. Cooper, G. Nicola Natural Products Chemistry: Sources, Separations, and Structures, CRC Press Taylor & Francis Group, London. 3. T. Aniszewski, Alkaloids – Secrets of life, Elsevier, Amsterdam.		
2.119. Quality assurance methods that ensure the acquisition of exit competences	Student survey		
2.120. Other (as the proposer wishes to add)			

ORGANIC PRODUCTION OF POULTRY AND GAME BIRDS

1. GENERAL INFORMATION			
1.147. Course teacher	Assoc. prof. Željko Gottstein	2.298. Year of the study programme	6
1.148. Name of the course	Organic production of poultry and game birds (226769)	2.299. Credits (ECTS)	2
1.76. Associate teachers	Full prof. Tomislav Mašek Full prof. Danijela Horvatek Tomić Assoc. prof. Maja Lukač Liča Lozica, PhD, DVM, Emanuel Budicin, DVM	2.300. Type of instruction (number of hours L + S + E + e-learning)	0+0+10+20
1.77. Study programme (undergraduate, graduate, integrated)	integrated	2.301. Expected enrolment in the course	
1.78. Status of the course	elective	2.302. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
5.69. Course objectives	Students will acquire knowledge on benefits of organic poultry production and its sustainability. They will as well overcome technology of poultry production and breeding and be capable of poultry disease recognition, prevention and control.
5.70. Course enrolment requirements and entry competences required for the course	
5.71. Learning outcomes at the level of the programme to which the course contributes	Student will successfully interconnect gained knowledge from fields of technology, nutrition, hygiene and diseases of poultry what will serve them to successfully organize organic production and perform prevention and cure in it.
5.72. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	- compare different technology principles in intensive and organic poultry production - propose poultry nutrition according to technology principles and breed composition - recognize infectious and non-infectious diseases in specific conditions of organic production

<table>
<tr><td></td><td colspan="6">- use classic and alternative principles in disease diagnostic, treatment and prevention
- identify legal guidelines as basis of organic poultry production.</td></tr>
<tr><td>5.73. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">1 Introduction into organic poultry and game bird production (comparison between conventional and farm poultry production; vertical integration – poultry production on pasture (free-range production) – advantages and disadvantages of free-range production; sustainable poultry and game bird production), 2 Principles of poultry and game bird production (systems of poultry breeding in organic production – combination of house and free-range holding – fencing (electric fence), 3 Genetic and productive traits of poultry intended for organic production (selection of poultry and game birds for free-range production – genetic lines and hybrids of poultry with production aim: meat or eggs), 4 Technology in organic production (summer and winter organic poultry production: heat and cold), 5 Nutrition in organic poultry production (nutrition in organic production: possibility of meat and egg quality manipulation considering the content of biologically active compounds (cholesterol, fatty acids, vitamins, amino acids), feeding with no antibiotics and other medicaments), 6 Nonspecific protection using technology measures (poultry protection in organic production from predators and other pests), 7 Specific health protection according to legislation guidelines for organic production (poultry health protection in organic and free-range holdings – viral, bacterial, fungal infections, micotoxicoses and parasitic invasions), 8 Poultry disease diagnostics in free-range production (Disease diagnostics and detection of level of disease protection), 9 Other poultry organic and free-range production (geese, duck, turkey, guineafowl, quail and other game birds), 10 Legal guidelines (legal guidelines in organic poultry production and possibilities of its application in view of etiological complexes)</td></tr>
<tr><td rowspan="2">5.74. Format of instruction:</td><td colspan="2">☐ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☒ partial e-learning
☒ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td colspan="2">5.75. Comments:</td></tr>
<tr><td colspan="4"></td><td colspan="2"></td></tr>
<tr><td>5.76. Student responsibilities</td><td colspan="6">Student must be present in at least 50% of lectures, 70% of seminars and 70% of exercises.</td></tr>
<tr><td rowspan="4">5.77. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0,36</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Activity (other)</td><td>0,2</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>0,64</td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td></td><td>(other)</td><td></td></tr>
</table>

	Written exam	0,8	Project		(other)	

Activity	Min. number of points	Max. number of points
Lecture attendance 10 hours (XI semester)	**3** 3/0,6 = 5 hours of lecture	**6** 6/10 = 0,6 (coefficient for 1 hour of lecture attandance)
Seminar attendance 10 hours (XI semester)	**4** **maximum 30% absence (3 hours)** 7 hours of seminars obligatory	**6** 6/10 = 0,6 (coefficient for 1 hour of seminar attandance)
Exercises attendance 10 hours (XI semester)	**4** **maximum 30% absence (3 hours)** 7 hours of practicals obligatory	**6** 6/10 = 0,6 (coefficient for 1 hour of exercise attandance)

2.10. Grading and evaluating student work in class and at the final exam

Activity on seminars and exercises 10 points[1]	**5**	**10**
Seminar essay 32 points[2]	**20**	**32**
Final exam (40 points[3])	**24** 24/1 = 24 (coefficient 1)	**40** 40/40 = 1 (coefficient 1)
Σ [4]	**60**	**100**

[1] – For activity on seminars and exercises student can get max. 10 points and min. 5 points. Activity on seminars is obligatory and is graded acording to succesfuly prepared and held seminar and for positivelly oriented answers with min. 3 points and max. 6 points (for positivelly oriented answers 0,2 points can be given, and for 5 answers it is 1 point). For activity on exercises (succesfully performed practical part) student can get min. 2 and max 4 points (0,5 points per activity).

[2] – Before oral exam student have to prepare written seminar which brings min. 20 and max. 32.

[3] – Written exam gives 24 to 40 points. Student answers 10 questions, and for 1 question can get 4 points. Student can aply for the final exam with min 36 points.

[4] – Final grade is defined quantitatively, with numeric point scale and a grade corresponding to that scale, from 1 to 5. With grade 1 (one) student is graded if she/he didn't pass the course, i.e. he failed on the exam. For each student its

<table>
<tr><td></td><td colspan="3">attendance and activity is registered in its personal form, together with its success on the colloquium, what teacher uses to form final grade.

Points Grade
do 59 1(F)
60-76 2 (D,E)
77-84 3 (C)
85-92 4 (B)
93-100 5 (A)</td></tr>
<tr><td rowspan="8">2.11. Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>Swayne, D. E. et all. (2020): Diseases of poultry. 14th ed., Wiley-Blackwell, USA.</td><td></td><td>Electronic media</td></tr>
<tr><td>Merritt, S. (2012): Free-range and organic poultry handbook. Small Farm Future Publishing.</td><td></td><td>Electronic media</td></tr>
<tr><td>Boulianne, M.L. et al. (2013): Avian Disease Manual. AAAP, SAD.</td><td></td><td>Electronic media</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>2.121. Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">Selected papers and internet materials.</td></tr>
<tr><td>2.122. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">Student questionnaire</td></tr>
<tr><td>2.123. Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

PARASITIC ZOONOTIC DISEASES

1. GENERAL INFORMATION			
1.149. Course teacher	Full Prof. Albert Marinculić	2.303. Year of the study programme	3 rd
1.150. Name of the course	Parasitic zoonotic diseases	2.304. Credits (ECTS)	2
1.77. Associate teachers	Assistant lecturer Franjo Martinković, Assistant Nika Konstantinović	2.305. Type of instruction (number of hours L + S + E + e-learning)	10+20+0+0
1.78. Study programme (undergraduate, graduate, integrated)	integrated	2.306. Expected enrolment in the course	
1.79. Status of the course		2.307. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	Level 2, 50%

2. COUSE DESCRIPTION	
5.78. Course objectives	Students will be aknowledged with the routes of infections in humans which is very important for the prevention. Since control measures of some parasitic zoonotic diseases are prescribed by legislative rules, the course aims to provide the education of future veterinarians previously aknowledged through the course Parasitology and parasitic diseases in order to give an active contribution for the prevention and education of animals owners. Seminars will include cases with special emphasis on routes of infection and prevention.
5.79. Course enrolment requirements and entry competences required for the course	Regular knowledge achieved throughout the veterinary study with the special emphasis on veterinary parasitology.
5.80. Learning outcomes at the level of the programme to which the course contributes	By the end of this course students should be able to demonstrate: detailed knowledge and understanding of the biology, life cycles, epidemiology and risk factors, clinical signs of the disease, diagnosis, prevention and control of zoonotic parasites detailed knowledge and understanding of the role of the veterinarian for the prevention of human risks caused by animal parasites

5.81. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Understanding of biology and ecology of parasites and vectors that are causing and transmitting zoonotic parasites Understanding of spreading ways of parasitic zoonotic diseases Understanding of human risks for zoonotic parasites Improving of skills and abilities in establishing proper control methods Understanding of modern trends in prevention of parasitic zoonotic diseases
5.82. Course content broken down in detail by weekly class schedule (syllabus)	LECTURES 1st week Introduction (meaning of the term zoonotic disease, public health significance of parasitic zoonotic diseases, epidemiology and epizootiology of parasitic zoonotic diseases, routes of infections, infective stages, diagnostic stages, preventive measures, aberrrant and ocasional parasite) 2nd week Important zoonotic parasites related to routes of infection and preventive measures, food and waterborne infections, infection after ingestion of tissues from intermediate hosts 3rd week Feco-oral route of infection (contamination of food and water) - giardiosis, cryptosporidiosis 4th week Toxocariasis - VLM, cyisticercosis, toxoplasmosis, hydatidosis 5th week Foodborne infections with developmental stages of parasites (trichinelosis, teniasis, toxoplasmosis) 6th week Trematode infections, anisakiasis, legislation 7th week Arthropods as vectors and control of vector borne diseases, vector borne zoonotic parasitic diseases (leishmaniasis) 8th week Dirofilaria infections, Chagas disease, Thelazia infections 9th week Contagious zoonotic diseases, ectoparasites (sarcoptic mange, Cheyletiella infection, fleas). 10th week Ancylostomiasis-CLM, strongyloidosis, occasional (aberrant) parasites in man. (Dypilidium infections, oftalmomyasis- *Oestrus ovis*, trombiculiasis, *swimer's itch*). Delusional parasitosis - *Ekbom syndrome*

	SEMINARS Case reports of important parasitic zoonotic diseases					
5.83. Format of instruction:	x☐ lectures x☐ seminars and workshops ☐ exercises ☐ on line in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	5.84. Comments:			
5.85. Student responsibilities	During the Course a student must attend at least 5 lecture lessons. During the course session the student must be actively involved in at least 8 seminars. At the final exam a student answers the questions orally.					
5.86. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	**0,5**	Research		Practical training	
	Experimental work		Report		**E learning tasks** (other)	**0,5**
	Essay		Seminar essay		(other)	
	Tests		Oral exam	1	(other)	
	Written exam		Project		(other)	
2.10. Grading and evaluating student work in class and at the final exam	Coursework will be evaluated according to the results obtained at the final exam. The final exam will be comprehensive and entirely oral.					

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the department library**	**Availability via other media**
	Human Parasitology, Burton Jerome Bogitsh, Clint Earl Carter, Thomas N. Oeltmann Academic Press, 2005	1	
	Clinical Parasitology, P. Chakraborty,New Central Book Agency (P) Limited, 2004	1	

	Principles and Practice of Clinical Parasitology: Stephen Gillespie, Richard D. Pearson, Wiley, 2001	1	
2.124. Optional literature (at the time of submission of study programme proposal)	Practical guide to diagnostic parasitology,Lynne Shore Garcia,ASM Press, 1999 Recent scientific artcles concerning important parasitic zoonotic diseases		
2.125. Quality assurance methods that ensure the acquisition of exit competences	Course information documentation, annual monitoring reports, student feedback by student questionnaire that cover all aspects of the course.		
2.126. Other (as the proposer wishes to add)			

PHYSIOLOGY OF BIRDS

1. GENERAL INFORMATION			
1.151. Course teacher	Associate professor Ivona Žura Žaja	2.308. Year of the study programme	2
1.152. Name of the course	**Physiology of Birds**	2.309. Credits (ECTS)	1
1.78. Associate teachers	Full professor Jasna Aladrović, Associate prof. Ivona Žura Žaja, Associate prof. Ana Shek Vugrovečki, Associate prof. Lana Pađen Assistant prof. Dražen Đuričić	2.310. Type of instruction (number of hours L + S + E + e-learning)	L12+E3
1.79. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine, Faculty of Veterinary medicine, University of Zagreb	2.311. Expected enrolment in the course	10
1.80. Status of the course	Elective	2.312. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	-
2. COUSE DESCRIPTION			
5.87. Course objectives	After the successful completion of the elective subject Physiology of birds, students will acquire knowledge peculiarities of the physilogy of birds and gain knowledge of the physiology of reproduction, digestion, respiration, excretion, blood and circulatory system, metabolism, neurophysiology and endocrinology, and behavior of birds.		
5.88. Course enrolment requirements and entry competences required for the course	-		

<table>
<tr><td>5.89. Learning outcomes at the level of the programme to which the course contributes</td><td>Students during class acquire knowledge about the basic peculiarities of the comparative physiology of birds, and obtained knowledge provide a good introduction to the knowledge of breeding and keeping of birds, and birds diseases.</td></tr>
<tr><td>5.90. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td>After successfully completing this course the student will be able to:
- explain the peculiarities of the comparative physiology of organ systems of birds
- interpret the function of various organ systems in different physiological conditions
- explain and relate the regulatory mechanisms of physiological processes in birds
- recognize and associate the importance of knowing the physiology of birds with breeding, keeping and diseases of birds</td></tr>
<tr><td>5.91. Course content broken down in detail by weekly class schedule (syllabus)</td><td>
<table>
<tr><th>Methodological unit / course content</th><th>class schedule (lectures + exercises + seminars)</th></tr>
<tr><td>Physiology of reproduction in birds, egg and its composition, the development of egg laying, the male reproductive processes, nesting, embryonic development, molt</td><td>L3</td></tr>
<tr><td>Physiology of digestion, the characteristics of the digestive tract in different species of birds given the diet</td><td>L2</td></tr>
<tr><td>Physiology of respiration, and cardiovascular system with hematologic characteristics</td><td>L2 + E3</td></tr>
<tr><td>Physiology of excretion, regulation of body temperature</td><td>L1</td></tr>
<tr><td>Physiology changes of the substance</td><td>L1</td></tr>
<tr><td>Neurophysiology and endocrinology with the physiology of behavior</td><td>L2</td></tr>
<tr><td>Physiology of flying</td><td>L1</td></tr>
</table>
</td></tr>
<tr><td>5.92. Format of instruction:</td><td>☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work

☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)

5.93. Comments:</td></tr>
<tr><td>5.94. Student responsibilities</td><td>Student obligations are defined with the Regulations on the integrated undergraduate and graduate Study of Veterinary Medicine, University of Zagreb.
Students are required to attend classes (according to the mentioned Regulation) and taking the final (oral) exam.</td></tr>
</table>

5.95. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0.12	Research		Practical training	
	Experimental work		Report		Activity during lectures	
	Essay		Seminar essay		Activity during exercises	0.16
	Tests	0.32	Oral exam	0.4	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam

Activities	Minimum number of points	Maximum number of points
Class attendance	**3**	**6**
12 hours of lectures	(coeficient = 0,5) 6 x 0,5 = 3	(coeficient = 0,5) 12 x 0,5 = 6
Exercises attendance	**4**	**6**
3 houes of exercises	(coeficient = 2) 2 x 2 = 4	(coeficient = 2) 3 x 2 = 6
Activity during exercises	**9**	**16**
Continuous evaluation	**20**	**32**
Oral evaluation		
Final exam	**24**	**40**
Oral 1 correct answer = 8 points	3 correct answers	5 correct answers
In total	**60**	**100**

2.11. Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
SCANES, C. G. (Ed.) (2015): Sturkie's Avian Physiology. 6th ed., Springer Verlag, New York, Berlin, Heidelberg, Tokyo.	1 book in the Library of the Department of Physiology and Radiobiology	-
SJAASTAD, Ø. V., O. SAND, K. HOVE (2010): Physiology of Domestic Animals. 12nd ed., Scandinavian Veterinary Press, Oslo.	1 book in the Library of the Department of	-

		Physiology and Radiobiology	
	WEISS, D. J., J. WARDROP (Eds.) (2010): Schalm's Veterinary Hematology. 6th ed., Blackwell Publishing Ltd, Ames.	1 book in the Library of the Department of Physiology and Radiobiology	
	NELSON, R. J. (2011): An Introduction to Behavioral Endocrinology. 4th ed., Sinauer Associates, Inc., Sunderland, Massachusetts.		
2.127. Optional literature (at the time of submission of study programme proposal)	CLARK, P., W. S. J. BOARDMAN, S. R. RAIDAL (2009): Atlas of Clinical Avian Hematology. Wiley-Blackwell, Oxford, UK. BRADSHAW, D. (2003): Vertebrate Ecophysiology. An Introduction to Its Principles and Applications. Cambridge University Press, Cambridge, UK.		
2.128. Quality assurance methods that ensure the acquisition of exit competences	Students' work will be monitored through the activity during lectures and exercises, and continuous (oral) evaluation. At the end of teaching the knowledge of students will be verified by a final (oral) exam.		
2.129. Other (as the proposer wishes to add)			

PHYSIOLOGY OF AMPHIBIANS AND REPTILES

1. GENERAL INFORMATION			
1.153. Course leader (substitute)	Assoc. prof. Lana Pađen, DVM, PhD (substitute prof. Jasna Aladrović, DVM, PhD)	2.313. Year of the study programme	2
1.154. Name of the course	**Physiology of Amphibians and Reptiles**	2.314. Credits (ECTS)	1
1.79. Teachers and associate teachers	Prof. Jasna Aladrović, DVM, PhD, Assoc. prof. Lana Pađen, DVM, PhD, Assoc. prof. Ana Shek Vugrovečki, DVM, PhD, Assoc prof. Ivona Žura Žaja, DVM, PhD,	2.315. Type of instruction (number of hours L + S + E + e-learning)	L10+E5
1.80. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate Veterinary Medicine study, Faculty of Veterinary Medicine, University of Zagreb	2.316. Expected enrolment in the course	
1.81. Status of the course	elective	2.317. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
5.96. Course objectives	To introduce students to the characteristics of physiology of amphibians and reptiles: physiology of reproduction, digestion, respiration, hematology characteristics and biochemical parameters. The course gives students a basic understanding of the regulation of homeostasis in amphibians and reptiles: neurophysiology, endocrinology and oversight of structure and function of special sensory organs. Students learn about thermoregulation in amphibians and reptiles, as well as about the specificities of metabolic processes.		

5.97. Course enrolment requirements and entry competences required for the course	-					
5.98. Learning outcomes at the level of the programme to which the course contributes	During class students will learn about basic comparative characteristics of amphibians and reptiles physiology. The course follows after the Physiology of Domestic Animals course, and represents a good introduction to the knowledge of breeding, keeping and diseases of amphibians and reptiles.					
5.99. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	- understanding of the biology of amphibians and reptiles - understanding of the basics of breeding in amphibians and reptiles, and methods of preserving the health of these animals - understanding of thermoregulation and maintenance processes in the homeostasis of amphibians and reptiles - analysis of health conditions, rearing and feeding of amphibians and reptiles					
5.100. Course content broken down in detail by weekly class schedule (syllabus)	The development of life in the water, maintenance of homeostasis in the water, adjusting to the life on land. Physiology of reproduction, sexual cycle, the female and male reproductive organs, viviparity, ovoviviparity, developing tadpoles, metamorphosis, the development of the offspring of lizards. Physiology of digestion, food intake, physiological characteristics of digestion of amphibians and reptiles. Respiratory physiology, physiology of the vascular system with hematologic characteristics and excretion in amphibians and reptiles. Neurophysiology and endocrinology, special sensory organs. Basic characteristics of metabolism, poikilothermic.					
5.101. Format of instruction:	☒ lectures ☒ seminars and workshops ☐ exercises ☐ on line in entirety ☐ partial e-learning ☐ field work		☒ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)		5.102. Comments:	
5.103. Student responsibilities						
5.104. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0.18	Research		Practical training	
	Experimental work		Report		Activity (other)	0.1
	Essay	0.32	Seminar essay		(other)	
	Tests		Oral exam	0.4	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	During the course students will be evaluated through their activity on lectures. Final exam: oral exam.		
2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	CAMPBELL, T. W. (2015): Exotic Animal Hematology and Cytology. 4th ed., Wiley Blackwell, Ames. MARCUS, L. C. (1983): Amphibien und Reptilien in Heim, Labor und Zoo. Ferdinand Enke Verlag, Stuttgart.	1	
	POUGH, F. H., M. R. ANDREWS, J. E. CADLE, M. L. CRUMP, A. H. SAVITZKY, K. D. WELLS (1998): Herpetology. Prentice Hall, Upper Saddle River, New Jersey.	1	
	SCHMIDT-NIELSEN, K. (1997): Animal Physiology: Adaptation and Environment. 5th ed., Cambridge University Press, Cambridge.	1	
2.130. Optional literature (at the time of submission of study programme proposal)	KARDONG, K. V. (1995): Vertebrates. 2nd ed., Wm. C. Brown Publishers, Dubuque, Iowa. COGGER, H. G., R. G. ZWEIFEL (1998): Encyclopedia of Reptiles and Amphibians. Fog City Press, San Francisco.		
2.131. Quality assurance methods that ensure the acquisition of exit competences	Students anonymous poll.		
2.132. Other (as the proposer wishes to add)			

PIGEON KEEPING AND BREEDING

1. GENERAL INFORMATION			
1.155. Course teacher	Full Professor Kristina Matković, DVM, PhD	2.318. Year of the study programme	III
1.156. Name of the course	Pigeon Keeping and Breeding	2.319. Credits (ECTS)	2
1.80. Associate teachers	Full Professor Kristina Matković, PhD,; Full Professor Željko Pavičić Full Professor Mario Ostović, PhD	2.320. Type of instruction (number of hours L + S + E + e-learning)	L 0+ S 15+ E 15
1.81. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	2.321. Expected enrolment in the course	
1.82. Status of the course	Elective course	2.322. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
5.105. Course objectives	In our country pigeon breeding presents a certain part in keeping small animals. In that context, many veterinarians in their job meet that kind of bird; at the same time, people ask advice from them about pigeon breeding and keeping. Therefore the goal and aim of this optional course is about future doctors of veterinary medicine to gain basic knowledge about pigeon biological characteristics, pigeon breeding directions, recognition of certain pigeon breeds, role of feeding and diet balancing in specific pigeon categories as well as right housing and keeping of pigeons as an important factor of preventive veterinary medicine. Apart from that, pigeon meat has recently been recognised as a valuable animal origin food. For this specific purpose, pigeon breeding has been organised on smaller and bigger farms all over the world. That is why the goal of the course is that future veterinarians gain basic knowledge about specific qualities of farm pigeon breeding and the role of the branch in that kind of small animals breeding.
5.106. Course enrolment requirements and entry competences required for the course	Passed compulsory courses Environment, Animal Behaviour and Welfare and Hygiene and Housing of Animals with average grade higher than 3,5. Mentor type of teaching, up to 3 students.
5.107. Learning outcomes at the level of the programme to which the course contributes	-basic knowledge about pigeon biological characteristics, pigeon breeding directions, recognition of certain pigeon breeds, role of feeding and diet balancing in specific pigeon categories as well as right housing and keeping of pigeons as an important factor of preventive veterinary medicine.

5.108. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After successful completion of the course the student will be able to: -define basic characteristic of reproduction of pigeons -enumerate characteristics of pigeons for meat production -describe basic biological characteristic of pigeons -classify requirements considering to quality of meat of pigeons -know the basic way of how to put the ring on pigeon -make a plan of proper housing conditions for every each category of pigeons -make a difference among the most popular breeds according to external characteristic -evaluate food needs according the breed of pigeon
5.109. Course content broken down in detail by weekly class schedule (syllabus)	1. Introduction; 2. Wild pigeon species; 3. Basic biological characteristics of pigeons; 4. Pigeon reproduction; 5. Pigeon ringing; 6. Pigeon breeds; 7. Croatian authentic pigeon breeds; 8. Pigeon feeding; 9. Pigeon breeds hygiene; 10. Pigeon breeding for meat production

5.110. Format of instruction:		5.111. Comments:
☐ lectures X seminars and workshops X exercises ☐ on line in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	

5.112. Student responsibilities
1. attending exercises 2. attending seminars 3. participation at exercises and seminars 4. continuous knowledge checking 5. final exam (written)

5.113. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
Class attendance		Research		Practical training		
Experimental work		Report		Attending exercises	0,18	
Essay		Seminar essay		Attending seminars	0,18	
Continuous	0,64	Oral exam		Participation at exercises	0,2	
Written exam		Project		Final exam	0,8	

2.10. Grading and evaluating student work in class and at the final exam			
	Type of activities	Minimal number of points	Maximal number of points
	attending seminars	5	9
	attending exercises	5	9
	participation at exercises and seminars	6	10

	continuous knowledge checking	20	32
	final exam (written)	24	40
	Total	**60**	**100**

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and via other media)	1. Brown, D. (1995): A guide to pigeons, doves and quail: their management, care and breeding. ABK Publications, Australia.		
	3. Hiatt, S., J. Esposito (2000): The pigeon guide: practical breeding, training and management. Silvio Mattacchione and Co, Canada. 3. Lang, E. (2016): Pigeon racing. The complete pigeon racing guide. Racing pigeons breeds, loft, feeding, health, training, racing, record keeping and systems. IMB Publishing, UK.		
2.133. Optional literature (at the time of submission of study programme proposal)			

2.134. Quality assurance methods that ensure the acquisition of exit competences	**Type of activities**	**Minimal number of points**	**Maximal number of points**
	Attending exercises (15 hours)	**5** (coefficient 0,6) 5/0,6 = 8 exercise hours (a student must attend minimal 8 exercise hours in order to gain minimal 5 points)	**9** 9/15 = 0,6 (coefficient 0,6)
	Attending seminars (15 hours)	**5** (coefficient 0,6) 5/0,6 = 8 exercise hours (a student must attend minimal 8 seminars hours in order to gain minimal 5 points)	**9** 9/15 = 0,6 (coefficient 0,6)
	Participation at exercises and seminars	**6** 6/1 = 6 (coefficient 1)	**10** 10/10 = 1 (coefficient 1)

	(10 points[1])	(a student must collect minimal 6 points in order to gain minimal 6 points)	
	Continuous knowledge checking (8 points[2])	**20** 20/4 = 5 (coefficient = 4) (a student must collect minimal 5 points in order to gain minimal 20 points)	**32** 32/8 = 4 (coefficient = 4)
	Final exam (written) (40 points[3])	**24** 24/1 = 24 (coefficient 1) (a student must collect minimal 24 points in order to gain minimal 24 points)	**40** 40/40 = 1 (coefficient 1)
	Total	**60**	**100**

[1]-10 points (writting of the report from field exercises (4 points)+preparation of seminar work during semestar (3 points if in PP additional 3 points)
[2]-8 points (8 questions, every correct answer worth 1 point)
[3]-40 points (written exam - 20 questions/ 2 points for each correct answer; a student must collect minimal 24 points in order to gain minimal 24 points. On written exam student can earn maximal 40 points)

The final grade is made on the basis of total sum of gained points as follows:

Points	*Grade*
up to 59	1 (F)
60-68	2 (E)
69-76	2 (D)
77-84	3 (C)
85-92	4 (B)
93-100	5 (A)

2.135. Other (as the proposer wishes to add)	

POSITIVE IMPACT OF ANIMALS ON HUMAN HEALTH

1. GENERAL INFORMATION			
1.157. Course teacher	Assoc. Prof. Denis Cvitković	3.6. Year of the study programme	First
1.158. Name of the course	Positive Impact of Animals on Human Health	3.7. Credits (ECTS)	1
1.81. Associate teachers	Full Prof. Damir Žubčić, Full Prof. Tomislav Krznar, Saša Zavrtnik, DVM	3.8. Type of instruction (number of hours L + S + E + e-learning)	5+5+5
1.82. Study programme (undergraduate, graduate, integrated)	Undergraduate	3.9. Expected enrolment in the course	25
1.83. Status of the course		3.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	.-

2. COUSE DESCRIPTION	
5.114. Course objectives	The main group of diseases in humans that can be treated with the help of companion animal would be discussed. Also main principles of animal activity and therapy would be discussed.
5.115. Course enrolment requirements and entry competences required for the course	-
5.116. Learning outcomes at the level of the programme to which the course contributes	Annotation: how animals can help prevent diseases, the preservation of health and treatment of diseases in humans. Interpretation: which category of human population and which diseases are especially favourable for treatment assisted with companion animals. Arranged: projects and connect different kinds of experts from other fields to treatment programs people with the help of animals. Point out: the needs of animals who participate in human treatment. Own assessment: which species are most suitable in prevention and treatment of certain disorders.
5.117. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	The goal of this class is to acquaint the student with the bond and dependence that exists between humans and animals and possibilities of animal assisted therapy. The main group of diseases in humans that can be treated with the help of companion animals will be discussed. Also main principles of animal activity and therapy will be discussed.

5.118. Course content broken down in detail by weekly class schedule (syllabus)	1. Human-animal bond (historical review); 2. Effects of animals on human health (effects on cardiovascular and mental diseases, sociological effects); 3. Animal activity as a form of improving human health status (animal assisted activity programs); 4. Animal therapy as a form of improving human health status (animal assisted therapy programs); 5. Physical and mental needs of animals in pet therapy programs.					
5.119. Format of instruction:	lectures seminars and workshops exercises ☐ on line in entirety ☐ partial e-learning field work		☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)		5.120. Comments:	
5.121. Student responsibilities						
5.122. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0,33	Research		Exercises	0,34
	Experimental work		Report		(other)	
	Essay		Seminar essay	0,33	(other)	
	Tests		Oral exam		(other)	
	Written exam		Project		(other)	
2.10. Grading and evaluating student work in class and at the final exam	Oral exam on the basis of lectures, seminar essays and exercises					

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Fine, A. H.: Handbook on Animal-assisted therapy. Third Edition. Esevier: AP. 2010.		
	Chandler, C. K.: Animal Assisted Therapy in Counseling. Second Edition. Taylor and Francis Group. 2012.		
	Pichot, T.: Animal-Assisted Brief Therapy. Taylor and Francis Group. 2012.		

2.136. Optional literature (at the time of submission of study programme proposal)	-
2.137. Quality assurance methods that ensure the acquisition of exit competences	-
2.138. Other (as the proposer wishes to add)	-

REPTILE MORPHOLOGY

1. GENERAL INFORMATION			
1.159. Course teacher	Full Professor Srebrenka Nejedli	3.11. Year of the study programme	Second year
1.160. Name of the course	Reptile Morphology	3.12. Credits (ECTS)	2
1.82. Associate teachers	Full Professor Damir Mihelić Associate Professor Ana Shek Vugrovečki Associate Professor Ivona Žura Žaja phD teaching assistant Magdalena Kolenc, DVM, PhD teaching assistant Kim Korpes, DVM	Type of instruction (number of hours L + S + E + e-learning)	4+15+11
1.83. Study programme (undergraduate, graduate, integrated)	undergraduate	3.13. Expected enrolment in the course	Depending on the interest
1.84. Status of the course	Elective course	3.14. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1
2. COUSE DESCRIPTION			
5.123. Course objectives	As reptiles are increasingly common patients in veterinary clinics and practices, the course **Reptile Morphology** aims to provide students with knowledge of: • reptile systematics; • the diversity of body regions in relation to locomotion, skeletal structure and musculature; • the basic differences in the structure of the digestive tract associated with different feeding habits; • the respiratory system and adaptations of respiratory organs according to aquatic or terrestrial lifestyles; • the structure of the urinary and reproductive systems; • the cardiovascular system, with particular emphasis on blood vessels relevant for blood sampling;		

	• the central and peripheral nervous systems and their accessibility for local anaesthesia
5.124. Course enrolment requirements and entry competences required for the course	Students should be able to: • identify organ systems in reptiles; • describe the structure of individual components of reptilian organ systems; • distinguish morphological characteristics of each organ system in reptiles; • compare the morphology of reptilian organ systems with those of other vertebrates.
5.125. Learning outcomes at the level of the programme to which the course contributes	Upon completion of the course, students will be able to recognize and classify acquired knowledge within the appropriate field and seek further clarification through consultation with mentors and relevant literature.
5.126. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Upon successful completion of the course, students will have acquired: • knowledge of reptile systematics; • knowledge of the skeletal and muscular systems of reptiles; • knowledge of the digestive, respiratory, nervous, endocrine, urinary and reproductive systems of reptiles; • knowledge of the cardiovascular system and techniques for blood collection in reptiles.
5.127. Course content broken down in detail by weekly class schedule (syllabus)	1. Systematics of reptiles and body forms and regions related to locomotion. 2. Locomotor system: skeletal and muscular systems. 3. Digestive system: oral cavity, pharynx, oesophagus, stomach, intestines, liver and pancreas. 4. Respiratory system: lungs, trachea, cutaneous respiration, and respiratory adaptations in terrestrial and aquatic environments. 5. Cardiovascular system: heart, blood and lymph circulation, and blood components. 6. Urinary and reproductive systems: kidney structure and male and female reproductive organs. 7. Nervous system: spinal cord, cranial nerves, peripheral nerves, autonomic nervous system, forebrain, midbrain, hindbrain and cerebellum. 8. Endocrine system: pituitary gland, pineal gland, thyroid and parathyroid glands, ultimobranchial gland, thymus and endocrine pancreas. 9. Sense organs: eye structure, vomeronasal organ and auditory organ. 10. Integumentary system: epidermis, dermis and scent glands.

5.128. Format of instruction:	x lectures x seminars and workshops x exercises ☐ on line in entirety ☐ partial e-learning ☐ field work		☐ independent assignments ☐ multimedia and the internet ☐ laboratory X work with mentor ☐ (other)		5.129. Comments:		
5.130. Student responsibilities							
5.131. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	**0.36**	Research		Practical training		
	Experimental work		Report		(other)	**0.1**	
	Essay		Seminar essay		(other)		
	Tests	**0.72**	Oral exam	0.8	(other)		
	Written exam		Project		(other)		
2.10. Grading and evaluating student work in class and at the final exam	Guest students in the final examination grades 1-5						

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Kenneth, V. Kardong (1995): Vertebrates, comparative anatomy, funkction, evolution. Wm. C. Brown Publishers. Washington State University.	1	
	Young, J. Z. (1981): The life of vertebrates. Clarendon press. Oxford.	1	
	O 'Mallei, B. (2005): Clinical anatomy and physiology of exotic species. Elsver Saunders.	1	

2.139. Optional literature (at the time of submission of study programme proposal)	Wineken, J., Godfrey, M. H., Bels, V. (2007): Biology of turtles. CRC Press

2.140. Quality assurance methods that ensure the acquisition of exit competences	Passed the test.
2.141. Other (as the proposer wishes to add)	

SELECTED CHAPTERS IN BIOMEDICAL PHYSICS FOR VETERINARIANS

1. GENERAL INFORMATION			
1.161. Course teacher	Assoc. prof. Pašić Selim	3.15. Year of the study programme	1.
1.162. Name of the course	Selected Chapters in Biomedical Physics for Veterinarians	3.16. Credits (ECTS)	2
1.83. Associate teachers		3.17. Type of instruction (number of hours L + S + E + e-learning)	20 + 10 + 0 + 0
1.84. Study programme (undergraduate, graduate, integrated)	Integrated	3.18. Expected enrolment in the course	
1.85. Status of the course	Elective	3.19. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1

2. COUSE DESCRIPTION	
5.132. Course objectives	The aim of the course is more detailed and better understanding of important physiological processes of living organisms.
5.133. Course enrolment requirements and entry competences required for the course	
6. Learning outcomes at the level of the programme to which the course contributes	1. apply, analyze and interpret the knowledge of the sciences on which veterinary medicine is based in order to make evidence-based decisions 2. independently use appropriate laboratory equipment and conducts critical analyzes of laboratory test results, with an understanding of applied techniques and diagnostic procedures in veterinary medicine 3. independently search literature, databases and other sources of information in order to improve theoretical knowledge and practical skills in solving professional and scientific problems in the field of veterinary medicine
6.1. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. understand the role of biomedical physics in describing the physiological functions of animals 2. explain the functions of the organism using basic natural laws 3. connect the laws of physics with the working principles of devices for electrodiagnostics and electrostimulation 4. distinguishing the consequences and limitations of devices for electrodiagnostics and electrostimulation

<table>
<tr><td></td><td colspan="6">5. describe the working principles of devices for measuring non-electric quantities characteristic of biological liquids and gases</td></tr>
<tr><td>6.2. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Electricity in living organisms (sources of bioelectric potentials (voltages on the membrane of cells, heart and circulatory system, nervous system, muscles, senses, physical fundamentals electro diagnostics and devices for measurement and registration of bioelectric potentials (electromyography, electrocardiography, electroencephalography, electroretinography and electronystagmography)). (2 hours of lectures)
Review of methods for electrical stimulation (electrical stimulation of skeletal muscles, respiratory organs, for the growth of biological tissues, and motor nerve system, pain relief). (2 hours of lectures)
Transport of substances (active and passive transport of substances; physics transport properties of cell membranes; physical quantities associated with the capillary, the interstitial fluid and lymph; dynamic balance entering and fluid secretion; physical fundamentals of gas exchange, diffusion of oxygen and carbon dioxide through the respiratory membrane). (2 hours of lectures)
Biophysical properties of biological fluids and gases (flow models; physical fundamentals circulation; physical fundamentals method of measuring blood pressure and blood flow measurement; transducers in chemical analyzes of blood; physics of diffusion of gases and partial pressures of gases, devices for measuring characteristic parameters of respiration, physical devices that measure the concentration of gases of respiration). (2 hours of lectures)
Interactions thermodynamic system with the environment (physics of regulation of body temperature and its disorders; equilibrium closed-system interaction with the environment; correlation of biochemical reactions and thermodynamics of the process, ways of storing free energy using membrane; measurements in bioenergetics). (2 hours of lectures)

Seminar papers of students (10 hour seminars)</td></tr>
<tr><td>6.3. Format of instruction:</td><td colspan="2">☒ lectures
☒ seminars and workshops
☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☒ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td colspan="2">6.4. Comments:</td></tr>
<tr><td>6.5. Student responsibilities</td><td colspan="6"></td></tr>
<tr><td rowspan="5">6.6. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0,36</td><td>Research</td><td></td><td>Practical training</td><td>0,0</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Activity (other)</td><td>0,2</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>0,0</td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>0,64</td><td>Oral exam</td><td>0,8</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
</table>

2.10. Grading and evaluating student work in class and at the final exam			
2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Web page https://moodle.srce.hr/, Internal script (lectures)		Internet
	PAŠIĆ, S., A. KLOBUČAR (2023): How does an ultrasound diagnostic device measure distances in tissue? Matematičko-fizički list, 74, 82-85.	0	Internet
	G. J. Hademenos: Schaum's outline of physics for pre-med, biology and applied health students, McGraw-Hill, new-York, 1998.	3	Internet
	PAŠIĆ, S., N. POPARA (2023): *Osmosis-fatal dehydration of a cell surrounded by water*, Matematičko-fizički list, 73, 188-189.	0	Internet
	PAŠIĆ, S., N. POPARA (2023): *Hydrostatics and blood pressures*, Matematičko-fizički list, 73, 247-249.	0	Internet
	POPARA, N, S. PAŠIĆ, L. BAJIĆ(2025): *Velocity measurement using the classic Doppler effect and its application in medicine*, Matematičko-Fizički list, LXXVI 1, 7-11.	0	Internet
2.142. Optional literature (at the time of submission of study programme proposal)	Russell K. Hobbie, Bradley J. Roth: Intermediate Physics for Medicine and Biology, Springer, 2006.		
2.143. Quality assurance methods that ensure the acquisition of exit competences	Grading and evaluating student work in class and at the final exam		
2.144. Other (as the proposer wishes to add)			

SELECTED CHAPTERS IN AQUACULTURE

1. GENERAL INFORMATION			
1.163. Course teacher	Assoc. Professor Krešimir Matanović	3.20. Year of the study programme	6th
1.164. Name of the course	Selected Chapters in Aquaculture	3.21. Credits (ECTS)	2
1.84. Associate teachers	Full Professor Emil Gjurčević, Assoc. Professor Krešimir Matanović	3.22. Type of instruction (number of hours L + S + E + e-learning)	5+14+11+0
1.85. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate university study of veterinary medicine	3.23. Expected enrolment in the course	5
1.86. Status of the course	Elective	3.24. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	level 1 online instruction 10%
2. COUSE DESCRIPTION			
6.7. Course objectives	Elective course Selected Chapters in Aquaculture is anticipated for students who wish to enlarge general knowledge of breeding of aquatic organisms. Therefore, the aim of the course is to introduce students with aquaculture technologies, and to prepare them for laboratory and field work in the field of breeding of aquatic organisms.		
6.8. Course enrolment requirements and entry competences required for the course	Completed exam in Biology and Pathology of Aquatic Organisms		
6.9. Learning outcomes at the level of the programme to which the course contributes	The course represents synthesis of previous veterinary disciplines and presents knowledge in the field of aquatic organisms breeding. This course is linked to obligatory course of Biology and Pathology of Aquatic Organisms. Upon the completion of course, students will be qualified for breeding of fish and other aquatic organisms.		
6.10. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	○ Distinguish between different culture systems for specific aquatic organisms. ○ Explain key fish farming technologies and identify the main characteristics of aquatic ecosystems. ○ Interpret aquaculture regulations and evaluate biosecurity measures in aquaculture facilities.		

<table>
<tr><td></td><td colspan="6">○ Identify the nutritional requirements of farmed fish species and calculate daily rations and feed conversion ratios.</td></tr>
<tr><td>6.11. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Lectures (5)
○ Breeding of coldwater fish.
○ Cage culture (warmwater, coldwater and marine fish; extensive culture – farming in lagoons and fences).
○ Breeding of other aquatic organisms.
○ Regulations relating to aquaculture; roles and duties during the inspection of aquatic organisms
○ Nutrition and fish health
○ Predators and pests
○ Growth and development disorders

Seminars (14)
○ Breeding of certain warmwater and marine fish species
○ Fish farms (stock sampling, estimation of feed consumption, estimation of yield, health monitoring)

Exercises (11)
○ Practical work at wet laboratory (Determination of daily ration, calculation of feed conversion ratio and application of medicated feed)
○ Practical work at RAS (technological operations)</td></tr>
<tr><td rowspan="2">6.12. Format of instruction:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☒ exercises
☐ on line in entirety
☒ partial e-learning
☒ field work</td><td colspan="2">☒ independent assignments
☒ multimedia and the internet
☒ laboratory
☐ work with mentor
☐ (other)</td><td>6.13. Comments:</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td>6.14. Student responsibilities</td><td colspan="6">Attendance lectures (50%), seminars and exercises (70%); active participation at seminars; continuous assessment.</td></tr>
<tr><td rowspan="4">6.15. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is</td><td>Class attendance</td><td>0.36</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Participation at exercises</td><td>0.1</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>0.64</td><td>Participation at seminars</td><td>0.1</td></tr>
<tr><td colspan="6"></td></tr>
</table>

equal to the ECTS value of the course)	Tests		Oral exam	0.8	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	Evaluation elements: 1. Attending lectures: 3-6 points (1 lecture hour equals 1.2 point) 2. Attending exercises: 4-6 points (1 lecture hour equals 0.54 point) 3. Attending seminars: 4-6 points (1 lecture hour equals 0.42 point) 4. Participation at exercises: 5-10 points (evaluated with short oral tests) 5. Continuous knowledge checking 20-32 points (evaluated with short oral tests during seminars) 6. Final exam – oral: 24-40 points (4 questions): 1 question equals 10 points		
2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	ANDREWS, C., A. EXELL, N. CARRINGTON (1988): The mannual of fish health. Salamander book, London, New York.	1	
	BARDACH, J. E., J. H. RYTHER, W. O. McLARNEY (1972): Aquaculture: The Farming and Husbandry of Freshwater and Marine organisms. Wiley-Interscience, New York-London-Sydney-Toronto.	1	
	PP presentations of lectures and exercises		
2.145. Optional literature (at the time of submission of study programme proposal)	BOYD, C. E. (1990): Water Quality in Ponds for Aquaculture. Auburn University, Alabama, USA. GREENBERG, D. B. (1960): Trout farming. Chilton company – book division, Philadelphia-New York. HORVATH, L., G. TAMAS, C. SEAGRAVE (1992): Carp and pond fish culture. Fishing News Book, Oxford.		
2.146. Quality assurance methods that ensure the acquisition of exit competences	Final exam – oral. At the Department there will be a Form for each student for keeping records of his/her lecture and exercises attendance with columns for evaluating the participation at exercises and for continuous knowledge checking.		
2.147. Other (as the proposer wishes to add)			

SPECIFIC ANATOMICAL STRUCTURES OF THE LOCOMOTOR APPARATUS OF THE HORSE

1. GENERAL INFORMATION			
1.165. Course teacher	Assistant Prof. Ivan Alić; Deputy: Full Prof. Martina Đuras	3.25. Year of the study programme	1st year, 2nd semester
1.166. Name of the course	**Specific anatomical structures of the locomotor apparatus of the horse**	3.26. Credits (ECTS)	1
1.85. Associate teachers	Full Prof. Martina Đuras; Asociate Prof. Mirela Pavić Vulinović; teaching assistant Magdalena Kolenc, PhD, DVM; teaching assistant Kim Korpes, PhD, DVM; teaching assistant Ante Plećaš, PhD, DVM; teaching assistant Iva Matijević, DVM	3.27. Type of instruction (number of hours L + S + E + e-learning)	15 E
1.86. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	3.28. Expected enrolment in the course	
1.87. Status of the course	Elective	3.29. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	Merlin
2. COURSE DESCRIPTION			
6.16. Course objectives	The course presents the specific anatomical structures of the trunk, neck and limbs of the horse and explains their role in the static and dynamic.		

<table>
<tr><td>6.17. Course enrolment requirements and entry competences required for the course</td><td colspan="6">Completed course "Anatomy with organogenesis of domestic animals I".</td></tr>
<tr><td>6.18. Learning outcomes at the level of the programme to which the course contributes</td><td colspan="6">Following successful completion of the course, students will be able to apply the acquired knowledge on specific anatomical structures of the locomotor apparatus of the horse during clinical courses.</td></tr>
<tr><td>6.19. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">Following successful completion of the course, students will be able to:
1. list and describe specific anatomical structures of the locomotor apparatus of the horse
2. identify clinically important structures of the locomotor apparatus of the horse</td></tr>
<tr><td>6.20. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">1. Bones and joints of the forelimb of the horse (1 hours); 2. Bones and joints of the hindlimb of the horse (1 hours); 3. Muscles of the forelimb of the horse with special remarks on: m. serratus ventralis; m. triceps brachii; m. biceps brachii; lacertus fibrosus, m extensor carpi radialis; m. flexor digitorum superficialis; m. flexor digitorum profundus; m. interosseus medius, manica flexoria; bursae synoviales (4 hours); 4. Muscles of the hindlimb of the horse with special remarks on: m. quadriceps femoris, m. fibularis tertius, m. flexor digitorum pedis superficialis, m. flexor digitorum pedis profundus, dorsal patellar luxation; bursae synoviales; vaginae synoviales tendines (3 hours); 5. Muscles of the back, neck and the abdominal wall in the horse with special remarks on: m. rectus abdominis, lig. accessorium ossis femoris; ligamentum nuchae (3 hours); 6. Supportive mechanism of the forelimb joints (1 hour), 7. Supportive mechanism of the hindlimb joints (1 hour), 8. Supportive mechanism of the vertebral column (1 hour).</td></tr>
<tr><td rowspan="2">6.21. Format of instruction:</td><td colspan="3">☐ lectures
☐ seminars and workshops
X exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>6.22. Comments:</td></tr>
<tr><td colspan="5"></td><td></td></tr>
<tr><td>6.23. Student responsibilities</td><td colspan="6">Students are expected to attend dissection exercises.</td></tr>
<tr><td rowspan="6">6.24. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0.18</td><td>Research</td><td></td><td>Practical training</td><td>0.1</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>0.32</td><td>Oral exam</td><td>0.4</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
</table>

<table>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="3"><table>
<tr><th>Type of activity</th><th>Minimum number of points</th><th>Maximum number of points</th></tr>
<tr><td>Lecture attendance</td><td>3</td><td>6</td></tr>
<tr><td>Practical training attendance</td><td>8</td><td>12</td></tr>
<tr><td>Participation in the practical training</td><td>5</td><td>10</td></tr>
<tr><td>Tests</td><td>20</td><td>32</td></tr>
<tr><td>Oral exam</td><td>24</td><td>40</td></tr>
<tr><td>Total</td><td>60</td><td>100</td></tr>
</table></td></tr>
<tr><td rowspan="6">2.11. Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>KÖNIG, H. E., H.-G. LIEBICH (2007): Veterinary anatomy of domestic mammals, Textbook and color atlas. 3rd Ed. Schattauer, Stuttgart, New York</td><td></td><td></td></tr>
<tr><td>DYCE, K. M., W. O. SACK, C. J. G. WENSING (2010): Textbook of veterinary anatomy. 4th Ed. Saunders Elsevier, Philadelphia.</td><td></td><td></td></tr>
<tr><td>NICKEL, R., A. SCHUMMER, E. SEIFERLE (1986): The locomotor system of the domestic mammals. Volume I. Verlag Paul Parey, Berlin, Hamburg.</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>2.148. Optional literature (at the time of submission of study programme proposal)</td><td colspan="3"></td></tr>
<tr><td>2.149. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">Final oral exam</td></tr>
<tr><td>2.150. Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

SPORT AND WORKING ANIMALS

1. COURSE DECRIPTION – GENERAL INFORMATION			
1.1.Course teacher	Assoc. Prof. Nika Brkljača Bottegaro	1.6.Year of study	5
1.2.Name of the course	Sport and Working Animals	1.7.Credit value (ECTS)	2
1.3.Associate teachers	Prof. Boris Pirkić; Prof. Ljubo Barbić; Prof. Ivana Kiš; Prof. Nikica Prvanović Babić; Assoc. Prof. Zoran Vrbanac; Assist. Prof. Vladimir Stvanović; Assist. Prof. Jelena Gotić; Assoc. Prof. Nika Brkljača Bottegaro, Katarina Miljak, DVM	1.8.Type of instruction (number of hours L+S+E+e-learning)	10+6+14
1.4.Study programme (undergraduate, graduate, integrated)	Integrated	1.9.Expected enrolment in the course	
1.5.Status of the course	Elective	1.10. Level of use of e-learning (1, 2, 3 level), percentage of instruction in the course on line (20% maximum)	2 h E-learning (6%)
2. COURSE DESCRIPTION			
2.1.Course objectives	The course is focused on diseases of horses used in different equestrian and canine sports, as well as the police, hunting and other working dogs and male animals used for semen production in artificial insemination centres. Students will have the opportunity to visit different equine competitions; police, army, training centres for sport and working dogs, simulation of sampling for doping in horses etc. After completing this subject they will develop competencies for an analytical and precise approach to specific diseases of sport and working animals. Furthermore, they will learn how to use such animals in reproduction keeping in mind all endogenous and exogenous factors involved.		
2.2.Enrolment requirements and required entry competences for the course			
2.3.Learning outcomes at the level of the study programme to which the course contributes	The majority of the course will be case-oriented and organized in the field. It will give students practical experience combined with self-explanatory examples designed for developing clinical skills and competencies from a general point of view. It is suitable for both small and large animal-oriented students since the majority of cases involved in the subject will be dogs and horses.		

<table>
<tr><td>2.4.Expected learning outcomes at the level of the course (4-10 learning outcomes)</td><td colspan="6">-practical experience in different equine and canine sports disciplines
-practical experience in the organisation and treatment of male animals in AI centres
-practical experience in simulation of equine doping control
-adequate treatment of sport and working animals depending on their use
-adequate reproduction of sport and working animals depending on their use</td></tr>
<tr><td>2.5. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">1. Equestrian sport and its influence on horse organism 2. Working and sport dogs as veterinary patients 3. Management of AI centres 4. Horse diseases as a consequence of athletic performance 5. Competitions Vet check and Doping control 7. Management of reproduction and contraceptive techniques in sport horses 8. Canine diseases and consequences of long term work 9. Reproduction, breeding and selection of sport and working dogs 10. Reproduction in senior subfertile retired sport horses 11. Profesional diseases of male animals used in AI centre 12. Practical work at different competitions and in working areas for dogs and horses combined with visits to AI centres 13. Practical approach – case-oriented learning on examples at Clinics of Faculty of Veterinary Medicine and under field conditions 14. Physical therapy and rehabilitation of sports animals</td></tr>
<tr><td rowspan="2">2.6.Type of instruction</td><td colspan="2">☐ lectures
☐ seminars and workshops
☐ exercises
☐ online in entirety
☐ mixed e-learning
☐ field work</td><td colspan="2">☐ independent study
☐ multimedia and the inter
☐ laboratory
☐ work with the mentor
☐ (other)</td><td colspan="2">2.7.Comments:</td></tr>
<tr><td colspan="6"></td></tr>
<tr><td>2.8.Student responsibilities</td><td colspan="6"></td></tr>
<tr><td rowspan="5">2.9.Screening of student’s work (specify the proportion of ECTS credits for each activity so that the total number of CTS credits is equal to the credit value of the course)):</td><td>Class attendance</td><td>0,36</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>0,2</td><td>(Other--describe)</td><td></td></tr>
<tr><td>Tests</td><td>0,64</td><td>Oral exam</td><td></td><td>(Other—describe)</td><td></td></tr>
<tr><td>Written exam</td><td>0,8</td><td>Project</td><td></td><td>(Other—describe)</td><td></td></tr>
<tr><td>2.10.Grading and evaluation of student work over the course of instruction and at a final exam</td><td colspan="6">All forms of instruction are obligatory for students. The course will be finished with a writing exam. They will have to write seminars and use E-learning as well.</td></tr>
</table>

	Title	Number of copies at the library	Availability via other media
2.11.Required literature (available at the library and via other media)	Conditioning sport horses (H. Clayton, SAUNDERS 2012),	1	
	Equine reproduction (McKinnon, WILLEY BLACKWELL, 2011)	1	
	Canine and feline theriogenology (Jonston, Kustritz, Olson, SAUNDERS, 2003)	1	
	Equine Sports Medicine and Surgery. 2014, 2nd ed. Hinchcliff K, Kaneps A and Geor R. Saunders.		
2.151. Optional literature (at the time of the submission of the study programme proposal)			
2.152. Methods of monitoring quality that ensure acquisition of exit competences	Students will be monitored during the complete education process. They have obligatory seminars and final exam.		

STRUCTURE AND FUNCTION OF CELL

1. GENERAL INFORMATION			
1.167. Course teacher	Associate professor Ana Shek-Vugrovečki (Deputy Associate professor Ivona Žura Žaja)	3.30. Year of the study programme	2
1.168. Name of the course	Structure and Function of Cell	3.31. Credits (ECTS)	2
1.86. Associate teachers	Associate professor Ivona Žura Žaja, Associate professor Mirela Pavić Vulinović, Associate professor Ana Shek-Vugrovečki	3.32. Type of instruction (number of hours L + S + E + e-learning)	10+7+8
1.87. Study programme (undergraduate, graduate, integrated)	integrated	3.33. Expected enrolment in the course	
1.88. Status of the course	elective	3.34. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
6.25. Course objectives	The elective course Structure and function of cells introduces students to the structure and function of cells of animal organisms, their differentiation and intercellular communication. Develops knowledge of the internal cellular organization, mechanisms of synthesis and action of organelles and mechanisms regulating relations with cellular environment. Students will be informed about the organization and chemical composition of the cells, cellular energetics, transport of substances through the cell membrane and the receiving and transferring messages.		
6.26. Course enrolment requirements and entry competences required for the course			
6.27. Learning outcomes at the level of the	Completes the knowledge about the morphological and functional characteristics of the cells and allows students to conclude about function based on cells feature.		

<table>
<tr><td>programme to which the course contributes</td><td></td></tr>
<tr><td>6.28. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td>After successfully completing the course, students will be able to:
- appoint methods in the process of the research,
- describe structure of the cells,
- identify the basic components of the cell on the electron micrographs,
- interpret elementary cellular functions,
- interconnect the structure with the function of the cells.</td></tr>
<tr><td>6.29. Course content broken down in detail by weekly class schedule (syllabus)</td><td>
<table>
<tr><th>Methodological unit/course content</th><th>L</th><th>S</th><th>E</th></tr>
<tr><td>1. Methods of cell investigate (light and electronic microscopy, cell fractionation and centrifugation, and cell culture).</td><td>1</td><td></td><td>2</td></tr>
<tr><td>2. Chemical organization of the cell (water, electrolytes, proteins, lipids and carbohydrates).</td><td>1</td><td></td><td></td></tr>
<tr><td>3.Organization and function of the cell organelles (the membranous structures of the cell, and
membranous structure of the cell organelles (granular and agranular endoplasmic reticulum, Golgy apparatus, lysosomes, peroxisomes, secretory vesicles).</td><td>1</td><td>1</td><td></td></tr>
<tr><td>4. Transport through the cell membrane (diffusion, facilitated diffusion, active transport, endocytosis (pinocytosis and fagocytosis), exocytosiss. Nuclear envelope, transport between the nucleus and the cytoplasm.</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>5. Cell membrane receptors (signal transduction mechanisms for plasma-membrane receptors, chemicals as intercellular messengers).</td><td>1</td><td>1</td><td>2</td></tr>
<tr><td>6. Energy and cellular metabolism (glycolysis, formation of ATP by oxidative phosphorylation, structural and functional characteristic of mitochondria).</td><td>1</td><td>2</td><td></td></tr>
<tr><td>7. Nucleus (The structure of the nucleus. The cell cycle).</td><td>1</td><td></td><td></td></tr>
<tr><td>8. Cytoskeleton and cell movement (microtubules, microfilaments, intermediate filaments, directions of cell movement).</td><td>1</td><td></td><td></td></tr>
<tr><td>9. Intercellular junctions and communication between cells (zonula occludens, zonula adherens, nexus, macula adherens, hemidesmosomes). Apical specializations of the cell surface. Lateral specializations of the cell surface. Basal specializations of the cell surface.</td><td>1</td><td></td><td>1</td></tr>
<tr><td>10. Organization levels of animal organism. Diversity of the cells (epithelial cells - cells that transport ions, cells that transport by pinocytosis, chemical-messenger-producing cells, protein-synthesizing cells, mucus-secreting cells, serous cells, myoepithelial cells, steroid-secreting cells.</td><td>1</td><td></td><td>2</td></tr>
<tr><td>11. Cell differentiation. Age and death.</td><td></td><td>2</td><td></td></tr>
</table>
</td></tr>
</table>

6.30. Format of instruction:	☒ lectures ☒ seminars and workshops ☒ exercises ☐ on line in entirety ☐ partial e-learning ☐ field work		☐ independent assignments ☐ multimedia and the internet ☒ laboratory ☐ work with mentor ☐ (other)		6.31. Comments:		
6.32. Student responsibilities	Student obligations are defined by Regulations on the integrated undergraduate and graduate Study of Veterinary Medicine, University of Zagreb.						
6.33. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0.36	Research		Practical training		
	Experimental work		Report		Activity during lectures		0.2
	Essay		Seminar essay		(other)		
	Tests	0.64	Oral exam		(other)		
	Written exam	0.8	Project		(other)		

2.10. Grading and evaluating student work in class and at the final exam

Activities	Minimum number of points	Maximum number of points
Lectures attendance (10 hours)	**3** (coeficient 0.6) 3 /0.6 = 5	**6** (coeficient = 0.6) 6/0.6 = 10
Seminars attendance (7 hours)	**4** (coeficient = 0.857) 4/0,857 = 5	**6** (coeficient = 0.857) 6/0.857 = 7
Exercise attendance (8 hours)	**4** (coeficient = 0.75) 4/0.75 = 5	**6** (coeficient = 0.75) 6/0.75 = 8
Activity during excercises (brief knowledge assessment)	**3**	**10**
Continous assessment	**20**	**32**
Written exam	**24**	**40**
Total	**60**	**100**

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	COOPER, G. M., R. E. HAUSMAN (2003): The Cell: A Molecular Approach. 3rd ed., ASM Press, Washington, D.C., Sinauer Associates, Inc., Sunderland, Massachusetts. SJAASTAD, Ø. V., O. SAND, K. HOVE (2010): Physiology of Domestic Animals. 2nd ed., Scandinavian Veterinary Press, Oslo.	1 book in the Library of the Department of Physiology and Radiobiology	
	COOPER, G. M., R. E. HAUSMAN (2009): The Cell: A Molecular Approach. 5th ed., ASM Press, Washington, D.C., Sinauer Associates, Inc., Sunderland, Massachusetts.	1 book in the Library of the Department of Anatomy, Histology and Embryology	
2.153. Optional literature (at the time of submission of study programme proposal)	ALBERTS, B., D. BRAY, J. LEWIS, M. RAFF, K. ROBERTS, J. D. WATSON (1989): Molecular Biology of the Cell. 2nd ed., Garland Publishing, Inc., New York, London. SEELEY, R. R., T. D. STEPHENS, P. TATE (1999): Essentials of Anatomy and Physiology. 3rd ed., McGraw-Hill, Boston. EURELL, J. A., B. L. FRAPPIER (Eds.) (2006): Dellmann's Textbook of Veterinary Histology. Blackwell Publishing. MESCHER, A. L. (2013): Junqueira's Basic Histology: Text and Atlas. McGraw-Hill Companies, Inc.		
2.154. Quality assurance methods that ensure the acquisition of exit competences	During the classes we will discuss with students and follow their progress. Acquired knowledge will be tested with final exam.		
2.155. Other (as the proposer wishes to add)			

TECHNOLOGY IN POULTRY PRODUCTION

1. GENERAL INFORMATION			
1.169. Course teacher	assoc. prof. Željko Gottstein	3.35. Year of the study programme	6
1.170. Name of the course	Technology in poultry production (226490)	3.36. Credits (ECTS)	1
1.87. Associate teachers	Full prof. Danijela Horvatek Tomić Liča Lozica, PhD, DVM Emanuel Budicin, DVM	3.37. Type of instruction (number of hours L + S + E + e-learning)	0+0+5+11
1.88. Study programme (undergraduate, graduate, integrated)	integrated	3.38. Expected enrolment in the course	
1.89. Status of the course	elective	3.39. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
6.34. Course objectives	Students will acquire knowledge of technology principles in poultry production and interdependence of its parts. Also, with aim to improve reproduction, they will learn how to artificially inseminate poultry and game birds.
6.35. Course enrolment requirements and entry competences required for the course	
6.36. Learning outcomes at the level of the programme to which the course contributes	Student will successfully apply gained knowledge in fields of technology of poultry production.
6.37. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	- define basic principles in technology, nutrition and reproduction in poultry - connect knowledge in technology, genetics and health protection with aim to improve production results - select and apply basic methods in disease diagnostics, prevention and treatment - use methods of artificial insemination in different poultry and game bird species
6.38. Course content broken down in detail by weekly class schedule (syllabus)	1 Technology in poultry and game bird production (integration of breeder flock reproduction, nutrition and health protection on farms), 2 Integration principles in poultry production (interconnection between different parts of poultry production, especially with aim in health protection and expression of genetically defined productive

<table>
<tr><td></td><td colspan="6">traits), 3 Artificial insemination in poultry and game birds (to improve poultry and game bird reproduction students will practically learn principles of artificial insemination)</td></tr>
<tr><td>6.39. Format of instruction:</td><td colspan="2">x☐ lectures
x☐ seminars and workshops
x☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td colspan="2">6.40. Comments:</td></tr>
<tr><td>6.41. Student responsibilities</td><td colspan="6">Student must be present in at least 50% of lectures, 70% of seminars and 70% of exercises.</td></tr>
<tr><td rowspan="5">6.42. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0,18</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Activity (other)</td><td>0,1</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>0,32</td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td>0,4</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6"><table>
<tr><th>Activity</th><th>Min. number of points</th><th>Max. number of points</th></tr>
<tr><td>Lecture attendance

6 hours

(XI semester)</td><td>3

3/1 = 3 hours of lecture</td><td>6

6/6 = 1 (coefficient for 1 hour of lecture attandance)</td></tr>
<tr><td></td><td>4</td><td>6</td></tr>
</table></td></tr>
</table>

	Seminar attendance 4 hours (XI semester)	**maximum 30% absence (1 hours)** 3 hours of seminars obligatory	6/4 = 1,5 (coefficient for 1 hour of seminar attandance)	
	Exercises attendance 5 hours (XI semester)	**4** **maximum 30% absence (1 hour)** 4 hours of exercises obligatory	**6** 6/5 = 1,2 (coefficient for 1 hour of exercise attandance)	
	Activity on seminars and exercises 10 points[1]	**5**	**10**	
	Seminar essay 32 points[2]	**20**	**32**	
		24	**40**	

Final exam (40 points[3])	24/1 = 24 (coefficient 1)	40/40 = 1 (coefficient 1)
Σ [4]	**60**	**100**

[1] – For activity on seminars and exercises student can get max. 10 points and min. 5 points. Activity on seminars is obligatory and is graded acording to succesfuly prepared and held seminar and for positivelly oriented answers with min. 3 points and max. 6 points (for positivelly oriented answers 0,2 points can be given, and for 5 answers it is 1 point). For activity on exercises (succesfully performed practical part) student can get min. 2 and max 4 points (0,5 points per activity).

[2] – Before oral exam student have to prepare written seminar essay which brings min. 20 and max. 32.

[3] – Oral exam gives 24 to 40 points. Student answers 10 questions, and for 1 question can get 4 points. Student can aply for the final exam with min 36 points.

[4] – Final grade is defined quantitatively, with numeric point scale and a grade corresponding to that scale, from 1 to 5. With grade 1 (one) student is graded if she/he didn't pass the course, i.e. he failed on the exam. For each student its attendance and activity is registered in its personal form, together with its success on the colloquium, what teacher uses to form final grade.

Points	*Grade*
do 59	1(F)
60-76	2 (D,E)
77-84	3 (C)
85-92	4 (B)
93-100	5 (A)

2.11. Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
Swayne, D. E. et all. (2020): Diseases of poultry. 14th ed., Wiley-Blackwell, USA.		Electronic media

	Boulianne, M. et all. (2013): Avian disease manual, seventh edition. American Association of Avian Pathologists, Jacksonville, Florida, USA.		Electronic media
	Merritt, S. (2012): Free-range and organic poultry handbook. Small Farm Future Publishing.		Electronic media
2.156. Optional literature (at the time of submission of study programme proposal)	Selected papers and internet materials.		
2.157. Quality assurance methods that ensure the acquisition of exit competences	Student questionnaire		
2.158. Other (as the proposer wishes to add)			

THE ROLE OF VETERINARIANS AT ORGANIC FARMS

1. GENERAL INFORMATION			
1.171. Course teacher	**Ivona Žura Žaja. PhD, assoc.professor;** deputy Ana Shek Vugrovečki PhD, assoc. professor	3.40. Year of the study programme	III.
1.172. Name of the course	**The Role of Veterinarians at Organic Farms**	3.41. Credits (ECTS)	2
1.88. Associate teachers	Albert Marinculić, PhD, Full professor; Mario Ostović, PhD, full professor; Zrinka Štritof, PhD, full professor; Franjo Martinković, PhD, DVM associate professor; Ana Shek Vugrovečki, PhD, DVM; associate professor; Ivona Žura Žaja, PhD, DVM, associate professor; Branimira Špoljarić, PhD, DVM, associate professor; Denis Cvitković, PhD, associate professor	3.42. Type of instruction (number of hours L + S + E + e-learning)	15+15+0
1.89. Study programme (undergraduate, graduate, integrated)	University Integrated undergraduate and graduate study of veterinary medicine	3.43. Expected enrolment in the course	
1.90. Status of the course	selective	3.44. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
6.43. Course objectives	Course objectives are to teach students: 1) The difference between conventional and organic livestock production, 2) raising animals according to the principles of organic farms; 3) permanently monitor the health of animals and controlling owners whether he gives animals unauthorized preventive or therapeutic agents; 4)how to prevent and treat infectious and parasitic diseases; 4) how to treat animals with holistic medicine methods; 5) organization and management on the organic farm		
6.44. Course enrolment requirements and			

<table>
<tr><td>entry competences required for the course</td><td colspan="6"></td></tr>
<tr><td>6.45. Learning outcomes at the level of the programme to which the course contributes</td><td colspan="6"></td></tr>
<tr><td>6.46. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">After successfully mastering the course students will be able to:
1) describe the basic principles of organic livestock production
2) explain the difference between conventional and organic agricultural production
3) recognize the importance of continuous animal health monitoring at organic farm
4) to use the latest findings in keeping and feeding of animals according organic principles;
5) assess whether the sick animals are for treatment and in what manner, or are they for voidance, and
6) to conclude the way they should manage the organization and operation of the organic farm.</td></tr>
<tr><td>6.47. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Lectures: 1) The history of organic farming, development of organic production in world, Europe and Croatia; legislation - 1 hour 2) The indigenous breed as a base for organic farming - 1 hour, 3) The role of veterinarian on organic farm – challenges
- 1 hours; 3) A holistic approach to healing animals - 2 hours, 4) The principles of invasive disease prevention - 2 hours, 5) Principles of infective disease prevention - 2 hours, 5) Organization and managment at an organic farm – 2 hours, 6) Relationships between organism and environment, - 2 hours 7) Herd health monitoring - 2 hours
Seminars: 1) The history of organic farming, development of organic production in world, Europe and Croatia; legislation - 1 hour 2) The indigenous breed as a base for organic farming - 1 hour, 3) The role of veterinarian on organic farm – challenges
- 1 hours; 3) Farm animals holistic treatment - 2 hours, 4) The principles of prevention and treatment of invasive disease prevention - 2 hours, 5) Principles of infective disease prevention - 2 hours, 5) Organization and managment at an organic farm – 2 hours, 6) Relationships between organism and environment, - 2 hours 7) Herd health monitoring at organic farms - 2 hours</td></tr>
<tr><td rowspan="2">6.48. Form at of instruction:</td><td colspan="3">x lectures
x seminars and workshops
☐exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">X independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>6.49. Comments:</td></tr>
<tr><td colspan="5"></td><td></td></tr>
<tr><td>6.50. Student responsibilities</td><td colspan="6"></td></tr>
<tr><td rowspan="2">6.51. Screening student work (name the</td><td>Class attendance</td><td>0,3</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Seminar essey</td><td>0,6</td></tr>
</table>

proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)	Essay		Seminar essay	**0,2**	(other)	
	Tests	0,2	Oral exam		(other)	
	Written exam	0,7	Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	During semester a student can be absent from up to 50 % of the lectures and up to 30 % of the seminars. During the course, student needs to produce and successfully present a seminar paper. The final exam is in written form. The final exam comprises the material from lectures and seminars; it estimates the understanding of a student of the role of veterinarian on organic farm: 1) describing the basic principles of organic livestock production 2) explaining the difference between conventional and organic agricultural production 3) recognizing the importance of continuous animal health monitoring at organic farm 4) usage of the latest findings in keeping and feeding of animals according organic principles; 5) assess whether the sick animals are for treatment and in what manner, or are they for voidance, and 6) to concluding the way they should manage the organization and operation of the organic farm.		
2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	VAARST M. ET AL. (2004): Animal health and welfare in organic agriculture. Bristol. CABI publishing	1	
	LAMPKIN N. (2002): Organic farming. Ipswich. Old Pond publishing	1	
	NEWTOIN J. (2004): Profitable Organic Farming, 2ed. Bleckwell Science	1	
2.159. Optional literature (at the time of submission of study programme proposal)	1. IFOAM – organics international (2024): Annual report for 2023. available at https://read.organicseurope.bio/?publication=ifoam-organics-europe-annual-report-2023/ifoam-organics-europe-annual-report-2023 2. EUROPEAN COMMISSION (2023): A decade of organic growth: Organic farming in the EU. Agricultural Market Brief No. 20. available at: https://agriculture.ec.europa.eu/document/download/df01a3c7-c0fb-48f1-8eca-ce452ea4b8c2_en?filename=agri-market-brief-20-organic-farming-eu_en.pdf 3. LINDQUIST, A. (2002): Animal health and welfare in organic sheep and goat farming, Swedish Animal Health Service. 5. ORGANIC FARMING IN EUROPE available at http://www.organic-europe.net/default.asp		
c. Quality assurance methods that ensure the acquisition of exit competences			

d. Other (as the proposer wishes to add)	

TUMORS OF DOMESTIC ANIMALS: MOLECULAR BASICS AND SPECIFICITIES OF SELECTED TUMOR TYPES

1. GENERAL INFORMATION			
1.173. Course teacher/ deputy	Prof. Andrea Gudan Kurilj, PhD, DVM, DECVP /Assisz. professor Lidija Medven zagradišnik, PhD, DVM	3.45. Year of the study programme	5th
1.174. Name of the course	Tumors of domestic animals: molecular basics and specificities of selected tumor types	3.46. Credits (ECTS)	2,0
1.89. Associate teachers	Professor Andrea Gudan Kurilj,DVM, PhD, DECVP; Assoc. Assoc. professor Ivan-Conrado Šoštarić-Zuckermann, DVM, PhD, DECVP, Assist. Professor Lidija Medven Zagradišnik, PhD DVM; Ivana Mihoković Buhin, DVM; Iva Ciprić, DVM, Marija Batinjan Matković, DVM, Karla Lemić, DVM	3.47. Type of instruction (number of hours L + S + E + e-learning)	10+0+20+0
1.90. Study programme (undergraduate, graduate, integrated)	Integrated	3.48. Expected enrolment in the course	
1.91. Status of the course	Active	3.49. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1
2. COUSE DESCRIPTION			

<table>
<tr><td>6.52. Course objectives</td><td>Most recent knowledge in the field of tumor molecular pathology</td></tr>
<tr><td>6.53. Course enrolment requirements and entry competences required for the course</td><td>Exam in General Veterinary Pathology</td></tr>
<tr><td>6.54. Learning outcomes at the level of the programme to which the course contributes</td><td>Training students to be able at the end of the course to analyze histopathological, immunohistochemical and cytological preparations of the most important tumors in animals as well as to gain knowledge important for understanding of pathogenesis and therapy of tumors.</td></tr>
<tr><td>6.55. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td>1. The student will acquire competences for the interpretation of histopathological, immunohistochemical, cytopathological and molecular characteristics of tumors of domestic animals.
2. They will understand the application of basic cytological and molecular diagnostic methods in tumor diagnostics, assessment of clonality and degree of malignancy of tumors.</td></tr>
<tr><td>6.56. Course content broken down in detail by weekly class schedule (syllabus)</td><td>Lectures:

<table>
<tr><th>Methodological units</th><th>Content</th><th>Number of lessons</th></tr>
<tr><td>Molecular basis of the cancer</td><td></td><td>2h</td></tr>
<tr><td>Carcinogenesis</td><td></td><td>2h</td></tr>
<tr><td>Tumor genetics</td><td></td><td>2h</td></tr>
<tr><td>Epidemiology, immune evasion</td><td></td><td>2h</td></tr>
<tr><td>Tumor angiogenesis, invasion and metastasis</td><td></td><td>2h</td></tr>
</table>
</td></tr>
</table>

Exercises:

Microscopy histopathological, immunohistochemical and cytological slides, also introduction to the basic cytological methods - 20 h

Methodological units	Content	Number of lessons
Exercises 1.	Mast cell tumors	2h
Exercises 2.	Oral and Cutaneous Melanocytic Tumors	2h
Exercises 3.	Lymphoma	2h
Exercises 4.	Histiocytic Diseases	2h
Exercises 5.	Mammary Gland Tumors	2h

Exercises 6.	Tumors of circumanal (hepatoid) glands and apocrine glands of anal sacs	2h	
Exercises 7.	Sarcomas (soft tissue, bones)	2h	
Exercises 8.	Squamous Cell Carcinomas	2h	
Exercises 9.	Selected Tumors of the Respiratory and Alimentary Tract + Liver	2h	
Exercises 10.	Submission, Trimming, Margin Evaluation, and Reporting of Tumor Biopsy Specimens in Veterinary Surgical Pathology	2h	

6.57. Format of instruction:	X lectures ☐ seminars and workshops X exercises ☐ on line in entirety ☐ partial e-learning ☐ field work		X independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)		6.58. Comments:	
6.59. Student responsibilities						
6.60. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is*	Class attendance	**0.36**	Research		Practical training	
	Experimental work		Report		**Activity** (other)	**0,2**

equal to the ECTS value of the course)	Essay		Seminar essay		(other)	
	Tests	**0,64**	Oral exam		(other)	
	Written exam	0,8	Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	The final exam is in written form. After passing the exam, student achieves 2 ECTS points. The written exam consists of 15 questions. For 8 and 9 correct answers students achieves the minimum passing grade 2; for 10 or 11 correct answers grade 3, for 12 or 13 correct answers grade 4, for 14 or 15 correct answers grade 5.		
2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	1. ZACHARY, J. F.: Pathologic Basis of Veterinary Disease Expert Consult, 7th Edition, Mosby, 2022.	1	
	2. MEUTEN, D. J.: Tumors in Domestic Animals, Fifth Edition, John Wiley & Sons, 2017.	1	
2.160. Optional literature (at the time of submission of study programme proposal)	3. KUMAR, V.; A. ABBAS; N. FAUSTO; J. ASTER: Robbins and Cotran Pathologic Basis of Disease, Professional Edition 8th Edition; Saunders, 2009 4. GRANT MAXIE M : Jubb, Kennedy, and Palmer's pathology of Domestic Animals. 7th ed. PhiladelphiaElsevier; 2025.		
2.161. Quality assurance methods that ensure the acquisition of exit competences			
2.162. Other (as the proposer wishes to add)			

VETERINARY EMERGENCY AND CRITICAL CARE MEDICINE

1. COURSE DECRIPTION – GENERAL INFORMATION				
1.175. Course teacher		Mirna Brkljačić, Full Professor	3.50. Year of study	6th
1.176. Name of the course		Veterinary Emergency and Critical Care Medicine	3.51. Credit value (ECTS)	2
1.90. Associate teachers		Vesna Matijatko, Full Professor, Nada Kučer, Full Professor; Ivana Kiš, Assoc. Professor; Boris Pirkić, Full Professor; Dražen Vnuk, Full Professor; Nikica Prvanović Babić, Full Professor; Mirna Brkljačić.,Full Professor; Marin Torti, Full Professor; Nika Brkljača Bottegaro, Full Professor; Jelena Gotić, Assist. Professor; Petar Kostešić, Assist.Professor.; Ivan Butković, Assist.Professor., Gabrijela Jurkić-Krsteska, PhD, DMV Filip Kajin, Assistant;, Phd, DMV, Assistant, Petra Dmitrović, PhD, DMV Filip, Assistant	3.52. Type of instruction (number of hours L+S+E+e-learning)	23+ 2 (L+E)

	Associates: Elizabeta Pongrac, DVM; Katarina Miljak, DVM; Petra Ricijaš, DVM		
1.91. Study programme (undergraduate, graduate, integrated)	integrated	3.53. Expected enrolment in the course	
1.92. Status of the course	elective	3.54. Level of use of e-learning (1, 2, 3 level), percentage of instruction in the course on line (20% maximum)	
2. COURSE DESCRIPTION			
6.61. Course objectives	The main course objective is to enable the students to acquire the necessary knowledge and skills in emergency and critical care medicine of domestic animals. Veterinary emergency and critical care medicine is the most dramatic part of the veterinary medicine, so resourcefulness and knowledge are critical for the appropriate management of emergency and critical patients. Main goal of the proposed course is to master the basic knowledge and procedures in emergency and critical medicine, so the student will be able to accurately assess, treat and stabilize the patient.		
6.62. Enrolment requirements and required entry competences for the course	none		
6.63. Learning outcomes at the level of the study programme to which the course contributes	Synthesis of all the acquired knowledge and skills, especially clinical knowledge, in the light of more accurate and efficient management of emergency and critical patients.		
6.64. Expected learning outcomes at the level of the course (4-10 learning outcomes)	After the successful completion of the course, the student will be able to: -triage emergency patients, open venous access, carry out ABC stabilization -diagnose and stabilize patients in shock (of various etiologies) -diagnose and stabilize emergency surgical patients -diagnose and stabilize emergency internal medicine patients -diagnose and stabilize emergency obstetric patients -diagnose and stabilize emergency in horses -apply basic critical care		
6.65. Course content broken down in detail by weekly class schedule (syllabus)	1. Triage and primary evaluation and initial laboratory workup,2. Shock and fluid therapy, 3. Emergency bleeding and wound management, 4. Acid-base disorders, 5. Electrolyte disorders, 6. Respiratory distress, 7. Anesthesia and analgezia in emergency and critical patients, 8. Emergencies in cardiology, 9.Urinary tract emergencies, 10. Acute abdomen, 11. Emergencies in gynecology and obstetrics, 12. Emergencies in pediatric patients, 13. Emergencies in neurology, 14. Transfusion in emergency patients, 15. Procedures and		

	protocols in veterinary emergency and critical care medicine, 16. Emergencies in ophtalmology, 17. Emergencies in endocrinology, 18. Critical care medicine 19. Equine emergency and critical care medicine, 20. Small mammals emergency and critical care medicine, 21. Practicum					
6.66. Type of instruction	☒ lectures ☐ seminars and workshops ☒ exercises ☐ online in entirety ☐ mixed e-learning ☐ field work		☐ independent study ☐ multimedia and the internet ☐ laboratory ☐ work with the mentor ☐ (other)		6.67. Comments:	
6.68. Student responsibilities	1. Exercises attendance 2. Activity on exercises and workshops 3. Contiuing testing of knowledge 4. Final exam					
6.69. Screening of student's work (specify the proportion of ECTS credits for each activity so that the total number of CTS credits is equal to the credit value of the course)*:*	Class attendance	0,2	Research		Practical training	0,3
	Experimental work		Report		Activity	
	Essay		Seminar essay	1,5	(Other--describe)	
	Tests		Oral exam		(Other—describe)	
	Written exam		Project		(Other—describe)	
13.1. Grading and evaluation of student work over the course of instruction and at a final exam	The exam is in the form of essay on the subject orderd by teachers. The essay is scored on the basis of quality of the comprehension regarding initial evaluation, diagnostic workup and stabilization of emergent and critically ill patient.					

13.2. Required literature (available at the library and via other media)	**Title**	**Number of copies at the library**	**Availability via other media**
	BSAVA Manual of Canine and Feline Emergency and Critical Care (King, L., Boag, A., Editors), 2nd Edition, BSAVA, Gloucester	5	
	Written web materials (Merlin)		

2.163. Optional literature (at the time of the submission of the study programme proposal)	1. Rozanski, E., Rush, J. A Colour Handbook of Small Animal Emergency and Critical Care Medicine, Manson Publishing Ltd., London.

	2. The Veterinary ICU Book (Wingfield, W. A., Raffe, M. R, ur.), Teton NewMedia, Jackson Hole. 3. Small Animal Critical Care Medicine (Silverstein, D., Hopper, K., ur.), Saunders Elsevier, St. Louis. 4. Plunkett, S. J. Emergency Procedures for the Small Animal Veterinarian, 2nd ed. W. B. Saunders, St. Louis. 5. Equine Emergencies: Treatment & Procedures (Orsini, J. A., Divers, T. J., ur.), 3rd ed. izdanje, Saunders Elsevier, St. Louis. 6. Veterinary Emergency and Critical Care Manual (Matthews, K. A., ur.), 2. izdanje, Lifelearn Publishers, Guelph, Ontario, 7. Manual of Small Animal Emergency and Critical Care Medicine (Macintire, D., Drobatz, K. J., Haskins, S., Saxon, W., ur.), Wiley-Blackwell, New York. 8. Feline Emergency and Critical Care Medicine (Drobatz, K. J., Costello, M. F., ur.), Wiley-Blackwell, New York. 9. Handbook of veterinary emergency protocols: dog and cat (McMichael, M., DeBiasio, J., Byers, C.G., ur.), Teton NewMedia, Jackson Hole. 10. Monitoring and Intervention for the Critically Ill Small Animal THE RULE OF 20 (Rebecca, K., Linklater, A., ur.), Wiley Blackwell, Iowa
a. Methods of monitoring quality that ensure acquisition of exit competences	Will be additionaly incorporated in concordance with the decree of the Council of the Faculty of Veterinary Medicine from 2008.

VETERINARY CYTOLOGY

1. GENERAL INFORMATION			
1.177. Course teacher	Assist. Prof. Lidija Medven Zagradišnik, PhD, DVM;	3.55. Year of the study programme	6th
1.178. Name of the course	Veterinary Cytology	3.56. Credits (ECTS)	2
1.91. Associate teachers	Full professor Andrea Gudan Kurilj DVM, PhD, Dipl. ECVP; Associate professor Ivan-Conrado Šoštarić-Zuckermann, DVM, PhD,Dipl. ECVP, Associate professor Nika Brkljača Bottegaro, DVM, PhD; Dipl. ECVSMR, Dunja Vlahović, PhD, DVM, Iva Ciprić, DVM, Marija Mamić, DVM	3.57. Type of instruction (number of hours L + S + E + e-learning)	10+0+20+0
1.92. Study programme (undergraduate, graduate, integrated)	Integrated	3.58. Expected enrolment in the course	
1.93. Status of the course	Active -Elective	3.59. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	0

2. COUSE DESCRIPTION	
6.70. Course objectives	The objectives of the course are to qualify student of veterinary medicine for sampling, managing and analysis of cytologic samples, and to make final or differential diagnosis.
6.71. Course enrolment requirements and entry competences required for the course	Passed exams from veterinary pathology, radiology, internal diseases, obstetrics and reproduction, surgery, ophthalmology and orthopedics.

6.72. Learning outcomes at the level of the programme to which the course contributes	Interconnection of diagnostic techniques and knowledge gained on clinical courses.
6.73. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	At the end of the course students will: - get knowledge in general pathology for further performing of education in other clinical subjects - be able to recognize a pathological process - be able to make a right diagnosis for a purpose of terapy - if the animal perishes to get the right diagnosis in a proper way (by autopsy and other laboratory studies) thus act as a preventive measure for other animals
6.74. Course content broken down in detail by weekly class schedule (syllabus)	LECTURES (10): Methods for cell sampling, management, fixation and dyeing of cytological preparations. Most common mistakes during sampling, management fixation and dyeing of cytological preparations. Types of cells and malignancy criteria. Types of inflammations and morphology of selected microorganism. Cytology of organic systems. EXERCISES (19): • Necropsy hall Individual sampling of cells from altered tissues and organs, using abrasive, exfoliative and aspiration methods. • Department of veterinary pathology laboratory Management (elaboration) of cytological smears, fixation, standard dyeing, differential dyeing, immunocytochemical dyeing. • Discussion (multi-headed) microscope Microscopic analysis of archive material and material elaborated by students individually. • Department of veterinary pathology classroom Individual microscopic examination of selected cytologic samples

6.75. Format of instruction:	☒ lectures ☐ seminars and workshops ☒ exercises ☐ online in entirety ☐ mixed e-learning ☐ field work		☒ independent study ☐ multimedia and the internet ☒ laboratory ☐ work with the mentor ☒ **final microscopic examination**		6.76. Comments:		Final microscopic examination represents individual work of student which proves scope of mastered skills regarding microscopic examination of samples and writing of cytologic reports. Department of veterinary pathology is equipped with all technical aids necessary for conducting curriculum on this elective course.
6.77. Student responsibilities	Creating and critical analysis of the cytological slides						
6.78. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Atendens	**0,36**	Research		Activity	0.2	
	Experimental work		Report				
	Essay		Seminar essay		(other)		
	Tests		Oral exam		(other)		
	Written exam	0,64	Project		(other)		
2.10. Grading and evaluating student work in class and at the final exam	Final interactive exam. 20 questions. According to the next scale: 12-13 points= 2(E) sufficient, 14-15 points= 2(D) sufficient, 16 points= 3 good, 17-18 points= 4 very good, 19-20= 5 excellent						

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Rick L. Cowell, Ronald D. Tyler, James H. Meinkoth, Dennis B. DeNicola (2008) Diagnostic Cytology and Hematology of the Dog and Cat	1	Internet source
	Rose E. Raskin, Denny J. Meyer (2016): Canine and Feline Cytology a color atlas and interpretation guide, 3rd ed., Elsevier, St. Louis, Missouri.	1	Internet source
	Rebecca Baker, John H. Lumsden (2000): Color Atlas of Cytology of the dog and cat	1	Internet source

2.164. Optional literature (at the time of submission of study programme proposal)			
2.165. Quality assurance methods that ensure the acquisition of exit competences	Summarized and individual assessment of student's knowledge from practical appliance of diagnostic veterinary cytology in real practice from leaders of units of extramural education (Veterinary clinics, Veterinary private practices, Croatian Veterinary Institute).		
2.166. Other (as the proposer wishes to add)			

VETERINARY CLINICAL MICROBIOLOGY

1. GENERAL INFORMATION			
1.179. Course teacher	Prof Nevenka Rudan, PhD, DVM	3.60. Year of the study programme	3 (VI semester)
1.180. Name of the course	Veterinary Clinical Microbiology	3.61. Credits (ECTS)	2.0
1.92. Associate teachers	Assis Marija Cvetnić, DVM	3.62. Type of instruction (number of hours L + S + E + e-learning)	30 (L-8, E-22)
1.93. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate veterinary study programme	3.63. Expected enrolment in the course	Max number of students: 10
1.94. Status of the course	elective	3.64. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
6.79. Course objectives	Lessons and practical work in Veterinary Clinical Microbiology should upgrade studen microbiology knowledge, medical thinking, and should improve their capability in differencial diagnostic procedures. Lessons and practices in Veterinary Clinical Microbiology are organised in order to gain practical experiances within the area of clinical microbiology.
6.80. Course enrolment requirements and entry competences required for the course	Basic requirements are Veterinary Immunology, General Microbiology and Special Microbiology with minimum score ∑ 3.5 Max number of students: 10
6.81. Learning outcomes at the level of the programme to which the course contributes	Lessons and practical work will capacitate student for further understanding of clinical subjects of the veterinary medicine studies particularly in the area of infectious diseases.
6.82. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to demonstrate, after attended lessons and practices in Veterinary Clinical Microbiology, knowledge on morphology and physiology and identification of the most important causative agents of animal diseases. Student will have additional knowledge on microbes pathogenicity and their relation to antimicrobial substances. After the course students will be able to perform simple procedures of microbs identification,

<table>
<tr><td></td><td colspan="6">including use of commercial compounds suitable for veterinarians in practice, and will be able to perform immunoprophylaxis of infectious diseases.</td></tr>
<tr><td>6.83. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">1. INTRODUCTORY LECTURE – Introduction to clinical microbiology area of bacteriology, mycology and virology. L -1
2. SAMPLING METHODS IN MICROBIOLOGY – Sampling procedures and transport of pathogen material to microbiology laboratories, safe measures and documents. L – 2, E – 4
3. IDENTIFICATION OF MICROBES FROM CLINICAL SPECIMENS – Indentification procedures of bacteria, fungi and viruses, rapid tests. L – 2, E – 6
4. TESTING FOR THE DRUG SUSCEPTIBILITY OF MICROBES – Techniques (agar diffusion methods, dillution methods), minimum inhibitory concentrations. E – 2
5. INTERPERTATION OF THE LABORATORY RESULTS AND DIFFERENCIAL DIAGNOSIS – critical point for medical interpretation L -1, E – 5
6. CHOICE THERAPY – methods of choosing the wright antimicrobial therapeutics in different animal species. L – 2, E - 5</td></tr>
<tr><td>6.84. Format of instruction:</td><td colspan="2">x☐ lectures
☐ seminars and workshops
x☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td colspan="2">6.85. Comments:</td></tr>
<tr><td>6.86. Student responsibilities</td><td colspan="6"></td></tr>
<tr><td rowspan="6">6.87. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0.36</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>activities</td><td>0.2</td></tr>
<tr><td>Tests</td><td>0.64</td><td>Oral exam</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>0.80</td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td></td><td colspan="5"></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">1. Attended lectures and exercises (1 hour = 1 point) - max 30, min 24 points
2. Microscopic slides questionarie (1 slide = 2 points) - max 10, min 6 points</td></tr>
</table>

<table>
<tr><td></td><td colspan="3">3. Final exam (1 question = 2 points) - max 20 , min 12 points
All: max 60, min 42 points
Points: Mark:
0 – 41 1
42 – 44 2
45 – 53 3
54 – 56 4
57 – 60 5</td></tr>
<tr><td rowspan="7">2.11. Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London.</td><td></td><td></td></tr>
<tr><td>Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders.</td><td></td><td></td></tr>
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<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>2.167. Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">Naglić, T., D. Hajsig, J. Madić, L. Pinter (2005): Specijalna veterinarska bakteriologija i mikologija.Veterinarski fakultet Sveučilišta u Zagrebu i Hrvatsko mikrobiološko društvo, Zagreb.
Hajsig, D., Lj. Pinter, T. Naglić, R. Antolović (2012): Veterinarska klinička imunologija. Sveučilišni udžbenik, Veterinarski fakultet Sveučilišta u Zagrebu i Hrvatsko mikrobiološko društvo, Zagreb.
Hajsig, D., F. Delaš (2016): Priručnik za vježbe iz opće mikrobiologije. Hrvatsko mikrobiološko društvo, Zagreb.</td></tr>
<tr><td>2.168. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">Test results, final discussions and anonymous questionnaires in order to get student critical opinion and suggestions for improvement.</td></tr>
<tr><td>2.169. Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

VETERINARY NUCLEAR MEDICINE

1. GENERAL INFORMATION			
1.181. Course teacher	Assist. Prof. Jadranka Pejaković Hlede, DVM, PhD	3.65. Year of the study programme	4
1.182. Name of the course	Veterinary nuclear medicine	3.66. Credits (ECTS)	1
1.93. Associate teachers	Marinko Vilić, DVM, PhD, Full Professor	3.67. Type of instruction (number of hours L + S + E + e-learning)	L12 + S0 + E3
1.94. Study programme (undergraduate, graduate, integrated)	Integrated	3.68. Expected enrolment in the course	
1.95. Status of the course	Elective	3.69. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	-

2. COUSE DESCRIPTION	
6.88. Course objectives	At the Veterinary nuclear medicine course students will learn how to be able to evaluate in which cases the patient should carry out to veterinary nuclear medicine, to select adequate radiopharmaceutical, to carry out scintigraphy and perform radiation protection.
6.89. Course enrolment requirements and entry competences required for the course	
6.90. Learning outcomes at the level of the programme to which the course contributes	
6.91. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After successfully mastering the course students will be able to: 1. define basic terms of veterinary nuclear medicine 2. to evaluate in which cases the patient should carry out scintigraphy 3. to select an adequate radiopharmaceutical 4. perform radiation protection of their selves, their associates and animals

6.92. Course content broken down in detail by weekly class schedule (syllabus)	1. Development of nuclear medicine 2. Radio-pharmaceuticals (definition; ideal radio-pharmaceutical; radio-nuclide generator; application) 3. Instrumentation (scintillation counter; rectilinear scanner; gamma camera) 4. Radiation protection 5. Nuclear medicine in small animal practice 6. Nuclear medicine in equine practice 7. Radiotherapy.					
6.93. Format of instruction:	X lectures X seminars X exercises ☐ on line in entirety ☐ partial e-learning ☐ field work		☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)		6.94. Comments:	
6.95. Student responsibilities						
6.96. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0.18	Research		Practical training	
	Experimental work		Report		Activity (other)	0.1
	Essay		Seminar essay		(other)	
	Tests	0.32	Oral exam		(other)	
	Written exam	0.4	Project		(other)	
2.10. Grading and evaluating student work in class and at the final exam	1. attending lectures 2. attending exercises 3. final exam					

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Daniel, G.B., C.R. Berry (eds.) (2006): Textbook of Veterinary Nuclear Medicine. American College of Veterinary Radiology		
2.170. Optional literature (at the time of submission of study programme proposal)	Vilić, M. (2018): Veterinary nuclear medicine. Internal scripts. Faculty of Veterinary Medicine, Zagreb.		

2.171. Quality assurance methods that ensure the acquisition of exit competences	Final exam (written test)
2.172. Other (as the proposer wishes to add)	

VETERINARY ETHICS

1. GENERAL INFORMATION			
1.183. Course teacher	Prof Krešimir Severin	3.70. Year of the study programme	1
1.184. Name of the course	Veterinary Ethics	3.71. Credits (ECTS)	2
1.94. Associate teachers	Assoc Prof Gordana Gregurić Gračner, Assoc Prof Dean Konjević Dipl. ECZM	3.72. Type of instruction (number of hours L + S + E + e-learning)	15+15+0
1.95. Study programme (undergraduate, graduate, integrated)	Integrated	3.73. Expected enrolment in the course	
1.96. Status of the course	Elective course	3.74. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
6.97. Course objectives	The subject aims to introduce students with development, basic principles and application of ethics in veterinary medicine. Students will become familiar with legislation that covers areas of veterinary ethics and code of ethics on both national and international level. The goal of this subject is to teach students ethical principles in all aspects of veterinary medicine, especially in the scientific research.
6.98. Course enrolment requirements and entry competences required for the course	None
6.99. Learning outcomes at the level of the programme to which the course contributes	1. to learn fundaments of veterinary ethics that will be upgraded during the programme 2. to enhance development of critical opinion in the field of veterinary medicine 3. to improve human-animal-animal owner relations
6.100. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. to acquire knowledge on development of veterinary ethics and its differences between different countries. 2. to learn and understand different aspects of observing human-animal relations 3. to understand guidelines of veterinary professional ethics 4. to apply ethical principles in all fields of veterinary medicine
6.101. Course content broken down in detail by weekly class schedule (syllabus)	Lectures – topics (15) 1. Fundaments of veterinary ethics 2. Development of veterinary ethics with emphasis on the Republic of Croatia

<table>
<tr><td></td><td colspan="6">3. Sources of veterinary ethics
4. Aspects of human-animal relations
5. Legislation
6. Code of ethics
7. Modern veterinary ethics and burnout syndrome
8. Veterinary ethics in animal breeding
9. Veterinary ethics in food production
10. Veterinary ethics in scientific research
11. Veterinary ethics and communication skills

Seminars - topics (15)
1. Animal welfare, animal rights
2. History of veterinary ethics in Croatia and neighbouring countries
3. Relevant (ethics) international legislation, description of ethical guidelines
4. Ethical principles related to clinical work
5. Ethical principles and wild animals
6. Preparation of scientific research
7. Evaluation of ethical principles and guidelines in accordance to veterinary education
8. Veterinary ethics in different countries</td></tr>
<tr><td>6.102. Format of instruction:</td><td colspan="2">☒ lectures
☒ seminars and workshops
☐ exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☒ work with mentor
☐ (other)</td><td>6.103. Comments:</td><td></td></tr>
<tr><td>6.104. Student responsibilities</td><td colspan="6">Students are obligate to present one seminar topic. Students may be absent from maximum 50% of lectures and 30% of seminars.</td></tr>
<tr><td rowspan="5">6.105. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>0.36</td><td>Research</td><td></td><td>Practical training, activity</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>0.20</td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>0.64</td><td>Oral exam</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>0.80</td><td>Project</td><td></td><td>(other)</td><td></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">Class attendance 30% (attendance at lectures – 15%, seminars – 15%)
Activity on seminars 30% (seminar preparation, presentation and discussion)
Written exam 40%</td></tr>
</table>

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	1. Rollin, B. E. (2006): An Introduction to Veterinary Medical Ethics: Theory and Cases. 2nd edn., Blackwell Publishing, USA	Department Library - 1	0
	4. Sandøe, P., S. B. Christiansen (2013): Ethics of Animal Use. Blackwell Publishing, USA.	Department Library - 1	0
2.173. Optional literature (at the time of submission of study programme proposal)	1. Staffle, F. R. (1994): The Ethical acceptability of animal experiments as judged by researchers. Utrecht, NL.		
2.174. Quality assurance methods that ensure the acquisition of exit competences	Written exam.		
2.175. Other (as the proposer wishes to add)			

WILDLIFE DISEASES

1. GENERAL INFORMATION			
1.185. Course teacher leader/deputy	Full professor Alen Slavica Assoc. prof. Magda Sindičić	4.6. Year of the study programme	6
1.186. Name of the course	**Wildlife Diseases**	4.7. Credits (ECTS)	2
1.95. Associate teachers	Full professor Zdravko Janicki , Full professor Alen Slavica, Assoc. professor Dean Konjević, PhD, DVM	4.8. Type of instruction (number of hours L + S + E + e-learning)	4+0+26+0
1.96. Study programme (undergraduate, graduate, integrated)	Integrated	4.9. Expected enrolment in the course	
1.97. Status of the course	Elective	4.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	Level 1
2. COUSE DESCRIPTION			
6.106. Course objectives	The goal of this subject is to teach basic principles of wildlife diseases, including surveillance, diagnostic procedures, pathogenesis, clinical presentation, epidemiology, pathology, prevention and potential treatment. Emphasis will be given on critical awareness of currents problems in wildlife diseases through case-based examples, as well as examples previously reported in scientific literature. During the lectures we will outline interaction between different types of pathogens and hosts, the potential impact of diseases on the population level, especially on endangered populations, and impact of human activities on the spread of wildlife disease. This subject is complement to previous subjects on domestic animal infectious diseases, so knowledge gained during these courses is prerequisite for understanding this course.		
6.107. Course enrolment requirements and entry competences required for the course			
6.108. Learning outcomes at the level of the programme to which the course contributes	- broad overview of wildlife diseases, their impact on human and livestock health - protection of wildlife, livestock and human health		

	- understanding of the effects of human activities, urbanization, and climate change on the health of wildlife populations		
6.109. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	- Surveillance of wildlife diseases - Prevention of wildlife diseases - Diagnostic methodologies - Therapeutic measures used in wildlife - Assessment of the impact of diseases on game management and endangered species		
6.110. Course content broken down in detail by weekly class schedule (syllabus)	In modern environment diseases of wild mammals are increasingly important field of veterinary medicine. Lack of wildlife disease surveillance is recognized as one of the factors that contribute to the spreading of emerging infectious disease and zoonosis. Course content: 1. Introduction – particularities of wildlife disease monitoring, diagnostics, prevention and treatment 2. National wildlife disease surveillance systems and the role of veterinarians 3. Post-mortem procedures, including working in field conditions, prevention measures and sample collection 4. Non-infectious diseases – natural hazards, poisoning, trauma, myopathy 5. Viral diseases of wild ungulates 6. Bacterial diseases of wild ungulates 7. Parasites of wild ungulates 8. Diseases of suide 9. Diseases of hares and rabbits 10. Diseases of carnivores 11. Overview of most important diseases in birds 12. Importance of diseases monitoring in game management and conservation of endangered species 13. Diseases of complex aetiology (Chronic Wasting Disease, Epizootic diarrhoea syndrome in roe deer		
	X lectures		6.112. Comments:

6.111. Format of instruction:	☐ seminars and workshops X exercises ☐ on line in entirety ☐ partial e-learning X field work		X independent assignments X multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)			
6.113. Student responsibilities	Attending lectures (50%), exercise (70%), active participation in exercises and in practical task/problem solving.					
6.114. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0,36	Research		Practical training	
	Experimental work		Report		Activity	0,2
	Essay		Seminar essay		(other)	
	Tests	0,,64	Oral exam	0,8	(other)	
	Written exam	0,1x2,5=0,25	Project		(other)	
2.10. Grading and evaluating student work in class and at the final exam	Elements of assessment: 1 Presence at lectures 2. Presence at exercises 3 Engagement and the result of practical work 4. Written exam 5. Oral exam					

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	1. Woebser, G. (2007): Diseases in wild animals, second edition. Springer.		
	2. Hudson, P. J., A. Rizzoli, B. T. Grenfell, H. Heesterbeek, A. P. Dobson (Eds.) (2002): The Ecology of Wildlife Diseases. Oxford University Press Inc., New York, USA.		
	3. Samuel, W. M., M. J. Pybus, A. A. Kocan (Eds) (2001): Parasitic Diseases of Wild Mammals 2nd edn. Manson Publishing / The Veterinary Press, London, UK.		

	4. Williams, E. S., I. K. Barker (Eds) (2001): Infectious Diseases of Wild Mammals 3rd edn. Manson Publishing / The Veterinary Press, London, UK.		
	5. Fowler, M. E., R. E. Miller (1999): ZOO & Wild Animal Medicine, Current Therapy 4. W. B. Saunders Company, Philadelphia, USA.		
2.176. Optional literature (at the time of submission of study programme proposal)	1. Stephen C (2014) Toward a modernized definition of wildlife health. Journal of Wildlife Diseases, 50(3):427-430. 2. Gibbs, E. P. J., B. H. Bokma (Eds) (2002): The Domestic Animal/Wildlife Interface. Issues for disease control, conservation, sustainable foodproduction, and emerging diseases. The New York Academy of Sciences, New York, USA. 3. Stocker, L. (2000): Practical Wildlife Care. Blackwell Publishing, Oxford, UK. 4. Woodford, M. H., D. F. Keet, R. G. Bengis (2000): Post-mortem procedures for wildlife veterinarians and field biologists. OIE, Pariz, Francuska 5. Woodford, M. H. (Ed) (2001): Quarantine and health screening protocols for wildlife prior to translocation and release in to the wild. OIE, Pariz, France		
2.177. Quality assurance methods that ensure the acquisition of exit competences	1. Presence at lectures and exercises (students must attend at least 50% of lectures and 70% of exercises). 2. Active participation during classes 3. Final exam (written and oral)		
2.178. Other (as the proposer wishes to add)			

ZOONOSES

1. GENERAL INFORMATION			
1.187. Course teacher	Prof. Ljubo Barbić, PhD	4.11. Year of the study programme	6th
1.188. Name of the course	Zoonoses	4.12. Credits (ECTS)	2
1.96. Associate teachers	Prof. Nenad Turk, PhD; Prof. Zrinka Štritof, PhD; assoc. prof. Josipa Habuš, PhD; assoc. prof. Vladimir Stevanović PhD; assis. prof. Matko Perharić, DVM; Iva Zečević, DVM, PhD; Iva Benvin DVM, PhD	4.13. Type of instruction (number of hours L + S + E + e-learning)	24 + 4 + 2 + 0 = 30
1.97. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	4.14. Expected enrolment in the course	
1.98. Status of the course	Elective (optional)	4.15. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
6.115. Course objectives	Students gain knowledge about ways of transmission of zoonoses through contact with infected animals, spending time in nature or ingestion of food of animal origin. They also gain practical knowledge for recognition and eradication of zoonoses and measures for protection of human health.		
6.116. Course enrolment requirements and entry competences required for the course	Infectious diseases of domestic animals must be completed.		

<table>
<tr><td>6.117. Learning outcomes at the level of the programme to which the course contributes</td><td>By finishing this course students gain knowledge needed for recognition, diagnostics, treatment and eradication of zoonoses. They become competent for differentiation of zoonoses from other diseases and timely application of measures for prevention of spreading of disease to ather animals and humans.</td></tr>
<tr><td>6.118. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td>After finishing the course student will be able to:
- Recognize outbreak of zoonosis
- Identify factors important for transmission of zoonosis
- Apply temporal measures for prevention of spreading of disease
- Elect diagnostic procedures
- Conduct prophylaxis procedures
- Estimate risk of infection for humans
- Reccommend measures for eradication and prevention of zoonoses</td></tr>
<tr><td>6.119. Course content broken down in detail by weekly class schedule (syllabus)</td><td>Course content
<table><tr><th>Hours</th><th>CLASS FORM AND THEME (lectures, seminars, exercises)</th></tr><tr><td></td><td>Lectures</td></tr><tr><td>2</td><td>Epizootiology and epidemiology of zoonoses
Importance of zoonoses in public health</td></tr><tr><td>2</td><td>Bacterial zoonoses: Salmonellosis, Campylobacteriosis</td></tr><tr><td>2</td><td>Listeriosis, Tularemia</td></tr><tr><td>2</td><td>Tuberculosis</td></tr><tr><td>2</td><td>Brucellosis</td></tr><tr><td>2</td><td>Natural foci zoonoses: Lyme borreliosis
Leptospirosis,</td></tr></table></td></tr>
</table>

2	Rickettsial and chlamydial zoonoses: Q fever Cat scratch disease
2	Ehrichiosis Chlamydiosis
2	Viral zoonoses: Rabies Influenza
2	Hemorrhagic fever with renal sindrome, West Nile fever
2	Hepatitis E, Tick-borne encephalitis
2	Current prevalence and emergence of zoonoses in Croatia and the world
	Seminars
2	Anthrax
2	Dermatophytoses
	Exercises
2	Diagnostics, surveillance and control of zoonoses in Croatia and the world

6.120. Forma t of instruction:	x lectures x seminars and workshops x exercises ☐ on line in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	6.121. Comments:

6.122. Student responsibilities						
6.123. Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	0,36	Research		Practical training	
	Experimental work		Report		Class activities	0,2
	Essay		Seminar essay		(other)	
	Tests	0,64	Oral exam	0,8	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam

TYPES OF ACTIVITIES	MINIMAL NUMBER OF POINTS	MAXIMAL NUMBER OF POINTS
Attending lectures	**3**	**6**
(24 lecture hours)	(coefficient 0,25) 3:0,25=12	6:24=0,25 (coefficient 0,25)
	(a student must attend 12 lecture hours in order to gain minimal 3 points)	
Attending seminars	**4**	**6**
(2 seminar hours)	(coefficient 3)	6:2=3

	4:3=1,3 (1)	(coefficient 3)
	(a student must attend 1seminar hours in order to gain minimal 4 points)	
Attending exercises	**4**	**6**
(4 exercise hours)	(coefficient 1,5) 4:1,5=2,6 (3)	6:4=1,5 (coefficient 1,5)
	(a student must attend 3 exercise hours in order to gain minimal 4 points)	

Participation at seminars and exercises	**5**	**10**
1 complete answer to a question at exercises = 5 points and 1 complete seminar = 5 points	(coefficient 1) 5:1=5	10:10=1 (coefficient 1)

	(a student must give 1 complete answer **or** 1 seminar to collect 5 points and gain minimal 5 points)	(a student must give 1 complete answer **and** 1 seminar to collect 10 points and gain maximal 10)
Continuous knowledge checking	**20**	**32**
1 oral preliminary exam x 5 questions 1 question = 0-6,4 point	(coefficient 6,4) 20:6,4=3,125 (3)	32:5=6,4 (coefficient 6,4)
	(a student must give 3 complete answers to gain minimal 20 points)	
Final exam	**24**	**40**
(oral exam with 5 questions) 1 question = 8 points	(coefficient 8) 24:8=3	40:5=8 (coefficient 8)
	(a student must gain minimal 3 complete answers to a question to earn minimal 24 points at final)	

	Ukupno	**60**	**100**

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	Colville, J. L., D. L. Berryhill (2007): Handbook of zoonoses, Identification and prevention. Moby and Elsavier		
	Hagan, W. A., Bruner, D. W. (1998): Microbiology and Infectious Diseases of Domestic Animals. 8th ed., Comstock, Ithaca.		
	Rolle/Mayr (2001): Mikrobiologie, Infektions-und Seuchenlehre. 7th ed., Ferdinand Enke Verlag., Stuttgart		
	Craig E. G. (1998): Infectious Diseases of the Dog and Cat. 2nd ed., W. B. Saunders Co.		
	Kerr, K. (2003): Zoonoses: Infectious Diseases Transmissible from Animals to Humans. ASM Press		
	Constable P., K. W. Hinchcliff, S. Done, W. Gruenberg (2016): Veterinary Medicine, A Textbook of the Diseases of Cattle, Horses, Sheep, Pigs and Goats, 11th Ed., 2 Volume set, W. B. Saunders Ltd.revention, Mosby Elsevier		
2.179. Optional literature (at the time of submission of study programme proposal)			
2.180. Quality assurance methods that ensure the acquisition of exit competences			
2.181. Other (as the proposer wishes to add)			