UNIVERSITY OF ZAGREB

FACULTY OF VETERINARY MEDICINE

DETAILED PROPOSAL OF THE STUDY PROGRAMME VETERINARY MEDICINE IN ENGLISH FOR THE 2019-2020 ACADEMIC YEAR

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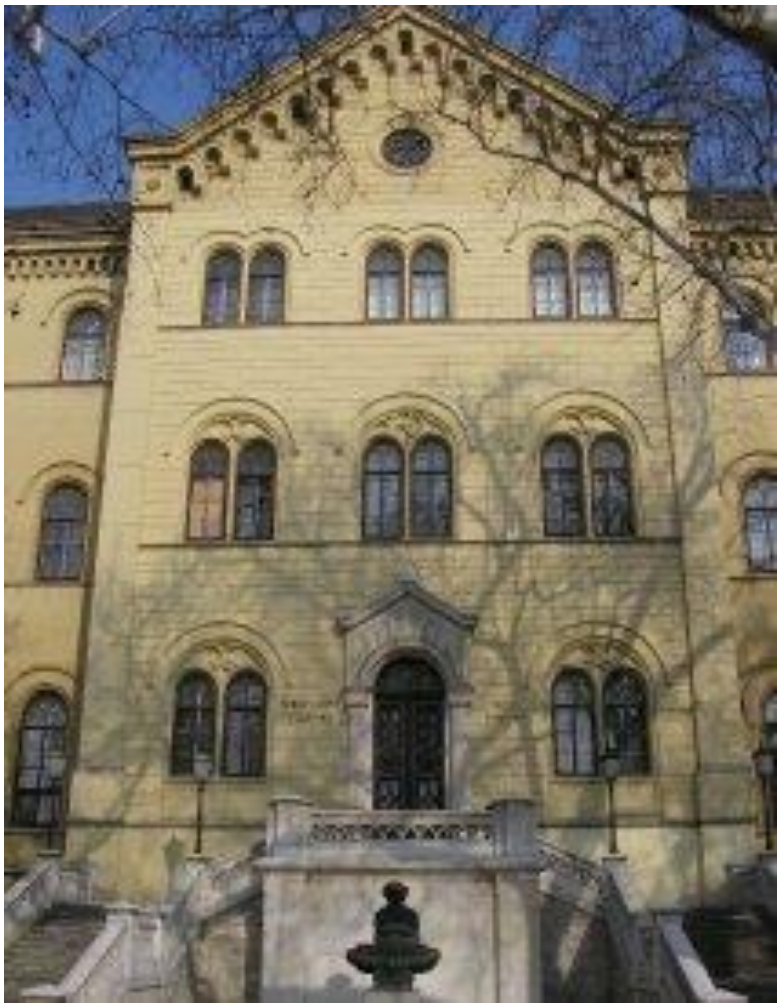
UNIVERSITY OF ZAGREB



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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.

CONTACT

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Vice deans:

Assoc. Prof. Andrea Gudan Kurilj, Vice Dean for Integrated Studies and Students
Assoc. Prof. Ivana Tlak Gajger, Vice Dean for Financial Operations and Investments
Prof. Ljubo Barbić, Vice Dean for Human Resources, Organization and Management
Assoc. Prof. Dean Konjević, Vice Dean for Research, Postgraduate Studies and Lifelong Learning
Prof. Juraj Grizelj, Vice Dean for International Cooperation and Veterinary Studies in English
Assoc. Prof. Danijela Horvatek Tomić, Vice Dean for Quality Assurance

2019/2020 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 Biophysics	16	0	38	0	5
	Medical Chemistry	20	0	34	0	5
	Zoology	15	20	30	10	5,5
	Botany in Veterinary Medicine	10	0	10	0	1,5
	Anatomy with Organogenesis 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	0	0	30	0	1
	Total hours of obligatory courses:	103	34	216+30	22	32

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
II semester						
Obligatory Subject	Anatomy with Organogenesis of Domestic Animals II.	20	0	100	0	8,0
	Biochemistry in Veterinary Medicine	28	12	32	0	7,5
	Histology with General Embryology	30	0	60	0	7
	Animal Breeds Characteristics	14	10	30	6	4,5
	Introduction to English Veterinary Medical Terminology I	0	5	10	0	1
	Physical Education	0	0	30	0	1
	Total hours of obligatory courses:	92	27	232+30	6	29
Elective Subject 2 ECTS (MIN 2, MAX 4 ECTS)	Chemistry of Natural Compounds	15	9	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
	Zooecology	0	20	0	10	2
	English for Academic purposes I	5	40	15	0	4
	Selected Chapters in Biomedical Physics for Veterinarians	20	10	0	0	2
	Veterinary Ethics	15	15	0	0	2
	Fundamentals of Scientific Research	8	4	18	0	2
	Specific Anatomical Structures of the Locomotor Apparatus of the Horse	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
	Molecular Biology and Genomics in Veterinary Medicine	5	10	30	0	3,5
	Basic Animal Nutrition	15	0	24	6	3,5
	Introduction to English Veterinary Medical Terminology II	0	5	10	0	1,0
	Anatomy with Organogenesis 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	15	0	15	0	2,5
	Physical Education	0	0	30	0	1
	Total hours of obligatory courses:	116	23	232+30	6	29,5
Elective Subject 2 ECTS	Reptile Morphology	4	15	11	0	2
	English for Academic purposes II	5	40	15	0	4
	Basic Anatomy of Bottlenose Dolphin (*Tursiops truncatus*)	10	0	20	0	2
(MIN 2, MAX 4)	Comparative Anatomy of Skeletal System	10	0	20	0	2
	Structure and Function of Cell	10	7	8	0	2
	Biology and Ecology of Predators	8	4	18	0	2
	Fundamentals of Agronomy	12	11	7	0	2,5

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
IV semester						
Obligatory Subject	Physiology of Domestic Animals II	45	25	60	0	10
	Applied Animal Nutrition	25	0	20	30	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
	Physical Education	0	0	30	0	1
	Total hours of obligatory courses:	109	65	124+30	62	26,5
4 ECTS (MIN 4, MAX 6 ECTS)	Game Zoology	5	0	25	0	2
	Anatomy of Laboratory Animals	6	0	24	0	2
	Archaeozoology	10	5	15	0	2
	Basic Biology and Fundamental Physiology of Marine Mammals	7	8	15	0	2
	Cytometry in Clinical Veterinary Medicine	0	15	15	0	2
	Fundamentals of Ecologic Livestock Breeding	10	5	15	0	2

3rd year

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
V semester						
Obligatory Subject	Parasitology and Parasitic Diseases	30	0	60	0	7,0
	General Veterinary Pathology	30	0	60	0	7,0
	Pathophysiology I	11	4	10	0	2,5
	Special Microbiology	15	15	30	0	4,5
	Pharmacology	45	5	35	0	6,5
	Radiation Hygiene	10	0	20	0	2,5
	Total hours of obligatory courses:	141	24	215	0	30

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
VI semester						
Obligatory Subject	Special Veterinary Pathology	60	0	75	0	10,5
	Pathophysiology II	39	6	50	0	6,5
	Clinical Propedeutics	45	0	60	0	8,0
	Communication Skills in Veterinary Medicine	16	0	12	0	1,0
	Total hours of obligatory courses:	160	6	197	0	26
Elective Subject MIN 5, 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	8	0	22	0	2
	Parasitology in Public Health	10	20	0	0	2
	Feed Additives - Health Modulators	3	2	10	0	1
	Pigeon Keeping and Breeding	0	15	15	0	2
	Breeding and Husbandry of Rabbits and Furbearers	3	25	2	0	2
	The Role of Veterinarians at Organic Farms	12	18	0	0	2
	Agricultural Economics and Rural Development	10	0	20	0	2

4th year

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
VII semester						
Obligatory Subject	Internal Medicine	90	0	115+5*	0	16,0
	Surgery, Orthopaedics and Ophthalmology I	30	0	60	0	7,0
	General and Clinical Radiology	15	0	30	0	3,5
	Game Breeding and Management	4	0	18	8	2,5
	Total hours of obligatory courses:	139	0	228	8	29

	Subject	COURSE DISTRIBUTION				ECTS
		L	S	P	F	
VIII semester						
Obligatory Subject	Surgery, Orthopaedics and Ophthalmology II	30	0	40+5*	0	5,5
	Obstetrics and Reproduction I	60	0	100+5*	0	12,5
	Methods of Physical Therapy and Diagnostics	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	22	2	3,5
	Total hours of obligatory courses:	151	6	213+10*	16	29
Elective Subject MIN 2, MAX 4 ECTS	Clinical Physiology	15	0	15	0	2
	Hunting and Nature Protection	4	0	26	0	2
	Veterinary Nuclear Medicine	12	0	3	0	1
	Comparative Nutrition	5	6	4	0	1
	Cynology and Felinology	10	20	0	0	2

*Clinic night shift hours

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 BIOPHYSICS	-	
MEDICAL CHEMISTRY	-	
ZOOLOGY	-	
BOTANY IN VETERINARY MEDICINE	-	
ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS I	-	
ENVIRONMENT, ANIMAL BEHAVIOUR AND WELFARE	-	
BASIC STATISTICS IN VETERINARY MEDICINE	-	
INTRODUCTION TO VETERINARY	-	
PHYSICAL EDUCATION	-	

II. SEMESTER

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

***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 IN BIOPHYSICS, BIOCHEMISTRY IN VETERINARY MEDICINE, ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS I., ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS II, HISTOLOGY WITH GENERAL EMBRYOLOGY must be completed
MOLECULAR BIOLOGY AND GENOMICS IN VETERINARY MEDICINE	BOTANY IN VETERINARY MEDICINE, MEDICAL CHEMISTRY, BIOCHEMISTRY IN VETERINARY MEDICINE and ZOOLOGY must be completed	BOTANY IN VETERINARY MEDICINE, 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 ORGANOGENESIS OF DOMESTIC ANIMALS III	-	ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS I and ANATOMY WITH ORGANOGENESIS 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
PHYSIOLOGY OF DOMESTIC ANIMALS II	Pending completion of PHYSIOLOGY OF DOMESTIC ANIMALS I*	PHYSIOLOGY OF DOMESTIC ANIMALS I must be completed.
APPLIED ANIMAL NUTRITION	Pending completion of BASIC ANIMAL NUTRITION*. BIOCHEMISTRY IN VETERINARY MEDICINE must be completed	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	PHYSIOLOGY OF DOMESTIC ANIMALS I., PHYSIOLOGY OF DOMESTIC ANIMALS II., ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS I., ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS II, ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS III and HISTOLOGY WITH GENERAL EMBRYOLOGY must be completed.	PHYSIOLOGY OF DOMESTIC ANIMALS I., PHYSIOLOGY OF DOMESTIC ANIMALS II., ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS I., ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS II and HISTOLOGY WITH GENERAL EMBRYOLOGY must be completed.
GENERAL VETERINARY PATHOLOGY	ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS I., ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS II., ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS III., HISTOLOGY WITH GENERAL EMBRYOLOGY, PHYSIOLOGY OF DOMESTIC ANIMALS I., and PHYSIOLOGY OF DOMESTIC ANIMALS II must be completed.	ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS I., ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS II., ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS III., HISTOLOGY WITH GENERAL EMBRYOLOGY, PHYSIOLOGY OF DOMESTIC ANIMALS I., and PHYSIOLOGY OF DOMESTIC ANIMALS II must be completed.
RADIATION HYGIENE	PHYSICS AND BIOPHYSICS and PHYSIOLOGY OF DOMESTIC ANIMALS I must be completed.	PHYSICS AND BIOPHYSICS 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
SPECIAL VETERINARY PATHOLOGY	Pending completion of GENERAL VETERINARY PATHOLOGY and passed midterms*	GENERAL VETERINARY PATHOLOGY must be completed.
PATHOPHYSIOLOGY II	Pending completion of the course PATHOPHYSIOLOGY I*	PATHOPHYSIOLOGY I must be completed.
CLINICAL PROPEDEUTICS	ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS I., ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS II., ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS III., and HISTOLOGY WITH GENERAL EMBRYOLOGY must be completed.	ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS I., ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS II., ANATOMY WITH ORGANOGENESIS 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	Pending completion of CLINICAL PROPEDEUTICS.* SPECIAL VETERINARY PATHOLOGY must be completed.	SPECIAL VETERINARY PATHOLOGY and CLINICAL PROPEDEUTICS must be completed.
SURGERY, ORTHOPAEDICS AND OPHTHALMOLOGY I.	GENERAL VETERINARY PATHOLOGY, SPECIAL VETERINARY PATHOLOGY must be completed.	GENERAL VETERINARY PATHOLOGY, SPECIAL VETERINARY PATHOLOGY must be completed.
GENERAL AND CLINICAL RADIOLOGY	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, SPECIAL VETERINARY PATHOLOGY must be completed.	GENERAL VETERINARY PATHOLOGY, SPECIAL VETERINARY PATHOLOGY must be completed.

***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.
METHODS OF PHYSICAL THERAPY AND DIAGNOSTICS	Pending completion of the course GENERAL AND CLINICAL RADIOLOGY, GENERAL VETERINARY PATHOLOGY, SPECIAL VETERINARY PATHOLOGY.*	GENERAL VETERINARY PATHOLOGY, SPECIAL VETERINARY PATHOLOGY must be completed.

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

REGISTRATION AND EXAMINATION REQUIREMENTS FOR ELECTIVE COURSES

SUBJECT	Registration requirements	Examination requirements
ARCHAEOZOOLOGY	ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS I., ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS II must be completed. Pending completion of ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS III and COMPARATIVE ANATOMY OF SKELETAL SYSTEM. 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	ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS I., ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS II must be completed.
BASIC ANATOMY OF BOTTLENOSE DOLPHIN	Pending completion of the course ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS I., ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS II and HISTOLOGY WITH GENERAL EMBRYOLOGY Maximum number of students: 20	
FUNDAMENTALS OF AGRONOMY	ENVIRONMENT, ANIMAL BEHAVIOUR AND WELFARE must be completed with a minimal grade of very good (4). Maximum number of students: 3	
PARASITOLOGY IN PUBLIC HEALTH	PARASITOLOGY AND PARASITIC DISEASES must be completed.	PARASITOLOGY AND PARASITIC DISEASES must be completed.
COMPARATIVE ANATOMY OF SKELETAL SYSTEM	ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS I., ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS II must be completed. Maximum number of students: 20	ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS I., ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS II must be completed.
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 mentionned subjects. Maximum number of students :3	
SPECIFIC ANATOMICAL STRUCTURES OF THE LOCOMOTOR APPARATUS OF THE HORSE	Pending completion of the course ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS I Maximum number of students: 20	
VETERINARY CLINICAL MICROBIOLOGY	GENERAL MICROBIOLOGY, SPECIAL MICROBIOLOGY and VETERINARY IMMUNOLOGY must be completed with an average grade which is higher than 3.5 in the above mentionned subjects. Maximum number of students: 10	GENERAL MICROBIOLOGY, SPECIAL MICROBIOLOGY and VETERINARY IMMUNOLOGY 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 Organogenesis of Domestic Animals I

Anatomy with Organogenesis of Domestic Animals II

Animal Breeds' Characteristics

Basic Statistics in Veterinary Medicine

Biochemistry in Veterinary Medicine

Botany in Veterinary Medicine

Environment, Animal Behaviour and Welfare

Histology with General Embryology

Introduction to English Veterinary Medical Terminology I

Introduction to Veterinary

Medical Chemistry

Physical Education

Physics and Biophysics

Zoology

ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS I

1. GENERAL INFORMATION			
Course teacher	Assoc. Prof. Martina Đuras	Year of the study programme	1st year, 1st semester
Name of the course	**Anatomy with organogenesis of domestic animals I**	Credits (ECTS)	7
Associate teachers	Full Prof. Tajana Trbojević Vukičević; Assist. Mirela Pavić, PhD, DVM; Assist. Denis Leiner, DVM, Assist. Kim Korpes, DVM	Type of instruction (number of hours L + S + E + e-learning)	18 L + 64 E
Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	Expected enrolment in the course	
Status of the course	Compulsory	. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	VEF-LMS
OURSE DESCRIPTION			
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.		
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.		
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 thoracic and pelvic limbs of domestic mammals during preclinical and clinical courses.		
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: list and describe major anatomical structures of the thoracic and pelvic limbs of domestic mammals explain the development of the thoracic and pelvic limb structures apply anatomical nomenclature skilled communicate anatomical information utilize dissection skills		
Course content broken down in detail by weekly class schedule (syllabus)	Lectures: 1. Introduction and anatomical nomenclature (1 hour), 2. General anatomy of the locomotor apparatus and basic angiology (1 hour), 3. General anatomy of the nervous system (1 hour), 4. Basic arthrolology (2 hours), 5. Skeleton and joints of the thoracic limb (2 hours), 6. Development of the muscular tissue (1 hour), 7. Extrinsic musculature of the thoracic limb (1 hour), 8. Intrinsic musculature of the thoracic limb (1 hour). 9. Blood vessels, nerves and lymph nodes of the thoracic limb (1 hour), 10. Skeleton and joints of the pelvic limb (1 hour), 11. Extrinsic and intrinsic musculature of the pelvic limb (2 hours), 12. Blood vessels, nerves and lymph nodes of the pelvic limb (1 hour), 13. Distal digital organ (2 hours) Practicals: 1. Directional terms and planes of the animal body (1 hour), 2. Skeleton of the thoracic limb (10 hours), 3. Regions and fasciae of the thoracic limb (1 hour), 4. Girdle muscles of the thoracic limb (4 hours), 5. Muscles of the shoulder joint (3 hours), 6. Muscles of the elbow joint (2 hours), 7. Axilla (3 hours), 8. Muscles of the radioulnar joints, carpal joint and joints of the digits (3 hours), 9. Blood vessels, nerves and lymph nodes of the thoracic limb (3 hours), 10.		

	Joints of the thoracic limb (3 hours), 11. Skeleton of the pelvic limb (8 hours), 12. Regions and fasciae of the pelvic limb (1 hour), 13. Girdle muscles of the pelvic limb (3 hours), 14. Muscles of the hip joint (4 hours), 15. Muscles of the stifle joint (2 hours), 16. Muscles of the tarsal joint and joints of the digits (5 hours), 17. Joints of the pelvic limb (3 hours), 18. Blood vessels, nerves and lymph nodes of the pelvic limb (3 hours), 19. Distal digital organ (2 hours)

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)	Comments:
Student responsibilities	Students are expected to attend lectures and dissection exercises and prepare cadavers according to course instructions.		

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)	

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

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.		

Optional literature (at the time of submission	NICKEL, R., A. SCHUMMER, E. SEIFERLE (1986): The locomotor system of the domestic mammals. Volume I. Verlag Paul Parey, Berlin, Hamburg.

of study programme proposal)	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.
Quality assurance methods that ensure the acquisition of exit competences	Grading of active participation in the practical training, two written tests, final oral exam
Other (as the proposer wishes to add)	

ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS II

1. GENERAL INFORMATION			
1.1. Course teacher	Assoc. Prof. Martina Đuras	1.6. Year of the study programme	1st year, 2nd semester
1.2. Name of the course	**Anatomy with organogenesis of domestic animals II**	1.7. Credits (ECTS)	8
1.3. Associate teachers	Full Prof. Tajana Trbojević Vukičević; Assist. Mirela Pavić, PhD, DVM; Assist. Denis Leiner, DVM, Assist. Kim Korpes, DVM	1.8. Type of instruction (number of hours L + S + E + e-learning)	20 L + 100 E
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%)	VEF-LMS
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			
2.3. 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.		
2.4. 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: list and describe major anatomical structures of the trunk including the viscera of domestic mammals explain the development of the viscera apply anatomical nomenclature skilled communicate anatomical information utilize dissection skills		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	Lectures: 1. Skeleton of the trunk: structure and development (1 hour), 2. Body cavities and their serous lining (2 hours), 3. Heart: structure and development (3 hours), 4. Lungs: structure and development (1 hour), 5. Digestive system: structure and development (4 hours), 6. Urinary and genital organs: structure and development (4 hours), 7. Mammary gland: structure and development (2 hours), 9. Blood vessels, nerves and lymphatic nodes of the trunk and viscera (3 hours) Practicals: 1. Skeleton of the trunk (thoracic, lumbar and caudal vertebrae, ribs, sternum) (5 hours), 2. Regions of the trunk (2 hours), 3. Mammary gland (4 hours), 4. Respiratory muscles (except diaphragm) (4 hours), 5. Thoracic and pectoral cavities, pleurae and pleural cavities (3 hours), 6. Trachea and lungs (5 hours), 7.		

	Thymus, oesophagus, phrenic nerve, vagal nerve, sympathetic trunk (7 hours), 8. Pericardium and the heart (10 hours), 9. Blood vessels in the pectoral cavity (6 hours), 10. Transversus thoracis muscle, longus colli muscle, diaphragm (5 hours), 11. Abdominal wall, inguinal canal, external male genital organs (10 hours), 12. Peritoneum (3 hours), 13. Intestine (6 hours), 14. Stomach (5 hours), 15. Liver and pancreas (4 hours), 16. Spleen, abdominal aorta, caudal vena cava, portal vein, nervous system of the abdominal cavity (5 hours), 17. Urinary system and adrenal gland (4 hours), 18. Female genital organs (4 hours), 19. Pelvic cavity, accessory genital glands, rectum, internal iliac artery (4 hours), 20. Muscles of the back (4 hours).

2.6. 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)	Comments:
2.8. Student responsibilities	Students are expected to attend lectures and dissection exercises and prepare cadavers according to course instructions.		

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	1.44	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.		
2.12. 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 (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.		
2.13. 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)			

ANIMAL BREEDS' CHARACTERISTICS

1. GENERAL INFORMATION			
1.1. Course teacher	Maja Maurić, PhD, Assistant Professor	1.6. Year of the study programme	1st
1.2. Name of the course	**Animal breeds' characteristics**	1.7. Credits (ECTS)	4.5
1.3. Associate teachers	Anamaria Ekert Kabalin, PhD, Full Professor Velimir Sušić, PhD, Full Professor (permanent) Sven Menčik, PhD, Assistant Professor Ivan Vlahek, VMD Aneta Piplica, VMD	1.8. Type of instruction (number of hours L + S + E + e-learning)	11 (L)+7 (S)+30 (E)+12 (e-learning)
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%)	2 20%
2. COUSE DESCRIPTION			
2.1. 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.		
2.2. 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	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.		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After successfully finishing the course student will be able to: explain 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) identify 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) describe the exterior of certain domestic animals evaluate production type or breeding group based on individual phenotypic characteristics use the gained knowledge in judging the exterior, condition, constitution, temperament and age as well as measuring and marking of animals		

<table>
<tr><td></td><td colspan="6">identify basic administrative books, forms and computer programs used in the registration of domestic animals</td></tr>
<tr><td>2.5. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Number of hours (lectures, seminars,
Methological unit / course content exercises and e-learning)
1. Introduction to breeding of most important animal species for production, companion and laboratory animals (domestication, different usage of animals, autohtonous breeds)…….....2 L+1 S+0 E+1 e-lear.
2. General and specific biological characteristics of animals (reproduction; growth; constitution; condition; temperament and temper; exterior-age, body measures, evidention and registration).....2 L+0 S+14 E+2 e-lear.
3. Breed as base for breeding of animals. Breeds of pigs and poultry .....1 L+1 S+ 4 E+2 e-lear.
4. Breeds of cattle and horses.....1 L+1 S+4 E+2 e-lear.
5. Breeds of sheep, goats and fur animals. Most important species of laboratory animals.....2 L+2 S+4 E+2 e-lear.
6. Breeds of dogs and cats.....1 L+2 S+4 E+3 e-lear.
7. The role of breed in livestock production (genotype environment interaction, specific products) ….....2 L+0 S+0 E+0 e-lear.</td></tr>
<tr><td>2.6. 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>2.7. Comments:</td></tr>
<tr><td>2.8. Student responsibilities</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 in order 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)
- attending seminars; a total of 6 points (the lowest number of points that a student should gain from this element is 4 points)
- attending exercises (intramural and extramural-farms); a total of 6 points (the lowest number of points that a student should gain from this element is 4 points)
- active participation in seminars and exercises (solving and interpretation of tasks); a total of 10 points (the lowest number of points that student should gain from this element is 5 points)
- continuous knowledge checking (colloquia); a total of 32 points (the lowest number of points that a student should gain from this element is 20 points); during the course 3 colloquia will be organised - 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)
- final exam; a total of 40 points (the lowest number of points that student should gain from this element is 24 points)</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>0.81</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>0.45</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>1.8</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 colspan="6"></td></tr>
<tr><td>2.10. Grading and evaluating</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</td></tr>
</table>

<table>
<tr><td>student work in class and at the final exam</td><td>/ 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>
<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>Mason, I. L.: World dictionary of livestock breeds,types and varieties. 5th Edition. CABI Publishing, 2002.</td><td>1 in the library of the Department</td><td>no</td></tr>
<tr><td>Fogle, B.: The new encyclopedia of the dog. Dorling Kindersley Publishing, Inc.,2000.</td><td></td><td></td></tr>
<tr><td>Helgren, A.J.: Encyclopedia of cat breeds. Barrons Educational Series, Inc.,2013.</td><td></td><td></td></tr>
<tr><td>Ward, J.D.:A Manual for laboratory animal management. World Scientific Publishing, 2008.</td><td></td><td></td></tr>
</table></td></tr>
<tr><td>2.12. Optional literature (at the time of submission of study programme proposal)</td><td>On-line basis with data about breeds of animals</td></tr>
<tr><td>2.13. Quality assurance methods that ensure the acquisition of exit competences</td><td>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 colloquia. At the end of teaching the knowledge of students and independence in work will be verified by a final examination.</td></tr>
<tr><td>2.14. Other (as the proposer wishes to add)</td><td></td></tr>
</table>

BASIC STATISTICS IN VETERINARY MEDICINE

1. GENERAL INFORMATION			
1.1. Course teacher	Assistant Professor Sven Menčik, DVM, PhD,	1.6. Year of the study programme	1st
1.2. Name of the course	**Basic statistics in veterinary medicine**	1.7. Credits (ECTS)	2,5
1.3. Associate teachers	Full Professor Velimir Sušić, DVM, PhD Full Professor Anamaria Ekert Kabalin, DVM, PhD, Assistant Professor Maja Maurić, DVM, Ivan Vlahek, DVM Aneta Piplica, DVM	1.8. Type of instruction (number of hours L + S + E + e-learning)	8 (L) + 0 (S) + 16 (E) + 6 (e-learning)
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%)	20%

2. COUSE DESCRIPTION		
2.1. Course objectives	Adoption of facts about the significance of statistics for 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 system with the aim of achieving new skills related to different program environments during the statistical analysis	
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	Acquiring knowledge about the collection, processing and presentation of 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.	
2.4. 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, - interpret the results of basic statistical data processing and analysis, - determine the normality of variables, - select the test to verify the hypothesis, - determine the correlation between two or more variables - familiarize with programming environments for statistical analysis	
2.5. 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. Data entry and processing in Statistica	2 L

	v.13.3 program (StatSoft Inc., TIBCO, 2017). Variables – the nature of expression and scales of measurement. Data collection – definition and size (population and sample). Statistical observation and collecting the data.	
	Meaning and the use of the representative values of the statistical data set. Data collection outline, tables and graphs. Meaning and using of representative values of statistic data collection - arithmetic mean, geometric mean, harmonic mean, median, mode.	1 L + 4 E + 1e-learning
	Learning objectives and calculation of the indicators variability in the statistical data set. Measures of dispersion (spread) - variance, standard deviation, range, interquartile range, coefficient of variation. Measures of layout - measures of asymmetry and kurtosis.	1 L + 2 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 + 1 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 + 1 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).	1L + 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

2.6. 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)	2.7. Comments: -
2.8. Student responsibilities	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 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: - 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 that a student should gain from this element is 8,4 points) - Active participation in exercises (solving and interpretation of tasks): a total of 10 points (the minimum number of credits that 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.		

	- During the periods of the second (2nd) to the seventh (7th) exercise, the students will have to do a self-check exam based on five questions in the LMS 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 are allowed to interpret the given results and can get another extra point there. For the successful task completion and independent data analysis using Microsoft Excel students can earn another point. - 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). A 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 at the beginning of the regular exercise hours there will be organized four (4) colloquia as a written assessment of knowledge. Each of the colloquia carries 8 points, student must successfully solve at least 50% to achieve a minimum of 4 points. From all the colloquia student must achieve at least 20 points. - Final exam: a total of 40 points (the lowest number of points that a student should gain from this element is 24 points)

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	**0,45**	Research		Activity	**0,25**
	Experimental work		Report			
	Essay		Seminar essay			
	Tests	**0,8**	Oral exam			
	Written exam	1	Project			

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

2.12. 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.
2.13. Quality assurance	During teaching students' work will be monitored on tasks that are performed during the exercises, through conversations (on lectures, exercises, online via

methods that ensure the acquisition of exit competences	LMS), 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.
2.14. Other (as the proposer wishes to add)	-

BIOCHEMISTRY IN VETERINARY MEDICINE

1. GENERAL INFORMATION			
1.1. Course teacher	Full Prof. Renata Barić-Rafaj	1.6. Year of the study programme	first
1.2. Name of the course	Biochemistry in Veterinary Medicine	1.7. Credits (ECTS)	7.5
1.3. Associate teachers	Andrea Tumpa, mag. med. biochem.	1.8. Type of instruction (number of hours L + S + E + e-learning)	28 + 12 + 32
1.4. Study programme (undergraduate, graduate, integrated)	integrated	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%)	
2. COUSE DESCRIPTION			
2.1. Course objectives	Objective of studying biochemistry is exploring the structure and function of the body. Modern biochemistry is in constant interaction with medicine, so the acquisition of knowledge about the biochemical and energetic changes and the regulation of metabolic processes in the body of healthy animals provides a biochemical basis for understanding the physiological processes, as well as the basis for understanding the consequences of disorders of metabolic pathways. Management of certain metabolic processes or change their courses according to our needs and goals is possible only with a good knowledge of biochemical pathways. During practical work in the lab, students will learn about the principles of individual techniques used in the laboratory.		
2.2. Course enrolment requirements and entry competences required for the course	attendance in Medical Chemistry		
2.3. 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		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After successfully passing the course student will be able to: - to define the structure of most proteins, carbohydrates and fats in the body, and the importance of certain types of chemical bonds in metabolic processes - to explain the correlation of structure and main function of most proteins, carbohydrates and fats - to show the sequence of biochemical changes in the major metabolic pathways, explain the effect of the major enzyme systems in catalysis of certain reactions - to analyse the ways of regulation of biological activity - to apply a simple biochemical methods for measuring analytes in biological samples - to understand the connection of metabolic pathways and accept the theoretical basis for the selection and evaluation to the results of varuous laboratory measurements		

	- to understand changing of metabolic pathways using various treatment procedures
2.5. Course content broken down in detail by weekly class schedule (syllabus)	Lectures: 1 Aminoacids, 2. Protein structure, 3 Enzymes, 4. Hemoglobin, 5. Collagen, Basics of cell signaling, 6. ATP, Glycolysis, 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. Anaerobic glycolysis, 6. Inhibitors of oxidative phosphorylation, 7. Vitamins, 8. Glutathione, 9. cAMP, 10. Ketone bodies, 11. Specific derivats of aminoacids, 12. Integration of metabolism Exercises: 1 Isolation methods in biochemistry, 2. Proteins, 3. Enzymes – kinetics, 4. Enzymes, 5. Hemoglobin, 6. Carbohydrates, 7. Glycogen, 8. Enzyme regulation 9. Lipids, 10. Urea, 11. Urinalysis 12. Integration

2.6. 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)	2.7. Comments:
2.8. Student responsibilities	presence at lectures, seminars and excercises, practical activity at seminars, successfully performed practical exercises, successfully passed the final exam		

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	1,35	research		activity	0,75
	experimental work		report		knowledge verification - seminars	
	essay		seminar essay		knowledge verification - exercises	
	tests	2,4	oral exam		(other)	
	written exam	3	project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	attending classes lectures: 0.43 x 14 lectures = max 6, min 3 points attending classes seminars: 0.5 x 12 seminars= max 6, min 4 points attending classes exercises: 0.5 x 12 exercises= max 6, min 4 points activity seminars: 1,25 point (short questions) x 4 seminars=max 5, min 2,5 points activity exercises: 0.5 (0.2 successfully exercise, 0.3 point short questions) x 10 exercises=max 5, min 2,5 points continual knowledge testing: 1 mandatory colloquium max 32, min 20 points (required for the exam, 3 terms during the course + 1 during the first term of the exam = max 4 times), 3 optional colloquium, max 40, min 24, (one term for 1. coll. , one term for 2. coll, one term for 3. coll) if on each of the three achieved 24 min - recalculated as successfully passed the exam final exam=max 40, min 24 points final grade is based on total points

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	J. M.Berg, J. L.Tymoczko, L. **Stryer**: Biochemistry, New York: W H Freeman; 2002.	150	web

	T. M. **Devlin** - Textbook of Biochemistry with Clinical Correlations, A.J.Willey, New York, 2006.	0	web
	Seminars – script		
	Exercises - script		
2.12. Optional literature (at the time of submission of study programme proposal)			
2.13. Quality assurance methods that ensure the acquisition of exit competences	Continuous knowledge verification, scoring active participation in class, the final exam		
2.14. Other (as the proposer wishes to add)			

BOTANY IN VETERINARY MEDICINE

1. GENERAL INFORMATION			
1.1. Course teacher	Full prof. Ksenija Vlahović, PhD	1.6. Year of the study programme	1st (first)
1.2. Name of the course	**Botany in veterinary medicine**	1.7. Credits (ECTS)	1,5 ECTS
1.3. Associate teachers	Prof. Josip Kusak, PhD; Full prof. Maja Popović, PhD; Prof. Tomislav Gomerčić, PhD; Assistant prof. Daniel Špoljarić, PhD; Fodder plants: full prof. Nora Mas, PhD; Poisonous plants: full prof. Emil Srebočan, PhD; Medicinal plants: full prof. Damir Žubčić, PhD;	1.8. Type of instruction (number of hours L + S + E + e-learning)	10+0+10
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%)	
2. COUSE DESCRIPTION			
2.1. 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.		
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	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.		
2.4. Learning outcomes expected at the level of the course	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		

<table>
<tr><td>(4 to 10 learning outcomes)</td><td colspan="6">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. Draw and explain the processes associated with cell division in plants and animals, and operate a light microscope and draw observed cells and intracellular structures
5. Written to summarize their knowledge of the structure of plant cells and the function of its organelles with special reference to material, accommodation and the role of DNA molecules
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. Systems used to search for content relevant to botany in veterinary medicine using literature and databases</td></tr>
<tr><td>2.5. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">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: 1. Lonjsko polje; 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; Preserving of autochthonic breeds in situ (turpoljska svinja, posavski konj); Jakuševac (on the way to Lonjsko polje); Comprehension of indispensable care for waste disposal. Wild and domestic animals at waste disposal. 2. Park Maksimir: Forest community; Meadow association</td></tr>
<tr><td rowspan="2">2.6. Format of instruction:</td><td colspan="2" rowspan="2">X lectures
X exercises
☐ on line in entirety
☐ partial e-learning
☐ field work</td><td colspan="2" rowspan="2">☐ independent assignments
☐ multimedia and the internet
X laboratory
☐ work with mentor
☐ (other)</td><td colspan="2">2.7. Comments:</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="6">Students are obliged to participate lectures, seminars and exercise.</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>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></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">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 "Botany in veterinary medicine" in autumn semester are being defined as follows:</td></tr>
</table>

	1 attending lectures 2 attending exercises 3.participation at exercises and seminars 4 continuous knowledge checking 5 final exam During the session for the „Botany in veterinary medicine" 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 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 13 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 13 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	
2.12. Optional literature (at the time of submission of study programme proposal)			

2.13. Quality assurance methods that ensure the acquisition of exit competences	Final written exam.
2.14. Other (as the proposer wishes to add)	

ENVIRONMENT, ANIMAL BEHAVIOUR AND WELFARE

1. GENERAL INFORMATION			
1.1. Course teacher	Gordana Gregurić Gračner, DVM, PhD, Associate Professor	1.6. Year of the study programme	1th
1.2. Name of the course	Environment, animal behaviour and welfare	1.7. Credits (ECTS)	3
1.3. Associate teachers	Kristina Matković, DVM, PhD, Full Professor; Mario Ostović, DVM, PhD, Assistant Professor; Ivana Sabolek, DVM, Assistant	1.8. Type of instruction (number of hours L + S + E + e-learning)	L8+ S8+E24
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%)	
2. COUSE DESCRIPTION			
2.1. 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.		
2.2. 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	Understanding the concept of animal behaviour and welfare Understanding of mutual impact of animals and environement (soil, water) in order to positive influence on animal health condition, production and reproduction as well as to preserve proper bio ecologic relationships in the environment		
2.4. 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 effect of soil and water on health, production and reproduction of animals, but also explain the animal impact on the environment in order to preserve the biological and ecological relationships in it -interpreting results of soil and water examinations -organize grazing systems for animals on the basis of climate-specificity, depending of their species, number and health -identify physiological and abnormal behaviour in domestic animals -self-judge the benefit of (farm) animals in the context of their behaviour		

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

2.6. Format of instruction:		2.7. Comments:
X lectures X seminars and workshops X exercises ☐ on line in entirety ☐ partial e-learning ☐ field work	☐ independent assignments X multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	

2.8. Student responsibilities
1. attending lectures 2. attending exercises 3. attending seminars 4. participation at exercises and seminars 5. continuous knowledge checking 6. final exam

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)					
Attending lectures	0,18	Research		Practical training	
Experimental work		Report		Attending seminars	0,18
Essay		Seminar essay		Attending excersises	0,18
Continuous knowledg checking	0,96	Written exam (final exam)	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

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. The Ethology of Domestic Animals (2009): An Introductory Text / edited by Per Jensen-2nd ed.		
2. Appleby, M. C., B. O. Huges (2004): Poultry Behaviour and Welfare. CABI Publishing, London, UK.		

	3. Fraser, A., D. M. Broom (1996): Farm animal behaviour and welfare (3rd Edition). CABI Publishing, London, UK.		
	4. Harrison, R. M. (1995): Polution: Causes Effects and Control (2nd Edition). The Royal Society of Chemistry, Cambridge, UK		
	5. Keeling, L., H. Gonyou (2001): Social Behaviour in Farm Animals. CABI Publishing, London, UK.		
	6. McFarland, D. (1999): Animal behaviour: Psychobiology, Ethology and Evolution (3rd Edition). Pearson Education Limited, Essex, UK.		
	8. Rollin, B. R. (2003): Farm Animal Welfare: Social, Bioethical, and Research Issue, Iowa State Press, USA.		

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

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

Types of activities	Minimal number of points	Maximal number of points
Attending lectures (16 hours)	**3** 3/0.375 = 8 lectures hours (min.)	**6** 6/16 = 0.375 (coefficient for attending 1 lecture hour)
Attending seminars (18 hours)	**4** 4/0.33 = 12 seminar hours (min.)	**6** 6/18= 0.33 (coefficient for attending 1 seminar hour)
Attending exercises (6 hours)	**4** 4/1 = 4 exercise hours (min.)	**6** 6/6 = 1 (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 have minimal 24 points)	**40** 40/40 = 1 (coefficient 1)
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] – 8 points (8 question, each correct answer is worth 1 point)
[3] – 40 points (**written exam** – 40 questions / 1 points for each correct answer; a student must have 24 correct answers in order to have 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)
2.14. Other (as the proposer wishes to add)	

HISTOLOGY WITH GENERAL EMBRYOLOGY

1. GENERAL INFORMATION			
1.1. Course teacher	**Snježana Kužir,** Associate Professor	1.6. Year of the study programme	I
1.2. Name of the course	**Histology with General Embryology**	1.7. Credits (ECTS)	7
1.3. Associate teachers	**Ivan Alić,** PhD, DVM (senior researcher) **Lucija Bastiančić**, DVM	1.8. Type of instruction (number of hours L + S + E + e-learning)	30 + 0 + 60
1.4. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate university study program 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%)	1

2. COUSE DESCRIPTION	
2.1. Course objectives	Histology is one of the basic subjects of the medical sciences; it studies the structure of human and animal bodies, which can be seen only with the help of optic aids. Etymologically, histology is a science that studies the tissues of a body. However, it explores the complete microscopic and submicroscopic system of the organism. During the study, students of veterinary medicine improve their knowledge from macroscopic anatomy and at the same time, they gain insight into the correlation between the structure and function of organs and organic systems. Knowledge of the normal structures is essential for the recognition of changes in the structure of the tissue, organs and organic systems. Embryology deals with the embryonic development and enables the understanding of complex interrelations in the body of an animal. It is also of practical importance since, it explains the emergence of anomalies during development.
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	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. It is also the basis for understanding and linking the 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.
2.4. 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: -recognize and define the basic elements of the microscopic structures of tissues and organs of animals -explain and compare the structure of certain organs in different animal species; -propose the necessary histological method of processing the sample; -independently cut off a piece of tissue and fix it correctly for the selected histological method; -use the microscope efficiently for the purpose of analysis and study of histological slides; -recognize and analyze the histological slides of various organs and tissues;

	-examine the relations between the structures and development of domestic animals
2.5. 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. imunocytochemistry. 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 tissue (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 features. 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 collagen. 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

<table>
<tr><td></td><td colspan="6">intestine: 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 bronci. 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 (1h); Cardiovascular system (1h); Lymphatic system (2h); Digestive system (4h); Respiratory system (2h); Urinary system (2h); Male reproductive system (1h); Female reproductive system (2h); Extra embryonic membrane (1h).

Exercises:
Cytology (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>2.6. Format of instruction:</td><td colspan="2">X lectures
☐ seminars and workshops
X 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>2.7.Comments:
The introduction of higher level of LMS for the course. In the exercises, students will use microscopes, which limits the size of the group to 8-12 students.</td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="6">Presence at lectures (min 15h or 3 points earned). Presence in training (min. 40h or 8 points earned). Activity in training (a minimum of 5 points earned). Passed Examination of three preliminary exams (min. 10 +5 +5 points earned). Final oral exam (min. 24 points earned).</td></tr>
<tr><td>2.9.Screening student work</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">(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>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. Checking of attendance at lectures will be done by collection of students' signatures. One hour of a lecture (45 minutes) is equal to 0.2 points.
Attending exercises (8-12 points)
During the “Histology and general embryology” course students must attend 40 out of 60 hours of exercises in order to gain the 8 minimal points. The maximum number of points from this evaluation element is 12. The checking of attendance at exercises will be done by calling out the students at the beginning of each practical. One hour of practical (45 minutes) is equal to 0.2 points
Participation at exercise (5-10 points)
Participation is expected of students by asking questions, drawing microscopic slides and by active studying from the given literature. The active participation of each student at the exercises will be evaluated by 1-10 points. A student must gain a minimum of 5 points. The maximum number of points from this evaluation element is 10.
Continuous knowledge checking (preliminary exams: first 10-16 points; second 5-8 points; third 5-8 points)
Three preliminary exams will be organized during the course. The first is worth minimum 10 and maximum 16 points. Second and third are worth minimum 5 and maximum 8 points. To take the oral exam students must have 20 points from this domain. In case she/he does not earn enough points, the student has the right to repeat preliminary exam twice again (second and third attempt), and a fourth time with permission from the vice dean. In this context it is possible to gain 32 points max.
Final, oral exam (24-40 points)
The final exam is oral and it consists of revision and knowledge of histological slides (according to the course goals and outcomes). For each slides (there are 5 of them) a student can gain 8 points max. To pass the exam students must gain at least 24 points. The maximum number of points is 40.
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 40 practical (8 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.
<table>
<tr><td>Points</td><td>Grade</td></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>
<tr><td>77-84</td><td>3 (C)</td></tr>
</table></td></tr>
</table>

	85-92 | 4 (B) 93-100 | 5 (A) In case a student gains the maximum number of points by attending lectures (6), attending exercises (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).

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and 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 exercises		LMS
2.12. 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.		
2.13. Quality assurance methods that ensure the acquisition of exit competences	Monitoring of attending to lectures and exercises, activities during the exercises, the success of the three preliminary exams and final oral exams		
2.14. Other (as the proposer wishes to add)	It is necessary to supply required mandatory and additional literature.		

INTRODUCTION TO ENGLISH VETERINARY MEDICAL TERMINOLOGY I

1. GENERAL INFORMATION			
1.1. Course teacher	Dubravka Vilke-Pinter, Ph.D.	1.6.Year of the study programme	I
1.2. Name of the course	Introduction to English Veterinary Medical Terminology I	1.7. Credits (ECTS)	1
1.3. Associate teachers		1.8. Type of instruction (number of hours L + S + E + e-learning)	5 hours S + 10 hours E (tutorials)
1.4. Study programme (undergraduate, graduate, integrated)	integrated	1.9. Expected enrolment in the course	25
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%)	
2. COUSE DESCRIPTION			
2.1. 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 of, 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.		
2.2. 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	Process of studying the principles of word formation in technical terminology and of gaining understanding of terms used in various fields of veterinary medicine enables students to identify, ***acquire*** and use ***information*** provided in scientific and technical literature from the field. Through the learning process, besides gaining specific knowledge of veterinary English students achieve progress in general language skills as well.		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	student 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 have basic understanding of the structure of technical and scientific text		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	1st unit: Introduction to veterinary terminology. English as a means of global communication. Different language registers. General English/professional English (English for Specific Purposes - ESP). 2nd unit: Basic features of English in veterinary medicine (specific terminology, specific grammatical structures). 3rd Unit: Analysis of terms pertaining to veterinary profession: Branches of veterinary medicine; Veterinary education worldwide; Career opportunities (veterinary practice, public health, industries) 4thunit: Dictionaries and vocabulary building: Types of dictionaries; Dictionary skills; Key words.		

	Collocations and idioms 5thunit: Word formation in specialised veterinary medical terminology: Word elements. Prefixation and suffixation. Compounds. 6th unit: Analysis of specialized terminology in technical texts. Basic features of scientific text. Topic: Characteristics of living beings. 7th unit: Analysis of specialized terminology in technical texts. Topic: Organisation of living beings: Cells. 8th Unit: Analysis of specialized terminology in technical texts. Topic: Tissues; Organs; Organs systems; Organism.

2.6. Format of instruction:	☐ lectures ☐ seminars and workshops ☐ exercises X ☐ on line in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	2.7. Comments:
2.8. Student responsibilities			

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	18%	Research		Practical training	
	Experimental work		Report		Class participation	10%
	Essay		Seminar essay		(other)	
	Tests	32**%**	Oral exam **10credits**		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	class attendance class participation continual assessment final exam		
Class attendance	15 hourly classes	Minimum number of points	Maximum number of points
		11 coefficient = 18/15 = 1,2 Students must attend at least 9 out of 15 hourly classes (3 hours S and 6 hours E) to achieve minimum number of points	18
CLASS PARTICIPATION		Minimum number of points	Maximum number of points
		5 coefficient 10/15 = 0,66 Students must earn at least 5 points out of maximum 10 by performing in-class assignements	10
Continual assessment		Minimum number of points	Maximum number of points

			20 Students take a mIdterm test Minimum passing score on the test 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. (2018). Introduction to English Veterinary Medical Terminology (Part 1) - reading materials - each student receives his/her individual copy of the materials	3	
2.12. Optional literature (at the time of submission of study programme proposal)	Cochran P. (1991). Student's guide to Veterinary Medical Terminology. St. Louis, Mosby. Cox, K. & Hill, D. (2007). Preliminary English for Academic Purposes. Longman. McBride, D.E. (2002). Learning Veterinary Terminology. Mosby. McCarthy, M & O'Dell, F. (2008). Academic Vocabulary in Use. Vocabulary Reference and Practice. Self-study and Classroom Use. Cambridge: CUP. McCormack, J. (2005). English for Academic Study. Garnet Publishing Ltd. Garnet Education. ***Porter***. ***D*** & C Black (2007).Check your Vocabulary for Academic English. A & C Black Publishers Ltd.		
2.13. Quality assurance methods that ensure the acquisition of exit competences	Continual asssesment: in-class writing activities, homework		
2.14. Other (as the proposer wishes to add)			

INTRODUCTION TO VETERINARY

1. GENERAL INFORMATION			
1.1. Course teacher	Assoc Prof Krešimir Severin	1.6. Year of the study programme	1
1.2. Name of the course	Introduction to veterinary	1.7. Credits (ECTS)	1.5
1.3. Associate teachers	Asst Prof Dean Konjević, Asst Prof Gordana Gregurić Gračner	1.8. Type of instruction (number of hours L + S + E + e-learning)	2+6+12+0
1.4. Study programme (undergraduate, graduate, integrated)	Integrated	1.9. Expected enrolment in the course	10-30
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%)	1, 10%
2. COUSE DESCRIPTION			
2.1. Course objectives	Overview of organized veterinary medicine, history of the profession, and career opportunities within the profession.		
2.2. Course enrolment requirements and entry competences required for the course	Terms not specified.		
2.3. Learning outcomes at the level of the programme to which the course contributes	After all lectures attended students will be acquainted with all aspects of veterinary medicine activities and domain of veterinary profession.		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: define the term, subject and role of veterinary medicine in modern society recognize all aspects of veterinary activities and scope of the veterinary profession interpret the development of science and profession connect the acquire knowledge and professionalization with the development of veterinary disciplines finish plan postgraduate specialist and doctoral studies and training through courses		
2.5. 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.

2.6. 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)	2.7. Comments:

2.8. Student responsibilities	Attendance at seminars, exercises and writing seminar essay					
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	0.27	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 points
Attending lectures	**1**	**2**
2% of grade	A student must attend at least 1 lecture lessons to gain the minimal number of points - 1 point (coefficient = 1). In order to gain the maximal number of points – 2 points, the student must attend 2 lectures lessons (coefficient = 1).	4.5% of grade
Attending seminars	**4**	**6**
6 % of grade	A student must attend at least 4 seminar lessons to gain the minimal number of points - 4 points (coefficient = 1). In order to gain the maximal number of points – 6 points, the student must attend 6 seminar lessons (coefficient = 1).	
Attending filed exercises	**8**	**12**
12 % of grade	During the session of the course a student must attend at least 10 filed	

		exercises lessons in order to gain the minimal number of points – 8 points (coefficient = 0.8). To gain the maximum number of points the student must attend both of field programs (16 lessons) in order to gain the maximum number of points – 12 points (coefficient = 0.8)	
	Participation at seminars	**5**	**10**
	10% of grade	Each student is obliged to create and present the seminar work that is evaluated.	
	Continuous knowledge checking	**16**	**30**
	30% of grade	Written preliminary exams will be organized upon completion of the filed exercises. Preliminary exam consists of 16 questions each referring to seminar materials. From this evaluation element a student can gain minimal 16 points (coefficient = 2) for 15 correct answers, or maximal 24 points for 24 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 is made of written part in form of a test (17 questions each referring to seminar materials. Answers to questions 1 to 15 are valued by a maximum of 2 points while 16-17 with a maximum of 5 points). Regardless to the gained number of points up to the final exam, a student must show the knowledge at this evaluation element as well and gain minimal 24 points (coefficient = 2). The maximum number of points a student can gain at the final exam is 40 points (coefficient = 2).	

	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	
2.12. 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.		

2.13. Quality assurance methods that ensure the acquisition of exit competences	Anonymous student survey about all aspects of teaching.
2.14. Other (as the proposer wishes to add)	

MEDICAL CHEMISTRY

1. GENERAL INFORMATION			
1.1. Course teacher	Assistant professor Luka Krstulović	1.6. Year of the study programme	first
1.2.Name of the course	Medical chemistry	1.7. Credits (ECTS)	5
1.3. Associate teachers		1.8. Type of instruction (number of hours L + S + E + e-learning)	L-20+E-34
1.4. Study programme (undergraduate, graduate, integrated)	integrated	1.9. Expected enrolment in the course	25
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%)	
2. COUSE DESCRIPTION			
2.1. Course objectives	Chemistry covers an important part in the study of medicine and veterinary medicine, dealing with basic molecular structures and their changes within the organism, and nature as such. World around us is made of chemical compounds that rule our lives, all functions of life organisms from their birth to death. In order to comprehend functioning of the human and animal organism, in health and disease, and ways of curing, students will learn to understand chemical processes that are responsible for these reactions. All macroscopic occurrences are results of processes in macroscopic world of molecules and atoms and cannot be explained without changes that provoke them. For that reason, it is necessary for the students of veterinary medicine to get reasonable level of chemical knowledge – in particular chemical composition of matter, principal chemical reactions, and principal groups of natural compounds. By using models of small and simple molecules, students should understand the relationship between structure and reactivity that will be extended further on for on bio molecules. The achieved knowledge will help students in better comprehending of other fields and courses during their study, such as Biochemistry, Physiology, Pathophysiology, Pharmacology, Toxicology and others.		
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	Learning outcomes at the level of the programme: Understanding the basic science on which veterinary medicine is based 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 The ability of use laboratory equipment and make critical analysis of test results The ability of consolidation of the theoretical knowledge and practical skills within the fields of veterinary medicine The ability of conduct independent research and work in team The ability of presenting the results – oral and writing		
2.4. Learning outcomes expected at the level of the course	Learning outcomes at the level of the course: Ater successful completion of the course the studen will be able to: apply basic chemical reactions and physicochemical processes; compare the structurte and properties of simple organic compounds and complex biologically important molecules:		

<table>
<tr><td>(4 to 10 learning outcomes)</td><td colspan="6">connect the relationship of chemical structure of a molecule and its physical and chemical properties;
independently use basic methods of analytic chemistry for quantitative and qualitative analysis;
apply chemical calculations to solve the tasks.</td></tr>
<tr><td>2.5. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">1 Introduction (Role of chemistry in veterinary medicine);
2. Structure of substances (ionic and covalent bonds, electro negativity of elements);
3 Dispersed systems (Suspensions, colloids, solutions, aqueous solutions, properties of water, hydrogen bonds, electrolytes, diffusion, osmosis, colligate properties);
4 Acids and basis (Acids and basis, pH, buffer solutions, buffering system in body);
5 Reaction energy (Activation energy, endothermic and exothermic reactions, catalysts, biocatalysts);
6 Introduction to organic chemistry, Isomerism;
7 Hydrocarbons (Alkanes, alkenes, alkynes, aromatic hydrocarbons);
8 Oxygen-containing organic compounds (Alcohols, ethers, phenols, aldehydes, ketones, carboxylic acids and derivatives);
9 Nitrogen-containing organic compounds (Amines, heterocyclic compounds, alkaloids);
10 Carbohydrates (Classification and stereoisomerism, monosaccharides, oligosaccharides and polysaccharides);
11 Amino acids (Amino acids, peptides, proteins, protein structure, peptide bonds, conformation);
12 Lipids (Structure and classification, saponification);
13 Nucleic acids (Purine and pyrimidin basis, nucleotides, structure);
14 Vitamins (Vitamins and coenzymes, definition and classification).</td></tr>
<tr><td rowspan="2">2.6. 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>2.7. Comments:</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="6">1. attending lectures
2. attending exercises
3. participation at exercises</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>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>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">There are 20 lecture lessons. A student must attend 1 lesson to gain 0.3 point. The maximum number of points is 6 (20 lessons) and the minimum number of points is 3 (10 lessons).
There are 22 exercise lessons in the lecture-room (11 programmes). Each analyzed programme, two exercise lessons, is worth 0.55 point. A student must attend 7 programmes (14 lessons) in order to gain 4 points max. Maximal number of points: 6 (22 hours – 11 programmes) Minimal number of points: 4 (14 hours – 7 programmes)
There are 12 exercise lessons in a lab (6 programmes). Each realized programme, two exercise lessons, is worth 1 point. A student must attend 4</td></tr>
</table>

<table>
<tr><td></td><td colspan="3">programmes (8 lessons) in order to gain minimal 4 points. Maximal number of points: 6 (6 programmes) Minimal number of points: 4 (4 programmes)
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 well 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) 8 points (5 programmes), 7 points (4 programmes) The minimal number of points: 5 (3 programmes).
Chemical calculation exercises:There will be 6 preliminary exams from chemical calculation organized during the sessions. Each preliminary exam is worth 2 points. A student must gain minimal 8 points. For students who do not gain the minimal number of points makeup preliminary exam will be organized.The maximum number of points: 12 (6 preliminary exams) The minimal number o points. 8 (4 preliminary exams). A preliminary exam from attended lectures will be organized during the sessions. The exam consists of 10 questions and each correct answer is worth 2 points. A student can gain maximal 20 points (10 correct answers), and she/he must gain a total of minimal 12 points (6 correct answers). A student who does not gain the minimal 12 points has a right to take a makeup preliminary exam. Preliminary exams: the maximum number of points: 20, the minimal number of points: 12
In order to take the final exam a student must gain the minimal number of 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 20 questions. Each correct answer is worth 2 points. A student can gain 40 points max. (20 correct answers). The minimal number of points a student must gain at the final exam is 24 (12 correct answers). In case a student does not satisfy at the final part of the exam, the lecturer determines a time for reexamination.
The maximum number of points: 40
The minimal number of points: 24.</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>1. F. A. Bettelheim, W. H. Brown, J. March (2004): Introduction to General, Organic, and Biochemistry, Thomson.</td><td>1</td><td>No</td></tr>
<tr><td>2. M. S. Silberberg (2000): Chemistry, The Molecular Nature of Matter and Change, McGraw Hill.</td><td>1</td><td>No</td></tr>
<tr><td>3. F. A. Carey (2003): Organic chemistry, McGrawHill, New York</td><td>5</td><td>Yes</td></tr>
<tr><td>4. J. G. Smith (2006): Organic chemistry, McGrawHill, New York</td><td>5</td><td>No</td></tr>
<tr><td>5. Stolić, I. (2013): Chemical calculation I, Veterinary faculty, Zagreb</td><td>10</td><td>Yes</td></tr>
<tr><td>6.Krstulović, L. (2013): Chemical calculation II, Veterinary faculty, Zagreb</td><td>10</td><td>Yes</td></tr>
<tr><td>2.12. Optional literature (at the time of submission of study programme proposal)</td><td colspan="3"></td></tr>
<tr><td>2.13. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">Student survey</td></tr>
</table>

2.14. Other (as the proposer wishes to add)	

PHYSICAL EDUCATION

1. GENERAL INFORMATION			
1.1. Course teacher	Saša Čuić, B.A. – Senior Lecturer	1.6. Year of the study programme	First year
1.2. Name of the course	**PHYSICAL EDUCATION**	1.7. Credits (ECTS)	1
1.3. Associate teachers		1.8. Type of instruction (number of hours L + S + E + e-learning)	30 hours per semester of practical work
1.4. Study programme (undergraduate, graduate, integrated)	Integrated	1.9. Expected enrolment in the course	25
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%)	

2. COUSE DESCRIPTION			
2.1. 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: swimming, basketball, football, volleyball, handball, dances, aerobics, badminton, skating, skiing, squash, sports on the water (sailing, paddle), riding.		
2.2. Course enrolment requirements and entry competences required for the course	Full-time inscription semester.		
2.3. 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.		
2.4. 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		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	Swimming, basketball, football, volleyball, handball, dances, aerobics, badminton, skating, skiing, squash, sports on the water (sailing, paddle), riding.		
2.6. 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)	2.7. Comments:

<table>
<tr><td>2.8. Student responsibilities</td><td colspan="6">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">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>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 colspan="2">(other)</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td colspan="2">(other)</td></tr>
<tr><td>Tests</td><td></td><td>Oral exam</td><td></td><td colspan="2">(other)</td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td colspan="2">(other)</td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">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="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">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>
<tr><td>2.12. Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">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.</td></tr>
<tr><td>2.13. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">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.</td></tr>
<tr><td>2.14. Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

PHYSICS AND BIOPHYSICS

1. GENERAL INFORMATION			
1.1. Course teacher	Pašić Selim	1.6. Year of the study programme	1.
1.2. Name of the course	**Physics and Biophysics**	1.7. Credits (ECTS)	5
1.3. Associate teachers	Nato Popara	1.8. Type of instruction (number of hours L + S + E + e-learning)	16 + 0 + 38
1.4. Study programme (undergraduate, graduate, integrated)	Integrated	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%)	1
2. COUSE DESCRIPTION			
2.1. 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.		
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	-Distinguish mechanisms of biological systems based on knowledge of the fundamental laws of physics with using simple models. -Clarify the effects of external energy sources on an animal organism. -Connect the laws of physics with the basic principles of diagnostic methods. -Handled by simply measuring instruments. -Analyze the measured data and process them using a simple statistical procedure.		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	-Explain the physical basis of biological processes at the molecular level -Distinguish mechanisms of biological systems based on knowledge of the fundamental laws of physics with using simple models. -Describe ways to transfer energy and matter within the body and in its interaction with the environment. -Clarify the effects of external energy sources on an animal organism. -Connect the laws of physics with the basic principles of diagnostic methods. -Handled by simply measuring instruments. -Analyze the measured data and process them using a simple statistical procedure.		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	**Introduction** (Introduction. International Systems of Units (SI) and units. Erors in measurements. Some important mathematical functions. Vectors.) **(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. Centre of gravity. Equilibrium.) **(2 hours of lectures)** **Fluids** (Surface tension. Density of matter. Hydrostatic and hydraulic pressure. Lift. Archimedes Principle. Viscometers. Bernoulli's Equation and blood flow. Ideal Gas. Equation of state of an ideal gas. Dalton laws. Atmospheric pressure and its measurement.) **(2 hours of lectures)**		

	Heat (Temperature and molecular motions. Laws of thermodynamics. Thermal expansion of solids. Heat capacity. States of matter. Heat conduction. Animal and its thermal environment. Liquefaction of natural gas. Cooling devices) **(2 hours of lectures)** **Oscillations and Waves** (Resonance. Wave equation. Interference of waves. Transverse and longitudinal waves. Waves. Harmonic oscillator.) **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.) **(2 hours of lectures)** **Optics** (Index of the refraction and dispersion. Lenses and their characteristic points. Part of a microscope. Construction of an image in the eye. Dispersion of the light. Beer-Lambert law of the absorption. Spectral analyse. Polarization of an electromagnetic wave. Features of infrared radiation. Blackbody radiation. Spectrum of electromagnetic radiation. Photoelectric effect. Dual nature of the light.) **(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** (Elementary particles. Bohr model of the atom. Structure of the atom, atomic nuclei and isotope. Pauli's principle. Absorption, stimulated and nature emission of radiating. Laser. X-ray tube. Radioactivity and types of radioactive radiation. Law of radioactivity. Radioisotopes. Ionisation radiation (α,β,γ,n,x) and their penetrability. Measuring of ionization radiation. NMR imaging.) **(2 hours of lectures)** **Qualitative and numerical exercises (12 exercises)** **Laboratory exercises (26 exercises)**
2.6. 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) 2.7. Comments:
2.8. Student responsibilities	

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	**0,9**	Research		Practical training	**0,5**
	Experimental work		Report		(other)	
	Essay		Seminar essay		(other)	
	Tests	**1,6**	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 **(15 sati)**	3.00 **3/0.40≈8 (coefficient 0,40) Students have to attend minimum of 8 hours of lecture to gain minimum of 3.00 credits.**	6.00 **6/15=0.4 (coefficient 0.40)**
	Attending exercises **(30 sati)**	8.00 **8/0.40=20 (coefficient 0.40) Students have to attend minimum 20 hours of exercise to gain minimum credits (8.00).**	12.00 **12/30=0.4 (coefficient 0.40)**
	Activity on exercises [a]	5.00 **5/0.1923=26 (coefficient 0.1923) Students have to gain 26 units for minimum 5.00 credits**	10.00 **10/52=0.1923 (coefficient 0.1923)**
	Continues exams [b]	20.00 **a) Measure units' continuous exam. The minimum credits is 4.00 4/0.4=10 (coefficient 0.4) Preliminary exam. Minimum of credits is 16.00 16/0.4=40 (coefficient 0.4)**	32.00 **a) Measure units' continuous exam. The maximum of credits is 6.00 6/15=0.4 (coefficient 0.4)) Preliminary exam. Maximum of credits is 26.00. 26/65=0.4 (coefficient 0.4)**
	Final exam [c]	24.00 **24/1=24 (coefficient 1) Student have to gain at least: a) 6.00 credits from numerical tasks. b) 18.00 credits from theoretical tasks for minimum 24.00 credits.**	40.00 **40/40=1 (coefficient 1) Student can gain the maximally: a) 10.00 credits from numerical tasks. b) 30.00 credits from theoretical tasks for maximum 40.00 credits.**
	TOTAL:	**60.00**	**100.00**
	[a] 52 units consist of: a) Preparation for lab exercise =1 unit (13 preparations x 1 unit = 13 units) b) Finishing task and processing of the data give 3 units (13 tasks x 3 units = 39 units) [b] Units consist of: a) preliminary exam in labs (13 exercises x 5 tasks = 65 units) b) continuous exam from measure units (15 tasks x 1 unit = 15 units) [c] 40 units are consisted of: a) numerical task (10 tasks x 1 unit = 10 units) b) theoretical tasks (30 tasks x 1 unit = 30 units)		

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	S. Pašić: Laboratory exercises manual for students of veterinary medicine Web page http://www.fizika.vef.unizg.hr/	0	Internet
	C. Hilyard, H.C. Biggin: Physics for Applied Biologists, Hodder & Stoughton Educational (December 1, 1977)	0	Internet
	Instructions and forms for laboratory exercises, internal script	50	
2.12. 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.		
2.13. Quality assurance methods that ensure the acquisition of exit competences	Grading and evaluating student work in class and at the final exam		
2.14. Other (as the proposer wishes to add)			

ZOOLOGY

1. GENERAL INFORMATION			
1.1. Course teacher	Full professor Josip Kusak, DVM, PhD	1.6. Year of the study programme	The first year
1.2. Name of the course	Zoology	1.7. Credits (ECTS)	5.5
1.3. Associate teachers	Full professor Ksenija Vlahović, DVM Full professor Maja Popović, DVM, PhD Associate professor Tomislav Gomerčić, DVM, PhD Assistant professor Daniel Špoljarić, DVM, PhD	1.8. Type of instruction (number of hours L + S + E + e-learning)	L=15; S=20; E=40
1.4. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate studies	1.9.Expected enrolment in the course	30
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%)	2 i.e. 10%
2. COUSE DESCRIPTION			
2.1. Course 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 nonliving 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 strict.		
2.2. Course 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.		
2.3. Learning outcomes at the level of the programme to which the course contributes	- taxonomically classifying every animal to the phylum level, while classifying mammals to the order level - interpret basics of evolutionary processes - explain the structure and role of cell parts during cell division - distinguish types of reproduction, ways and processes of fertilization		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	- compare stages of embryonic development of invertebrates and various groups of vertebrates - knowing abiotic and biotic ecological factors and mechanisms of their interactions - distinguish biomes and phases of community successions		

	- classifying types of pollutants and basic mechanisms of their interactions in ecosystems		
2.5. Course 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 divisions 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.		
	☒ lectures	☐ independent assignments	2.7. Comments:

<table>
<tr><td>2.6. 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 (in the case of having less than ten students enrolled)
☐ (other)</td><td></td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="3">Attending lectures, seminar, field work and lab exercises. Preparing for lab and field work from materials on LMS. Preparing, presenting and defending one seminar.</td></tr>
<tr><td>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 colspan="3"><table>
<tr><td></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</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>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>2.2</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="3">According to Bologna approach of study process, the work of an student will be evaluated by the following means:
For attending a total of 16 lecture hours a student can gain 3 to 6 points, thereby each lesson is worth 0.4 point.
For attending a total of 20 seminar hours a student can gain 4 to 6 points, thereby each lesson is worth 0.3 point. A condition is to write one seminar work.
For attending a total of 40 exercise hours a student can gain 4 to 6 points, thereby each lesson is worth 0.15 point.
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:<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>2.11. Required literature (available in the library and via other media)</td><td colspan="3"><table>
<tr><th>Title</th><th>Number of copies in the library</th><th>Availability via other media</th></tr>
<tr><td>All study material are available in form of Power point presentations</td><td></td><td>Files on LMS</td></tr>
<tr><td>Đuro Huber, Tomislav Gomerčić, Josip Kusak, FUNDAMENTALS OF ECOLOGY, University textbook for students of veterinary medicine</td><td></td><td>Available as PDF on LMS</td></tr>
</table></td></tr>
</table>

2.12. 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
2.13. Quality assurance methods that ensure the acquisition of exit competences	Continuous oral and written checking of acquired knowledge
2.14. Other (as the proposer wishes to add)	

LIST OF OBLIGATORY SUBJECTS - 2nd STUDY YEAR

Obligatory Subjects - 2nd study year

Anatomy with Organogenesis of Domestic Animals III

Animal Breeding and Production

Applied Animal Nutrition

Basic Animal Nutrition

General Microbiology

Hygiene and Housing of Animals

Introduction to English Veterinary Medical Terminology II

Molecular Biology and Genomics in Veterinary Medicine

Physical Education

Physiology of Domestic Animals I

Physiology of Domestic Animals II

Veterinary Immunology

ANATOMY WITH ORGANOGENESIS OF DOMESTIC ANIMALS III

1. GENERAL INFORMATION			
1.1. Course teacher	Assoc. Prof. Martina Đuras	1.6. Year of the study programme	2nd year, 3rd semester
1.2. Name of the course	**Anatomy with organogenesis of domestic animals III**	1.7. Credits (ECTS)	5.5
1.3. Associate teachers	Full Prof. Tajana Trbojević Vukičević; Assist. Mirela Pavić, PhD, DVM; Assist. Lucija Bastiančić, DVM; Assist. Denis Leiner, DVM; Assist. Kim Korpes, DVM;	1.8. Type of instruction (number of hours L + S + E + e-learning)	15 L + 63 E
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%)	VEF-LMS
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	Completed courses "Anatomy with organogenesis of domestic animals I" and "Anatomy with organogenesis of domestic animals II".		
2.3. 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 head and neck of domestic mammals and basic gross anatomy of domestic birds during preclinical and clinical courses.		
2.4. 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: list and describe major anatomical structures of the head and neck of domestic mammals and basic gross anatomy of domestic birds explain the development of the structures of the head and neck apply anatomical nomenclature skilled communicate anatomical information utilize dissection skills		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	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).

2.6. Format of instruction:			2.7. Comments:
	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)	

2.8. Student responsibilities	Students are expected to attend lectures and dissection exercises and prepare cadavers according to course instructions.

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	0.99	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

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.		

2.12. Optional literature (at the time of submission	NICKEL, R., A. SCHUMMER, E. SEIFERLE (1986): The locomotor system of the domestic mammals. Volume I. Verlag Paul Parey, Berlin, Hamburg.

of study programme proposal)	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.
2.13. 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)	

ANIMAL BREEDING AND PRODUCTION

1. GENERAL INFORMATION			
1.1. Course teacher	Anamaria Ekert Kabalin, PhD, Full Professor	1.6. Year of the study programme	2nd
1.2. Name of the course	**Animal Breeding and Production**	1.7. Credits (ECTS)	7
1.3. Associate teachers	Velimir Sušić, PhD, Full Professor (permanent) Sven Menčik, PhD, Assistant Professor Maja Maurić, PhD, Assistant Professor Ivan Vlahek, VMD	1.8. Type of instruction (number of hours L + S + E)	34 L + 14 S + 42 E
1.4. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	1.9. Expected enrolment in the course	20
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%)	
2. COUSE DESCRIPTION			
2.1. Course objectives	The objective of the course Animal breeding and production is to teach students of veterinary medicine how to evaluate and improve genetic basis of animals. Special attention is focused on genotype-phenotype characteristics which have influence on quality and quantity of animal products, than to the characteristics of animal resistance to diseases and animal organism -environment interactions.		
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	Material is divided into three parts which first allow student to acquire knowledge about animal species as a result of its genetic particularities and specific environment. Then there are lessons on how to estimate genetic basis of particular traits and breeding methods how to improve this traits. Finally, in the third part students learn about different production systems and the way of using animal genetics to improve quantity and quality of production and in the same time how production influence on animal health.		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After successfully completion of the course students will be able to: - understand the role of genetic basis in different ways of breeding and exploiting animals - apply different methods to improve the genetic basis of animals with respect to specific breeding traits - identify various animal production systems - geather animal health and production data - analyze animal health and production data - setting the goals in cooperation with farmer - control advancment according to set goals		

	Methodological unit / course content	Class schedule (“L” lectures + “S” seminars + “E” excercises intramural + “Ef” excercises field)
2.5. Course content broken down in detail by weekly class schedule (syllabus)	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. Programs to improve the genetic base of different animal species.	L 2 + S 6 + E 4
	Preventive measures and procedures of health protection as parts of technology in animal production. Preventive measures and procedures for the protection of health in milk production. Preventive measures and procedures for health protection in meat production. Introduction to Herd health and production management.	L 3
	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.	L 3 + S 2 +E 2 + E(f) 8
	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.	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.	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, parturation, 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
	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 2 + 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. Breeding programs. Breeding programs in Croatia - cattle, sheep and goats, pigs, poultry and horses. Breeding program for dogs. Breeding program for cats.	L 4 + E 4

2.6. 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)	2.7. Comments: -
2.8. Student responsibilities	Student obligations are listed in the Act on prediploma and diploma integrated study program of the University of Zagreb Faculty for Veterinary Medicine. Student have to geather at least minimum points in each grading element to go to the final exam when all points are calculated and grade si 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 semianars: The maximum number of points from this evaluation element is 6 points (minimum is 4 points) - Student actitvity 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)

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	0,56
	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/ independant assignment, tests and final exam). Grading is done by the grades according to the grading system in table. Final grade is quantitative with points and qualitative by wording from one to five or F to A. Where F or 1 is given to the not successful students and maximal grade is A or 5.

points	*grade*
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
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.	1 book in the library of The Department of Animal Breeding and Livestock Production	no
web pages		yes

2.12. Optional literature (at the time of submission of study programme proposal)	Prepared written material for lectures and exercises.
2.13. Quality assurance methods that ensure the acquisition of exit competences	Students' work will be monitored through conversations (on lectures, seminars, exercises, online via LMS), as well through continuous knowledge short tests. At the end of teaching the knowledge of students will be verified by a final (written and oral) exam.
2.14. Other (as the proposer wishes to add)	

APPLIED ANIMAL NUTRITION

1. GENERAL INFORMATION			
1.1. Course teacher	Full professor Željko Mikulec, DVM, PhD	1.6. Year of the study programme	2nd
1.2. Name of the course	Applied Animal Nutrition	1.7. Credits (ECTS)	5,5
1.3. Associate teachers	Associate Professor Hrvoje Valpotić, DVM, PhD Diana Brozić DVM, PhD	1.8. Type of instruction (number of hours L + S + E + e-learning)	25 L + 50 E
1.4. Study programme (undergraduate, graduate, integrated)	Integrated	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%)	2nd level, 10%
2. COUSE DESCRIPTION			
2.1. Course objectives	Upon completion of the lectures and after passing the final exam of "Applied Animal Nutrition" the students will be able to recognize the conditions in the field and to take feed samples for chemical analysis. They will also know the right procedure of 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.		
2.2. Course enrolment requirements and entry competences required for the course	Attended the course of „Basic Animal Nutrition"		
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)	Upon successful completion of the course students will be able to: 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		
2.5. Course content broken	1 Factors affecting feed consumption (Taste. Appearance. Hunger. Appetite. Physical form. Mechanisms of feed intake. Inhibition of feed intake. Expected		

down in detail by weekly class schedule (syllabus)	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. 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.); 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 Feeding ostrich. (Physiological and nutritional characteristics of ostrich. Nutrient requirements of ostrich. Selection of feedstuffs in ostrich feeding. Feeding ostrich in intensive production systems. Malnutrition.); 21 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.).

2.6. 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)	2.7. Comments:

2.8. Student responsibilities						
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	**0,99**	Research		Practical training	
	Experimental work		Report		(other)	
	Essay		Seminar essay		(other)	
	Tests	**2,31**	Oral exam	2,2	(other)	
	Written exam		Project		(other)	

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

Type of activity	Minimal points	Maksimal points
Attending lectures 25 hours	**3** (coefficient 0,24) 3 : 0,24 = 13 (12.5)	**6** 6 : 30 = 0,24 (coefficient 0,24)
Attending exercises 50 hours	**8** (coefficient 0,24) 8 : 0,24 = 34 (33.3)	**12** 12 : 50 = 0,24 (coefficient 0,24)
Participation at exercises 1 preliminary exam X 10 questions = 10 points 1 question = 1 point	**5** (coefficient 1) 5 : 5 = 1	**10** 10 : 1 = 1 (coefficient 1)
Continuous knowledge checking 1 preliminary exam theoretical questions = 1 point calculations = 4 points Total of 32 points	**20** (coefficient 1) 20 X 1 = 20	**32** 32 : 32 = 1 (coefficient 1)
Final exam (Oral exam) 1 question = 8 points 5 questions = 40 points	**24** (coefficient 8) 24 : 8 = 3	**40** 40 : 5 = 8 (coefficient 8)
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**
	Cheeke, P. R. (2005): Applied Animal Nutrition. Feeds and Feeding. (3rd ed.). Pearson Prentice Hall, USA.		

2.12. 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.

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

BASIC ANIMAL NUTRITION

1. GENERAL INFORMATION			
1.1. Course teacher	Associate Professor Hrvoje Valpotić	1.6. Year of the study programme	2nd year
1.2. Name of the course	Basic animal nutrition	1.7. Credits (ECTS)	3,5
1.3. Associate teachers	Full professor Željko Mikulec, Diana Brozić DVM, PhD	1.8. Type of instruction (number of hours L + S + E + e-learning)	15 L + 30 E
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	Compulsatory	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
2.1. Course objectives	After successfully passing the exam of course “Basic Animal Nutrition” students will gain basic knowledge in the area of animal nutrition necessary for better understanding the course "Applied Animal Nutrition" which starts the following semester. This means that students are familiar with 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.		
2.2 Course enrolment requirements and entry competences required for the course	Completed final exam in Medicinal Chemistry.		
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)	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		
2.5. 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.).

2.6. Format of instruction:			2.7. Comments:
	X lectures ☐ seminars and workshops X exercises ☐ on line in entirety ☐ partial e-learning ☐ field work	☐ independent assignments X multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	

2.8. Student responsibilities	

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	0,63	Research		Practical training	
	Experimental work		Report		Participation at exercises	0,35
	Essay		Seminar essay		(other)	
	Tests	1,12	Oral exam	1,40	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	**Type of activity**	**Minimal points**	**Maksimal points**
	Attending lectures 15 hours	**3** (coefficient 0,4) 3 : 0,4 = 7,5 (8)	**6** 6 : 15 = 0,4 (coefficient 0,4)
	Attending exercises 30 hours	**8** (coefficient 0,4) 8 : 0,4 = 20	**12** 12 : 30 = 0,4 (coefficient 0,4)
	Participation at exercises 1 preliminary exam X 10 questions = 10 points 1 question = 1 point	**5** (coefficient 1) 5 : 1 = 5	**10** 10 : 10 = 1 (coefficient 1)
	Continuous knowledge checking 1 preliminary exam theoretical questions = 1 point calculations = 4 points Total of 32 points	**20** (coefficient 1) 20 : 1 = 20	**32** 32 : 32 = 1 (coefficient 1)
	Final exam (Oral exam) 1 question = 10 points 4 questions = 40 points	**24** (coefficient 10) 24 : 10 = 2,4	**40** 40 : 4 = 10 (coefficient 10)
	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)	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.		
2.12. Optional literature (at the time of submission of study programme proposal)			
2.13. Quality assurance methods that ensure the acquisition of exit competences			
2.14. Other (as the proposer wishes to add)			

GENERAL MICROBIOLOGY

1. GENERAL INFORMATION			
1.1. Course teacher	Prof Ljiljana Pinter, PhD, DVM	1.6. Year of the study programme	2
1.2. Name of the course	General Microbiology	1.7. Credits (ECTS)	3.5
1.3. Associate teachers	Prof Nevenka Rudan, PhD, DVM	1.8. Type of instruction (number of hours L + S + E + e-learning)	L 12 S 12 E 30
1.4. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate veterinary study programme	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%)	
2. COUSE DESCRIPTION			
2.1. Course objectives	Microbiology is an important preclinical course where students are prepared for further understanding of lessons in General pathology and pathological morphology, Pharmacology and clinical courses such as infectious diseases and microbial intoxication of animals. Procedures of sterilization, of sampling and sending different materials for further 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 particular microorganisms and methods of aethiological diagnostics as well as possibilities of immunoprophylaxis of infectious diseases		
2.2. Course enrolment requirements and entry competences required for the course	Attended course lectures of Veterinary Immunology.		
2.3. Learning outcomes at the level of the programme to which the course contributes	Microbiology is an important preclinical course where students are prepared for further understanding of lessons in General pathology and pathological morphology, Pharmacology and clinical courses such as infectious diseases and microbial intoxication of animals.		
2.4. 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 microbiology, basic knowledge on morphology, physiology, specific qualities of cultivation and identification, antigen properties, tenacity, relation to antimicrobial substances, pathogenicity of particular microorganisms and methods of aethiological diagnostics as well as possibilities of immunoprophylaxis of infectious diseases. After the course students are able to sterilize, to take and send different materials for further microbiological and immunological tests, to perform simple procedures of microorganism identification, including use of commercial compounds suitable for veterinarians in practice.		
2.5. Course content broken down in detail by	Microbiology development and its importance in veterinary medicine. Bacterial morphology (shape, size, structure, mobility, spores). Bacterial physiology. Bacterial ecology. Bacterial genetics. Antibiotics and mechanisms of their effects. Bacterial resistance.		

<table>
<tr><td>weekly class schedule (syllabus)</td><td colspan="6">Morphology, physiology and reproduction of yeast and moulds.
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.Hemagglutionation. Hemadsorption.
Bacteriophages and phagotyping. Viral genetics. Viral interference. Tumours. Effects of physical and chemical factors on viruses. Antiviral chemotherapy. Prions and viroids.
Viral diseases diagnostics (laboratory diagnostics).</td></tr>
<tr><td rowspan="2">2.6. 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="3">☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td colspan="6">2.7. Comments:</td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="6"></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>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>Practical work and seminar activities</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></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">1. Class attendance
2. Exercises
3. Seminar
4. Activities at exercises and seminars
5.continuous knowledge checking
6. Final exam

Minimum points are 3 (min 6 hours of class attendance), and maximum are 6 points (max 12 hours of class attendance) for class attendance. Minimum points are 4 (min 20 hours of exercises), and maximum are 6 points (max 30 hours of exercises) for exercises. Minimum points are 4 (min 8 hours of seminar), and maximum are 6 points (max 12 hours of seminar) for seminar .
For exercises and seminar activities maximum points are 10 (35 points out of three grading elements), and minimum are 5 points (min 16 points out of three grading elements): a) prepaired for exercises and seminars and b) succesful experimental work (total 35, coefficient 0.2857). Five point is for succesful preparation for exercises and seminars gained by oral examination. One point is for sucessful exercises, signed in student notebook. Preparation for exercises and seminars is 10 points (total 20), and each succesful experimental work is 1 point (total 15 points for 15 excercises).
Two continuous knowledge checking will be organised at the beginning of the excercises. Each has 10 questions with 1.6 points. In order to gain minimum of 20 points student must give correct answers to minimum 13 questions.
Maximum is 32 points for total questions (20 questions x 1.6 points = 32 points).
Final written exam has 40 questions (1 question = 1 point). A student must give correct answers to 24 questions in order to gain a minimum of 24 points.
Maximum is 40 points

.</td></tr>
</table>

Type of activity	Minimal number of points	Maximal number of points
Attending lectures	3	6
Attending seminars	4	6
Attending exercises	4	6
Participation at seminars and exercises	5	10
Continuous knowledge checking	20	32
Final exam	24	40
Total	60	100

For the final exam student must have minimum of 36 points (attendance and participation at lectures, seminars, exercises and continuous knowledge checking.

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**
Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London.		
Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders.		

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

1.Hajsig, D., F. Delaš (2016): Priručnik za vježbe iz opće mikrobiologije. Sveučilišni priručnik, Hrvatsko mikrobiološko društvo, Zagreb.
2.Naglić, T., D. Hajsig, J. Madić, L. Pinter (2005): Specijalna veterinarska bakteriologija i mikologija.Veterinarski fakultet Sveučilišta u Zagrebu i Hrvatsko mikrobiološko društvo
3.Topolnik, E., T. Naglić, D. Hajsig (1980): Opća mikrobiologija i imunologija. Veterinarski fakultet Zagreb, Zagreb.
4.Materijali s predavanja
5.Mrežne stranice Zavoda za mikrobiologiju i zarazne bolesti s klinikom Veterinarskog fakulteta Sveučilišta u Zagrebu.
6.Kalenić. S., E. Mlinarić-Missoni (1995): Medicinska bakteriologija i mikologija. Zagreb.
7.Presečki, V. et al. (2002): Virologija, Medicinska naklada, Zagreb.
8.Brudnjak, Z. (1987): Medicinska virologija. Jugoslavenska medicinska naklada. Zagreb.

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

Test results, final discussions and anonymous questionnaires in order to get student critical opinion and suggestions for improvement.

2.14. Other (as the proposer wishes to add)

HYGIENE AND HOUSING OF ANIMALS

1. GENERAL INFORMATION			
1.1. Course teacher	Full prof. Kristina Matković	1.6. Year of the study programme	2.
1.2. Name of the course	Hygiene and housing of animals	1.7. Credits (ECTS)	6.0
1.3. Associate teachers	Assoc. prof. Gordana G. Gračner Assist. prof. Mario Ostović Ivana Sabolek, DMV - assistant	1.8. Type of instruction (number of hours L + S + E + e-learning)	29 + 22 + 44
1.4. Study programme (undergraduate, graduate, integrated)	Integrated	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%)	

2. COUSE DESCRIPTION	
2.1. Course objectives	The course will enable the students acquire skills and knowledge qualifying them to ensure appropriate animal housing to prevent the occurrence of unfavourable conditions of housing environment that may compromise animal health, productivity and reproduction. In addition, students will acquire due knowledge about the methods of animal waste disposal to prevent environmental contamination, and on the role of veterinarian in animal care and transportation to prevent stress situations and health disturbance due to inappropriate transfer from one setting to another one, or because of poor animal hygiene. Sanitation plays 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 in preserving animal health as well as in the control of pest insects and rodents in the environment to prevent the spread of disease to humans and animals. The objective of the course is to develop competences qualifying students for preservation of biological balance between the environment and the animal while exhibiting appropriate health state through optimal productivity and reproduction.
2.2. Course enrolment requirements and entry competences required for the course	Completed course «Environment, animal behaviour and welfare».
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)	- describe the impact of the accommodation and housing conditions of certain species and categories of animals on their health, production and reproductive performance; - define 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; - choose ways of animal waste substances disposing for the environmental pollution prevention; - independently verify the microclimatic conditions in certain animal facilities;

	- propose appropriate measures of disinfection and control of harmful insects and rodents in order to preserve the animals and humans health status; - independently conclude about animal welfare on the basis of the production conditions		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	1. Environment and animal health (Environmental factors – biotic and abiotic; Thermocomfortable 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, air flow velocity, dust and airborne micro organisms; Noise and its sources; Lighting; Stable air gas composition; Determination of stable microclimate conditions); 4. Heat balance in stables (Definition; Heat generated by animals; Heat lost through exposed surfaces – coefficient of heat flow; Heat needed for warming up fresh air); 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 barns); 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 keeping (Keeping of gilts, nongravid, gravid 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, partridge; Species specific egg incubation); 11. Hygiene of pet housing and accommodation (Accommodation and housing of dogs and cats; Hygiene of housing other pet species – hamsters, 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. Prophylaxis of diseases of the young (Environmental diseases of the foals, calves, lambs, kids, piglets and poultry; Ecologic factors and their alteration as the cause of disease of the young; Prophylactic measures in the prevention of diseases of the young); 14. Animal faecal substance (Solid and liquid manure; Processing, hygienization, composting; Biogas – distribution and environmental effects); 15. Animal waste disposal (Procedures for carcasses and offals: utilization facilities, grave pits, cattle graveyards, incinerating plants); 16. Animal transportation (Specificities of animal transportation by particular transportation facilities in domestic and international transport; Losses and damages during transportation); 17. Heard health in context of housing hygiene and animal wefare; 18. Disinfection in veterinary practice (Types and methods of disinfection; Action and chemical composition of disinfectants; Applied disinfection – drinking water, wastewater, housing, 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 cattle breeding (Bioecologic characteristics of pest insects in cattle breeding and public health; Control methods; Insecticides); 20. Control of pest rodents in veterinary practice and cattle breeding (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.		
2.6. 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)	2.7. Comments:

2.8. Student responsibilities						
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	1,08	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 sati lectures + 1 point (IV semester) 1/0,15 = 7 hours of lectures	**6** 4 points (III semester) 4/16 = 0,25 (coefficient for presence on 1 hour 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)	**4** (IV semester) 4/0,27 = 15 hours of seminars	(IV semester) 6/22 = 0,27 (coefficient for presence on 1 hour of seminars)
Presence at exercises 44 hours: 24 (III semester) + 20 (IV semester)	**4** 2 points (III semester) 2/0,125 = 16 hours of exercises + 2 points (IV semester) 2/0,15 = 13 sati of exercises	**6** 3 points (III semester) 3/24 = 0,125 (coefficient for presence on 1 hour of exercises) + 3 points (IV semester) 3/20 = 0,15 (coefficient for presence on 1 hour of exercises)
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 assesment 32 points[2] : 16 (III semester) + 16 (IV semester)	**20** 10 points (III semester) 10/1 = 10 + 10 points (IV semester) 10/1 = 10	**32** 16 points (III semester) 16/16 = 1 + 16 points (IV semester) 16/16 = 1
Final exam (40 points[3])	**24** 24/1 = 24 (coefficient 1) (minimaly student must collest 24 points to achive 24 minimum points)	**40** 40/40 = 1 (coefficient 1)

	Ukupno	**60**	**100**
	[1] – assesment of practical exams (III semester, 2 points) – two positive answer during exercises (each answer one point) and producing of seminar work during semester (IV semester – 2 points, if in power point additional 2); 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 / 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)	Grandin, T. (2000): Livestock Handling and Transport (2nd Edition). CABI Publishing, London, UK.		online
	Younie, D., J.M. Wilkinson (2001): Organic Livestock farming. Chalcombe Publications.	1	
	Aland, A., F. Madec (2010): Sustainable animal production. Wageningen Academic Publishers, NL.	2	
	Aland, A., T. Banhazi (2013): Livestock housing. Wageningen Academic Publishers, NL.		online
2.12. Optional literature (at the time of submission of study programme proposal)			
2.13. Quality assurance methods that ensure the acquisition of exit competences	Student questionnaire		
2.14. Other (as the proposer wishes to add)			

INTRODUCTION TO ENGLISH VETERINARY MEDICAL TERMINOLOGY II

1. GENERAL INFORMATION			
1.1. Course teacher	Dubravka Vilke-Pinter, Ph.D.	1.6. Year of the study programme	2
1.2. Name of the course	Introduction to English Veterinary Medical Terminology II	1.7. Credits (ECTS)	1
1.3. Associate teachers		1.8. Type of instruction (number of hours L + S + E + e-learning)	5 hours S + 10 hours E (tutorials)
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate	1.9. Expected enrolment in the course	25
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%)	
2. COUSE DESCRIPTION			
2.1. 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, 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 progress in both written and oral language skills.		
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	By developing students' skills to use technical vocabulary specific for the field of veterinary medicine and through the process of developing their academic ***reading*** skills the course aims to develop students' abilities to use relevant literature in the field of veterinary medicine which the students will need both during their academic studies and also during the process of life-long learning throughout their professional careers.		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	student will/wil be able to: effectively recognise a number of technical and scientific terms used in various fields of veterinary medicine explain principles of word formation in scientific veterinary medical English independently use a number of scientific terms in a given context understand structure of scientific text and and recognise various types of cohesive means actively use some cohesive devices in a text to achieve text cohesion increase scope of general verbal understanding		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	1st methodical unit: Analysis and usage of professional terminology in technical and academic texts. Usage of cohesive devices that create coherence in technical and academic texts. Topic: Organs and organ systems. 2nd methodical unit. Classifications. Topics: Species diversity; Taxonomic classifications. 3rd methodical unit: Graphical presentation of data. Topic: Ecology and endangered species. 4th methodical unit: Physical description. Skeletal system. Basic terms in genetics. 5th methodical unit. Description of processes and of sequences of events. Digestive system of ruminants. Developmental cycles in some animal		

	species. 6th methodical unit. Cause-and effect relations. Topic: Etiology and pathogenesis of diseases. Analysis of technical terms. 7th methodical unit. Contrasting and comparing. Topic: Cattle breeds.		
2.6 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	2.7. Comments:
2.8. Student responsibilities			

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	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	class attendance class participation continual assessment final exam		
Class attendance	15 hourly classes	Minimum number of points	Maximum number of points
		11 coefficient = 18/15 = 1,2 Students must attend at least 9 out of 15 hourly classes (3 hours S and 6 hours E) to achieve minimum number of points	18
Class participation		5 coefficient 10/15 = 0,66 Students must earn at least 5 points out of maximum 10 by performing in-class assignements	10
Continual assessment		20 Students take a mIdterm test Minimum passing score on the test is 20 points	32
Final exam		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. (2018). Introduction to English Veterinary Medical Terminology (Part 2) - reading materials for internal use at the Veterinary faculty - each student receives his/her individual copy of the materials	3	
2.12. Optional literature (at the time of submission of study programme proposal)	Cochran P. (1991). Student's guide to Veterinary Medical Terminology. St. Louis, Mosby. Cox, K. & Hill, D. (2007). Preliminary English for Academic Purposes. Longman. McBride, D.E. (2002). Learning Veterinary Terminology. Mosby. McCarthy, M & O'Dell, F. (2008). Academic Vocabulary in Use. Vocabulary Reference and Practice. Self-study and Classroom Use. Cambridge: CUP. McCormack, J. (2005). English for Academic Study. Garnet Publishing Ltd. Garnet Education. ***Porter***. ***D*** & C Black (2007).Check your Vocabulary for Academic English. A & C Black Publishers Ltd.		
2.13. Quality assurance methods that ensure the acquisition of exit competences	Continual asssesment during classes: written and oral asignements,in-class writing activities, homework		
2.14. Other (as the proposer wishes to add)			

MOLECULAR BIOLOGY AND GENOMICS IN VETERINARY MEDICINE

1. GENERAL INFORMATION			
1.1. Course teacher	Full prof. dr. sc. Maja Popović, PhD	1.6. Year of the study programme	2nd
1.2. Name of the course	**Molecular biology and genomics in veterinary medicine**	1.7. Credits (ECTS)	3,5
1.3. Associate teachers	Prof. Josip Kusak,PhD; Full prof. Ksenija Vlahović, PhD; Prof. Tomislav Gomerčić, PhD; Assistant prof. Daniel Špoljarić, PhD;	1.8. Type of instruction (number of hours L + S + E + e-learning)	5+10+30
1.4. Study programme (undergraduate, graduate, integrated)	integrated	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%)	10%
2. COUSE DESCRIPTION			
2.1. 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. To enroll in the course Molecular biology and genomics in veterinary medicine students must first undergo the following: Zoology, Botany in Veterinary Medicine, Medical Chemistry, Biochemistry in Veterinary Medicine.		
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	1. Recognition and understanding of contemporary aspects of cytology, molecular biology and genetics in veterinary medicine, public health and forensic. 2. Understanding of basic principles of molecular research of animal cells and tissues.		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. Understanding of molecular processes of replication, transcription and translation of animal information macromolecules. 2. Understanding 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. 3. Understanding genetic disorders of animals of interest for veterinary medicine.		

	4. Selecting molecular-genetic method for preventive, diagnostic and therapy of ill animal.
2.5. 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; 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); 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 –

<table>
<tr><td></td><td colspan="6">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).</td></tr>
<tr><td>2.6. 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>2.7. Comments:</td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="6">Attending lectures, seminar and lab exercises. Preparing for lab from materials on LMS. Preparing, presenting and defending one seminar.</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>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>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">During the session of the “Molecular biology and genomic” course a 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 the “Molecular biology and genomic” course a 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 20 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 seven preliminary exams will be organized at the time of exercises. Each preliminary exam consists of 5 questions or problems. Each correctly solved problem or answered question is worth 1 point. 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</td></tr>
</table>

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 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.

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**
..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.		

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

2. Johnson G.B.: The living world. McGraww Hill, Boston, New York, London, 2000.

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

Continuous oral and written checking of acquired knowledge

2.14. Other (as the proposer wishes to add)

PHYSICAL EDUCATION

1. GENERAL INFORMATION			
1.1. Course teacher	Saša Čuić, B.A. – Senior Lecturer	1.6. Year of the study programme	Second year
1.2. Name of the course	**Physical Education**	1.7. Credits (ECTS)	1
1.3. Associate teachers		1.8. Type of instruction (number of hours L + S + E + e-learning)	30 hours per semester of practical work
1.4. Study programme (undergraduate, graduate, integrated)	Integrated	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%)	

2. COUSE DESCRIPTION			
2.1. Course objectives	Physical education should become an integral and vital part of the University and should encourage free expression in sports of all its members, both students and teachers. This subject also helps students to perform better and with greater efficacy in their studies.		
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	Possibility changes morphological characteristics, motor and functional abilities; training students for independent physical exercises; laws of medical culture; qualitiy nutrition.		
2.4. 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		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	Swimming, basketball, football, volleyball, handball, dances, aerobics, badminton, skating, skiing, squash, sports on the water (sailing, paddle), riding.		
2.6. 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)	2.7. Comments:
2.8. 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.		

<table>
<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>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="6">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="4">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="4">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>
<tr><td>2.12. Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">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.</td></tr>
<tr><td>2.13. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">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.</td></tr>
<tr><td>2.14. Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

PHYSIOLOGY OF DOMESTIC ANIMALS I

1. GENERAL INFORMATION			
1.1. Course teacher	Miljenko Šimpraga, PhD, full professor	1.6. Year of the study programme	II.
1.2. Name of the course	**Physiology of Domestic Animals I**	1.7. Credits (ECTS)	6
1.3. Associate teachers	Suzana Milinković Tur, PhD, full professor; Jasna Aladrović, PhD, associate professor; Ana Shek-Vugrovečki, PhD, assistant professor; Ivona Žura Žaja, PhD, assistant professor; Lana Vranković, PhD; Jadranka Pejaković Hlede, DVM	1.8. Type of instruction (number of hours L + S + E + e-learning)	30+0+50
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%)	.....
2. COUSE DESCRIPTION			
2.1. 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.		
2.2. 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 d) Histology and General Embryology		
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)	After successfully mastering the course students will be able to: 1) **describe** the basic principles and the facts of the physiological processes from the cell to the whole organism, 2) **explain** the physiological functions of the blood, nervous and muscular system and hormones, 3) **recognize** the importance of maintaining continuous function of blood, nerve and muscle tissue, 4) **connect** the regulatory mechanisms maintain homeostasis and acid-base balance; 5) **use the skills** of obtaining and analyzing whole blood, plasma, and serum 6) **to evaluate** whether the obtained values are within		

<table>
<tr><td></td><td colspan="6">physiological limits for certain species of domestic animals, and 7) to conclude how blood tests can indicate certain pathological changes or certain disease stages</td></tr>
<tr><td>2.5. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">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): 3. 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.</td></tr>
<tr><td>2.6. 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
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>2.7. Comments:</td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="6">Lectures: 1) Introduction, body fluids - 2 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 - 3 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">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>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 colspan="2">(other)</td></tr>
<tr><td>Tests</td><td>1</td><td>Oral exam</td><td>3.5</td><td colspan="2">(other)</td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td colspan="2">(other)</td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">1. lectures attending: During semester a student must attend 15 lecture lessons in order 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 in order 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 gained ones. If the student makes up for the unattended lessons in further tries the points do not count.</td></tr>
</table>

<table>
<tr><td></td><td colspan="3">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 tasks and receive teacher's signature for the completed assignments. Each neatly done and signed task is worth 0.3 points. 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 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 „Physiology of domestic animals I” course two tests will be organized. The first test comprises general physiology and blood physiology, and the second one comprises muscle and nervous systems physiology. At each test a student must earn minimal 10 points in order to gain 20 points. The maximum number of points from this evaluation element is 32 points. In case a student does not gain the required point during the course he/she has the right to take three times the makeup preliminary exam, which will be organized.
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 gained number of points at the final exam is 40 points. Regardless the gained number of points from the first four evaluation elements, the student must show minimal knowledge at the final exam in order to earn minimal 24 points. In case the student does not satisfy at 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>Cunningham, J. G.: Textbook of veterinary physiology. 3nd edition, W. B. Saunders Company, 2002.</td><td>1</td><td></td></tr>
<tr><td>Dukes’ physiology of domestic animals (William O. Reece, Ed.). The 12th ed. Cornell University Press. Ithaca and London, 2004.</td><td>1</td><td></td></tr>
<tr><td>Sjaastad Ø. V., O. Sand, K. Hove: Physiology of Domestic Animals. The 12nd ed. Scandinavian veterinary press, 2010.</td><td>2</td><td></td></tr>
<tr><td>2.12. Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">Feldman, B. F.,J. G. Zinkl, N. C. Jain: Schalm´s Veterinary Hematology. 5th ed. Lippincott Williams&Wilkins, 2000.
Kaneko, J. J., J. W. Harvey, M. L. Bruss: Clinical Biochemistry of Domestic Animals. Academic Press. San Diego, at all, 1987.
Payne, J. M., S. Payne: The Metabolic Profile Test. Oxford University Press. Oxford, New York, Tokyo, 1987.
Schmidt-Nielsen, K.: Animal Physiology. Adaptation and Environment. Cambridge University Press, 1997.
Sturkie, P. D.: Avian Physiology. Springer Verlag. New York, Berlin, Heidelberg, Tokyo, 2000.</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			
1.1. Course teacher	Miljenko Šimpraga, PhD, full professor	1.6. Year of the study programme	II.
1.2. Name of the course	**Physiology of Domestic Animals II**	1.7. Credits (ECTS)	10
1.3. Associate teachers	Suzana Milinković Tur, PhD, full professor; Jasna Aladrović, PhD, associate professor; Ana Shek-Vugrovečki, PhD, assistant professor; Ivona Žura Žaja, PhD, assistant professor; Lana Vranković, PhD; Jadranka Pejaković Hlede, DVM	1.8. Type of instruction (number of hours L + S + E + e-learning)	45+25+60
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%)	.....
2. COUSE DESCRIPTION			
2.1. Course 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.		
2.2. Course enrolment requirements and entry competences required for the course	**Enrolment requirements:** completed course **Physiology of domestic animals I** **Entry competences:** - acquired knowledge and skills in **Physiology of domestic animals I**		
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)	After successfully mastering the course students will be able to: **1. describe** physiology of heart and cardiovascular system, respiration, digestion in monogastric animals and ruminants, excretion, the metabolism of nutrients, minerals and vitamins, physiological processes of oviposition, lactation and thermoregulation; **2. associate** regulatory mechanisms of specific body systems**; 3. interpret** functions of different body systems during different physiological conditions; 4. prepare biological samples for various laboratory analyses; **5. know** the concept of modern diagnostic tools and machines		

	(haematological and biochemical analyser, spirometry, ECG, EMG, EEG); **6. analyse** and interpret the results of laboratory tests
2.5. Course 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).

2.6. 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 ☐ work with mentor ☐ (other)	2.7. Comments:
2.8. Student responsibilities			

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	**1,8**	Research		Practical training	
	Experimental work		Report		Seminars	
	Essay		Seminar essay		conversation	
	Tests	**3,2**	Oral exam	4	Activity	1
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	Evaluation elements : 1) lectures attending, 2) participation during seminars, 3) lab exercises attending; 4) exercise and seminars attending; 5) continuous assessment; 6) final exam **lectures attending:** During semester a student must attend 23 lecture lessons in order to gain minimum of 3 points. The maximum points from this evaluation element is 6. **seminars attending**: During the course the student must attend 18 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. **lab exercises attending:** During the course the student must be present at the 42 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. **activity on lab exercises and seminars:** During 25 hours of seminars and 60 hours of lab exercises, the student must complete the tasks to get the signature of teachers. For each neatly competed and signed task of the exercise will be scored with 0.177 points. During the course, a student can achieve total of 3 points. For successful presentation of two seminars, student will get 2 points per seminar, a total of 4 point. For six positive responses on exercise, a student obtains an additional 3 points. During the seminars and exercises the students must achieve a minimum of 5 points and a maximum of 10 points can be achieved

<table>
<tr><td></td><td colspan="3">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.
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>
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Kaneko, J. J., J. W. Harvey, M. L. Bruss: Clinical Biochemistry of Domestic Animals. Academic Press. San Diego, Boston, New York, Sydney, Tokyo, 1987.

Payne, J. M., S. Payne: The Metabolic Profile Test. Oxford University Press. Oxford, New York, Tokyo, 1987.

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<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>

VETERINARY IMMUNOLOGY

1. GENERAL INFORMATION			
1.1. Course teacher	Full Prof. Nevenka Rudan	1.6. Year of the study programme	II.
1.2. Name of the course	**Veterinary Immunology**	1.7. Credits (ECTS)	2.5
1.3. Associate teachers	Full Prof. Ljiljana Pinter, Luka Radmanić, DVM	1.8. Type of instruction (number of hours L + S + E + e-learning)	15 + 0 + 15 + 0
1.4. Study programme (undergraduate, graduate, integrated)	integrated	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%)	-
2. COURSE DESCRIPTION			
2.1. 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, infectional 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.		
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	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.		
2.4. 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.		

2.5. 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. Complement system; Cells and Tissues of the Immune System (2 hours lectures) 4. The Major Histocompatibility Complex; Antigen Presentation and Cytokines (2 hours lectures) 5. The Biology of T Lymphocytes; The Biology of B Lymphocytes (2 hours lectures) 6. Hypersensitivity Mechanisms (2 hours lectures) 7. Vaccination (2 hours lectures) 8. Immunotolerance (1 hour lecture) 1. Antigen, antibody (2 hours excecises) 2. Paired sera, titer (2 hours exercises) 3. Agglutination, precipitation (2 hours excecises) 4. Preliminary exam; immunofluorescence (2 hours exercises) 5. ELISA, Complement-fixation test (2 hours exercises) 6. Hemagluttination-inhibition assay (2 hours exercises) 7. Virus neutralization test (2 hours exercises) 8. Preliminary exam; vaccination (1 hour exercises)

2.6. Format of instruction:			2.7. 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)	

2.8. Student responsibilities	

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	0.45	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	
2.12. 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.		
2.13. Quality assurance methods that ensure the acquisition of exit competences	Continous checking via disscusion plus two written preliminary exams.		
2.14. 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			
1.1. Course teacher	Ivana Kiš, associate. professor	1.6. Year of the study programme	III
1.2. Name of the course	**Clinical Propedeutics**	1.7. Credits (ECTS)	8
1.3. Associate teachers	prof. Vesna Matijatko PhD, prof. Nikša Lemo PhD , prof. Damjan Gračner PhD, assoc. prof. Ivana Kiš PhD, ass. prof. Mirna Brkljačić PhD, ass. prof. Marin Torti PhD, ass. prof. Martina Crnogaj PhD, PhD Iva Šmit, DVM, PhD Jelena Selanec DVM, PhD, Ines Spaijić DVM, Filip Kajin DVM, Jurica Tršan DVM	1.8. Type of instruction (number of hours L + S + E + e-learning)	L 45 + E 60
Study programme (undergraduate, graduate, integrated)	integrated	1.9. Expected enrolment in the course	6 students
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%)	There are no online lectures.
2. COUSE DESCRIPTION			
2.1. Course objectives	Preparation of domestic animals and little carnivores for clinical exam, recognition of internal diseases symptoms using inspection, palpation, percussion and auscultation, sense of smell and measuring (changes of body weight, retarded growth, weakness and syncope, anorexia and polyphagia, changes of behaviour, pain, hypothermia and hyperthermia, cough, dyspnoea, ascites, peritonitis and other causes of abdominal distention, cardiopulmonary arrest, sneezing and nasal discharge, abnormal heart sounds and heart murmurs, EKG, changed pulse qualities, oedema, liquidothorax, vomiting, regurgitation and dysphagia, diarrhoea, constipation, tenesmi, incontinence, melanea, haematochesia, ptyalism, joint effusion, lameness, tremor, ataxia, paresis, paralysis, stupor and coma, epileptiform seizures, polyuria, polydipsia, incontinence, enuresis, dyisuria, urinary tract obstruction, urinalysis, vaginal and preputial discharge, anaemia, cyanosis, jaundice, skin changes (alopecia, pruritus, lumps), lymphadenopathies, performing of clinical lab studies of animals according to body systems, intubation, catheterization, venepuncture, rectal examination, therapy preparation for application and i/m, s/c, i/v application, infusion therapy.		
2.2. Course enrolment requirements and entry competences required for the course	Anatomy of domestic animals I, II and III, Histology and embriology		
2.3. 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 and neurological examination in a safe manner. The knowledge obtained during clinical propedeutics shall be the basis for all other clinical subjects. Internal diseases, Diseases and treatment of dogs and cats II, Herd medicine, Equine diseases).		
2.4. Learning outcomes expected at the level of the	1.Students shall be able to take adequate disease history. 2. Students will be able to make clinical examination 3. Students will have adequate knowledge for basic differential diagnostics of most common clinical problems.		

<table>
<tr><td>course (4 to 10 learning outcomes)</td><td colspan="6">4. Students shall be able to perform additional clinical examinations (depending of the organ system involved).
5. Students will be able to decide which advanced additional clinical methods of examination should be employed and be able to partly conduct those methods, eg. blood analysis).</td></tr>
<tr><td>2.5. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Introduction to clinical propedeutics, methods of clinical examination, examination of digestive tract of domestic animals, examination of circulation, examination of respiratory system, examination of urinary system, examination of neurologic system, examination of skin, application of medicines.</td></tr>
<tr><td rowspan="2">2.6. 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 colspan="3">2.7. Comments:</td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="6"></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>1,44</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>0,8</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td colspan="2">(other)</td></tr>
<tr><td>Tests</td><td>2,56</td><td>Oral exam</td><td>3,2</td><td colspan="2">(other)</td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td colspan="2">(other)</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="3">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">Radostits, O., Mayhew, I., Houston, D. (2001): Veterinary clinical examination and diagnosis. Saunders, Philadelphia.</td><td></td><td></td></tr>
<tr><td colspan="4">Rijnberk, A., van Sluijs, F. J.(2009): Medical history and physical examination in companion animals. Saunders Elsevier, Houten</td><td></td><td></td></tr>
<tr><td>2.12. Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">Bexfield, N., Lee, K. (2010): BSAVA Guide to procedures in small animal practice. BSAVA, Quedgeley.
Rockett, J., Bosted, S. (2016): Veterinary clinical procedures in large animal practice. Cengage Learning, Boston.
Speirs, V. E., Wrigley, R. H. (1997): Clinical examination of horses. Saunders, Pennsylvania.
Jackson, P. G. G., P. D. Cockroft (2002): Clinical examination of farm animals. Blackwell, Oxford.
Aspinall, V., Aspinall, R. (2013): Clinical procedures in small animal veterinary practice. Saunders Elsevier, Edinburgh.
Costa, L. R. R., Paradis, M. R. (2018): Clinical procedures in the horse. Willey Blackwell, New Delhi.
Englar, R. E. (2017): Performing the small animal physical examination. Willey Blackwell, New York.</td></tr>
</table>

<table>
<tr><td>2.13. 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</td><td>23 lectures: 3 points (coefficient 0,133)</td><td>45 lectures: 6 points (coefficient 0,133)</td></tr>
<tr><td>Exercise attendance Student has to be present minimally at 67% of exercises</td><td>42 hours: 8 points (coefficient 0,2)</td><td>60 hours: 12 points (coefficient 0,2)</td></tr>
<tr><td>Activity at exercises 60 hours of exercises, each student is graded according to his/hers activity</td><td>5 (coefficient 0,1667)</td><td>10 (coefficient 0,1667)</td></tr>
<tr><td>Continuous monitoring of knowledge</td><td></td><td></td></tr>
<tr><td>Colloquium Consists of 5 questions, for each question student can obtain minimally 4, and maximally 6,4 points</td><td>20</td><td>32</td></tr>
<tr><td>Oral exam</td><td>Student can apply for final exam if he/she has obtained totally at least 36 points</td><td></td></tr>
<tr><td>Final (oral) exam consists of 6 questions For each question student can minimally obtain 4, and maximally 6,4 points</td><td>24</td><td>40</td></tr>
<tr><td>Total points for determining the grade of each student</td><td>Points
up to 59
60 - 76
77 - 84
85 - 92
93 - 100</td><td>Grade
1
2
3
4
5</td></tr>
</table>
</td></tr>
<tr><td>2.14. Other (as the proposer wishes to add)</td><td></td></tr>
</table>

COMMUNICATION SKILLS IN VETERINARY MEDICINE

1. COURSE DECRIPTION – GENERAL INFORMATION			
1.1. Course teacher	Danijel Labaš, Ph.D., associate professor	1.6. Year of the study	3rd
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+E6+6e-learning
1.4. Study programme (undergraduate, graduate, integrated)	integrated	1.9. Expected enrolment in the course	
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	
2.1. 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.
2.2. Enrolment requirements and/or entry competences required for the course	Enrolled integrated study.
2.3. 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.
2.4. Expected learning outcomes at	Students will be able to: analyze and compare various types of communication;

the level of the course (3-10 learning outcomes)	correctly interpret the underlying concepts - intrapersonal, interpersonal, verbal, nonverbal, social and media communication; argue the importance of knowing the communication dynamics and challenges of communication in veterinary; to describe the role of verbal and non-verbal communication in everyday and business life and prepare to talk about giving diagnosis and therapy; analyze and interpret the verbal and non-verbal communication of their interlocutors; use the acquired knowledge about the relationship of interpersonal communication and communication in the business environment; to evaluate the quality of interpersonal communication; analyze and compare communication relationships in dialogue and persuasion in discussing the prognosis of treatment and risk communication; critically analyze and adopt the process of active listening in interpersonal diagnostic communication; 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; critical approach to establishing communication with the public and the media and analyzing crisis communication strategies.
2.5. Course content (syllabus)	
2.6. 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)
2.7. Comments:	
2.8. Student responsibilities	

2.9. 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	

2.11. 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.		
2.12. 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			
1.1. Course teacher	Associate Professor Andrea Gudan Kurilj, DVM, PhD,DECVP	1.6. Year of the study programme	3rd
1.2. Name of the course	**General veterinary pathology**	1.7. Credits (ECTS)	7
1.3. Associate teachers	Professor Željko Grabarević DVM, PhD; Associate professor Marko Hohšteter, DVM, PhD; Assistant professor Ivan-Conrado Šoštarić-Zuckermann, DVM, PhD; Doroteja Huber, DVM, PhD; Lidija Medven Zagradišnik, DVM; Ivana Mihoković, DVM.	1.8. Type of instruction (number of hours L + S + E + e-learning)	30+60+0+0
1.4. Study programme (undergraduate, graduate, integrated)	Integrated	1.9. Expected enrolment in the course	
1.5. Status of the course	Active	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	Students gain knowledge on basic pathology including general aetiology, circulatory disturbances, cell injury and cell death, discyclia, accommodation processes and hypoxia, organisation processes and healing, inflammation and reparation, tumours and hereditary anomalies. Students learn some basic methods used in modern pathology, like autopsy and taking materials for additional laboratory research, especially emphasising pathohistological research.		
2.2. 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.		
2.3. Learning outcomes at the level of the programme to which the course contributes	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.		
2.4. 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 recognise 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		

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

LECTURES:

Methodological unit	Contents	No. of hours
Introduction and general aethiology	Introduction and general aethiology	1 hr
Circulatory disturbances	General circulatory disturbances and haemostasis	1 hr
Circulatory disturbances	Haemostasis; oedema, hyperaemia, haemorrhages	2 hrs
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 accumulations); pathological calcification, heterotopic bone, pigments	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 changes	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:

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

2.6. Format of instruction:			2.7. Comments:
	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)	

<table>
<tr><td>2.8. Student responsibilities</td><td colspan="6"></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>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>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 NUBMER OF POINTS</th></tr>
<tr><td>Attending lectures</td><td>3</td><td>6</td></tr>
<tr><td>The total of 30 lecture hours</td><td>(each particular lecture hour is summed as 0,2 point)</td><td></td></tr>
<tr><td></td><td>A student must attend minimal 15 lecture hours in order to gain 3 minimal points;</td><td></td></tr>
<tr><td>Attending practicals</td><td>8</td><td>12</td></tr>
<tr><td>Total of 60 exercise hours</td><td>A student must attend minimal 42 exercise hours in order to gain 8 minimal points;</td><td></td></tr>
<tr><td>Participation at practicals</td><td>5</td><td>10</td></tr>
<tr><td></td><td>Every student has the opportunity to carry out two autopsies, success at each is awarded with 0 to 5 points. (0 points= autopsy not carried out; 1 point= autopsy carried out, but insufficient knowledge of theory and technique; 2 points= autopsy carried out, but insufficient knowledge of theory; 3 points= autopsy carried out, good knowledge of theory and technique; 4 points= autopsy carried out, very good knowledge of theory and technique; 5 points= autopsy carried out, excellent knowledge of theory and technique). The range of 5 to 10 points student achieves by combining ie. adding two values earned by autopsies. (eg. student carried out one autopsy at which he/she demonstrated good knowledge of theory and technique [3 points] and another one at which he/she demonstrated excellent knowledge of theory and technique [5 points], that way the student achieves 8 points from participation at exercises).</td><td></td></tr>
</table>
</td></tr>
</table>

Continuous knowledge checking	**20** (Written preliminary exam from General pathology chapter "Inflammation" 10 points; Practical partial exam from autopsy 10 points)	**32** (Written preliminary exam from General pathology chapters "Inflammation" 16 points; Practical partial exam from autopsy 16 points)
	Written preliminary exam from General pathology chapters "Inflammation", is made out of 32 questions, each point score from the written preliminary exam is awarded with 0,5 point. **Practical partial exam from autopsy** is conducted by examining practical and theoretical knowledge of autopsy (0-9 points= student didn't demonstrate sufficient knowledge; 10 points= student demonstrated minimal knowledge; 11 points= student demonstrated sufficient knowledge; 12 points= student demonstrated satisfying knowledge; 13 points= student demonstrated good knowledge; 14 points= student demonstrated above average good knowledge; 15 points= student demonstrated very good knowledge; 16 points= student demonstrated excellent knowledge).	
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:
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 minimum of 36 points. The final exam consists of a written and oral part. The written part of the exam will be in essay form. It will last 60 minutes and will consist of 8 questions. Each question will be scored with a maximum of 5 points. A minimum of 24 points is required for the passage in 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. After scoring a written part of the exam, students who achieve a minimum of 24 points can access the oral exam. Students who did not achieve the minimum score (24 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 will be on the same principe 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 corresponding to questions from the written and oral part of the exam. The maximum amount of points in final exam is 40.

<table>
<tr><td></td><td>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.
<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>V. Kumar, Abul K. Abbas, N. Fausto: Robbins and Cotran Pathologic Basis of Disease, 9th. Elsevier Saunders, Philadelphia, 2015.</td><td></td><td></td></tr>
<tr><td>J. F. Zachary: Pathologic Basis of Disease, 6th edition, Elsevier, Philadelphia, 2017.</td><td>5</td><td></td></tr>
<tr><td>D. O. Slauson, Cooper, B. J.: Mechanisms of Disease. 3th edition, Mosby, St. Louis, 2002.</td><td></td><td></td></tr>
</table></td></tr>
<tr><td>2.12. Optional literature (at the time of submission of study programme proposal)</td><td>Grabarević, Željko i Sabočanec, Ruža (ur.): Osnove razudbe domaćih životinja. Medicinska naklada, Zagreb, 2016.
Notes and presentations provided by lecturers.</td></tr>
<tr><td>2.13. Quality assurance methods that ensure the acquisition of exit competences</td><td></td></tr>
<tr><td>2.14. Other (as the proposer wishes to add)</td><td></td></tr>
</table>

PARASITOLOGY AND PARASITIC DISEASES

1. GENERAL INFORMATION			
1.1. Course teacher	Full Prof.Albert Marinculić	1.6. Year of the study programme	third
1.2. Name of the course	Parasitology and Parasitic Diseases	1.7. Credits (ECTS)	7
1.3. Associate teachers	Assistant Lecturer Franjo Martinković	1.8. Type of instruction (number of hours L + S + E + e-learning)	30+0+60+0
1.4. Study programme (undergraduate, graduate, integrated)	integrated	1.9. Expected enrolment in the course	
1.5. Status of the course		1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	Level1, 10%

2. COUSE DESCRIPTION	
2.1. Course objectives	This course aims to provide core training in the theoretical and practical aspects of veterinary parasitology, covering the protozoan and metazoan parasites of animals and the vectors which transmit them, and equip students with specialised skills to enable them to pursue a career as a veterinary proffesional.
2.2. Course enrolment requirements and entry competences required for the course	Regular knowledge achieved throughout the veterinary study.
2.3. 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, pathogenesis, and diagnosis of parasitic infections in animals and their relevance for human health and control detailed knowledge and understanding of the biology and strategies for control of animal parasites carry out practical laboratory identification of parasite stages specialised skills in: advanced diagnostic, chemotherapeutic, ecological and/or control aspects of the subject
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Understanding of biology and ecology of parasites and vectors of medical and veterinary medical importance, distinguishing and recognising of particular parasite groups as well as individual parasites and their development stages inside a group understanding of particular parasitic diseases spreading ways understanding of pathogenesis caused by parasites or their development stages improving of diagnostic skills and abilities in taking, preparing and searching of parasite samples, diagnosing and identification of parasites or their development stages, knowledge n treatment and prevention of particular parasitic diseases understanding of modern trends in veterinary parasitology.
2.5. 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

<table>
<tr><td></td><td colspan="6">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, Trichuridae, Capillaridae
11th week Trichinellidae, Dictyocaulidae, Metastrongylidae, Protostrongylidae
12th week Filariata, Spirurata, Arthropoda –Introduction, Acari, Ixodidae, Argasidae
13th week Sarcoptidae, Psoroptidae, Demodicidae, Cheyletiidae, Trombicidae
14th week Insecta –Introduction,Malophaga, Anoplura, Siphonaptera, Tabanidae, Muscidae Calliphoridae, Sarcophagidae
15th 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
9th 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</td></tr>
<tr><td>2.6. Format of instruction:</td><td colspan="2">x☐ lectures
☐ 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
x☐ laboratory
☐ work with mentor
☐ (other)</td><td>2.7. Comments:</td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="6">During the Course a student must attend 15 lecture lessons. During the Exercise Session a student must attend 42 (out of 60) exercise lessons, i.e. 21 programmes out of 30 programmes. During the exercise session a student must solve the given problems from 60 exercise lessons, i.e. from 30 programmes, and get a lecturer’s signature for the solved exercises. During the course session there will be 4 knowledge assessments with 20 questions. At the final exam a student answers the questions orally.</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>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 (other)</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></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"></td></tr>
</table>

	Title	Number of copies in the department library	Availability via other media
2.11. Required literature (available in the library and via other media)	Veterinary Clinical Parasitology, A. Zajac,G. Conboy,2012.	1	
	Essentials of Veterinary Parasitology, H.M. Eisheikha,N.A.Khan,2011	1	
	Focus on Small Animal Parasitology, M. Fisher, J. MacGarry,2006	1	
2.12. Optional literature (at the time of submission of study programme proposal)	Laboratory Procedures, 2002. 4th edition C. M. Hendrix, Small animal clinical diagnosis by laboratory methods, Willard – Tvedten, 2004., 4.th edition		
2.13. 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.		
2.14. Other (as the proposer wishes to add)			

PATHOPHYSIOLOGY I

1. GENERAL INFORMATION			
1.1. Course teacher	Prof. Mirna Robić	1.6. Year of the study programme	third
1.2. Name of the course	**Pathophysiology I**	1.7. Credits (ECTS)	2,5
1.3. Associate teachers	Prof. Nina Poljičak-Milas, Assoc. Prof. Romana Turk, Assoc. Prof. Maja Belić	1.8. Type of instruction (number of hours L + S + E + e-learning)	11+4+10
1.4. Study programme (undergraduate, graduate, integrated)	Integrated graduate and postgraduate study	1.9. Expected enrolment in the course	
1.5. Status of the course	compulsatoryi	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
2.1. 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.		
2.2. Course enrolment requirements and entry competences required for the course	Succesfully passed all the exams of I.st year of study and participation in lectures and excercises in Physiology of domestic animals I and II		
2.3. 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 bioactive substances and their role in pathophysiolgy, describe disturbances in neural system function, master biological samples handling, determine serum protein, glucose and lipid concentrations and interprete the results		
2.4. 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, -describe bioactive substances and their role in pathophysiolgy, -describe disturbances in neural system function, -master biological samples handling, -determine serum protein, glucose and lipid concentrations and interprete the results		
2.5. 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 and sepsis, 2 hours disturbances in adrenal gland function 2 hours disturbances in pituitary gland function,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 hidrosolubile and liposolubile vitamines and minerales metabolism 2 hours,, Exercises: Absorption photometry 2 hours, Changes in protein concentration in serum, 2 hours, Diagnostic importance of acute phase proteins, 2 hours, disturbances in glucose metabolism 2 hours.		

2.6. Format of instruction:	x lectures Xseminars and workshops X exercises ☐ on line in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	2.7. Comments:

2.8. Student responsibilities						
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	0,45	Research		Practical training	
	Experimental work		Report		**Active participation in excercises**	**0.25**
	Essay		Seminar essay		(other)	
	Tests	**0.8**	Oral exam		(other)	
	Written exam	1	Project		(other)	

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

Elements of evaluation	Minimal points	Maximal points
Class attendance (11 hours of lectures)	3 (coefficient 0.154) 6 x 0,545 = 3,27 Student must attend6 hours of lectures to get minimal 3 points	6 (coefficjent: 0,154) 11 x 0,154 = 6,00
Seminars attendance (4 hours of seminars)	4 (coefficient: 1,5) 1,5 x 2 = „4“ Student must attend 2 hours of seminars to get minimal 4 points	6 coefficjent: 1,5) 4 x 1,5 = 6
Excercise attendance (10hours of exercises)	4 (coefficient: 0,6) 7 x 0,6 = 4,2 Student must attend 7 hours of excercises to get minmal 4 points	6 (coefficient: 0,6) 10 x 0,6 = 6
Active participation in excercises Excercises done and signed by teacher Short knowledge examinations	5	10 5x2=10 points
Continous knowledge checking Written test Biochemistry I	20	32
Written 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
2.12. Optional literature (at the time of submission of study programme proposal)	www. ivis. org		
2.13. Quality assurance methods that ensure the acquisition of exit competences	Written exam		
2.14. Other (as the proposer wishes to add)			

PATHOPHYSIOLOGY II

1. GENERAL INFORMATION			
1.1. Course teacher	Prof. Mirna Robić	1.6. Year of the study programme	third
1.2. Name of the course	**Pathophysiology II**	1.7. Credits (ECTS)	6,5
1.3. Associate teachers	Prof. Nina Poljičak-Milas, Assoc. Prof. Romana Turk, Assoc. Prof. Maja Belić	1.8. Type of instruction (number of hours L + S + E)	39+6+50
1.4. Study programme (undergraduate, graduate, integrated)	Integrated graduate and postgraduate study	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%)	

2. COUSE DESCRIPTION	
2.1. Course objectives	During the course students become familiar with development of pathological events, disturbances of normal function during the development of disease processes, and therefore achieve the basis for logical understanding of symptomatology in diseases and diagnostic procedures.
2.2. Course enrolment requirements and entry competences required for the course	Participation in course Pathophysiology I (lectures, seminars, exercises).
2.3. Learning outcomes at the level of the programme to which the course contributes	Students are enabled to describe digestive system pathophysiology, describe disturbances in hepatic and biliary function, define disturbances in carbohydrate, fat and protein metabolism, describe renal diseases pathophysiology, describe disturbances in blood and hematological system functions and heart diseases, describe disturbances in respiratory system functions, determine bilirubine concentration and liver enzymes activity and evaluate liver status, perform urinalysis and interpret results, evaluate red and white blood cells count in inflammatory and hematological diseases.
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After succesful mastering, student will be able to: -describe and explain pathophysiology of digestive tract, liver and biliary system diseases -define metabolic disturbances - describe and explain kidney disease pathophysiology - describe and explain blood and hematological system disturbances and heart diseases - describe and explain respiratory system disorders - deterimne bilirubin concentration,and evaluate jaundice mechanism, determine liver enzymes function and evaluate liver status, determine lipid concentration and evaluate lipid metabolism - perform urinalysis and interpret results - perform hematological analysis and interpret results
2.5. Course content broken down in detail by weekly class schedule (syllabus)	Disturbances in carbohydrate, fat and protein metabolism 4 hours, pathophysiology of liver and biliary system diseases 6 hours, pathophysiology of hemopoetic system 6 hours, pathophysiology of digestive system diseases 10 hours, pathophysiology of cardiac function and shock 6 hours, pathophysiology of respiratory system diseases 4 hours, pathophysiology of renal diseases 3 hours. Seminars (6 hours): Individual students presentation on specific topics in mechanisms of diseases Excercises: lipid and lipoprotein disorders (2 hours), urine analysis (2 hours), bilirubin metabolism disorders (2 hours) clinical enzymology (2 hours), anatomy and physiology of hematopoetic

	system (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 constants (2 hours), determination of reticulocytes count, 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), preparation of microphotographies and morphometry of blood cells (2 hours), changes in blood cells morphology in neoplastic diseases of hematopoetic system (2 hours), blood cells in laboratory rodents (2 hours), preparation and inspection of bone marrow slides (2 hours), interpretation of laboratory findings (2 hours), preparation for exam (2 hours).

2.6. Format of instruction:	Xlectures Xseminars and workshops X exercises ☐ on line in entirety ☐ partial e-learning ☐ field work	☐ independent assignments ☐ multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	2.7. Comments:

2.8. Student responsibilities						
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	**0,715**	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 exercise attendance and active participation in exercises. 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 acces 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 will have to correctly answer the questions to gain minimal 24 or maximal 40 points. The final grade will be the sum of points gained by each criteria mentioned before. Grading scheme will be 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).

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and via other media)	Robert H. Dunlop, Charles-Henri Malbert (2004): Veterinary pathophysiology, Blackwell Publishing, Ames, Iowa		
	Bernard, F. Feldman, 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.		

<table>
<tr><td></td><td>David O. Slauson, Barry J. Cooper (2002): Mechanism of disease. Mosby, St. Louis, London, Philadelphia, Sydney, Toronto</td><td></td><td></td></tr>
<tr><td></td><td>Hansen, M. (1998): Pathophysiology. Foundations of disease and Clinical Intervention. Saunders company, Usa</td><td></td><td></td></tr>
<tr><td>2.12. Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">www. ivis. org</td></tr>
<tr><td>2.13. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3"><table>
<tr><td>Evaluation elements</td><td>Minimal points</td><td>Maximal points</td></tr>
<tr><td>Lectures attendance</td><td>3</td><td>6</td></tr>
<tr><td>Seminars attendance</td><td>4</td><td>6</td></tr>
<tr><td>Excercises attendance</td><td>4</td><td>6</td></tr>
<tr><td>Active participation in excercises</td><td>5</td><td>10</td></tr>
<tr><td>Knowledge checking</td><td>20</td><td>32</td></tr>
<tr><td>Total points till final exam</td><td>36</td><td>60</td></tr>
<tr><td>Final exam</td><td>24</td><td>40</td></tr>
</table></td></tr>
<tr><td>2.14. Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

PHARMACOLOGY

1. GENERAL INFORMATION			
1.1. Course teacher	Frane Božić	1.6. Year of the study programme	3.
1.2. Name of the course	**Pharmacology**	1.7. Credits (ECTS)	6.5
1.3. Associate teachers	Jelena Šuran	1.8. Type of instruction (number of hours L + S + E + e-learning)	45L + 35E + 5S
1.4. Study programme (undergraduate, graduate, integrated)	Integrated	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%)	-
2. COUSE DESCRIPTION			
2.1. Course objectives	Preparing students for veterinary clinics where they can choose appropriate therapy for any disease diagnosed in vet patients as well as correct writing formulary.		
2.2. 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.		
2.3. Learning outcomes at the level of the programme to which the course contributes	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.		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	On the basis of 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 chose 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).		
2.5. 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, carentia, medication listing); 2 Peripheral nervous system pharmacology (Chemical neurotransmission, cholinergic and andrenergic), 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) , dissocative anaesthetics, local anaesthetics, myorelaxines, opioid analgesics, anticolinergics, analeptics); 4 Pharmacology of heart and vascular system (Heart stimulators, antiarrhythmics, antihypersensitives, vasodilatators); 5 Pharmacology of urinary organs and reproduction (Diuretics, antidiuretics, acidotics and acalotics, uroantiseptics, reproduction pharmacology); 6 Pharmacology of respiratory organs (Expectoranses, mucolitics, antitusics,		

<table>
<tr><td></td><td colspan="6">bronchodilatators, breathing stimulators); 7 Pharmacology of digestive system (Emetics, antiemetics, antacids, procinetics, laxans, antidiaroics, anticimotics); 8 Anti-inflammatory and imunomodulative drugs (Nonsteroide anti-inflammatory drugs (effects and side effects), steride anti-inflammatory drugs (effects and side effects), imunosupressives, imunostimulators); 9 Antimicrobial medications (Antimicrobial spectrum, pharmacodynamics, pharmacokinetics, application, resistance, side effects); 10 Beta lactams (Benzylpenicillin (Na, K, procain, benzatin), ampicillin and amoxicillin, inhibitors beta laktamase – clavuline acid, isoxasolyl penicillins, cefalosporines – I, II, III and IV generation); 11 Aminoglycosides, aminocyclitoles, polypeptides (Streptomicin, gentamicin, neomycin, amikacin, spectinomicin, polymixin B and E, zincbacitarcin); 12 Macrolides, lincozamides, tetracyclines (Erythromycin, tylosin, asitromycin, lyncomycn, tetracycline, oxytetracycline, doxycycline); 13 Phenicoli, kinolones, sulphonamides (Chloramphenicol, fluorphenicol, thiamphenicol, flumequin, enrofloxacin, norfloxacin; Sulfonamides – enteric and systematic); 14 Antimycotics (Grizeofluvin, nistatin, immidasotiasoles, amfotecirin B, terbifanin, iodine preparations and other); 15, Antiprosoics (Anticocxide medications – ionophorne antibiotics and other coxidiocides, antihystomonoses, antihemosphoridive drugs – diminazen, imidokarb): 16 Endoparasiticides – nematocides (Piperazin, organophosphates, tetrahydropirimidines, imidazotiasoles, benzimidasoles, avermectines and milbemicines); 17 Trematocides (BZM – albendazol and triclabendazol, subtituated phenols, salicylanides); 18 Cestoides (Arekolin, niclozamyd, bitionol, BZM, prasiquantel); 19 Ectoparasiticides (Piretrines, piretroides, OFS, carbamates, avermectines – milbemicines, amitraz, fipronil, insects growth and development inhibitors);</td></tr>
<tr><td>2.6. 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>2.7. Comments:</td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="6">attending lectures
attending exercises
attending seminars
participation at exercises and seminars
continuous knowledge checking and final exam</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>1,17</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td>0</td><td>Report</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Essay</td><td>0</td><td>Seminar essay</td><td>0,65</td><td>(other)</td><td></td></tr>
<tr><td>Tests</td><td>2,08</td><td>Oral exam</td><td>2,6</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>0</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">Participation of students at exercises will be evaluated with short oral tests.Continuous knowledge checking will be done with preliminary written exams which will be organised during the semester at one exercise term. The preliminary exams will be divided in two parts. Students are obliged to pass short oral tests and written exams 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 makeup 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.</td></tr>
</table>

	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

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and via other media)	Lecture handouts and notes	-	Yes, LMS
	Riviere, J., M. Papich (2018): Veterinary Pharmacology and Therapeutics, 8th ed. Wiley Blackwell.	1	
	Maddison, Page and Church (2008): Small Animal Clinical Pharmacology. 2nd ed. Saunders Elsevier. Papich, M.G. (2011): Saunders Handbook of Veterinary Drugs. 3rd Ed. Elsevier Saunders. Booth D. M. (2012): Small animal Clinical Pharmacology, Elsevier (Saunders) 2nd ed., St. Louis, Missouri 63043.		
2.12. Optional literature (at the time of submission of study programme proposal)	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.		
2.13. Quality assurance methods that ensure the acquisition of exit competences			
2.14. Other (as the proposer wishes to add)			

RADIATION HYGIENE

1. GENERAL INFORMATION			
1.1. Course teacher	Marinko Vilić, DVM, PhD, Associate Professor	1.6. Year of the study programme	3
1.2. Name of the course	Radiation hygiene	1.7. Credits (ECTS)	2.5
1.3. Associate teachers	Miljenko Šimpraga, DVM, PhD, Full Professor Jadranka Pejaković Hlede, DVM	1.8. Type of instruction (number of hours L + S + E + e-learning)	L10+S0+E20
1.4. Study programme (undergraduate, graduate, integrated)	Integrated	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%)	-
2. COUSE DESCRIPTION			
2.1. Course objectives	At the Radiation hygiene course students will learn how to be able to (1) protect their selves and their associates from radioactive contamination and irradiation; (2) use detectors of ionising radiation and dosimeters, detect ionising radiation, determine its type and calculate the radiation dose (3) to use high frequency spectrum analyzer and radiofrequency meters and to calculate the exposure limits (4) protect the housings, animal habitats, domestic animals, animal feed and foodstuff from radioactive contamination and radiation (5) perform decontamination of domestic animals, animal feed, meat, milk, water and other food of animal origin, animal habitats, various subjects and environment (soil, farmlands) and check-up the success of decontamination; (6) evaluate radiation hygiene properties of meat, milk and other food and their use as human food, and all intended to protect humans from radiation and radiation risks; (7) evaluate the risk of malignant diseases appearance in humans due to feeding with contaminated milk and meat; (8) conserve food by ionizing radiation. Besides, the students will obtain the basic knowledge about ionizing and non-ionizing (microwave) radiation effects on animals and humans. Both is necessary for course in radiology, nuclear veterinary medicine and for performing other activities in veterinary profession referring to electromagnetic radiation. Finally, without mastering this course, veterinarians are not legally allowed to perform X-ray examinations or examinations by application with radioactive isotopes (nuclear veterinary medicine). Neither is it allowed to perform veterinary inspection or other things relating to animal hygiene.		
2.2. Course enrolment requirements and entry competences required for the course	Physic and biophysics final exam, Physiology of domestic animals 1 final exam		
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)	After successfully mastering the course students will be able to: recognize the sources of ionizing radiation describe the pathway of radioactive contamination and the biological effects of ionizing radiation protect the housings, animal habitats, domestic animals, animal feed and foodstuff from radioactive contamination and radiation		

<table>
<tr><td></td><td>perform decontamination of domestic animals, animal feed, meat, milk, water and other food of animal origin, animal habitats, various subjects and environment (soil, farmlands) and check-up the success of decontamination
evaluate radiation hygiene properties of meat, milk and other food
use the dosimeters and detectors of ionizing radiation and calculate the radiation dose
recognize food conserving by ionizing radiation
recognize the sources of non-ionizing (microwave) radiation and describe the biological effects</td></tr>
<tr><td>2.5. Course content broken down in detail by weekly class schedule (syllabus)</td><td>Introduction to radiation hygiene
Standards of radiation protection
Radioactive contaminations
Biologically significant radionuclides (Iodine-131, Strontium-90, Caesium-137 and Caesium-134)
Effects of ionizing radiation upon animals and humans
Protection of humans and domestic animals from radiation.
Protection of humans, animals, animal feed and foodstuff from contamination
Methods of radioactive decontamination
Radioactive decontamination of animals, animal feed, food (milk and meat), various material and environment
Radiation-hygiene controls of food, water and animal feed and evaluation of their propriety
Conservation of food by ionizing radiation
Dosimetry (Dosimeters, the role of personal dosimetry. Dosimetric sizes and units
Work with detectors of radioactivity
Gamma ray spectrometry
Procedure with animals, animal feed and foodstuff of animal origin in possible accidental contamination of the area
Calculation of maximum permissible concentration of radio nuclides in animal feed in regard to permissible concentrations of those radionuclides in milk and meat
17. Calculation of risk from malignant diseases in humans after exposure to ionizing radiation or due to intake of contaminated milk and meat
Calculation of exposition rate, safe distance from sources of radiation as well as absorber thickness in the vicinity of radioactive source. Calculation of maximum time spending inside contamination area
Sources of non-ionizing (microwave) radiation
Biological effects of non-ionizing (microwave) radiation
Instrumentation for measuring microwave power</td></tr>
<tr><td>2.6. Format of instruction:</td><td>x lectures
x exercises
☐ on line in entirety
☐ partial e-learning
☐ field work
☐ independent assignments
☐ multimedia and the internet
☐ laboratory
☐ work with mentor
☐ (other)</td><td>2.7. Comments:</td></tr>
<tr><td>2.8. Student responsibilities</td><td>The students total obligations at the course, start and finish times of the lessons, time-table and location of lessons will be announced on the Department of Physiology and Radiobiology and Faculty of Veterinary medicine notice board and on their web page.</td></tr>
<tr><td>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>
<table>
<tr><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</td><td>0.25</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>0.8</td><td>Oral exam</td><td></td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>1</td><td>Project</td><td></td><td>(other)</td><td></td></tr>
</table>
</td></tr>
</table>

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

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

Types of activities	Minimal number of points	Maximal number of points
Attending lectures (10 lecture hours)	**3**	**6**
	(coefficient 0.6); 3:0.6=5 (5 lecture hours)	6:10=0.6 (coefficient 0.6)
Attending exercises (20 lecture hours)	**8**	**12**
	(coefficient 0.6) 8:0.6=13,3 (14 lecture hours)	12:20=0.6 (coefficient 0.6)
Participation at exercises 10 points = 5 tests 1 test = max. 2 points 1 test = 4 question x 0.5 (2 points x 5 tests = 10 points)	**5**	**10**
	(coefficient 0.5); 5:0.5=2.5 (student must write 3 tests and answer minimum 10 questions)	10:20 question =0.5 (coefficient 0.5)
Continuous knowledge checking 1 test = 32 questions 1 question = 1 point	**20**	**32**
	(coefficient 1); 20:1=20 (student must gain minimal 20 points)	32:32=1 (coefficient 1)
Final exam In written form 33 quesiones 7 questiones = 14 points 26 questiones = 26 points	**24**	**40**
	(coefifcient 1 or 2) 7x2=14 26x1=26 (student must gain minimal 24 points)	14+26=40 14:7=2 (coefficient 2) 26:26=1 (coefficient 1)
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
Vilić, M. (2014): RADIATION HYGIENE, Selected chapters of radioecology, radiobiology and radiation hygiene. Faculty of Veterinary Medicine, Zagreb.		available online
IAEA (2010): Radiation biology: a handbook for teachers and students		available online
Howard, B. J., N. A. Beresford, G. Voigt (2001): Countermeasures for animal products: a rewiew of effectiveness and potential usefulness after an accident. J. Environ Radioactivity 56, 115-137.		available online
Statkiewicz-Sherer, M. A.. P. J. Visconti, E. R. Ritenour (2002): Radiation protection. 4th ed. Mosby, Inc. St. Louis.	2	

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

Eisenbud, M. (1997): Enviromental Radioactivity. 5th ed. Academic Press. London.
Hall, J. E. (2000): Radiobiology for the radiologist. 5th ed. Lippincott Williams & Wilkins. Philadelphia-Baltimore-New York-LondonBuenos Aires-Hong Kong-Sydney-Tokyo.

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

Continuous knowledge checking
Final exam

2.14. Other (as the proposer wishes to add)

SPECIAL MICROBIOLOGY

1. GENERAL INFORMATION			
1.1. Course teacher	Prof. Nevenka Rudan, PhD	1.6. Year of the study programme	Third (3.) year of the study programme
1.2. Name of the course	**Special Microbiology**	1.7. Credits (ECTS)	4.5 ECTS
1.3. Associate teachers	Prof. Ljiljana Pinter, PhD; Luka Radmanić, DVM	1.8. Type of instruction (number of hours L + S + E + e-learning)	15+15+30
1.4. Study programme (undergraduate, graduate, integrated)	Integrated study	1.9. Expected enrolment in the course	
1.5. Status of the course	Regular course	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
2.1. 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.
2.2. Course enrolment requirements and entry competences required for the course	Audited teaching from „Veterinary immunology“ and „General microbiology“
2.3. Learning outcomes at the level of the programme to which the course contributes	Students will get knowledges necessary for clinical courses, especially for „Infectious diseases of domestic animals“
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	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.
2.5. Course content broken down in detail by weekly class schedule (syllabus)	**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*

2.6. 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 ☐ work with mentor ☐ (other)	2.7. Comments:
2.8. Student responsibilities			

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	**0.81**	Research		Practical training	
	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 16 points from attending lectures, seminars, exercises and from participation at seminars and exercises. 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		
2.12. 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		
2.13. 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.		
2.14. Other (as the proposer wishes to add)			

SPECIAL VETERINARY PATHOLOGY

1. GENERAL INFORMATION			
1.1. Course teacher	Associate Professor Andrea Gudan Kurilj, DVM, PhD, DECVP	1.6. Year of the study programme	3rd
1.2. Name of the course	**Special veterinary pathology**	1.7. Credits (ECTS)	10,5
1.3. Associate teachers	Professor Željko Grabarević DVM, PhD; Associate professor Marko Hohšteter, DVM, PhD; Assistant professor Ivan-Conrado Šoštarić-Zuckermann, DVM, PhD; Doroteja Huber, DVM, PhD; Lidija Medven Zagradišnik, DVM; Ivana Mihoković, DVM	1.8. Type of instruction (number of hours L + S + E + e-learning)	60+0+75+0
1.4. Study programme (undergraduate, graduate, integrated)	integrated	1.9. Expected enrolment in the course	
1.5. Status of the course	active	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	Pathogenesis of noninfectious, infectious and congenital diseases. Classification and nomenclature of diseases. Morphology of lesions characteristic for certain diseases. Macroscopic and microscopic recognition of diseases related to the clinical signs of the disease.		
2.2. Course enrolment requirements and entry competences required for the course	Previous completion of General veterinary pathology course.		
2.3. Learning outcomes at the level of the programme to which the course contributes	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.		
2.4. 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:** - analyze pathological changes (lesions) and classify them in order to determine specific animal diseases - analyze microscopic slides of basic pathologic processes and most important animal diseases - correlate macroscopic and microscopic changes together with the results of other ancillary laboratory tests - make diagnosis and conclusion about emergence and development of disease or animal death - write necropsy report		

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

Lectures:

Methodological unit	Contents	No. of hours
Special pathology of digestive system	Oral cavity, salivary glands, esophagus	2h
"	Forestomachs and stomach	2h
"	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 (30h):

Exercise 1.	introduction: sample preparation, dyeing techniques fatty liver liver, cholestasis skeletal muscle, myofibrilar degeneration and coagulative necrosis	2h

	Exercise 2.	Chronic, eosinophilic and fibrous interstitial hepatitis (parasitic hepatitis) Multifocal miliary necrotizing and neutrophilic hepatitis (Sallmonelosis) Postnecrotic liver cirrhosis hepatitis, necrotizing, multifocal to confluent, acute (mainly centrolobular)	2h
	Exercise 3.	Pulmonary artery branch thrombosis Chronic vegetative valvular endocarditis Septic thrombotic endocarditis. Hemorrhagic infarction of the spleen (hog cholera)	2h
	Exercise 4.	Embolic myocarditis Viral myocarditis (FMD) hepatitis, granulomatous, multifocal (miliary), chronic (tuberculosis) Cutaneous actinomycosis	2h
	Exercise 5.	Skin; Sebaceous gland, nodular hyperplasia Skin; Squamous cell carcinoma Skin; Papilloma Testis; Seminoma	2h
	Exercise 6.	Lymph node; Lymphoma Skin; Mast cell tumor (HE & Toluidin) Mammary gland; Adenocarcinoma Mammary gland; Benign mixed tumor	2h
	Exercise 7.	Fibrinous, partially necrotic pneumonia. Embolic purulent bronchopneumonia Enzootic pneumonia of pigs	2h
	Exercise 8.	Stomach; Gastric ulcer Intestine; Parvovirosis Kidney: FIP	2h
	Exercise 9.	Canine distemper (Lung, Urinary bladder) Rabies	2h
	Exercise 10.	Mammary gland; Mastitis Uterus; pyometra. Glomerulo-interstitial chronic nephritis	2h
	Exercise 11.	Liver; Infectious canine hepatitis. Acute hemorrhagic lymphadenitis (hog cholera) Purulent lymphadenitis	2h
	Exercise 12.	-Chronic verminous pneumonia (aelurostrongylosis) -Liver; Coccidiosis -Liver; Toxoplasmosis -Myocard; Sarcocystosis.	2h
	Exercise 13.	-Uremia (Kidney, tongue)	2h
	Exercise 14.	-Repetition	2h
	Exercise 15.	-Test	2h
	Konverzatorij: 15h		

2.6. 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)	2.7. Comments:

<table>
<tr><td>2.8. Student responsibilities</td><td colspan="6">Active participation during course.</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>1,89</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>1,05</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>3,36</td><td>Oral exam</td><td>4,2</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>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">
<table>
<tr><td>TYPES OF ACTIVITIES</td><td>MINIMAL NUMBER OF POINTS</td><td>MAXIMAL NUBMER OF POINTS</td></tr>
<tr><td>Attending lectures</td><td>3</td><td>6</td></tr>
<tr><td>(The total of 60 lecture hours)</td><td>(each particular lecture hour is summed as 0,1 point)</td><td></td></tr>
<tr><td></td><td>A student must attend minimal 30 lecture hours in order to gain 3 minimal points;</td><td></td></tr>
<tr><td>Attending exercises</td><td>8</td><td>12</td></tr>
<tr><td>(Total of 75 exercise hours; Autopsy 30 hours, Histopathology 30 hours, Exercises-Konverzatorij 15 hours)</td><td></td><td></td></tr>
<tr><td></td><td>(A student must attend minimal 53 hours of exercise in order to gain 8 minimal points)</td><td></td></tr>
<tr><td>Participation at exercises</td><td>5 (Autopsy 2 points, Histopathology 2 points, Exercises – Konverzatorij 1 point)</td><td>10 (Autopsy 4 points, Histopathology 4 points, Exercises – Conversatoriu m 2 points)</td></tr>
<tr><td></td><td>Necropsy:
0 points= autopsy was not carried out and report wasn’t turned in, 1 point=, autopsy for report carried out, report not turned in 2 points= autopsy for report carried out, report turned in, 3 points= autopsy for report carried out, report turned in + additional autopsy carried out; 4 points= autopsy for report carried out, report turned in + additional</td><td></td></tr>
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		autopsy carried out, with demonstration of good knowledge; **Histopathology**: 0 points= most of the given histological preparations not drawn, 1 point= most of the given preparations are drawn, 2 points=all given preparations are drawn and most of the proper preparation descriptions are attached, 3 points= all given preparations are drawn and all of the proper preparation descriptions are attached, 4 points= all given preparations are neatly drawn and all of the proper preparation descriptions are attached ; **Exercises-Konverzatorij** : 0 points= given programme unit is not acquired, 1 point= the acquired programme unit, 2 points= acquired given programme unit +active participation at the analysis of the programme unit)	
		(a student must gain 5 points - two from Autopsy, two from Histopathology and one from Exercises-Conversatorium, in order to earn minimal 5 points)	
	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)
		Written preliminary exam from Pathology of skin is made out of 32 questions. To pass this test student must reach a minimal score of 10 points, maximum being 16 points. To obtain minimal score student should correctly answer 20 questions, since every correct answer is awarded with 0.5 points (20x0.5=10 minimal points). It is important to notice that incorrect answers on this test are awarded with negative points (every incorrect answer nullifies one correct answer). The total number of points scored at this test is gained by subtracting number of incorrect answers from correct ones. Unanswered questions will be omitted. **Practical partial exam from histopathology** is carried out by examining students knowledge of the histopathology slides. To pass this part student must reach a	

	minimal score of 10 points, maximum being 16 points.	
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 90 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 1 point per photograph (points are awarded in range from 0.25 to 1). 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 9 questions, six of which give up to four (4) points (24 points in total), and three (3) questions bring up to two (2) points (6 points total). Two questions from those who bring 4 points are qualifying questions that must be answered with a minimum of 3 points. The maximum maximum number of points on the written exam is 40. After scoring a written part of the final exam, students who got the minimum number of points (24) will be allowed to access the oral exam, while those with fewer points receive a negative grade and will not be able to access the oral part of the final exam. Questions at the oral part of the exam will be on the same principe 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 corresponding to questions 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)

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and via other media)	M. D. McGavin, Zachary, J. F.: Pathologic Basis of Disease, 6th edition, Elsevier, Philadelphia, 2017.	5	
	Jubb, Kennedy, and Palmer's pathology of Domestic Animals. 5th ed. Vol. 3. Edited by Grant Maxie M. Philadelphia: Elsevier Saunders; 2007		
2.12. 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. Notes and presentations provided by lecturers.		
2.13. Quality assurance methods that ensure the acquisition of exit competences			
2.14. 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

General and Clinical Radiology

Internal Medicine

Methods of Physical Therapy and Diagnostics

Obstetrics and Reproduction I

Surgery, Orthopaedics and Ophthalmology I

Surgery, Orthopaedics and Ophthalmology II

Toxicology

BIOLOGY AND PATHOLOGY OF BENEFICIAL INSECTS

1. GENERAL INFORMATION			
1.1. Course teacher	Associate Professor Ivana Tlak Gajger	1.6. Year of the study programme	4th
1.2. Name of the course	Biology and Pathology of Beneficial Insects	1.7. Credits (ECTS)	2.5
1.3. Associate teachers	Associate Professor Emil Gjurčević Assistant 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 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)	- Annotate the role of honeybee in natural ecosystems - Explain manner of life and activities of honeybee colony, construction of combs and development of brood - Recognize different types of hives, feeders and water suppliers, and beekeeping equipment - 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 - Define role of veterinarian in procedure of sampling and sending materials for laboratory examinations, treatments and sanitation of diseases		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	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.)

2.6. 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)	2.7. Comments: Laboratory work includes teaching sessions where students themselves prepare and use microscope preparations of pathological materials.

2.8. Student responsibilities	Active attending and participation at lectures (53%), exercises and field work (69%). Accessing to continuous knowledge checking and final exam.					
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	0.45	Research		Practical training	
	Experimental work		Report		Activity on exercises	0.25
	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) 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	
	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	Associate Professor Emil Gjurčević	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	Associate Professor Ivana Tlak Gajger Assistant 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 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 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 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 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)	Recognize fish species and other aquatic organisms important for breeding Obtain general knowledge about breeding of aquatic organisms Comprehend the importance and role of veterinarians in maintenance of fish health and human health Perform routine diagnostic examination, recognize clinical signs of disease Professional sampling and transport of samples for laboratory examinations Apply therapeutic measures and measures for prevention of disease		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	**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 and parasitological procedures (Specified for aquatic organisms).

2.6. Format of instruction:			2.7. 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)	Laboratory work includes teaching sessions where students themselves use microscope for pathological examination.

2.8. Student responsibilities	Attendance lectures (55%) and exercises (64%); active participation at exercises; continuous assessment (1 preliminary exam – 20 questions).

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	0.45	Research		Practical training	
	Experimental work		Report		Participation at exercises	0.25
	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	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 (1 preliminary exam – 20 questions): 20-32 points (1 question equals 1.6 points) 5. Final exam – oral: 24-40 points (5 questions): 1 question equals 8 points

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

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)	Anonimous student questionar about teacing work.

GAME BREEDING AND MANAGEMENT

1. GENERAL INFORMATION			
1.1. Course teacher	Full professor Alen Slavica, PhD, DVM	1.6. Year of the study programme	4
1.2. Name of the course	**Game Breeding and Management**	1.7. Credits (ECTS)	2.5
1.3. Associate teachers	Full professor Zdravko Janicki, Associate professor Dean Konjević, PhD, DVM; Assistant professor Magda Sindičić, PhD, DVM	1.8. Type of instruction (number of hours L + S + E + e-learning)	4+0+26
1.4. Study programme (undergraduate, graduate, integrated)	Integrated	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%)	Level 1
2. COUSE DESCRIPTION			
2.1. 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.		
2.2. Course enrolment requirements and entry competences required for the course	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		
2.3. Learning 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		

<table>
<tr><td>2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="2">- Development and Implementation of Game management plan and Game protection plan
- Modeling 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</td></tr>
<tr><td>2.5. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="2"><table>
<tr><td>Keynote lecture - 1 hour
Wildlife Management I - 1 hour</td><td>Presentation of the curriculum, organization of lectures and exams; defining concepts - wild animals, game, wildlife and protected species, hunting management; models of farming. Game and hunting by the Hunting Act, ZOL, types of hunting grounds; Establishing redistribution of fields and forests; Population dynamics and rearing age, game planning in the natural rearing of game species</td></tr>
<tr><td>Wildlife Management II - 1 hour
Selection - 1 hour</td><td>Components of HMP, glossary, definition of the hunting ground evaluation, determination hunt-productive area and hunt-management capacity; Funds of game – reproductive and total stock, growth and accretion, 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 the gender, selection by age categories.</td></tr>
<tr><td>Arrangement and maintenance hunting ground - 1 hour
Detriments on game and form game - 1 hour</td><td>Technical arrangement of hunting ground, hunting management and technical facilities. Damage to wildlife and damage from wildlife, game road kills; measures of detriments prevention; detriments on game by nature</td></tr>
<tr><td>The principles of selection in game breeding, estimate age and gender - 2 hours</td><td>Selection in natural rearing of game, identification of game age categories, perspective and non perspective male and female, quality selection models and their adjustment to breeding goal, culling types, Practical work - selection in red deer, fallow deer, roe deer and mouflon population. Estimation of age.</td></tr>
<tr><td>Practical work in hunting ground – 6 hours</td><td>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</td></tr>
<tr><td>Natural rearing of game and HMP - 2 hours</td><td>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 game species</td></tr>
</table></td></tr>
</table>

	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 of small and big game species
	Equipment for capture and immobilization Capture and transport of game 2 hours	Methods of capturing wildlife, equipment and accessories for injection application; Application routes and technical means for immobilization; transport of large and small game, Game welfare in transport.
	Chemical immobioization -2 hour	Decision making in immobilization drug selection and dose estimation, environmental and game conditions; Transport premedication; immobilization protocol and preparing the operator; professional procedure with immobilized beast; Technical problems and complications of manipulation and immobilization; prevention and elimination of complications
	Chemical immobioization -2 hour	Practical work - Selecting immobilization drug on the game species; calculation of dose per kg / body weight and total dose of application, determination of percent concentration; Preparation sedatives, darts and 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 grazed areas, corridors and 'Crush' systems for manipulation, protection of breeding areas and types of fences, farm 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 quail; facilities in the breeding of game birds; formation of broodstock and selection of breeding stock; Phase breeding of game birds and nutrition standards , methods and effectiveness of pheasants and partridge release, preparing hunting area for game birds release; facilities for the reception and releasing game birds in hunting area; technopathy and diseases game birds in farm breeding

2.6. 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)	2.7. Comments:
2.8. Student responsibilities	Attending lectures (50%), exercise (70%), active participation in exercises and seminars, self support task/problem solving, continuous preliminary exam (once).		

<table>
<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>0,18x2,5=0,45</td><td>Research</td><td></td><td>Practical training</td><td>0,1x2,5=0,25</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>0,32x2,5=0,8</td><td>Oral exam</td><td>0,3x2,5=0,75</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>0,1x2,5=0,25</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"><table>
<tr><th>Type of activity</th><th>Minimal points</th><th>Maximal points</th></tr>
<tr><td>Attending ecture
(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</td><td>8</td><td>12</td></tr>
<tr><td>(26 hours of practic work
=13 programs)</td><td>(coefficient 0,46) 18 x 0,45 = 8
(the student must be at least 18 hours of practice in order to achieve the minimum 8 points)</td><td>12 : 26=0,45
(coefficient 0,45)</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
1 point = one correct and complete answer at exercises</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>
<tr><td>2 x preliminary exam
16 questions per exam
1 question = 1 point
16 x 1 = 16 points
Total = 32 points</td><td>(2x10) 20
(coefficient 1) 10 x 1 =10
(a student must have 10 correct answers to get minimum 10 points per each exam)</td><td>32
32 :32=1 (coefficient 1)</td></tr>
<tr><td>Final exam</td><td>20</td><td>40</td></tr>
<tr><td>(Oral exam)
1 question = 5points(max.)
8 questions = 40 points</td><td>To pass the oral part of the exam a student must gain minimal 20 points</td><td>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</td></tr>
<tr><td>TOTAL</td><td>56</td><td>100</td></tr>
</table></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)	1. Haigh, J. C., R. J. Hudson (1993): Farming Wapiti and Red Deer. Mosby-Year Book, 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		
2.12. 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.		
2.13. 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 18 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 oral examination. Student answers the eight questions asked. Each correct and complete answer brings 5 points. The minimum number of points is 20. The maximum number of points is 40- At the oral examination by the each answer 0-5 points are given, with a minimum of 2 points per answer.		
2.14. Other (as the proposer wishes to add)			

GENERAL AND CLINICAL RADIOLOGY

1. GENERAL INFORMATION			
1.1. Course teacher	Prof. Damir Stanin, MSc, PhD	1.6. Year of the study programme	4th
1.2. Name of the course	General and Clinical Radiology	1.7. Credits (ECTS)	3.5
1.3. Associate teachers	Prof. Damir Stanin, MSc, PhD Assist. Prof. Hrvoje Capak, PhD Assist. Prof. Zoran Vrbanac, PhD, DACVSMR, DECVSMR	1.8. Type of instruction (number of hours L + S + E + e-learning)	15 L + 30 E
1.4. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study	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%)	
2. COUSE DESCRIPTION			
2.1. Course objectives	In the general part of the course the student is introduced to basics of X-rays physics, X-rays devices and positioning. Both plain and digital radiography procedures will be covered. Interpretation protocols, projection effects and contrast survey will be explained to the student. In the clinical part of the subject, the theoretical and practical education of radiological diagnostic of different body systems (skeletal, digestive, respiratory, cardiovascular, and urogenital) will be covered. During the practical work, student will gain experience in analyses and interpretation of radiographs, composing the findings and determine the diagnosis.		
2.2. Course enrolment requirements and entry competences required for the course	3rd year courses		
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)	1. to understand the physics of x-ray image, potential harmful effect of x-ray and protection 2. to perform the x-ray survey and the image processing 3. to analyse and interpret different anatomical structures and opacities with the goal of determining the diagnosis 4 to choose and apply suitable contrast survey and to compare it with plain radiographs 5. to evaluate the diagnostic possibility in different pathological conditions and to determine the possible use of radiological exam		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	**LECTURES**: Introduction, X-ray machines and physics of X-rays, application of X-rays in diagnostics, plain and digital radiography, general radiological anatomy and physiology, general radiological pathology, radiological diagnostics of skeletal system diseases, radiological diagnostics of respiratory organs diseases, radiological diagnostics of cardiovascular system diseases, radiological diagnostics of gastrointestinal diseases, radiological diagnostics of urogenital system diseases.		

<table>
<tr><td></td><td colspan="6">PRACTICAL: X-ray equipment, X-ray film, X-ray cassette, developing procedures, radiographic image, opacities. Fluoroscopy indications and procedure. Radiological anatomy, plain and contrast survey, contrast medium. Positioning techniques, positioning effects. Hazards of X-ray production, X-ray scattering removal.
General radiological pathology: normal, increased, decreased opacity intensity, change in shape, size, position and function.
Radiological diagnostics of pathological conditions of respiratory, cardiovascular, gastrointestinal, urogenital and skeletal systems.</td></tr>
<tr><td>2.6. 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>2.7. Comments:</td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="6"></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>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>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 1.6 points). A student must attend minimal 5 programmes.
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)

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).
<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>
</table>
</td></tr>
</table>

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: Diagnostic Radiology and Ultrasonography of the Dog and Cat, Third Edition, Philadelphia (2000)	2	
	Donald E. Thrall: Textbook of Veterinary Diagnostic Radiology, 5th ed. Elsevier (2009)	2	
2.12. Optional literature (at the time of submission of study programme proposal)			
2.13. Quality assurance methods that ensure the acquisition of exit competences			
2.14. Other (as the proposer wishes to add)			

INTERNAL MEDICINE

1. GENERAL INFORMATION			
1.1. Course teacher	Vesna Matijatko, professor	1.6. Year of the study programme	IV
1.2. Name of the course	Internal Medicine	1.7. Credits (ECTS)	16
1.3. Associate teachers	Vesna Matijatko, professor, Nikša Lemo, DECVD, professor, Damjan Gračner, professor, Nada Kučer, assoc. professor, Ivana Kiš, assoc. professor, Mirna Brkljačić, assistant professor, Martina Crnogaj, assistant professor Marin Torti, assistant professor, Iva Šmit, assistant professor Jelena Gotić, PhD, DVM, Ines Jović, DVM	1.8. Type of instruction (number of hours L + S + E + e-learning)	L90 + E120
1.4. Study programme (undergraduate, graduate, integrated)	integrated	1.9. Expected enrolment in the course	10
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%)	

2. COUSE DESCRIPTION	
2.1. Course objectives	Diagnosis and treatment of the diseases of digestive, cardiovascular, respiratory and urinary system, as well as diagnosis and treatment of neurological, endocrinological, hematopoetic, neoplastic, dermatological diseases in domestic amnimals. Basics of emergency and critical care medicine.
2.2. Course enrolment requirements and entry competences required for the course	Anatomy of domestic animals, physiology of domestic animals, Pathophysiology of domestic animals, Pharmacology, Clinical propedeutics.
2.3. Learning outcomes at the level of the programme to which the course contributes	During studying internal medicine students acquire and consolidate their medical logics based on medical premises gained in study of preclinical subjects. Such an approach enables forming of experts disposed to new knowledge and independent on stereotypes. They check their approach by lab diagnostic aids. Upon acquisition on teaching matter a student is able to examine the patient, notice disease symptoms, establish a proper diagnosis, check it by additional lab tests and finally determine the proper treatment of diseases within internal medicine at the level of general veterinary medicine. Thereby, a student is well prepared and trained to take part in attending the further clinical courses, as well as those belonging to public veterinary health.
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. Students will be able to establish a diagnosis based on disease history and clinical examination. 2. Students will have adequate knowledge to make a list of differential diagnoses and to decide which advanced clinical methods should be used to establish a final diagnosis. 3. Students will be able to interpret the results of various findings.

	4. Students will be able to select an adequate treatment according to symptoms and diagnosis. 5. On the basis of the trend of various findings students will be able to modify the treatment. 6. On the basis of everything afore mentioned, students will be able to establish a prognosis.
2.5. Course content broken down in detail by weekly class schedule (syllabus)	**Dermatology.** Inflammatory diseases of the skin. Pruritus. Allergies. Otitis externa. Dermatology of cats. Immune mediated skin diseases. Burns, hypovitaminoses, endocrinologic imbalance. **Clinical pathology.** Anemia. Polycythemia. Leukopenia, leucocytosis, leukaemias. Coagulopathies, hemorrhagic diatheses. Blood types, blood transfusion. Interpretation of laboratory results – enzymes. Interpretation of laboratory results – metabolites. **Digestive system.** 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 shunt, hepatic lipidosis. Pancreatic diseases – acute and chronic pancreatitis, exocrine pancreatic insufficiency. **Urinary system.** Clinical signs and diagnostics of urinary tract diseases. Acute renal failure. Chronic renal failure. Lower urinary tract inflammation, urolithiasis, FLUTD, urethral obstruction in cats. **Cardiology.** Clinical signs and diagnostics of heart and pericardium diseases. Congenital heart diseases. Valve diseases. Cardiomyopathies. Arrhythmias. Pericardial diseases. **Respiratory system.** Rhinitis, sinusitis. Diseases of larynx and trachea. Bronchitis. Pneumonias. Pneumothorax, pleural effusions. **Endocrinology.** Diagnostic of endocrinology diseases. Diabetes insipidus. Hypothyreosis, hyperthyreosis. Hypoadrenocorticism, hyperadrenocorticism. Diabetes mellitus. Diabetic ketoacidosis and other complication of diabetes. Insulinoma and other hormonally active neoplasms. **Neurology.** Clinical signs and diagnostics of neurological diseases. Vestibular disease. Seizures. SRMA and other inflammatory diseases of nervous system. Diseases of spine. Myasthenia gravis and other diseases of the peripheral nervous system. Behavioural disorders. **Oncology.** Approch to a patient with mass, bumb and lump - clinical signs and diagnostic of neoplastic diseases. Paraneoplastic syndrome. The most frequent neoplasms – lymphoma, mastocytoma, melanoma, hemangiosarcoma, mammary gland adenocarcinoma, TNCC. Life quality assessment and palliative care of patient with malignant neoplasms. **Emergency and critical care medicine.** Triage and CPR. Respiratory distress. Shock. Selected emergencies. 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. **Swine diseases.** Anemia in piglets, hypoglycemia in piglets, multiple degeneration of muscles and myocardium in swine. Peptic ulcer. Specific vitamin and mineral deficiencies. **Equine diseases.** Features of clinical signs, diagnostics and treatment of equine diseases. Equine cardiology – features of ECG, equine heart diseases. Reccurent airway opstruction (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, myocardiopahies. Selected diseases of rabbits and rodents (malocclusion, gastrostasis, pneumonias, urolithiasis, vestibular disease)**.**

<table>
<tr><td>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>2.8. Student responsibilities</td><td colspan="3"></td></tr>
<tr><td>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 colspan="3"><table>
<tr><td>Class attendance</td><td>1</td><td>Research</td><td></td><td>Practical training attendance</td><td>1,9</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Practical training 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>5,1</td><td>Oral exam</td><td>2,5</td><td>(other)</td><td></td></tr>
<tr><td>Written exam</td><td>3,8</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="3"></td></tr>
<tr><td>2.11. Required literature (available in the library and via other media)</td><td colspan="3"><table>
<tr><th>Title</th><th>Number of copies in the library</th><th>Availability via other media</th></tr>
<tr><td>Ettinger S.J., Feldman, E.C.: Textbook of Veterinary Internal Medicine Expert Consult: Expert Consult, 8 th edition, Saunders, Elsevier, USA, 2017</td><td></td><td></td></tr>
<tr><td>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 9th Edition, Saunders, Elsevier, USA</td><td></td><td></td></tr>
</table></td></tr>
<tr><td>2.12. Optional literature (at the time of submission of study programme proposal)</td><td colspan="3"></td></tr>
<tr><td>2.13. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">Continuing knowledge assasment, Internal diseases test, final exam</td></tr>
<tr><td>2.14. Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

METHODS OF PHYSICAL THERAPY AND DIAGNOSTICS

1. GENERAL INFORMATION			
1.1. Course teacher	Assist. Prof. Zoran Vrbanac, PhD, DACVSMR, DECVSMR	1.6. Year of the study programme	4th
1.2. Name of the course	Methods of physical therapy and diagnostics	1.7. Credits (ECTS)	2,5
1.3. Associate teachers	Prof. Damir Stanin, MSc, PhD Assist. Prof. Zoran Vrbanac, PhD, DACVSMR, DECVSMR Assist. Prof. Hrvoje Capak, PhD	1.8. Type of instruction (number of hours L + S + E + e-learning)	15 L + 15 E
1.4. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study	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%)	

2. COUSE DESCRIPTION			
2.1. Course objectives	The course objective is to explain the different forms of artificial and natural energy and its use in treatment and prophylaxis. Student will get acquainted with most frequently used physical therapy modalities as well as ultrasound diagnostic.		
2.2. Course enrolment requirements and entry competences required for the course	3rd year courses		
2.3. Learning outcomes at the level of the programme to which the course contributes	The 4th year student will gain the insight in methods and modalities of physical therapy and diagnostic used in rehabilitation protocols. Upon attended course student is able to determine indications for physical therapy and can apply different forms of rehabilitation procedures and protocols..		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1- introduction to different methods of physical therapy and their effect on body systems 2- to apply and to determine the duration of the methods depending on clinical condition 3- to evaluate the outcome of physical therapy treatment 4- to interpret ultrasound image of different body system		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	LECTURES: Introduction and basic part, physiological effect of warmth and cold application, hydrotherapy, thermotherapy procedures and therapy with curative mud, electrotherapy – low and high frequency currents, phototherapy – heliotherapy, lucotherapy, chromo therapy, treatment with ultraviolet rays. Mechanotherapy, therapeutic ultrasound, diagnostic ultrasound, laser therapy PRACTICAL: hydrotherapy, thermotherapy, electrotherapy, phototherapy, mechanotherapy, therapeutic ultrasound, diagnostic ultrasound.		
2.6. 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)	2.7. Comments:

<table>
<tr><td>2.8. Student responsibilities</td><td colspan="6"></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>6%</td><td>Research</td><td></td><td>Practical training</td><td>12%</td></tr>
<tr><td>Experimental work</td><td>10%</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>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 1.6 points). A student must attend minimal 5 programmes.
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)
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).
<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>
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
<table>
<tr><th>Types of activities</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 exercises</td><td>8</td><td>12</td></tr>
<tr><td>Participation at exercises</td><td>5</td><td>10</td></tr>
<tr><td>Continuous knowledge checking</td><td>20</td><td>32</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td></td><td>
<table>
<tr><td>Final exam</td><td>24</td><td>40</td></tr>
<tr><td>Total</td><td>60</td><td>100</td></tr>
</table>
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.
</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>Millis, D.L., D. Levine, R.A. Taylor: Canine Rehabilitation and Physical Therapy. Second edition. Elsevier, Philadelphia, 2014</td><td>3</td><td></td></tr>
<tr><td>Bockstahler, B, D. Levine, D. Millis: Essential Facts of Physiotherapy in Dogs & Cats - Rehabilitation and Pain Management, BE VetVerlag Babenhausen, 2004.</td><td>1</td><td></td></tr>
<tr><td>2.12. Optional literature (at the time of submission of study programme proposal)</td><td colspan="3"></td></tr>
<tr><td>2.13. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3"></td></tr>
<tr><td>2.14. Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

OBSTETRICS AND REPRODUCTION I

1. GENERAL INFORMATION			
1.1. Course teacher	Juraj Grizelj, Full Prof	1.6. Year of the study programme	4 (VIII semester)
1.2. Name of the course	**Obstetrics and Reproduction I**	1.7. Credits (ECTS)	12.5
1.3. Associate teachers	Goran Bačić, Full Prof, Tomislav Dobranić, Full Prof, Tugomir Karadjole, Full Prof, Marko Samardžija, Full Prof, Iva Getz, Assoc. Prof, Martina Lojkić; Assoc. Prof, Nino Maćešić, Assoc. Prof, Nikica Prvanović Babić, Assoc. Prof, Silvijo Vince, Assoc. Prof, Ivan Folnožić, Assist. Prof, Branimira Špoljarić, Assist. Prof, Ivan Butković, Assistant, DVM; Juraj Šavorić, Assistant, DVM	1.8. Type of instruction (number of hours L + S + E + e-learning)	60 + 0 + 100+5 + 0
1.4. Study programme (undergraduate, graduate, integrated)	Integrated Undergraduate and Graduate University Study of Veterinary Medicine in English	1.9. Expected enrolment in the course	25
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%)	-
2. COUSE DESCRIPTION			
2.1. Course objectives	Within the course framework, the students will get acquainted in detail with the hormonal regulation of the sexual cycle of domestic animals, including phases, a clinical signs of sexual cycle 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 udder.		
2.2. 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.		
2.3. 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 asses 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.		

<table>
<tr><td>2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">to explain the neurohormonal regulation of sexual cycles of domestic animals;
to independently perform andrologic and gynaecological examinations of domestic animals;
to clearly distinguish phases and clinical specificity of the sexual cycle of domestic animals;
to apply proper methods of pregnancy diagnostics and artificial insemination;
to be acquainted with the physiology and pathology of puerperium;
to be acquainted with the physiology and pathology of the mammary gland;
to identify and explain the stages of parturition.</td></tr>
<tr><td>2.5. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">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.</td></tr>
<tr><td>2.6. 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>2.7. Comments:</td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="6">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, 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="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>0.75</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>2.75</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 colspan="6"></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 (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 exercises 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 10 questions and performed in written form.
The progress test brings 32 points (each question equals a 3.1 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.</td></tr>
</table>

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) 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 and G. C. W. England (2009): Veterinary Reproduction & Obstetrics, 9th edition. 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	-

2.12. 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
- Gary Landsberg, Wayne L. Hunthausen, Lowell J. Ackerman (2003): 5.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

2.13. 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			
1.1. Course teacher	Ass.prof. Tomislav Babić: Phd;/Ass. Prof. Marko Pećin; Phd	1.6. Year of the study programme	7th (the seventh)
1.2. Name of the course	**Surgery, orthopaedics and ophthalmology I**	1.7. Credits (ECTS)	7
1.3. Associate teachers	Ass. prof. Tomislav Babić, PhD; Acad.Dražen Matičić, PhD; Prof. Boris Pirkić; PhD;. Ass. Prof. Mario Kreszinger, PhD; Prof. Berislav Radišić, PhD; Prof. Dražen Vnuk; PhD; Ass. Prof. Ozren Smolec, PhD, Ass. Prof. Nika Brkljača Bottegaro; PhD, Ass. Prof. Marko Pećin, PhD, Andrija Musulin; PhD, Valentina Plichta, DVM,	1.8. Type of instruction (number of hours L + S + E + e-learning)	30+0+60
1.4. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	1.9. Expected enrolment in the course	25
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%)	
2. COUSE DESCRIPTION			
2.1. Course 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 propedeutics 5 Principles of surgical asepsis and antisepsis. Sterilization and disinfection. 6 Introduction to anaesthesiology. Premedication and sedation. Anaesthesia classification. Local and regional anaesthesia. Intravenous anaesthesia. 7 Inhalatory anaesthesia. 8 Shock: Diagnostics and treatment 9 Therapy with liquids and acid-base equilibrium 10 Disorders of coagulative mechanism and haemostasis 11 Injuries and wounds; Definition, aetiology and classification. Healing and basic principles of treatment. 12 Surgical procedures of burns, congelations and injuries caused by electricity, radiation and chemicals 13 Surgical techniques of knotting 14 Materials for stitching 15 Bandages, compresses, drainage 16 Infections and the use of antibiotics in surgery 17 Essential reconstruction surgeries (stitches, lobes, grafts)		
2.2. Course 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 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		

	apply correctly the principles of sterilization of surgical equipment and principles of aseptic surgery. The student is capable to apply safely the sedimentation, local and general anaesthesia and to estimate and control the pain. He/she is ready to recognise states indicating appropriateness of euthanasia and make it in a human way understanding the emotional state of the owner. The student can apply techniques of first aid 25 points (first exercises – thematic – participation is not evaluated, second exercises –thematic – participation is not evaluated, third exercises – 5 points max, fourth exercises -5 points max., fifth exercises – thematic –participation is not evaluated, sixth exercises – thematic –participation is not evaluated, seventh exercises -5 points max., eighth exercises – 5 points max., ninth exercises -5 points max) = keeping records of anaesthesiologic protocols in an orderly manner 25 points (first exercises – thematic – participation is not evaluated, second exercises –thematic – participation is not evaluated, third exercises – 5 points max, fourth exercises -5 points max., fifth exercises – thematic –participation is not evaluated, sixth exercises – thematic –participation is not evaluated, seventh exercises -5 points max., eighth exercises – 14 points max., ninth exercises -5 points max) = active participation in the work with patients The number of points students must gain in order to earn minimal 5 points is 37,5. Participation of students at exercises will be checked continuously.
2.3. Learning outcomes at the level of the programme to which the course contributes	To be able independently take history, treating and restriing animal in safe and a human way and performing the whole clinical examination. To be ready to give his/her opinion of the other additional diagnostic examinations which are to bed one on the surgical patient. To be able to determine the way of treatment in postoperative period (e.g. pain controle, treatment with antibiotics, physical therapy and other what was recquired). To be able to perform the surgical and anesthesiologic protocol and taking records in the book of a patient in a way understandable to his/her profession and the public. To able to applay correctly the principles of sterilization of surgical equipment and principles of aseptic surgery. To be able to applay safely the sedimentation local and general anesthesia an d to estimate and control the pain. To be albe to reciognase states indicating appropriatiens of euthanasia and make it in human way understanding the emotional state of the owner.
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	to take history, treating and restraining the animal in a safe and human way and perform the whole clinical examination; to propose the other additional diagnostic examination which are needed to get objective status of the surgical patient; to determine the way and content of treatment in postoperative period of patient; to perform to surgical and anasthesiologic protocol and taking record in the book of patient in a way understandable to his/her profession and the public; to applay safely the sedimentation, local and general anaesthesia and to estimate the control od the pain; to recognise states indicating appropriateness of euthanasia and make it in a human way undestandable to the emotional state of the owner; to applay techniques of first aid giving in case of bleading, wounds, burns and congelations; to perform techniques involving workup and bandaging the wounds, imobilisation and arresting bleading; to assist during surgical procedures, honering the principles of asseptic surgery; to be able to conservatively and surgically workup small wounds; to be acquainted with basic techniques of stiching of organs and thessues and to choose adequate stiching material;

<table>
<tr><td>2.5. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">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 anaesthesia. Intravenous anaesthesia; Inhalatory anaesthesia; Shock: Diagnostics and treatment; Therapy with liquids and acid-base equilibrium; Disorders of coagulative mechanism and haemostasis; Injuries and wounds; Definition, aetiology and classification. Healing and basic principles of treatment; Surgical procedures of burns, congelation and injuries caused by electricity, radiation and chemicals; Surgical techniques of knotting; Materials for stitching; Bandages, compresses, drainage; Infections and the use of antibiotics in surgery; Essential reconstruction surgeries (stitches, lobes, grafts)</td></tr>
<tr><td>2.6. 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">x☐ independent assignments
☐ multimedia and the internet
☐ laboratory
x☐ work with mentor
☐ (other)</td><td>2.7. Comments:</td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="6">attending lectures
attending exercises
participation at exercises
continuous knowledge checking
final exam</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>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">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 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 apply correctly the principles of sterilization of surgical equipment and principles of aseptic surgery. The student is capable to apply safely the sedimentation, local and general anaesthesia and to estimate and control the pain. He/she is ready to recognise states indicating appropriateness of euthanasia and make it in a human way understanding the emotional state of the owner. The student can apply techniques of first aid giving in case of bleeding, wounds, burns or congelations. The techniques involve workup and wrapping of wounds, immobilisation and arresting bleeding. He/she can conservatively and surgically workup small wounds. He/she is acquainted with basic techniques of stitching of organs and tissues and with the choice of stitching materials.
25 points (first exercises – thematic – participation is not evaluated, second exercises –thematic – participation is not evaluated, third exercises – 5 points max, fourth exercises -5 points max., fifth exercises – thematic –participation is not evaluated, sixth exercises – thematic –participation is not evaluated,</td></tr>
</table>

	seventh exercises -5 points max., eighth exercises – 5 points max., ninth exercises -5 points max) = keeping records of anaesthesiologic protocols in an orderly manne. 25 points (first exercises – thematic – participation is not evaluated, second exercises –thematic – participation is not evaluated, third exercises – 5 points max, fourth exercises -5 points max., fifth exercises – thematic –participation is not evaluated, sixth exercises – thematic –participation is not evaluated, seventh exercises -5 points max., eighth exercises – 14 points max., ninth exercises -5 points max) = active participation in the work with patients The number of points students must gain in order to earn minimal 5 points is 37,5. Participation of students at exercises will be checked continuously. During the semester, the continuous knowledge checking will be performed in oral form. The very checking will not be anounced in front and shell be performed during the excersise hours. Iti s expected that students attent excersises prepared for the topic of excersise. Each student will be asked 6 questions, on which they can achieve 0 – 4 points per each question. The writen materials will be provided to students as mandatory literature for students of the subject : „ Surgery, orthopaedics and ophtalmology I „- The continuous knowledge checking will beperformed in formo f 3 entireties: The surgical asepsis and surgical instruments (4. and 5. chapters of the textbook „ The veterinary surgery and anaestesiology“ edited by Matičić & Vnuk , in further text „Textbook“) The stitching materials and basic techniques of stitching of organs and tissues (the 6. and 7. chapter of the „Textbook“) And finally the bondages, compresses and drainage and infection of surgical patients, containing antimicrobe prophylaxis (chapter 8. and 18. of the „Textbook“) Within this element of valuation it is possible to obtain maximum 32 points, (24 points x coefficiant 1.3333) The minimum amount of the points for the student that wants to gain the right to complete the cours of studies of „Surgery, orthopaedics and ophtalmology I“ is 20 points (15 points x coefficient 1,3333). Each student collect the points answering on the questions that are asked from the theaching person during the excersises time. There is not possible option of correcting or compensating those points. In the case that student has not accomplished the minimal number of points during the semester, loses the right on the signature of the course advisor that verifies hers/his apprenticeship of the course: „Surgery, orthopaedics and ophtalmology I“. that means that student can not participate in the preliminare exam. If the student has been absent from the oral continuous knowledge checking during the semester, this person can be orally examined only with the justified cause. Before the final exam students will have chance to make up for exercises and the make up preliminary exam in case of their excused absence. Minimal conditions for passing the first, second, third and forth evaluation element are summed up and they are worth 36 points all together. 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 written and oral form. In the written form there will be 5 questions, 3 of which must be answered correctly in order to take the oral exam (Student has to gain minimal 12 points). The maximum number of points that can be gained at the final exam is 40 points, where 4 points = 1 correct answer. The 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 12 (12 points minimal at written as well at oral exam). 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 five evaluation elements, according the following table: 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.		
2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	1.Theresa Fossum - Small Animal Surgery (2018.)		
	2.Jorg A. Auer; John A. Stick – Equine Surgery (2018.)		
	3.Ames N.K. – Noordsy's Food Animal Surgery (2014.)		
	4. Grimm K.A., at all – Veterinary Anesthesia and Analgesia (2015.)		
2.12. Optional literature (at the time of submission of study programme proposal)			
2.13. Quality assurance methods that ensure the acquisition of exit competences			
2.14. Other (as the proposer wishes to add)			

SURGERY, ORTHOPAEDICS AND OPHTHALMOLOGY II

1. GENERAL INFORMATION			
1.1. Course teacher	Boris Pirkić, Full Professor, PhD, DMV	1.6. Year of the study programme	4
1.2. Name of the course	Surgery, Orthopaedics and Ophthalmology II	1.7. Credits (ECTS)	5,5
1.3. Associate teachers	Dražen Matičić, Full Professor, PhD, DMV, Berislav Radišić Full Professor, PhD, DMV Dražen Vnuk, Full Professor, PhD, DMV Mario Kreszinger, Assoc,. Professor, PhD, DMV Tomislav Babić, Assoc. Professor, PhD, DMV Nika Brkljača Bottegaro – Assoc. Profwssor. PhD, DMV Ozren Smolec, Assoc. Professor, PhD, DMV Mako Pećin, Assoc. Professor, PhD, DMV Andija Musulin, Assoc. Professor, PhD, DMV	1.8. Type of instruction (number of hours L + S + E + e-learning)	30+0+45
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%)	
2. COUSE DESCRIPTION			
2.1. Course objectives	Objective is to introduce the student with the basic knowledge in ophthalmology, abdominal and thoracic surgery, and oncology of domestic animals.		
2.2. 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 chest, bases of their treatment and stabilisation of the patient with the chest 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 diseases of abdomen in horses evident in colica, approach a team treatment of the colica, undertake the stabilisation of the patient and estimate indication for a surgical treatment and its referring to a referral clinic. A student is acquainted with basic postulates of surgical approach and techniques of treatment of oncologic patients, and with a necessity of multidiscipline consideration of treatment modality. 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.
2.3. 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.
2.4. 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 recogniza various types od 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 surgical diagnostics and treatment of oncologic patient 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
2.5. Course content broken down in detail by weekly class schedule (syllabus)	Lectures: Surgery of head and neck at large animals ((trepanation, dehornisation etc.) Surgery of head and neck at small animals Surgical diseases of chest Hernia Castrations Surgical treatment of diseases of digestive system in dogs and cats Surgical treatment of diseases of rectum and anus Surgical treatment of diseases of urinary and sex organs Surgical treatment of diseases of abdomen in ruminants Surgical treatment of colica in horses Surgical oncology Diseases of eyelids, conjunctiva and lacrimal apparatus Diseases of cornea Diseases of middle ocular coat and lens Glaucoma Diseases of retina, vitreous body, optic nerve and eye orbit Prectical training: 1. Examination of the eye
2.6. 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) 2.7. Comments:
2.8. Student responsibilities	

2.9. Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is						
	Class attendance	**0,99**	Research		Practical training	
	Experimental work		Report		(other)	
	Essay		Seminar essay		(other)	
	Tests	**1,76**	Oral exam	2,2	(other)	

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	Participating actively at the exercises students can gain 75 points max., what brings them 10 points in final. Points for performing the following tasks: 25 points = keeping records in the book of a patient in an orderly manner 25 points = keeping records of anaesthesiologic protocols in an orderly manner 25 points = active participation i the work with patients The number of points students must gain in order to earn minimal 5 points is 37,5. Student's participation at the exercises will be checked continuously During the semester a student must attend 30 exercise hours (out of total 45 hours) in order to gain minimal 8 points during the semester. The maximal number of gained points from this evaluation element is 12. During the semester there will be three (3) preliminary 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 preliminary exams (minimal 7 from each preliminary exam) 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 21 points during the semester from preliminary exam has a right to take a makeup preliminary exam covering the units from all programme exercises. The makeup preliminary exam will be organised upon completion of the teaching in the semester. The total number of points at the preliminary exam is 32 (1 point multiply with 0,9696). A student who passes the makeup preliminary exam with more than half of correct answers has a right to take the final exam. Before the final exam students will have chance to make up for exercises and the makeup preliminary exam in case of their excused absence. Minimal conditions for passing the first, second, third and forth evaluation element are summed up and they are worth 36 points all together. 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 written and oral form. In the written form there will be 5 questions, 4 of which must be answered correctly in order to take the oral exam. The maximum number of points that can be gained at the final exam is 40 points, where 4 points = 1 correct answer. The 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 12 (12 points minimal at written as well at oral exam). In case a student does not satisfy at the final part of the exam, the lecturer determines time for re-examination.

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 Clinical web site		web

2.12. Optional literature (at the time of submission of study programme proposal)	- Theresa Fossum - Small Animal Surgery (2018) - Jorg A. Auer, John A. Stick – Equine surgery (2018.) - Noordsy J. L.; Ames N.K. – Food animal surgery (2006.) - Slatter Douglas – Fundamentals of veterinary ophtalmology (2017.)
2.13. Quality assurance methods that ensure the acquisition of exit competences	
2.14. Other (as the proposer wishes to add)	

TOXICOLOGY

1. GENERAL INFORMATION			
1.1. Course teacher	Prof. Andreja Prevendar Crnić, Ph.D.,DVM	1.6. Year of the study programme	4rd
1.2. Name of the course	Toxicology	1.7. Credits (ECTS)	3.5
1.3. Associate teachers	Prof. Emil Srebočan, Ph.D., DVM	1.8. Type of instruction (number of hours L + S + E + e-learning)	24+6+24
1.4. Study programme (undergraduate, graduate, integrated)	integrated	1.9. Expected enrolment in the course	20
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 2 on-line instructions 10%
2. COUSE DESCRIPTION			
2.1. Course objectives	With the knowledge gained at the Toxicology course students will be educated to recognise intoxication in particular animal, approach treating the intoxicated animal, assess the successfulness of treatment, and provide for other possible harmful effects caused by intoxication. Professional sampling and transport of samples for toxicological analysis. Evaluation of the results of chemical toxicological tests in the case of residues according to legislation.		
2.2. 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.		
2.3. Learning outcomes at the level of the programme to which the course contributes	- recognize poisoning - undertake therapeutic measures - evaluate the success of the therapeutic measures - evaluate possible hazardous consequences produced by the poisoning		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	- recognize poisoning - undertake therapeutic measures - evaluate the success of the therapeutic measures - evaluate possible hazardous consequences produced by the poisoning - professional sampling and transport of samples for toxicological analysis - evaluation of the results of chemical toxicological tests in the case of residues according to legislation		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	1 Introduction (technical terms, toxin effects mechanisms, intoxication diagnostics, procedure with intoxicated animal, antidotes, calculation in toxicology, taking and sending of samples to chemical-toxic lab test); 2 Pesticides (insecticides, rodenticides, limacides, herbicides, fungicides); Metals (mercury, lead, copper, zinc, iron, arsenic, selenium, cadmium); 4 Industrial polluters (cyanides and cyanogen plants, fluorine, PCB, dioxins, and other POPs): 5 Nitrogen compounds (urea, ammonia and ammonium salts, nitrates, nitrous compounds); 6 Mycotoxins (hepatotoxins, nephrotoxins, trichitecenes, estrogens, fumonisines); 7 Others (sodium chloride, ethylene glycol, grapes, chocolate); 8 Biological material sampling (taking and sending of samples to toxic lab); 9 Clinical toxicology (bite of poisonous snakes in animals); 10 Sting of hymenopterous insects in animals; 11 Sting or bite of ticks and spiders in animals 12 Nanotoxicology.		

<table>
<tr><td>2.6. 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
X laboratory
☐ work with mentor
☐ (other)</td><td>2.7. Comments:
-</td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="3">Attending lectures, continuous assessment and final exam.</td></tr>
<tr><td>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 colspan="3"><table>
<tr><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</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></td></tr>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="3">Attending lectures
24 HOURS 3 – 6 points
1 double period is worth 0.5 point (1 period = 0,25 point)
In order 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
In order to gain minimal 4 points a student must attend 4 seminars out of 6
Attending exercises
24 HOURS 4 – 6 points
1 double period is worth 0.5 point (1 period = 0.25 point)
In order to gain minimal 4 points a student must attend 8 exercises 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 short oral testa with 2.5- 5 points.
Continuous knowledge checking
20 – 32 points
1st PRELIMINARY EXAM - 16 points max.
2nd PRELIMINARY EXAM - 16 points max.
Checking of knowledge with preliminary exams will be held after completed thematic units at seminares and practically done at exercises.
Final exam
WRITTEN AND ORAL 24 – 40 POINTS
In order to take the final exam a student must gain minimal 16 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:
<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>
</table>

	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.: Veterinary Toxicology: Basic and Clinical Principles. Elsevier, 2018		Department
	2. http://www.ivis.org/library.asp, V. Baesley: Veterinary toxicology,1999		web
	3. Osweiler, G.D.: Toxicology, Williams & Wilkins Philadelphia, Baltimor, 1996		Department
	4. PP presentations of lectures, exercises and laboratory work		LMS
2.12. Optional literature (at the time of submission of study programme proposal)			
2.13. Quality assurance methods that ensure the acquisition of exit competences	Continuous knowledge checking		
2.14. Other (as the proposer wishes to add)			

LIST OF ELECTIVE SUBJECTS

Elective Subjects

Agricultural Economics and Rural Development
Anatomy of Laboratory Animals
Archaeozoology
Basic Anatomy of Bottlenose Dolphin (*Tursiops truncatus*)
Basic Biology and Fundamental Physiology of Marine Mammals
Biology and Ecology of Predators
Breeding and Husbandry of Rabbits and Furbearers
Chemistry of Natural Compounds
Clinical Physiology
Comparative Anatomy of Skeletal System
Comparative Mucosal Immunology
Comparative Nutrition
Conservation and Management of Endangered Species
Cynology and Felinology
Cytometry in Clinical Veterinary Medicine
English for Academic purposes I
English for Academic purposes II
Feed Additives - Health Modulators
Fundamentals of Agronomy
Fundamentals of Ecologic Livestock Breeding
Fundamentals of Physics for Diagnostics Methods
Fundamentals of Scientific Research
Game Zoology
Hunting and Nature Protection
Parasitology in Public Health
Pigeon Keeping and Breeding
Positive Impact of Animals on Human Health
Reptile Morphology
Selected Chapters in Biomedical Physics for Veterinarians
Specific Anatomical Structures of the Locomotor Apparatus of the Horse
Structure and Function of Cell
The Role of Veterinarians at Organic Farms
Veterinary Clinical Microbiology
Veterinary Nuclear Medicine
Veterinary Ethics
Zooecology

AGRICULTURAL ECONOMICS AND RURAL DEVELOPMENT

1. GENERAL INFORMATION			
1.1. Course teacher	Assist. Prof. Denis Cvitković	1.6. Year of the study programme	3
1.2. Name of the course	**Agricultural Economics and Rural Development**	1.7. Credits (ECTS)	2
1.3. Associate teachers	Prof. Marina Pavlak, DVM, PhD, Assoc. Prof Dean Konjević, DVM, PhD	1.8. Type of instruction (number of hours L + S + E + e-learning)	10 + 0 + 20
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 application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
2.1. Course objectives	Explain the meaning of the basic economic terms Explain the relation between rural area and agriculture, as well as the rational of integral and sustainable development of rural area present different theories of agricultural development, general economic, agricultural, regional and rural policy prepare the students for appropriate participation in preparing and implementation of the rural area and agricultural development prepare the students for the appropriate economic analysis methods implementation
2.2. 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
2.3. 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.
2.4. 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 - to compile planned and actual calculations - to compute and interpret the business success indicators
2.5. Course content broken down in detail by weekly class schedule (syllabus)	**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

2.6. Format of instruction:			2.7. 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 × business intelligence (other)	

2.8. Student responsibilities	attending lectures, attending exercises, writing seminar works, participation in exercises and seminars, continuous knowledge checking, final exam

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	0,36	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

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	1. Barkley. A., Barkley. P. (2016): Principles of Agricultural Economics, second edition. Routledge, Oxford, UK.		internet

2.12. Optional literature (at the time of submission of study programme proposal)	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.
2.13. Quality assurance methods that ensure the acquisition of exit competences	Monitoring class attendance, tests, seminar essays, final exam
2.14. Other (as the proposer wishes to add)	

ANATOMY OF LABORATORY ANIMALS

1. GENERAL INFORMATION			
1.1. Course teacher	Prof Damir Mihelić	1.6. Year of the study programme	2nd (second)
1.2. Name of the course	Anatomy of Laboratory Animals	1.7. Credits (ECTS)	2
1.3. Associate teachers	Prof Snježana Vuković, Assist. Mirela Pavić, PhD, DVM, Denis Leiner, DVM, Snježana Ćurković, PhD	1.8. Type of instruction (number of hours L + S + E + e-learning)	6 + 0 + 24
1.4. Study programme (undergraduate, graduate, integrated)	inegrated	1.9. Expected enrolment in the course	25
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 10%
2. COUSE DESCRIPTION			
2.1. Course objectives	Introduce students to the basics of anatomy most commonly used laboratory animals.		
2.2. Course enrolment requirements and entry competences required for the course	Undergraduate courses in anatomy of domestic animals (Anatomy with organogenesis of the domestic animals I., II.)		
2.3. 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.		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1st Overcoming basic principles sectional techniques of laboratory animals 2nd Describe the basic structure of the body most commonly used laboratory animals. 3rd Identify the basic characteristics of comparative anatomical structure of laboratory animals and to compare them with the anatomy of domestic animals 4th Connect knowledge with future professional work in scientific and technical laboratories.		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	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 omphaloentericus 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 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

2.6. Format of instruction:			2.7. 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)	

2.8. Student responsibilities	

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	**0,36**	Research		Practical training	
	Experimental work		Report		Students activity at the exercises	**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	
	1st Attendance 2nd Students activity in training - During maintenance exercises in anatomy, student activity during the exercises is estimated by examining the composition student dissects and setting short questions related section of rat or a short oral presentation on a given topic earlier. 3rd Final Exam - The final exam is conducted by oral examination of the student.

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	Popesko, P., V. Rajtova, J. Horak: Atlas anatomie malyh laboratornych zvierat, 1 Kralik, Morča. Priroda. Bratislava, 1990.		
	Popesko, P., V. Rajtova, J. Horak: Atlas anatomie malyh laboratornych zvierat, 1 Myš, Chrček zlaty. Priroda. Bratislava, 1990.		
	Komarek, V., L. Malinovsky, L. Lemež (1982.): Anatomia avium domesticorum et embryologia galii. Priroda. Bratislava		

2.12. 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.

2.13. Quality assurance methods that ensure the acquisition of exit competences	Regularly conducting .continunous assessement of the students knowledge.
2.14. Other (as the proposer wishes to add)	

ARCHAEOZOOLOGY

1. GENERAL INFORMATION			
1.1. Course teacher	Full Prof. Tajana Trbojević Vukičević	1.6. Year of the study programme	Second year, FOURTH semester
1.2. Name of the course	ARCHAEOZOOLOGY	1.7. Credits (ECTS)	2
1.3. Associate teachers	Associate Prof. Snježana Kužir;	1.8. Type of instruction (number of hours L + S + E + e-learning)	10+5+15
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	Elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1. level (application of VEF-LMS)
2. COUSE DESCRIPTION			
2.1. 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.		
2.2. 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", finish attendance at courses "Anatomy with organogenesis of domestic animals III" and "Comparative anatomy of the skeletal system" Maximum number of students: 20		
2.3. 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.		
2.4. 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.		
2.5. 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) The basics of the skeletal system of mammals and birds (2 hours) The basics of the skeletal system of fish and amphibians (3 hours) Primary and secondary archaezoological analysis (5 hours) Introduction to taphonomy (2 hours) Interpretation of archaeozoological findings (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)

2.6. 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)	2.7. Comments:
2.8. Student responsibilities	Presence at lectures and exercises, activity in exercises, write a seminar essay, passed preliminary exam and final written exam.		

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	**0,36**	Research		Practical training	
	Experimental work		Report		Activity	**0,2**
	Essay		Seminar essay		(other)	
	Tests	**0,64**	Oral exam			
	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.		

2.12. Optional literature (at the time of submission	- KUŽIR, S. (2002): Arheozoološko istraživanje kostiju i zubiju životinja badenske kulture s lokaliteta Vučedol. Znanstveni magistarski rad, Veterinarski fakultet Sveučilišta u Zagrebu, Zagreb.

of study programme proposal)	- 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
2.13. 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.
2.14. Other (as the proposer wishes to add)	

BASIC ANATOMY OF BOTTLENOSE DOLPHIN (*TURSIOPS TRUNCATUS*)

1. GENERAL INFORMATION			
1.1. Course teacher	Assist. Prof. Martina Đuras	1.6. Year of the study programme	2nd year
1.2. Name of the course	**Basic anatomy of the bottlenose dolphin (*Tursiops truncatus*)**	1.7. Credits (ECTS)	2
1.3. Associate teachers	Assist. Prof. Tomislav Gomerčić, Assist. Denis Leiner, DVM, Assist. Kim Kopres, DVM	1.8. Type of instruction (number of hours L + S + E + e-learning)	10 L+ 20 E+0 S
1.4. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate study of veterinary medicine	1.9. Expected enrolment in the course	20 students
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%)	Application of VEF-LMS
2. COUSE DESCRIPTION			
2.1. Course objectives	The course presents the specific morphology of the bottlenose dolphin to veterinary medicine students. The bottlenose dolphin is an endangered species and also the only resident marine mammal in the Adriatic Sea. As a top predator the bottlenose dolphin indicates the health of the Adriatic Sea habitat.		
2.2. 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".		
2.3. Learning outcomes at the level of the programme to which the course contributes	Following successful completion of the course, students will be able to describe basic anatomy of the bottlenose dolphin and participate in community engaged projects in the field of marine mammal conservation.		
2.4. 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: 1. demonstrate and explain basic anatomy of the bottlenose dolphin 2. utilize morphological characteristics of bottlenose dolphin in conservation, management and community engaged projects		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	**Lectures**: 1. Bottlenose dolphin in general and community engaged projects in marine mammal conservation (2 hours), 2. External morphology of the bottlenose dolphin (1 hour), 3. Locomotor apparatus of the bottlenose dolphin (2 hours), 4. Introduction to organic systems of the bottlenose dolphin (3 hours). 5. Introduction to the histology of the bottlenose dolphin (2 hours) **Practicals**: 1. Morphometry of the bottlenose dolphin (2 hours), 2. Skeleton of the bottlenose dolphin (4 hours), 3. Topographic anatomy of the bottlenose dolphin (6 hours), 4. Anatomical dissection of the bottlenose dolphin (6 hours), 5. Histology of the bottlenose dolphin (2 hours)		

2.6. 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)	2.7. Comments:

2.8. Student responsibilities	Students are expected to attend lectures and dissection 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	**0.36**	Research		Practical training	**0.2**
	Experimental work		Report		(other)	
	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

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**
LEATHERWOOD, S., R. R. REEVES (1990): The Bottlenose Dolphin. Academic Press. San Diego.		
RIDGWAY, S. H. (Ed.) (1972): Mammals of the Sea, Biology and Medicine. Charles C Thomas Publisher. Springfield, Illinous, U.S.A.		
PERRIN, W. F., B. WÜRSIG, J. G. M. THEWISSEN (2002): Encyclopedia of Marine Mammals. Academic Press. San Diego.		
JEFFERSON, T. A., S. LEATHERWOOD, M. A. WEBBER (1993): Marine Mammals of the World. UNEP, FAO. Rome		

2.12. Optional literature (at the time of submission of study programme proposal)	BERTA, J. L. SUMICH (1999): Marine Mammals, Evolutionary Biology. Academic Press. San Diego. ELLIS, R. (1996): Dolphins and Porpoises. Alfred K. Knopf. NewYork.
2.13. Quality assurance methods that ensure the acquisition of exit competences	Final oral exam
2.14. Other (as the proposer wishes to add)	

BASIC BIOLOGY AND FUNDAMENTAL PHYSIOLOGY OF MARINE MAMMALS

1. GENERAL INFORMATION			
1.1. Course teacher	Assistant professor Tomislav Gomerčić	1.6. Year of the study programme	2.
1.2. Name of the course	Basic Biology and Fundamental Physiology of Marine Mammals	1.7. Credits (ECTS)	2
1.3. Associate teachers	Assistant professor Martina Đuras	1.8. Type of instruction (number of hours L + S + E + e-learning)	P7+S8+V15 +e0
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 application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	2, 10%

2. COUSE DESCRIPTION			
2.1. Course objectives	Introducing the students with marine mammal species, basics of their biology and physiology.		
2.2. Course enrolment requirements and entry competences required for the course	Passed exam in Zoology		
2.3. Learning outcomes at the level of the programme to which the course contributes	Students will learn about basic biology of marine mammals that are present in the Adriatic sea, their physiology and adaptations for the life in aquatic habitat, and their role in the ecosystem.		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	- knowledge about marine mammal physiology - knowledge about marine mammal biology - knowledge about marine mammal physiological adaptations for life in the aquatic habitat - ability to estimate physiological condition of marine mammals - ability to participate in projects of socially useful learning to protect marine mammals		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	Pinnipedia basic biology and physiology; Cetacea basic biology and physiology; Sirenia basic biology and physiology; Monachus basic biology and physiology; Monachus monachus; Mysticeti basic biology and physiology; Tursiops truncatus basic biology and physiology.		
2.6. Format 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 ☐ laboratory ☐ work with mentor ☐ (other)	2.7. Comments:

2.8. Student responsibilities						
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	**0,36**	Research		Practical training	
	Experimental work		Report		**Activity** (other)	**0,2**
	Essay		Seminar essay		(other)	
	Tests	**0,64**	Oral exam	0,8		
	Written exam	0,3	Project		(other)	
2.10. Grading and evaluating student work in class and at the final exam	Seminar, written and 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**
	Scinetific papers and lectures available as PDF documents		web

2.12. Optional literature (at the time of submission of study programme proposal)	135 scientific publications available at http://www.vef.unizg.hr/dolphins/radovi/popis.htm
2.13. Quality assurance methods that ensure the acquisition of exit competences	Seminar, written and oral exam
2.14. Other (as the proposer wishes to add)	

BIOLOGY AND ECOLOGY OF PREDATORS

1. GENERAL INFORMATION			
1.1. Course teacher	Prof Josip Kusak	1.6. Year of the study programme	The second year
1.2. Name of the course	**Biology and Ecology of Predators**	1.7. Credits (ECTS)	2
1.3. Associate teachers	Assoc. Prof Tomislav Gomerčić, Assist. Prof Magda Sindičić	1.8. Type of instruction (number of hours L + S + E + e-learning)	L=8; S=4; E=18
1.4. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate studies	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%)	2 i.e. 10%
2. COUSE DESCRIPTION			
2.1. Course objectives	The aim is to give students the right perspective of 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 that predators have their ecological role in keeping the ecosystem in balance. Humans are also close to the top of 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.		
2.2. Course enrolment requirements and entry competences required for the course	The subject Biology and ecology of predators is at the second 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.		
2.3. Learning outcomes at the level of the programme to which the course contributes	- recognizing predation at different trophic levels - knowing biological features of predatory species		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	- 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 by the use of simulation models of food chains - understand the value of large carnivores for the stability and diversity of ecosystems		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	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 studies of large carnivores:		

<table>
<tr><td></td><td colspan="6">study ex-situ and in-situ, methods of capturing, handling, marking, sampling and tracking. Use of radio-telemetry. Practical work in the Zoo and in the field.</td></tr>
<tr><td>2.6. 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 (in the case of having less than ten students enrolled)
☐ (other)</td><td>2.7. Comments:</td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="6">Attending lectures, seminar and field work. Preparing, presenting and defending one seminar.</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>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>
<tr><td>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">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="2">2.11. Required literature (available in the library and via other media)</td><td colspan="3">Title</td><td colspan="2">Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="3">All study material available in Power point format</td><td colspan="2"></td><td>Files on LMS</td></tr>
<tr><td>2.12. Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">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>2.13. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">Attendance to classes, seminar work and exam.</td></tr>
<tr><td>2.14. Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

BREEDING AND HUSBANDRY OF RABBITS AND FURBEARERS

1. GENERAL INFORMATION			
1.1. Course teacher	Ekert Kabalin Anamaria, PhD, Full Professor	1.6. Year of the study programme	3rd
1.2. Name of the course	**Breeding and Husbandry of Rabbits and Furbearers**	1.7. Credits (ECTS)	2
1.3. Associate teachers	Velimir Sušić, PhD, Full Professor Sven Menčik, PhD, Assistant Professor Maja Maurić, PhD, Assistant Professor Ivan Vlahek, VMD	1.8. Type of instruction (number of hours L + S + E + e-learning)	3L + 2E + 25S (as e-learning)
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	elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction	2, 80%

2. COUSE DESCRIPTION	
2.1. 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.
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	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).
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	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

<table>
<tr><td rowspan="10">2.5. Course content broken down in detail by weekly class schedule (syllabus)</td><td>Methodological unit / course content</td><td>class schedule (lectures + exercises + seminars + e-learning)</td></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>
<tr><td>Production and breeding of Nutria (Origin and types of Nutria. Systems of breeding and production.)</td><td>0,5 L + 2 S(e-learning)</td></tr>
<tr><td>Breeding of different cage-pets (rabbit, mouse, rat, guinea pig, hamster, chinchilla, degu)</td><td>0,5 L + 0,5 E + 3 S(e-learning)</td></tr>
<tr><td></td><td></td></tr>
<tr><td>2.6. Format of instruction:</td><td colspan="2">☒ 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)</td><td>2.7. Comments:
-</td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="3">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.</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>0,1</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>0,1</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td>0,3</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>0,5</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="5">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.</td></tr>
</table>

		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

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and 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
2.12. Optional literature (at the time of submission of study programme proposal)			
2.13. 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.		
2.14. Other (as the proposer wishes to add)			

CHEMISTRY OF NATURAL COMPOUNDS

1. GENERAL INFORMATION			
1.1. Course teacher	Assist. Prof Luka Krstulović	1.6. Year of the study programme	1-6
1.2. Name of the course	**Chemistry of Natural Compounds**	1.7. Credits (ECTS)	2
1.3. Associate teachers		1.8. Type of instruction (number of hours L + S + E + e-learning)	L-15+S-9+E-6
1.4. Study programme (undergraduate, graduate, integrated)	integrated	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%)	
2. COUSE DESCRIPTION			
2.1. Course objectives	The course Chemistry of natural compounds comprises topics of natural organic compounds that are not included or that are not covered in detail in the compulsory course Medical Chemistry in the 1st semester. Elective course should rise the level of basic knowledge of students in the field of organic chemistry, which are necessary for monitoring and mastering the teaching contents in Biochemistry, Physiology and other subjects at the integrated and postgraduate studies, in which more solid knowledge of the structure and chemical properties of biological important compounds is needed. Knowledge of the structure and properties of some important natural products and their biosynthesis mechanisms will enable better understanding of complex chemical changes which occur in animals and plants.		
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	Learning outcomes at the level of the programme: Understanding the basic science on which veterinary medicine is based 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 The ability of use laboratory equipment and make critical analysis of test results The ability of consolidation of the theoretical knowledge and practical skills within the fields of veterinary medicine The ability of conduct independent research and work in team The ability of presenting the results – oral and writing		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Learning outcomes at the level of the course: student will be familiar with major groups of natural compounds- secondary metabolites student will be able to made connections between structure and potential activity of secondary metabolites; students will be able to compare biosynthetic pathways and laboratory preparations of the important natural compounds; student will be able to independently use methods for extraction of compounds from natural material; student will be able to propose methods for separation of compounds from mixture based on their physical-chemical properties		

2.5. Course content broken down in detail by weekly class schedule (syllabus)	Definition and classification of secondary metabolits. Vitamins, terpenes, carbohydrates, steroids, alkaloids – clasiffication and biosynthesis of the compounds within each group, laboratory synthesis of natural compounds as well as compounds whose designe and prepare was based on their structure or biological activity. Indentifiction and separation tehniques, examples of laboratory and industrial synthesis of organic compounds, example of their use in human and veterinary medicine, and their impact on human and animal health. Isolation and indentification of natural products (Isolation of alkaloids (caffeine) from biological material). Determination of bioactive composition of herbal infusions.					
2.6. 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 x laboratory ☐ work with mentor ☐ (other)		2.7. Comments:	
2.8. Student responsibilities	1. attending lectures 2. attending exercises 3. participation at 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	0.36	Research		Practical training	
	Experimental work	0.2	Report		Activity	0.64
	Essay		Seminar essay		(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	After they attended the course, students submit the seminar on the topic that is previously selected in consultation with the professor. Grade of seminar and laboratory exercises form a final grade					

2.11. Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	F. A. Carey (2003): Organic chemistry, McGrawHill, New York	5	Yes
	J. G. Smith (2006): Organic chemistry, McGrawHill, New York	5	No
	J. Mann, R. S. Davison, J. B. Hobss, D. V. Banthorpe and J. B. Harborne (1996): Natural Products, Their Chemistry and Biological Significance, Longman, London	1	No
	F. A. Bettelheim, W. H. Brown, J. March (2004): Introduction to General, Organic and Biochemistry, Thomson	1	No

2.12. Optional literature (at the time of submission of study programme proposal)	Web
2.13. Quality assurance methods that ensure the acquisition of exit competences	Student survay
2.14. Other (as the proposer wishes to add)	

CLINICAL PHYSIOLOGY

1. GENERAL INFORMATION			
1.1. Course teacher	Prof. Jasna Aladrović, DVM	1.6. Year of the study programme	4
1.2. Name of the course	Clinical Physiology	1.7. Credits (ECTS)	2
1.3. Associate teachers	Prof. Zvonko Stojević, DVM; assist. prof. Lana Vranković, DVM	1.8. Type of instruction (number of hours L + S + E + e-learning)	15L+ 15E
1.4. Study programme (undergraduate, graduate, integrated)	integrated	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%)	-
2. COUSE DESCRIPTION			
2.1. 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.		
2.2. Course enrolment requirements and entry competences required for the course	Attended lectures of Physiology of Domestic Animals I and II		
2.3. Learning outcomes at the level of the programme to which the course contributes	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.		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	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.		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	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.

2.6. Format of instruction:			2.7. 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)	

2.8. Student responsibilities	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.

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	0,3	Research		Practical training	0,6
	Experimental work		Report		(other)	
	Essay		Seminar essay	0,3	(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**
	Feldmen, B. F., J. G. Zinkl, N. M. Jain: Shalm's Veterinary Hematology. Fifth edition, Ed. Lippincott Williams & Wilkins, A. Wolters Kluwers Companz, 2000.	1	
	Kaneko, J. J., J. W. Harvey, M. L. Bruss: Clinical Biochemistry of Domestic Animals. Fifth edition, Ed. Academic Press. San Diego, London, Boston, New York, Sydney, Tokyo, Toronto 1997.	1	
	Keer, M. G. (2004): Veterinary Laboratory Medicine. 2nd edition, Elsevier, Mosby	1	

2.12. Optional literature (at the time of submission of study programme proposal)	Payne, J. M., S. Payne: The metabolic profile test. Oxford University Press. Oxford-New York-Tokyo, 1987. Halliwel, B., J. M. C. Gutteridge (1999): Free radicals in biology and medicine. 3rd edition. 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 Edition, Elsevier Saunders SAD.
2.13. Quality assurance methods that ensure the acquisition of exit competences	Students anonymous poll

2.14. Other (as the proposer wishes to add)	

COMPARATIVE ANATOMY OF SKELETAL SYSTEM

1. GENERAL INFORMATION			
1.1. Course teacher	Prof. Tajana Trbojević Vukičević	1.6. Year of the study programme	Second year, third semester
1.2. Name of the course	**Comparative Anatomy of Skeletal System**	1.7. Credits (ECTS)	2
1.3. Associate teachers	Assoc. Prof. Snježana Kužir; Ivan Alić, DVM, junior researcher (with the prior approval of the Faculty Council)	1.8. Type of instruction (number of hours L + S + E + e-learning)	10+0+20
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	Elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1. level (application of VEF-LMS)

2. COUSE DESCRIPTION	
2.1. 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.
2.2. 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
2.3. 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.
2.4. 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: **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.
2.5. Course content broken down in detail by weekly class schedule (syllabus)	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)					
2.6. 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)		2.7. Comments:		
2.8. Student responsibilities	Presence at lectures and exercises. Activity in exercises. Passed preliminary exam and final oral exam.					
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	**0,36**	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	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.					
2.12. 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.					
2.13. 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.					
2.14. Other (as the proposer wishes to add)						

COMPARATIVE MUCOSAL IMMUNOLOGY

1. GENERAL INFORMATION			
1.1. Course teacher	Full Prof. Maja Popović	1.6. Year of the study programme	3
1.2. Name of the course	**Comparative Mucosal Immunology**	1.7. Credits (ECTS)	2
1.3. Associate teachers	Full Prof. Ksenija Vlahović	1.8. Type of instruction (number of hours L + S + E + e-learning)	15+5+10
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 application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	10%
2. COUSE DESCRIPTION			
2.1. Course objectives	Students will be able to recognize and understand the basic principles of mucosal immunology within veterinary medicine and public health.		
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	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.		
2.4. 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.		
2.5. 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. 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).		

<table>
<tr><td></td><td colspan="6">4. Methods for evaluation of mucosa immunocompetence.</td></tr>
<tr><td>2.6. 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>. Comments:</td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="6">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">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>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>
<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 “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 3 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 6 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 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</td></tr>
</table>

<table>
<tr><td></td><td>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><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 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 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.</td><td></td><td></td></tr>
<tr><td>2.12. Optional literature (at the time of submission of study programme proposal)</td><td colspan="3"></td></tr>
<tr><td>2.13. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">Continuous oral and written checking of acquired knowledge</td></tr>
<tr><td>2.14. Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

COMPARATIVE NUTRITION

1. GENERAL INFORMATION			
1.1. Course teacher	Full professor Tomislav Mašek	1.6. Year of the study programme	4th
1.2. Name of the course	Comparative Nutrition	1.7. Credits (ECTS)	1
1.3. Associate teachers	Full professor Željko Mikulec, assistant professor Diana Brozić	1.8. Type of instruction (number of hours L + S + E + e-learning)	5+6+4
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	Elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	2nd level, 10%
2. COUSE DESCRIPTION			
2.1. 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		
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	• 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		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	• to classify animals according to Hoffman and analyze the implications to nutrition of animals in zoos and intensive production • to identify animal species according to the strategy of digestion and digestive physiology • to assess the suitability of animals as models in biomedical research according to feeding strategy and physiology of the digestive system • knowledge of specific strategies of animal nutrition and to conclude how these can affect diet of domestic animals • to represent the opinion of the role of veterinarians in the diet of modern man and ancient nutrition linked to today's diseases		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	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)

2.6. Format of instruction:			2.7. Comments:
	☒ 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)	

2.8. Student responsibilities	

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	**0.05**	Research		Practical training	
	Experimental work		Report	**0.2**	(other)	
	Essay		Seminar essay	**0.5**	(other)	
	Tests		Oral exam	**0.25**	(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**
	Cheeke, PR, Dierenfeld ES (2010) Comparative animal nutrition and metabolism, CABI		

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

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

2.14. Other (as the proposer wishes to add)	

CONSERVATION AND MANAGEMENT OF ENDANGERED SPECIES

1. GENERAL INFORMATION			
1.1. Course teacher	Prof Josip Kusak	1.6. Year of the study programme	1
1.2. Name of the course	**Conservation and Management of Endangered Species**	1.7. Credits (ECTS)	1
1.3. Associate teachers	Prof Josip Kusak, Assoc. Prof Tomislav Gomerčić	1.8. Type of instruction (number of hours L + S + E + e-learning)	0+0+15
1.4. Study programme (undergraduate, graduate, integrated)	integrated	1.9. Expected enrolment in the course	
1.5. Status of the course	Facultative (elective)	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1, 10%
2. COUSE DESCRIPTION			
2.1. 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.		
2.2. Course enrolment requirements and entry competences required for the course	none		
2.3. 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		
2.4. 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		
2.5 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 world wide 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.					
2.6. 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)		2.7. Comments:	
2.8. Student responsibilities	Attending lectures, preparing from materials on LMS, preparing, presenting and defending the seminar					
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** (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.					

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and via other media)	Majić-Skrbinšek, A. (ed.) 2005. Lynx management plan for Croatia. Državni zavod za zaštitu prirode, Zagreb	10+WEB	
	Štrbenac, A. (ed.) 2005. Wolf management plan for Croatia. Državni zavod za zaštitu prirode, Zahreb	10+WEB	
	Iviček, B. (ed.) 20.05. Brown bear management plan for Croatia. Ministarstvo poljoprivrede, šumarstva i vodnog gospodarsta, Zagreb	10+WEB	

2.12. 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
2.13. Quality assurance methods that ensure the acquisition of exit competences	Attendance of seminars and exam.
2.14. Other (as the proposer wishes to add)	-

CYNOLOGY AND FELINOLOGY

1. GENERAL INFORMATION			
1.1. Course teacher	Prof Niksa Lemo	1.6. Year of the study programme	4
1.2. Name of the course	Cynology and Felinology	1.7. Credits (ECTS)	2,0
1.3. Associate teachers	/	1.8. Type of instruction (number of hours L + S + E + e-learning)	20 L, 10 E
1.4. Study programme (undergraduate, graduate, integrated)	Undergraduate	1.9. Expected enrolment in the course	
1.5. Status of the course	active	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 goal of the course in Cynology and Felinology is educated students with the particular characteristics of pure bred dog and cats in terms of breed variation and the specifics of inheritance, breeding, and training.
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)	During the course of the semester, students become acquainted with the biological origins of dogs and cats; this knowledge will help them in the understanding future patients, observing specific symptoms, harmonization of treatment and easiest talking with owner. 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.
2.5. 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).
2.6. 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)
2.7. Comments:	
2.8. Student responsibilities	

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		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	

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and 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		
2.12. Optional literature (at the time of submission of study programme proposal)	1. J. Anne Helgren (2013) Encyclopedia of Cat Breeds 2. D. Caroline Coile (2015) Encyclopedia of Dog Breeds		
2.13. Quality assurance methods that ensure the acquisition of exit competences			
2.14. Other (as the proposer wishes to add)			

CYTOMETRY IN CLINICAL VETERINARY MEDICINE

1. GENERAL INFORMATION			
1.1. Course teacher	Full prof. Maja Popović, PhD	1.6. Year of the study programme	2
1.2. Name of the course	**Cytometry in Clinical Veterinary Medicine**	1.7. Credits (ECTS)	2
1.3. Associate teachers	Full prof. Ksenija Vlahović, PhD Full prof. Maja Popović, PhD Assistant prof. Daniel Špoljarić, PhD	1.8. Type of instruction (number of hours L + S + E + e-learning)	0+15S+15E
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 application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	10%
2. COUSE DESCRIPTION			
2.1. 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.		
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	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.		
2.4. 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.		
2.5. 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 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		

<table>
<tr><td></td><td colspan="6">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>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>2.8. Student responsibilities</td><td colspan="6">Attending seminar and lab exercises. Preparing for lab from materials on LMS. Preparing, presenting and defending one seminar.</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>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>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>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 10 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 9 hours of practices in order to gain 7 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 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</td></tr>
</table>

<table>
<tr><td></td><td>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.
<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>2.11. 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></td><td>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.</td><td></td><td></td></tr>
<tr><td>2.12. Optional literature (at the time of submission of study programme proposal)</td><td colspan="3"></td></tr>
<tr><td>2.13. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">Continuous oral and written checking of acquired knowledge</td></tr>
<tr><td>2.14. Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

ENGLISH FOR ACADEMIC PURPOSES I

1. GENERAL INFORMATION			
1.1. Course teacher	Dubravka Vilke-Pinter, Ph.D.	1.6. Year of the study programme	1
1.2. Name of the course	English for academic purposes I	1.7. Credits (ECTS)	4
1.3. Associate teachers		1.8. Type of instruction (number of hours L + S + E + e-learning)	5 hours of L+ 40 hours of S+ 15 hours of E
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 application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
2.1. Course objectives	The course English for Academic Purposes I is specially designed for the target group of learners, that is students of veterinary medicine. The general objective of the course is to develop students' overall written and oral competence in English to enable them to communicate efficiently in a professional setting. Special empahsis is given to professional literature analysis. Texts from various information sources (manuals, professional and scientific journals, popular magazines, web pages) are analysed to acquaint students with various types of discourse. Students are acquainted with texts belonging to ***different*** genres and having different content, function, and style (summary, report, discussion, essay, etc.), as well as with the language structures typically used in technical texts. Students develop text organisation skills through paragraph and essay writing, as well as the abilities to design and deliver well structured and clear oral presentations
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	The course focuses on assisting students in developing the skills to speak and write effectively and fluently, using standard English. By getting acquainted with the veterinary medical terminology as well as with the different types of discourse, in particular with the academic texts, students improve their technical knowledge, that is language used specifically in the field of veterinary medicine, but also their ***overall*** academic performance, developing skills that are necessary to become independent and efficient readers and users of relevant professional literature, as ell as fluent speakers in an English speaking professional setting.
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	student will/ be able to recognise different types of academic writing develop skills necessary to analyse structure different of forms of writing (essay, summary, presentation) be able to use various sources of information (web databases, scientific and professional journals) to efficiently use various language means to acheive text cohesion to participate in discussions, follow continuous argument in an academically accepteble manner

2.5. Course content broken down in detail by weekly class schedule (syllabus)	1st methodological unit: basic characteristics of academic style. Types of professional and academic texts: scientivic papers, professional papers, reports, summaries, presentations, essays, projects. 2 ndmethodological unit: Structure and organisation of academic text. Main parts of an academic paper. 3rd methodological unit: Reading comprehension skills: skimming, scanning, intensive reading. 4th methodological unit: Achieving cohesion at the discourse level (sentence, paragraph, text). 5th methodological unit (4hours): Basic types of cohesive devices and their function. 6th methodological unit: Expressing time relations. Examples from various texts in the field of veterinary medicine. Reformulation. Examples from various texts in the field of veterinary medicine 7th methodological unit: Expressing causality. Examples from various texts in the field of veterinary medicine. Expressing contrast. Examples from various texts in the field of veterinary medicine. 8th methodological unit: Describing processes and procedures. Examples from various texts in the field of veterinary medicine 9th methodological unit: Defiinitions, simple definitions, academic definitions, extended definitions. 10th methodological unit: Professional and scientific journals – online data bases. 11th methodological unit: Writing essays and reports. Struture of an essay. 12th methodological unit: Literature reviews; Quoting; Paraphrasing. 13 th methodological unit: Oral presentations. Data interpretation. 14th methodological unit: Oral presentations. Producing generalisation. Careful reasoning. Stating facts/expressing opinions. 15th methodological unit: Data interpretation. Interpreting graphical presentations. Classifications and exemplification. 16th methodological unit: Oral presentations. Planning a presentation. Identifying goals and aims of presentations. Providing feedback on presentations.

2.6. Format of instruction:			2.7. Comments:
	☐ lectures X ☐ 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)	

2.8. Student responsibilities	

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		Class participation	0,10
	Essay		Seminar essay	0,32	(other)	
	Tests		Oral exam		(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	1. exercises attendance 2. class participation 3. continual assessment 4. final exam		
Type of activity		**Minimal points**	**Maximal points**
Lectures attendance	5 hourly classes	2 coeficient = 0,6 Students mus attend at least 3 hourly classes to achieve minimum number of points	3

	Exercises attendance	15 hourly classes	3 coeficient = 0,33 (5/15) Students must attend at least 9 hourly classes to achieve minimum number of points.	5
	Seminar attendance	40 hourly classes	6 coeficient = 0,25 (10/40) Students must attend at least 24 out of 40 hourly classes to acheieve minimum number of points	10
	Class participation		6 coefficient = 0,17 (10/60 = 0,17) Students must earn at least 5 points out of maximum 10 by actively participating at classes. students complete various assigmenents for which they can earn points.	10
	Continual assessment		20 Students deliver their oral presentations.	32
	Final exam		24 Having read an original academic paper of their own choice students write a reading report which they present in class	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).		

	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. (2017). English for Academic Purposes (Part 1) . reading materials. Each student receives his/her copy of the materials.	3	
2.12. Optional literature (at the time of submission of study programme proposal)	- Benesch, S. (2001). Critical **English** for **Academic** Purposes. Lawrence Erlbaum Coffin. - Byrd, P., Murphy, J. (2006). Essentials of Teaching Academic Oral Communication (English for **Academic** Success). - Glendinning, E. H. Holmstrom, B. (2004). English for Academic Purposes: Study Reading. Cambridge University Press. - Jordan, R. R. (1999). Academic Writing Course, Study Skills in English. Longman. - McCarthy, M & O'Dell, F (2008). Academic Vocabulary in Use. Vocabulary Reference and Practice. Self-study and Classroom Use. Cambridge: CUP. - McCormack, J. (2005). English for Academic Study. Garnet Publishing Ltd. Garnet Education. - ***Porter***. ***D*** & C Black (2007). Check your Vocabulary for Academic English. A & C Black Publishers Ltd. - Wallace M. J. (2004). Study Skills in English: Cambridge University Press.		

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

ENGLISH FOR ACADEMIC PURPOSES II

1. GENERAL INFORMATION			
1.1 Course teacher	Dubravka Vilke-Pinter, Ph.D.	1.6. Year of the study programme	2
1.2. Name of the course	English for academic purposes II	1.7. Credits (ECTS)	4
1.3. Associate teachers		1.8. Type of instruction (number of hours L + S + E + e-learning)	5 hours of L + 40 hours of S + 15 hours of E
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 application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
2.1. Course objectives	The object of the course is to develop further in the student a competence in using English both actively and receptively in order to be able to extract information from written and oral texts and from visual forms of presentation. In other words, the aim of the course is to improve in students both oral and written communication skills which will enable them to to effectively communicate in a professional setting, and competently use veterinary medical professional literature. Through analysis of the texts from various information sources (manuals, professional and academic journals, online databases) and of different functional styles, students get acquainted with various types of discourse and the pertaining language structures. Special emphasis is given to developing written competence in English, i.e. skills and strategies for generating different forms of writing (summary, essay, etc.), as well oral communication skills and techniques necessary fpr designg and delivering a well structured and clear oral presentations. Students are also encouraged to take part in discussions and follow continuous argument		
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	The course focuses on assisting students in developing the skills to speak and write effectively and fluently, using standard English. By getting acquainted with the veterinary medical terminology as well as with the different types of discourse, in particular with the academic texts, students improve their technical knowledge, that is language used specifically in the field of veterinary medicine, but also their ***overall*** academic performance, developing skills that are necessary to become independent and efficient readers and users of relevant professional literature, as ell as fluent speakers in an English speaking professional setting.		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	student will/ be able - to analyse different types of forms of academic writing and their functional styles - to use various sources of information (online databases, scientific and professional journals) - compose various forms of professional writining English, by using knowledge about the organisation and structure of various types of discourse. - to compose well structured and coherent oral presentations		

	- to participate in discussions and follow continuous argument in an academically accepteble manner
2.5. Course content broken down in detail by weekly class schedule (syllabus)	1. methodological unit: Analysis of the structure of academic and technical text. Correct usage of language devices used to achieve text cohesion. Topic: Health and causative agents of diseases. Control and eradication of diseases. Topic: Zoonoses - Rabies; Foot and mouth disesase; Anthrax; BSE; Swine fever; Avian influenza; Malaria. 2nd methodological unit: Writing skills: Essay: Structure of the essay. Topic: Farm animals. Laboratory animals. 3rd Methodological unit: Interpretation of data: Interpreting graphical forms of presentations. 4th methodological unit: Summary: Structure of a summary. Writing an effective summary. 5th methodological unit: Oral presentations: Developing oral skills. Planning oral presentations. Goals and aims of presentations. Analysis of various presentations. 6th Methodological unit: Delivering presentations. Types and methods of communication. Error anlysis. Topic. Laboratory animals. 7. Methodological unit: Delivering presentations. Practising presentation skills. Discussion: argumentative speech. Topics: Cloning. Genetic engineering: benefits and perspectives. 8. Methodological unit: Students' presentations. Error anlysis. Topic: Endangered species. Protection of endangered species. Presentation of topics of students' own choice. 9. Methodological unit: Students' presentations. Error anlysis. Topic: Small animals. Pets. Keeping pets. Working animals. Presentation of topics of students' own choice. Surveys, questionnaires and projects. Reports. 7th. Methodological unit. Legal language.Topic: Legislative norms in veterinary medicine, coping with translation problems; negative transfer from Croatian.
2.6. 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)
2.7. Comments:	
2.8. Student responsibilities	

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		Class participation	0,10
	Essay		Seminar essay	0,40	(other)	
	Tests		Oral exam		(other)	
	Written exam	0,60	Project		(other)	

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

	Assessment elements		
Overall grade elements	1. exercises attendance 2. class participation 3. continual assessment 4. final exam		
Type of activity		**Minimal points**	**Maximal points**
Lectures attendance Exercises attendance	5 hourly classes	2 coeficient = 0,6 Students mus attend at least 3 hourly classes to achieve minimum number of points	3

		15 hourly classes	3 coeficient = 0,33 (5/15) Students must attend at least 9 hourly classes to achieve minimum number of points.	5
	Seminar attendance	40 hourly classes	6 coeficient = 0,25 (10/40) Students must attend at least 24 out of 40 hourly classes to acheieve minimum number of points	10
	Class participation		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 = 0,17) (10/60 = 0,17)	10
	Continual assessment		20 Students deliver their oral presentations.	32
	Final exam		24 Having read an original academic paper of their own choice students write a reading report which they present in class	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)		

	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. (2017). English for Academic Purposes (Part 2) . reading materials. Each student receives his/her copy of the materials.	3	

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

- Benesch, S. (2001). Critical *English* for *Academic* Purposes. Lawrence Erlbaum Coffin.
- *Byrd, P., Murphy, J. (2006). Essentials of Teaching Academic Oral Communication* (English for *Academic* Success).
- Glendinning, E. H. Holmstrom, B. (2004). English for Academic Purposes: Study Reading. Cambridge University Press.
- Jordan, R. R. (1999). Academic Writing Course, Study Skills in English. Longman.
- McCarthy, M & O'Dell, F (2008). Academic Vocabulary in Use. Vocabulary Reference and Practice. Self-study and Classroom Use. Cambridge: CUP.
- McCormack, J. (2005). English for Academic Study. Garnet Publishing Ltd. Garnet Education.
- *Porter*. *D* & C Black (2007). Check your Vocabulary for Academic English. A & C Black Publishers Ltd.
- Wallace M. J. (2004). Study Skills in English: Cambridge University Press.

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

FEED ADDITIVES - HEALTH MODULATORS

1. GENERAL INFORMATION			
1.1. Course teacher	Full professor Željko Mikulec, DVM, PhD	1.6. Year of the study programme	3rd
1.2. Name of the course	Feed Additives - Health Modulators	1.7. Credits (ECTS)	1
1.3. Associate teachers	Associate Professor Hrvoje Valpotić, DVM, PhD Diana Brozić, DVM, PhD	1.8. Type of instruction (number of hours L + S + E + e-learning)	3L + 2S +10E
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	Elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	2nd level, 10%

2. COUSE DESCRIPTION	
2.1. 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
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	• synthesize current knowledge about different feed additives • assess the implications of feed additives application in modern animal production
2.4. 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
2.5. 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.)					
2.6. 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)		2.7. Comments:	
2.8. Student responsibilities						
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**	**0,20**
	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	Written 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**
	Adams C. A. (1999.): Nutricines. Food components in health and nutrition. Nottingham University Press, Nottingham		
	Adams C. A. (2002.): Total Nutrition. Feeding animals for health and growth. Nottingham University Press, Nottingham		

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

FUNDAMENTALS OF AGRONOMY

1. GENERAL INFORMATION			
1.1. Course teacher	Željko Pavičić, DVM, PhD, Full Professor	1.6. Year of the study programme	II
1.2. Name of the course	Fundamentals of agronomy	1.7. Credits (ECTS)	2,5
1.3. Associate teachers	Gordana Gregurić Gračner, PhD, Associate Professor; Mario Ostović, PhD, Assistant Professor	1.8. Type of instruction (number of hours L + S + E + e-learning)	L 12+ S 11+ E 7
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	Elective course	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
2.1. 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.
2.2. 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.
2.3. Learning outcomes at the level of the programme to which the course contributes	Understanding of agroecological fundamental facts in plant production
2.4. 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 -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
2.5. Course content broken down in detail by weekly class schedule (syllabus)	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).

2.6. Format of instruction:	X lectures X seminars and workshops X exercises ☐ on line in entirety ☐ partial e-learning ☐ field work	☐ independent assignments X multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	2.7. 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

2.8. Student responsibilities	1. attending lectures 2. attending exercises 3. attending seminars 4. participation at exercises and seminars 5. continuous knowledge checking 6. final exam

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	0,45	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.		

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

2.13. 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 (a student must attend minimal 6 lecture hours in order to gain minimal 3 points)	**6** 6/12 = 0,5 (coefficient 0,5)
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)
[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>
2.14. Other (as the proposer wishes to add)	

FUNDAMENTALS OF ECOLOGIC LIVESTOCK BREEDING

1. GENERAL INFORMATION			
1.1. Course teacher	Assist. Prof Mario Ostović, PhD	1.6. Year of the study programme	II
1.2. Name of the course	Fundamentals of Ecologic Livestock Breeding	1.7. Credits (ECTS)	2
1.3. Associate teachers	Prof. Željko Pavičić, PhD, Prof. Kristina Matković, PhD, Assoc. Prof Gordana Gregurić Gračner, PhD,	1.8. Type of instruction (number of hours L + S + E + e-learning)	L 10+S 5+E 15
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	Elective course	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
2.1. Course objectives	In this course students have possibility to meet basic characteristics of domestic animal breeding in ecologically accepted way, and the role of veterinary profession 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, breeding methods, animal housing and feeding, effects of ecologic production on environment, animal health protection and treating as well as veterinary-sanitary control of foodstuffs of animal origin in ecologic production. Better competencies in ecologic livestock breeding can be gained by vertical integration of this area through specific course in postgraduate study.		
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	- knowledge on law regulations in ecologic livestock breeding - knowledge on animal species and breeds acceptable for ecologic production - basic knowledge on breeding methods, animal housing and feeding in ecologic production - basic knowledge on effects of ecologic production on environment - basic knowledge on animal health protection and treating as well as veterinary-sanitary control of foodstuffs of animal origin in ecologic production		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After successful completion of the course the students: - will have basic knowledge on law regulations in ecologic livestock breeding - could enumerate animal species and breeds acceptable for ecologic production - will have basic knowledge on breeding methods, animal housing and feeding in ecologic production - will have basic knowledge on effects of ecologic production on environment - will have basic knowledge on animal health protection and treating as well as veterinary-sanitary control of foodstuffs of animal origin in ecologic production		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	1. Introduction; 2. Animal species and breeds and size of ecologic livestock production in Croatia and world; 3. Animal breeding methods 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 forages		
2.6. 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 ☐ work with mentor ☐ (other)	2.7. Comments:
2.8. Student responsibilities	1. attending lectures 2. attending exercises 3. attending seminars 4. participation at exercises and seminars 5. continuous knowledge checking 6. final exam		

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)						
	Attending lectures	0,12	Research		Practical training	
	Experimental work		Report		Attending seminars	0,12
	Essay		Seminar essay		Attending excersises	0,12
	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**
Andersen, A. B. (2000): Science in agriculture: advanced methods for sustainable farming. 2nd edition. Acres, USA.		Internet
Dawkins, M. S., R. Bonney, Eds. (2008): The future of animal farming: renewing the ancient contract. Blackwell Publishing, USA.		
Dupree, G. (2010): Homeopathy in organic livestock production. Acres, USA.		
Ekarius, C. (1999): Small-scale livestock farming: a grass-based approach for health, sustainability, and profit. Storey Publishing, LLC, MA, USA.		
Fossel, P. V. (2014): Organic farming: how to raise, certify, and market organic crops and livestock. Voyageur Press, USA.		
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.		

	Thistlethwaite, R., J. Dunlop (2015): The new livestock farmer: the business of raising and selling ethical meat. Chelsea Green Publishing, USA.		

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

2.13. 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 lectures hours (min.)	**6** 6/10 = 0.6 (coefficient for attending 1 lecture hour)
Attending seminars (5 hours)	**4** 4/1.2 = 3 seminar hours (min.)	**6** 6/5= 1.2 (coefficient for attending 1 seminar hour)
Attending exercises (15 hours)	**4** 4/0.4 = 10 exercise hours (min.)	**6** 6/15 = 0.4 (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 have minimal 24 points)	**40** 40/40 = 1 (coefficient 1)
Total	**60**	**100**

[1]-7 points (preparation of seminar work during semestar 4 points, if the seminar work is prepared in PP additional 3 points)
[2]-8 points (8 questions, every correct answer 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“)
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)

2.14. Other (as the proposer wishes to add)

FUNDAMENTALS OF PHYSICS FOR DIAGNOSTICS METHODS

1. GENERAL INFORMATION			
1.1. Course teacher	Assist. Prof. Selim Pašić	1.6. Year of the study programme	3.
1.2. Name of the course	**Fundamentals of Physics for Diagnostics Methods**	1.7. Credits (ECTS)	2
1.3. Associate teachers		1.8. Type of instruction (number of hours L + S + E + e-learning)	20 + 10 + 0 + 0
1.4. Study programme (undergraduate, graduate, integrated)	Integrated	1.9. Expected enrolment in the course	
1.5. Status of the course	Elected	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 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.		
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	Students gain a clear picture of the work and the possibilities of diagnostic methods and devices, which enable them, in future clinical practice, to make the proper selection of diagnostic methods for their patients, and correctly interpret the results.		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	-Develop an understanding of ultrasound and its possibilities. -Develop an understanding of the capabilities and use of X-ray diagnostics. -Understand the principles of nuclear magnetic resonance, and its possibilities and application as diagnostic methods. -Understand thermography and its application in the diagnostic and the use of contrast agents.		
2.5. 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)**

2.6. 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)	2.7. Comments:

2.10. tudent responsibilities						
2.11. 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	0,36	Research		Practical training	
	Experimental work		Report		Activity	0,2
	Essay		Seminar essay	0,0	(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			
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	
2.12. 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.		
2.13. Quality assurance methods that ensure the acquisition of exit competences	Grading and evaluating student work in class and at the final exam		
2.14. Other (as the proposer wishes to add)			

FUNDAMENTALS OF SCIENTIFIC RESEARCH

1. GENERAL INFORMATION			
1.1. Course teacher	Prof. Željko Grabarević	1.6. Year of the study programme	1st
1.2. Name of the course	Fundamentals of Scientific Research	1.7. Credits (ECTS)	2
1.3. Associate teachers		1.8. Type of instruction (number of hours L + S + E + e-learning)	8+4+18
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 application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION			
2.1. Course objectives	- to teach students about the basic principles of scientific work - to motivate students to find and read research papers relevant to their field and write scientific articles		
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	This course is essential for the scionetific student education and their enrollement in the Afculty scientific work.		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	The students shud be able to: search medical information on the web formulate scietific hypothesis prepare a research propousal analyse and present results of research cite the source of information used in research write scientific article		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	1. Science and scientific research (**L 2) 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. **(L 4) 3.** Structure of medical literature **(L 2) 4.** Original scientific paper. Scientific style used in scientific paper. Structure (chapters) and content of an original scientific paper. **(S 2) 5.** Scietific publication **(S 2) 6.** Publishing of results of experiments **(E 2).** 7**.** Searching scientific information on the web **(E 4) 8.** Presentation of results of experiments **(E 2). 9.** Citing references **(E 2) 10.** Searching for relevant journal articles referring to the problem of study (**E 4) 11.** Organization (structure) and analysis of content of original scientific paper and diploma work **(E 4)**		
2.6. 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 ☐ work with mentor ☐ (other)	2.7. Comments:

<table>
<tr><td>2.8. Student responsibilities</td><td colspan="6">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</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>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</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>2.10. Grading and evaluating student work in class and at the final exam</td><td colspan="6">1. attending lectures (6 %) max. 6 points; min. 3 points
2. exercises (36 %); max. 36 points; min. 20 points
3. seminars (18%) max. 18 points; min. 13 points
4. final exam (40%) max. 40 points – min. 24 points</td></tr>
<tr><td rowspan="2">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">Marušić, M. Principles of research in medicine. Medicinska naklada, Zagreb, 2008.</td><td></td><td></td></tr>
<tr><td>2.12. Optional literature (at the time of submission of study programme proposal)</td><td colspan="6"></td></tr>
<tr><td>2.13. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">continuous knowledge checking
written exam</td></tr>
<tr><td>2.14. Other (as the proposer wishes to add)</td><td colspan="6"></td></tr>
</table>

GAME ZOOLOGY

1. GENERAL INFORMATION			
1.1. Course teacher	Professor Zdravko Janicki, DVM, MSc, PhD	1.6. Year of the study programme	2nd
1.2. Name of the course	**Game Zoology**	1.7. Credits (ECTS)	2
1.3. Associate teachers	Professor Alen Slavica DVM, PhD Assistant professor Magda Sindičić, DVM, PhD	1.8. Type of instruction (number of hours L + S + E + e-learning)	5L+25E
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 application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	level 1
2. COUSE DESCRIPTION			
2.1. 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.		
2.2. Course enrolment requirements and entry competences required for the course	None		
2.3. Learning outcomes at the level of the programme to	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		

which the course contributes	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.					
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Identify and group all kinds of game species in Croatia by legal, technical and scientific categories Judged the most important characteristics of mammals and birds classes that include all kinds of wildlife in Croatia Correctly estimate the economic value of all (small and large) game species in Croatia Categorize big game species with regard to gender and age Identify traces of wildlife in nature Distinguish protected from unprotected species of game birds					
2.5. Course content broken down in detail by weekly class schedule (syllabus)	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).					
2.6. Format of instruction:	X lectures seminars and workshops X exercises ☐ on line in entirety partial e-learning ☐ field work	☐ independent assignments X multimedia and the internet ☐ laboratory ☐ work with mentor ☐ (other)	2.7. Comments: -			
2.8. Student responsibilities	Attending lectures (50%), exercise (70%)					
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	0.36	Research	-	Practical training	
	Experimental work	-	Report	-	Activity	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	Evaluating elements: 1. Attending lectures 2. Attending exercises 3. Seminar essay 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**
	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
2.12. 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		
2.13. Quality assurance methods that ensure the acquisition of exit competences	Assessment during practical classes, independent seminary, assessment via e-quiz		
2.14. Other (as the proposer wishes to add)	None		

HUNTING AND NATURE PROTECTION

1. GENERAL INFORMATION			
1.1. Course teacher	Professor Zdravko Janicki, DVM, MSc, PhD	1.6. Year of the study programme	4th, 5th
1.2. Name of the course	Hunting and Nature Protection	1.7. Credits (ECTS)	2
1.3. Associate teachers	Professor Alen Slavica, Professor Dean Konjević, Assistant professor Magda Sindičić, DVM, PhD	1.8. Type of instruction (number of hours L + S + E + e-learning)	4L+26E
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 application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	None

2. COUSE DESCRIPTION	
2.1. 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.
2.2. Course enrolment requirements and entry competences required for the course	None
2.3. Learning outcomes at the level of the programme to which the course contributes	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 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.
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Appoint and define the legal regulations related to hunting and nature protection Evaluate the basic requirements for capability evaluation of habitat and hunting grounds Forming plan skilled technical and economic regulation of hunting grounds (areas) 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) Handle hunting weapons and safe shooting 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 Demonstrate the proper procedure with the shot game Properly assessments of the trophies of big game species
2.5. 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).
2.6. 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) 2.7. Comments: -
2.8. Student responsibilities	Attending lectures (50%), exercise (75%)

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	0.36	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

	Title	Number of copies in the library	Availability via other media
2.11. Required literature (available in the library and 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
2.12. 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		
2.13. Quality assurance methods that ensure the acquisition of exit competences	Assessment during practical classes, assessment via e-quiz		
2.14. Other (as the proposer wishes to add)	None		

PARASITOLOGY IN PUBLIC HEALTH

1. GENERAL INFORMATION			
1.1. Course teacher	Full Prof. Albert Marinculić	1.6. Year of the study programme	3 rd
1.2. Name of the course	Parasitology in Public Health	1.7. Credits (ECTS)	2
1.3. Associate teachers	Assistant lecturer Franjo Martinković	1.8. Type of instruction (number of hours L + S + E + e-learning)	10+20+0+0
1.4. Study programme (undergraduate, graduate, integrated)	integrated	1.9. Expected enrolment in the course	
1.5. Status of the course		1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	Level 2, 50%

2. COUSE DESCRIPTION	
2.1. Course objectives	This course aims to provide students with a general overview of the basic themes and issues of veterinary parasitology in relation to human health risks. This will be done with the special emphasis on foodborne, waterborne and vector borne pathogens.
2.2. Course enrolment requirements and entry competences required for the course	Regular knowledge achieved throughout the veterinary study with the special emphasis on veterinary parasitology.
2.3. 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
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Understanding of biology and ecology of parasites and vectors of medical importance Understanding of particular parasitic zoonotic diseases spreading ways Understanding of human risks for zoonotic parasites Improving of skills and abilities in establishing proper control methods Understanding of modern trends in clinical parasitology
2.5. Course content broken down in detail by weekly class schedule (syllabus)	LECTURES 1st week Introduction (zoonotic disease; role of parasitic zoonoses in global health, epidemiology of parasitic zoonoses 2nd week Protozoal diseases I (Giardia, Balantidium, Entamoeba) 3rd week Protozoal diseases II (Toxoplasma, Cryptosporidium, Pneumocystis, occasional protozoal infections) 4th week Trematodes (Fasciola, Dicrocoelium) 5th week Cestodes (Taenia, cysticercosis, hydatidosis, coenurosis, Diphylobothrium, Hymenolepis), occasional cestode infections) 6th week Nematodes I (Trichinella) 7th week Nematodes II (Visceral larva migrans, Cutaneous larva migrans, Strongyloides) 8th week Nematodes III (Anisakis, occasional nematode infections) 9th week Arthropods I (ticks, mites, Trombicula) 10th week Arthropods II (Occasional ectoparasite infestations, allergic reaction in humans, myasis) EXERCISES 1st week Basics of practical clinical parasitology I

	2 nd week Basics of practical cčlinical parasitology II 3 rd week Basics of paractical clinical parasitology III 4th week Occasional infections with trematodes and cestodes 5th week Cestode larval stages 6th week Analytical methods for the control of trichinellosis 7th week Animal spirurids that infect humans 8th week Morphology of ticks 9th week Sarcoptosis and occasional mite infections 10th week Vectors responsible for transmission of parasites

2.6. Format of instruction:			2.7. 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)	

2.8. Student responsibilities	During the Course a student must attend 10 lecture lessons. During the course session the student must be actively involved in a t least 15 exercises. At the final exam a student answers the questions orally.

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	0,5	Research		Practical training	
	Experimental work		Report		E learning tasks	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 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	

2.12. Optional literature (at the time of submission of study programme proposal)	Practical guide to diagnostic parasitology,Lynne Shore Garcia,ASM Press, 1999
2.13. 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.
2.14. Other (as the proposer wishes to add)	

PIGEON KEEPING AND BREEDING

1. GENERAL INFORMATION			
1.1. Course teacher	Željko Pavičić, DVM, PhD, Full Professor	1.6. Year of the study programme	III
1.2. Name of the course	Pigeon Keeping and Breeding	1.7. Credits (ECTS)	2
1.3. Associate teachers	Kristina Matković, PhD, Full Professor; Mario Ostović, PhD, Assistant Professor	1.8. Type of instruction (number of hours L + S + E + e-learning)	L 0+ S 15+ E 15
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	Elective course	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
2.1. 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.		
2.2. 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.		
2.3. 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.		
2.4. 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		
2.5. Course content broken down in detail by weekly	1. Introduction; 2. Wild pigeon species; 3. Basic biological characteristics of pigeons; 4. Pigeon reproduction; 5. Pigeon ringing; 6. Pigeon breeds; 7.		

<table>
<tr><td>class schedule (syllabus)</td><td colspan="6">Croatian authentic pigeon breeds; 8. Pigeon feeding; 9. Pigeon breeds hygiene; 10. Pigeon breeding for meat production</td></tr>
<tr><td>2.6. Format of instruction:</td><td colspan="3">☐ 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>2.7. Comments:</td></tr>
<tr><td>2.8. Student responsibilities</td><td colspan="6">1. attending exercises
2. attending seminars
3. participation at exercises and seminars
4. continuous knowledge checking
5. final exam (written)</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></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 exercises</td><td>0,18</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Attending seminars</td><td>0,18</td></tr>
<tr><td>Continuous</td><td>0,64</td><td>Oral exam</td><td></td><td>Participation at</td><td>0,2</td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>Final exam</td><td>0,8</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"><table>
<tr><th>Type of activities</th><th>Minimal number of points</th><th>Maximal number of points</th></tr>
<tr><td>attending seminars</td><td>5</td><td>9</td></tr>
<tr><td>attending exercises</td><td>5</td><td>9</td></tr>
<tr><td>participation at exercises and seminars</td><td>6</td><td>10</td></tr>
<tr><td>continuous knowledge checking</td><td>20</td><td>32</td></tr>
<tr><td>final exam (written)</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="3">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">1. Brown, D. (1995): A guide to pigeons, doves and quail: their management, care and breeding. ABK Publications, Australia.</td><td></td><td></td></tr>
<tr><td colspan="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.</td><td></td><td></td></tr>
<tr><td>2.12. Optional literature (at the time of submission of study programme proposal)</td><td colspan="5"></td></tr>
</table>

2.13. 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 (10 points[1])	**6** 6/1 = 6 (coefficient 1) (a student must collect minimal 6 points in order to gain minimal 6 points)	**10** 10/10 = 1 (coefficient 1)
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)

2.14. Other (as the proposer wishes to add)

POSITIVE IMPACT OF ANIMALS ON HUMAN HEALTH

<table>
<tr><th colspan="5">1. GENERAL INFORMATION</th></tr>
<tr><td>1.1. Course teacher</td><td colspan="2">Assist. Prof. Denis Cvitković</td><td>1.6. Year of the study programme</td><td>First</td></tr>
<tr><td>1.2. Name of the course</td><td colspan="2">Positive Impact of Animals on Human Health</td><td>1.7. Credits (ECTS)</td><td>1</td></tr>
<tr><td>1.3. Associate teachers</td><td colspan="2">Prof. Damir Žubčić, Assoc. Prof. Tomislav Babić, Assoc. Prof. Tomislav Krznar, Saša Zavrtnik, DVM</td><td>1.8. Type of instruction (number of hours L + S + E + e-learning)</td><td>5+5+5</td></tr>
<tr><td>1.4. Study programme (undergraduate, graduate, integrated)</td><td colspan="2">Undergraduate</td><td>1.9. Expected enrolment in the course</td><td>25</td></tr>
<tr><td>1.5. Status of the course</td><td colspan="2"></td><td>1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)</td><td>.-</td></tr>
<tr><th colspan="5">2. COUSE DESCRIPTION</th></tr>
<tr><td>2.1. Course objectives</td><td colspan="4">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.</td></tr>
<tr><td>2.2. Course enrolment requirements and entry competences required for the course</td><td colspan="4">-</td></tr>
<tr><td>2.3. Learning outcomes at the level of the programme to which the course contributes</td><td colspan="4">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.</td></tr>
<tr><td>2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="4">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.</td></tr>
<tr><td>2.5. Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="4">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.</td></tr>
<tr><td rowspan="2">2.6. Format of instruction:</td><td rowspan="2">lectures
seminars and workshops
exercises
☐ on line in entirety
☐ partial e-learning
field work</td><td rowspan="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"></td></tr>
</table>

2.8. Student responsibilities						
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	0,33	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					

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

2.12. Optional literature (at the time of submission of study programme proposal)	-
2.13. Quality assurance methods that ensure the acquisition of exit competences	-
2.14. Other (as the proposer wishes to add)	-

REPTILE MORPHOLOGY

1. GENERAL INFORMATION			
1.1. Course teacher	Full Professor Srebrenka Nejedli	1.6. Year of the study programme	Second year
1.2. Name of the course	Reptile Morphology	1.7. Credits (ECTS)	2
1.3. Associate teachers	Full Professor Damir Mihelić Assistant Professor Ana Shek Vugrovečki	1.8. Type of instruction (number of hours L + S + E + e-learning)	4+15+11
1.4. Study programme (undergraduate, graduate, integrated)	undergraduate	1.9. Expected enrolment in the course	Depending on the interest
1.5. Status of the course	Elective course	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	Reptiles being nowadays common patients in veterinary clinics and surgeries, the subject “Morphology of reptiles” is meant to teach the students about: the systematization of reptiles; the variety of their body regions as to the locomotion, skeleton construction and musculature; fundamental differences in construction of digestion duct because of different ways of feeding, breathing and construction of respiratory organs due to the living mode (in water or on earth); construction of urinary and reproductive system; heart and blood vessels, particularly the relevant ones for blood taking; central and peripheral nerve systems and their accessibility for local anaesthesia, etc.		
2.2. Course enrolment requirements and entry competences required for the course	Appoint organ systems in reptiles, describe the structure of certain parts of the organ systems in reptiles, differentiate the morphologic characteristics of each system in reptiles, compared to organic systems in reptiles.		
2.3. Learning outcomes at the level of the programme to which the course contributes	Student content can recognize and classify it in the appropriate area. Will seek further clarification: from their mentors or literature.		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Knowledge of the systematics of reptiles, knowledge of skeletal and muscular systems in reptiles, knowledge of the digestive, respiratory, nervous, endocrine, urinary and reproductive system in reptiles, knowledge of the circulatory system and for the extraction of blood in reptiles.		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	1. Systematization of reptiles and their body forms and regions as to the way of their locomotion; 2. Locomotive system (appendicular head musculature, ligaments and tendons); 3. Importance of digestion system (mouth, pharynx, oesophagus, stomach, intestines, liver, pancreas); 4. Respiratory system (lungs, trachea, breathing by skin, ways of breathing on earth and in water); 5. Blood conducting system (heart, blood and lymph circulation, blood components); 6. Urinary and reproductive system (construction of kidneys, male and female sexual organs); 7. Nerve system (dorsal spine, brain nerves, peripheral nerves, autonomic nerve system; frontal, central, posterior and small brain); 8. Endocrine system (hypophysis, epiphysis, thyroidal and parathyroidal gland, ultimobrachial gland, thymus, endocrine part of the pancreas); 9.		

	Sensory organs (eye construction, vomeronasal organ, hearing organ); 10. Skin (epithelium, derma, olfactory glands).					
2.6. 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)		2.7. Comments:	
2.8. Student responsibilities						
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	**0.36**	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					

	Title	**Number of copies in the library**	**Availability via other media**
2.11. Required literature (available in the library and 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	
2.12. Optional literature (at the time of submission of study programme proposal)	Wineken, J., Godfrey, M. H., Bels, V. (2007): Biology of turtles. CRC Press		
2.13. Quality assurance methods that ensure the acquisition of exit competences	Passed the test.		
2.14. Other (as the proposer wishes to add)			

SELECTED CHAPTERS IN BIOMEDICAL PHYSICS FOR VETERINARIANS

1. GENERAL INFORMATION			
1.1. Course teacher	Assist. Prof. Pašić Selim	1.6. Year of the study programme	1.
1.2. Name of the course	Selected Chapters in Biomedical Physics for Veterinarians	1.7. Credits (ECTS)	2
1.3. Associate teachers		1.8. Type of instruction (number of hours L + S + E + e-learning)	20 + 10 + 0 + 0
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 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 the course is more detailed and better understanding of important physiological processes of living organisms.		
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	Students will be able to use part of the physical laws for explaining and understanding of the most important physiological functions of the body of animals.		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	- Students will better understand the role of electricity in the body of humans and animals. - Students will be considerably better understand the transport of substances in living organisms by combining the laws of electricity and thermodynamics. - Applying the laws of hydrodynamics (fluid) students will greatly enhance the understanding of blood flow and gas exchange with the environment. - Students will understand much better thermodynamic interaction of living organisms with their environment.		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	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)**

2.6. Format of instruction:			2.7. 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)	

2.8. Student responsibilities	

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	0,36	Research		Practical training	0,0
	Experimental work		Report		Activity	0,2
	Essay		Seminar essay	0,0	(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	

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 lms.vef.hr, Internal script (lectures)		Internet
	S. Gibilisco: Physics demystified, McGraw-Hill, New-York, 2002.	3	
	G. J. Hademenos: Schaum's outline of physics for pre-med, biology and applied health students, McGraw-Hill, new-York, 1998.	3	

2.12. 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.

2.13. Quality assurance methods that ensure the acquisition of exit competences	Grading and evaluating student work in class and at the final exam

2.14. Other (as the proposer wishes to add)	

SPECIFIC ANATOMICAL STRUCTURES OF THE LOCOMOTOR APPATARUS OF THE HORSE

1. GENERAL INFORMATION			
1.1. Course teacher	Assist. Prof. Martina Đuras	1.6. Year of the study programme	1st year, 2nd semester
1.2. Name of the course	**Specific anatomical structures of the locomotor apparatus of the horse**	1.7. Credits (ECTS)	1
1.3. Associate teachers	Assist. Mirela Pavić, PhD, DVM; Assist. Lucija Bastiančić, DMV; Assist. Kim Korpes, DMV	1.8. Type of instruction (number of hours L + S + E + e-learning)	15 E
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	Elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	Application of VEF-LMS
2. COURSE DESCRIPTION			
2.1. 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.		
2.2. Course enrolment requirements and entry competences required for the course	Completed course "Anatomy with organogenesis of domestic animals I".		
2.3. 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 the acquired knowledge on specific anatomical structures of the locomotor apparatus of the horse during clinical courses.		
2.4. 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: list and describe specific anatomical structures of the locomotor apparatus of the horse identify clinically important structures of the locomotor apparatus of the horse		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	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)**.**		

<table>
<tr><td>2.6. Format of instruction:</td><td>☐ lectures
☐ seminars and workshops
X 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>2,8, Student responsibilities</td><td colspan="3">Students are expected to attend dissection exercises.</td></tr>
<tr><td>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 colspan="3"><table>
<tr><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></td></tr>
<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>2.11. Required literature (available in the library and via other media)</td><td colspan="3"><table>
<tr><th>Title</th><th>Number of copies in the library</th><th>Availability via other media</th></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>
</table></td></tr>
<tr><td>2.12. Optional literature (at the time of submission of study programme proposal)</td><td colspan="3"></td></tr>
<tr><td>2.13. Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">Final oral exam</td></tr>
<tr><td>2.14. Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

STRUCTURE AND FUNCTION OF CELL

1. GENERAL INFORMATION			
1.1. Course teacher	Assistant prof. Ivona Žura Žaja	1.6. Year of the study programme	2
1.2. Name of the course	Structure and Function of Cell	1.7. Credits (ECTS)	2
1.3. Associate teachers	Full Prof. Suzana Milinković Tur Assistant prof. Ana Shek-Vugrovečki, Mirela Pavić, PhD	1.8. Type of instruction (number of hours L + S + E + e-learning)	10+7+8
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 application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	

2. COUSE DESCRIPTION	
2.1. 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 interpersonal 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.
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	Completes the knowledge about the morphological and functional characteristics of the cells and allows students to conclude about function based on cells feature.
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	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.

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

Methodological unit/course content	L	S	E
1. Methods of cell investigate (light and electronic microscopy, cell fractionation and centrifugation, and cell culture).	1		2
2. Chemical organization of the cell (water, electrolytes, proteins, lipids and carbohydrates).	1		
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).	1	1	

	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.	1	1	1
	5. Cell membrane receptors (signal transduction mechanisms for plasma-membrane receptors, chemicals as intercellular messengers).	1	1	2
	6. Energy and cellular metabolism (glycolysis, formation of ATP by oxidative phosphorylation, structural and functional characteristic of mitochondria).	1	2	
	7. Nucleus (The structure of the nucleus. The cell cycle).	1		
	8. Cytoskeleton and cell movement (microtubules, microfilaments, intermediate filaments, directions of cell movement).	1		
	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.	1		1
	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.	1		2
	11. Cell differentiation. Age and death.		2	

2.6. 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)	2.7. Comments:
2.8. Student responsibilities	Student obligations are defined by Regulations on the integrated undergraduate and graduate Study of Veterinary Medicine, University of Zagreb.		

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	0,36	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) 4/0,957 = 5	**6** (coeficient = 0,857) 6/0,857 = 7
	Exercise attendance (8 hours)	**4** (coeficient = 0,75) 4/0,75 = 6	**6** (coeficient = 0,75) 6/0,75 = 8
	Activity during excercises (brief knowledge assessment)	**5**	**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: The Cell: A Molecular Approach. ASM Press, Washington, D.C., Sinauer Associates, Inc., Sunderland, Massachusetts. 2003. Sjaastad Ø. V., O. Sand, K. Hove (2010): Physiology of Domestic Animals. The 12nd ed. Scandinavian veterinary press, 2010.	1 book in the Library of the Department of Physiology and Radiobiology	
2.12. Optional literature (at the time of submission of study programme proposal)	Alberts, B., D. Bray, J. Lewis, M. Raff, K. Roberts, J. D. Watson: Molecular biology of the cell. The 2nd ed. Garland Publishing, Inc. New York, London. 1989. Seeley, R. R., T.D. Stephens, P. Tate: Essentials of Anatomy and Physiology. The 3rd ed. McGraw-Hill. Boston. 1999. Euel, J. A., B. L. Frappier: Dellmann's Textbook of Veterinary Histology.Blackwell Publishing. 2006. Mescher, A.: Junqueira's Basic Histology: Text and Atlas. The McGraw-Hill Companies, Inc. 2013.		
2.13. 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.		
2.14. Other (as the proposer wishes to add)			

THE ROLE OF VETERINARIANS AT ORGANIC FARMS

1. GENERAL INFORMATION			
1.1. Course teacher	Ana Shek Vugrovečki, PhD, assistant professor	1.6. Year of the study programme	III.
1.2. Name of the course	**The Role of Veterinarians at Organic Farms**	1.7. Credits (ECTS)	2
1.3. Associate teachers	Ana Shek Vugrovečki, PhD, DVM, assistant professor, Branimira Špoljarić, PhD, DVM assistant professor	1.8. Type of instruction (number of hours L + S + E + e-learning)	12+18+0
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	selective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
2.1. 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		
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)	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.		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	**Lectures:** 1) The history of organic farming, development of organic production in Croatia; legislation - 2 hours. 2) The indigenous breed as a base for organic farming - 2 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 - 4 hours **Seminars:** 1) herd health monitoring - 4 hours, 2) Organization and Management at an organic farm - 4 hours, 3) Relationships between organism and environment - 4 hours 4) farm animals holistic treatment - 3 hours, 5) Principles of prevention and treatment of invasive diseases- 3 hours;		

2.6. 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)	2.7. Comments:
2.8. Student responsibilities			

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	0,3	Research		Practical training	
	Experimental work		Report		Seminar essey	0,6
	Essay		Seminar essay	**0,2**	(other)	
	Tests	0,2	Oral exam	0,7	(other)	
	Written exam		Project		(other)	

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

Type of activity	**minimal score**	**maximal score**
Class attendance	**10**	**18**
12 hours lectures + 18 hours seminars	(coefficient = 0,6) 16 x 0,6 = 10	(18:15 = 1,2 coefficient) 15 x 1,2 = 18
On-course activity	**5**	**10**
1 positive answer = 5 bodova	(5:1=5; coefficient = 1) 1 of 2 positive answer	(10:1=10; coefficient = 1) 2 of 2 positive answers
	20	**32**
Final exam	**25**	**40**
Oral exam 1 positive answer = 8 points	3 positive answers	5 positive answers
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**
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	

2.12. Optional literature (at the time of submission of study programme proposal)	1) Annual report for 2007, IFOAM, 2008., www.ifoam.org; 2) Duchateau, K. (2003.): Organic farming in Europe. A sustained growth over the period 1998-2000. Statistics in focus. Environment and energy. Theme 8 – 2. 1-8. http://www.eisfom.org/links/EUROSTAT.PDF; 3) Lindquist, A. Animal health and welfare in organic sheep and goat farming, Swedish Animal Health Service; 4) Organic Farming in Europe: http://www.organic-europe.net/default.asp; 5) http://www.ekoconnect.org/; 6) http://www.organicvet.co.uk/
2.13. Quality assurance methods that ensure the acquisition of exit competences	

2.14. Other (as the proposer wishes to add)	

VETERINARY CLINICAL MICROBIOLOGY

1. GENERAL INFORMATION			
1.1. Course teacher	Prof Ljiljana Pinter, PhD, DVM	1.6. Year of the study programme	3 (VI semester)
1.2. Name of the course	Veterinary Clinical Microbiology	1.7. Credits (ECTS)	2.0
1.3. Associate teachers	Prof Nevenka Rudan, PhD, DVM	1.8. Type of instruction (number of hours L + S + E + e-learning)	30 (L-8, E-22)
1.4. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate veterinary study programme	1.9. Expected enrolment in the course	Max number of students: 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%)	
2. COUSE DESCRIPTION			
2.1. 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.		
2.2. 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		
2.3. 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.		
2.4. 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, including use of commercial compounds suitable for veterinarians in practice, and will be able to perform immunoprophylaxis of infectious diseases.		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	INTRODUCTORY LECTURE – Introduction to clinical microbiology area of bacteriology, mycology and virology. L -1 SAMPLING METHODS IN MICROBIOLOGY – Sampling procedures and transport of pathogen material to microbiology laboratories, safe measures and documents. L – 2, E – 4 IDENTIFICATION OF MICROBES FROM CLINICAL SPECIMENS – Indentification procedures of bacteria, fungi and viruses, rapid tests. L – 2, E – 6 TESTING FOR THE DRUG SUSCEPTIBILITY OF MICROBES – Techniques (agar diffusion methods, dillution methods), minimum inhibitory concentrations. E – 2 INTERPERTATION OF THE LABORATORY RESULTS AND DIFFERENCIAL DIAGNOSIS – critical point for medical interpretation L -1, E – 5		

	CHOICE THERAPY – methods of choosing the wright antimicrobial therapeutics in different animal species. L – 2, E - 5

2.6. Format of instruction:			2.7. 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)	

2.8. Student responsibilities	

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	0.36	Research		Practical training	
	Experimental work		Report			
	Essay		Seminar essay		activities	0.2
	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

1. Attended lectures and exercises (1 hour = 1 point) - max 30, min 20 points
2. Microscopic slides questionarie (1 slide = 2 points) - max 10, min 6 points
3. Final exam (1 question = 2 points) - max 20 , min 12 points

All: max 60, min 38 points

Points:	Mark:
0 – 37	1
38 – 40	2
41 – 49	3
50 – 56	4
57 – 60	5

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

Title	Number of copies in the library	Availability via other media
Quinn, P. J., M. E. Carter, B. K. Markey, G. R. Carter (1994): Clinical Veterinary Microbiology. M. Wolfe. London.		
Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders.		

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

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.

2.13. Quality assurance methods that ensure the acquisition of exit competences	Test results, final discussions and anonymous questionnaires in order to get student critical opinion and suggestions for improvement.
2.14. Other (as the proposer wishes to add)	

VETERINARY NUCLEAR MEDICINE

1. GENERAL INFORMATION			
1.1. Course teacher	Marinko Vilić, DVM, PhD, Associate Professor	1.6. Year of the study programme	4
1.2. Name of the course	Veterinary nuclear medicine	1.7. Credits (ECTS)	1
1.3. Associate teachers	Jadranka Pejaković Hlede, DVM	1.8. Type of instruction (number of hours L + S + E + e-learning)	L12+S0+E3
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 application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	-

2. COUSE DESCRIPTION			
2.1. 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 and prepare adequate radiopharmaceutical, to carry out scintigraphy and diagnose.		
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)	After successfully mastering the course students will be able to: define basic terms of veterinary nuclear medicine to evaluate in which cases the patient should carry out scintigraphy to select an adequate radiopharmaceutical perform radiation protection of their selves, their associates and animals to analyse the scintigrams		
2.5. 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.		
2.6. 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)	2.7. Comments:

2.8. Student responsibilities						
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 (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		

2.12. Optional literature (at the time of submission of study programme proposal)	Vilić, M. (2018): Veterinary nuclear medicine. Internal scripts. Faculty of Veterinary Medicine, Zagreb.
2.13. Quality assurance methods that ensure the acquisition of exit competences	Final exam
2.14. Other (as the proposer wishes to add)	

VETERINARY ETHICS

1. GENERAL INFORMATION			
1.1. Course teacher	Assoc. Prof Dean Konjević Dipl. ECZM	1.6. Year of the study programme	1
1.2. Name of the course	**Veterinary Ethics**	1.7. Credits (ECTS)	2
1.3. Associate teachers	Prof Krešimir Severin, Assoc. Prof Gordana Gregurić Gračner	1.8. Type of instruction (number of hours L + S + E + e-learning)	15+15+0
1.4. Study programme (undergraduate, graduate, integrated)	Integrated	1.9. Expected enrolment in the course	
1.5. Status of the course	Elective course	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	
2. COUSE DESCRIPTION			
2.1. 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.		
2.2. Course enrolment requirements and entry competences required for the course	None		
2.3. 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		
2.4. 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		
2.5. 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 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

2.6. 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)	2.7. Comments:

2.8. Student responsibilities	

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	0.36	Research		Practical training, activity	0.20
	Experimental work		Report		(other)	
	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	Class attendance 30% (attendance at lectures – 15%, seminars – 15%) Activity on seminars 30% (seminar preparation, presentation and discussion) Written exam 40%

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
	Sandøe, P., S. B. Christiansen (2013): Ethics of Animal Use. Blackwell Publishing, USA.	Department Library - 1	0

2.12. 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.
2.13. Quality assurance methods that ensure the acquisition of exit competences	Written exam.
2.14. Other (as the proposer wishes to add)	

ZOOECOLOGY

1. GENERAL INFORMATION			
1.1. Course teacher	Prof. Josip Kusak	1.6. Year of the study programme	1st
1.2. Name of the course	**Zooecology**	1.7. Credits (ECTS)	2
1.3. Associate teachers	Assoc. Prof Tomislav Gomerčić, Goran Gužvica, PhD, Assoc. Prof Lidija Šver, Assoc. Prof Ana Galov Assist. Prof Daniel Špoljarić	1.8. Type of instruction (number of hours L + S + E + e-learning)	L=0; S=20; E=10
1.4. Study programme (undergraduate, graduate, integrated)	Integrated undergraduate and graduate studies	1.9. Expected enrolment in the course	0
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%)	2 i.e. 10%
2. COUSE DESCRIPTION			
2.1. Course objectives	Course “Zooecology” is an upgrade of a mandatory course “Zoology”, specifically of the teaching unit “Basics of ecology”. Zooecology is a scientific study of the relationship between animals and their environment. The goal of this course is to present ecological role of the diversity of the living organisms; evolutionary mechanisms that have created biodiversity; species extinctions caused by natural and anthropogenic factors; factors threatening local endangered species and breeds; and the importance of biodiversity preservation for the humankind (also presented from the genetic viewpoint). The ecological importance of food chains is discussed in details. Additionally the impact of animal farming is analysed. Species interactions and mutual influence, regulation of population size and dynamics, and their meaning for humankind are also presented in the course.		
2.2. Course enrolment requirements and entry competences required for the course	The subject Zooecology is at the first year of the Veterinary medicine study. Requirement for enrolment is that a student can use English by speaking and writing it.		
2.3. Learning outcomes at the level of the programme to which the course contributes	- recognizing basic phases of successions of biocenoses - explain ecological processes on the level of heterotrophs - animals		
2.4. Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	- use qualitative methods of ecological research - knowing the importance of preservation of autochthonous species - evaluate outcomes and risks of alohtonous species introduction		
2.5. Course content broken down in detail by weekly class schedule (syllabus)	1. Zoological component of ecological relations (Animals as consumers of different levels, Food pyramid relations); 2. Biodiversity (Role of fauna in biodiversity); 3. Ecosystem stability dependence on numbers of species of different categories (Examples of rainforest with many species and tundra with few); 4. Evolutionary process that led to the biodiversity (Natural selection, mutations, adaptive radiation); 5. Natural extinctions; 6. Man caused present extinction (Influences that cause extinctions, habitat destruction, direct exterminations); 7. Genetic variations among		

	animal species and populations (adaptations, gene flow, interrelatedness, island populations); 8. World conservation strategy, AGENDA 21; 9. Croatian strategy for biodiversity conservation - (gene banks, reserves, captive breeding, reintroductions, land and marine ecosystems); 10. Homeostasis (balance) in ecosystem (Mechanisms for keeping in balance. Predators as indicators); 11. Biotic ecological factors: (Abundance, sociability, domination, activity range, birth rate, mortality, biotic potential, age structure, population dynamics); 12. Interactions of species (neutralism, competition, predation, parasitism, mutualism); 13. Methods of ecologic research (Qualitative and quantitative methods); 14. Trophic status of organism on the top of food pyramid (small numbers, biomass and energy content – causes and consequences); 15. State and perspectives for large carnivores in Croatia and in world (Review of state, research and management of bears, wolves and lynxes in Croatia and worldwide); 16. Field work (Risnjak National Park).

2.6. 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 (in the case of having less than ten students enrolled) ☐ (other)	2.7. Comments:
2.8. Student responsibilities	Attending lectures, seminar and field work. Preparing, presenting and defending one seminar.		

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	0.2	Research		Practical training	
	Experimental work		Report		Activity (other)	0.2
	Essay		Seminar essay	1.0	(other)	
	Tests		Oral exam	0.6	(other)	
	Written exam		Project		(other)	

2.10. Grading and evaluating student work in class and at the final exam	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.		
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 material available in Power point format		Files on LMS
2.12. Optional literature (at the time of submission of study programme proposal)	Odum, E. (1988): Fundamentals of ecology,USA. Kusak, J., K. Krapinec (2010): Ungulates and their management in Croatia. European Ungulates and their management in 21st Century (M. Apollonio, R. Andersen R. Putman, editors). Cambridge University Press str. 527-539.		
2.13. Quality assurance methods that ensure the acquisition of exit competences	Attendance to classes, seminar work and exam.		
2.14. Other (as the proposer wishes to add)			

USEFUL INFORMATION FOR STUDENTS

About Zagreb

City of Zagreb is the capital and largest city in the Republic of Croatia. It is a cultural, scientific, economic, political and administrative centre of the Republic of Croatia with seat Parliament, President and Government of the Republic of Croatia.

Area: 641.355 km^2

Population: 800.000 (data from 2011)

History in brief: Written documents first mention Zagreb in 904, with founding of the Diocese.
In 1242, Zagreb (then Gradec) was proclaimed Free Town of the Kingdom by the Golden Bull of the Croatian-Hungarian King Bela IV. In 1577, Zagreb was for the first time mentioned in written documents as the capital.
In 1669, Jesuits found the first gymnasium and Academy. The year is taken as the year of establishment of the University of Zagreb.
In 1776, seat of Croatian King's council (Government) moves from Varaždin to Zagreb.
On June 25, 1991, Croatian parliament proclaims independence and sovereignty of the Republic of Croatia. Zagreb becomes the capital.

Museums and exhibitions
Archaeological Museum, Meštrović Atelier, Croatian House of Visual Artists, Ethnographic Museum, Gliptoteka HAZU – Sculpture Museum of the Croatian Academy of Science and Arts, Hunting Museum, HT Museum (telecommunications and postal traffic), Croatian History Museum, Croatian Sports Museum, Croatian School Museum, HAZU (Croatian Academy of Sciences and Arts) Department of Prints and Drawings , Modern Gallery, Zagreb City Museum, The Mimara Museum, Museum of Arts and Crafts, Museum of Contemporary Art, Klovicevi Dvori Museum Gallery Centre, Strossmayer Gallery of Old Masters, Technical Museum, Museum of Broken Relationships, Art Pavilion.

Events
Eurokaz (The International Festival of New Theatre), Zagreb Philharmonic Orchestra Festival, The world festival of animated movies, Floraart (International flower and garden show), International folklore festival, Music biennale Zagreb, Week of modern dance, Zagreb Histrion Summer and other theatre performances and concert hall events.

Sport and leisure centres
Hippodrome, Jarun Lake, Bundek Lake, Maksimir Park, Medvednica (Sljeme) Nature Park, Mladost Sports Park, Šalata Sport Centre; Ice Rinks: Dom sportova, Šalata and Velesajam; swimming pools: Mladost, Utrine, Dom sportova; Ski resort Sljerme (10 km from downtown)

Source: City of Zagreb (www.zagreb.hr)
Source: University website (www.unizg.hr)

PAPERWORK

Keeping up-to-date with the paperwork requirements in a new country is never easy but it's worth the peace of mind. As foreigners arriving to a new country, it is our responsibilities to be aware of laws and regulations pertaining to our stays. However, any current student understands that this is not easy and we'd like to do our best to help this process along for you. Here is our interpretation of the rules, processes and expectations along with what we hope are some useful websites.

If you are non-EU citizen don't forget to have your passport presented (in case of visa, you should get the stamp) at the border when you arrive! Avoid the hassle by asking the border guard to kindly stamp your passport!

EU citizens need to present a national ID.

The official source of the latest information regarding the documents required of foreign residents during their stay is always Ministarstvo unutarnjih poslova, the Croatian police („MUP“) whose main station is located at Petrinjska 30. Their telephone number is +385 1 45 63 623. You can find lots of helpful and the most up-to-date information on their website (www.mup.hr). (This is another website where the translate feature of Google can be very helpful!)

OIB

www.oib.hr

Shortly after arriving in Zagreb, you should get your national identity number “osobni identifikacijski broj – OIB”). You'll need this for many purposes including registering for classes in September. You can apply in-person at Draškovićeva 15 or on-line: http://oib.oib.hr/SaznajOibWeb/fizickaOsoba.html.

TEMPORARY RESIDENCE PERMIT

Be sure to check for info the latest on paperwork requirements and useful downloads on the portion of the MUP website pertaining to foreigners. The English version site is available at www.mup.hr/120009.aspx. Everything is quite well explained on the site but here's a summary of what you'll find. All foreign students staying in Croatia must obtain a „Temporary residence permit“. The permission is valid for one year after which time, a renewal application is submitted. All applications can be submitted at MUP in Zagreb. All documentation must be in Croatian, using official translations when needed and none can be more than six months old.

The students, who need a visa for entry in Croatia, should submit the request to a respective Croatian diplomatic mission, while the students who do not need a visa, may submit their requests in the police station in Zagreb.

For additional information, a contact-person from Zagreb’s Police Department is available at tel. +385 1 45 63 623.

While waiting for your permission to stay, you will be able to stay in Croatia legally on the visa. Be sure to check the Croatian visa requirements for your country. One month before the Permission expires, you'll need to be in Zagreb in order to resubmit similar documents and paperwork as in your initial application.

Something not mentioned on the pages of the MUP website but can be found in the „Aliens Act” which is available on the site for download, is that once you are the bearer of a Temporary residence permit, you will not be allowed to leave Croatia for more than 30 days at a time in order for your Permit to remain valid.

Another important piece of info that's not explicitly stated is that while you have a Temporary residence Permit, you will be required to participate in the Croatian National Health Plan.

Don't be surprised during your renewal application process when you're asked for a biljeg. This is a stamp that shows you've paid a small fee to the state for handling some paperwork. You can buy them at most Tisak news agents' stands. You'll need one at the tax office for your proof of having paid your health insurance and you'll also need one when submitting your application for renewal at MUP. It's a little tricky to know how to handle these as you may encounter that a price has changed from year to year and you'll only really know how much you owe once someone asks you for one. To be safe, check the MUP website for their current price of paperwork handling (they refer to it in English as a „revenue stamp“) and arrive at MUP with a biljeg paper clipped to your application. In all other cases, wait until you're asked for one before dashing to the nearest Tisak.

PUBLIC TRANSPORTATION

The great thing about the city is how you can really get everywhere on foot! That being true, if you're not living in the immediate downtown or need to get out to the Jarun Lake or Maksimir Parks or just want to check out the tram system you might want to acquire a student tram pass. These passes are issued at any of the 13 Zagreb municipal transit system, Zagrebački električni tramvaj (ZET) and offices. The best bargain is with monthly or yearly pass. However if you are not ready for such a commitment you can get single or 24-hour tickets at a newsagent. In any case make sure you are covered because ZET controllers issue unpleasantly steep fines to riders without valid tickets.

There are three ways of public transportation in the City of Zageb – trams, buses and city railway. Zagreb Electric Tram (ZET, **www.zet.hr**) together with Croatian railway (**www.hz-net.hr**) conduct the public transport in Zagreb.
How to get a monthly or annual ticket (“pokaz”) for Zagreb local transportation?- take a form for a monthly or annual ticket at one of the ZET main tram stations, such as at Borongaj final stop, at Remiza, Dubrava or in Marić passage which is close to Jelačić square, entrance from Gajeva or Praška - confirm the form containing a photo 3x3,5 cm in Students office at the Faculty - submit the confirmed form, “iksica” card and Students grade book “indeks” into one of the listed ZET offices to get your ticket printed. Issuing costs 30 kuna.

Student annual tickets are issued in October in the following ZET offices:

	from Monday to Friday	Saturday
ZET, Ozaljska 105, entrance East	7.30 am – 6 pm	8 am- 4 pm
BORONGAJ, tram terminal	10 am – 6 pm	8 am -4 pm
ZAPRUĐE, Ulica Zlatka Balokovića bb	10 am – 6 pm	8 am -4 pm
DUBRAVA, ZET terminals	10 am – 6 pm	8 am -4 pm
SAVSKI MOST, Savska cesta bb, tram terminal	10 am – 6 pm	8 am - 4 pm
TRG MAŽURANIĆA, Trg Mažuranića	10 am – 6 pm	8 am - 4 pm
ČRNOMEREC, tram terminal	10 am – 6 pm	8 am - 4 pm

At other times, student annual tickets are issued in:

- Marić passage, Mon to Sat, 6.30 am-8 pm
- Ozaljska 105, Mon to Fri, 7.30 am-6 pm

To get more information call ZET, phone: +385 1 36 51 478 or 36 51 479
Visit ZET website for useful information: **http://www.zet.hr/**

STUDENT RESTAURANTS so called “kantinas” or “mensas” (the student dining halls)

Meals, cafe, refreshments and cakes at affordable prices are served in student restaurants and cafeterias run by the Student Centre University of Zagreb. Services and offerings may vary in over 20 restaurants at various locations in the city, one of which is found at Faculty of Veterinary Medicine. The biggest student restaurant is located in the Student Centre, Savska 25.

At the time of publication, the kantina discount prices are available to students who have a Croatian or EU nationality, as being subsidized by Croatian ministry of science. These discount dining facilities will hopefully become available to all students of the faculty in the near future. Until then, you will have to pay a full price for meals at student restaurants; a complete meal will cost you approx. 20 HRK.

Internet at the Faculty of Veterinary Medicine

The Faculty of Veterinary Medicine is connected to the Internet by Croatian Academic and Research Network (CARNet). Computers can be used in the Library Reading Room and at student premises (Equus student club). Password is not needed for the access. Apart from those personal computers, there are computer classrooms which are mostly used for teaching. Undergraduate and graduate students are entitled to use public computers at the Faculty, to obtain their AAI@Edu.hr (EduRoam) identity (which is used as “electronic identity”), e-mail address as well as personal web page at the Faculty server. AAI@Edu.hr (EduRoam) electronic identity enables access at reduced price to a number of services, such as:

• scientific and research papers databases access (http://bib.irb.hr)
• CARNet public modem Internet access
• Mobile CARNet services (wireless Internet access powered by Vipnet service provider)
• XCARNet service (wireless access by B.net cable television network)
• MetroCARNet service (Metronet service provider)

Read more on the above listed services at http://www.carnet.hr and http://www.vef.hr/ict. A number of accessible services with e-identity has been constantly increasing.

Users account for listed services, AAI@Edu.hr identity and personal e-mail address can be obtained at IT Department (within the Library) by producing a studnet grade book ("Indeks") or student ID card (“X-card”, “iksica”).

EXAMS & OTHER ESSENTIALS

X-card

This is your official student ID card. For students with a Croatian and EU citizenship, this card also serves to provide discounts at students’ restaurants and coffee shops (“kantinas”). During your first days in Zagreb you will have your photo taken (and it's the same photo you will have during the whole of your stay, so smile pretty!) and the card will be available approximately a week later.

LMS

This is the official communication site for all courses during all years of study. You'll be given a username and password during your first weeks here, so as soon as you can, log-on and get familiar with all its features. The administration regularly posts important announcements here and documents such as course outlines and schedules are

available for download. Some professors also provide course materials and use other interactive features of the site.

EMAIL
This is the official school email account: SquirrelMail. This account requires the same username and password as LMS. Some professors require you to use this address when contacting them and any new info posted to LMS routes an announcement here. If you already have an email address that you use and love, you may find it most convenient to re-route your SquirrelMail into your existing account.

Studomat
www.isvu.hr/studomat
Studomat is the website where all your information as a student is held and updated. The student ID number located on your indeks and x-card is the 'user name' you will use to log-in to this site.
All exam dates are posted on studomat. Students MUST „sign-up“ here for their exams, usually 7 days in advance. Cancellations are also made via studomat and are usually allowed up until 3 days prior to the exam.

GRADE BOOK (“Indeks”)
This thin, dark blue book is the permanent record of the classes in which you've been registered and the marks you've received at their completion. It is as essential as your passport: take good care of it! You'll need it in order to register for classes, to take your exams, to apply for your permission to stay, and any other time you need proof that you're a full time student (such as receiving the student rate for your tram pass).
Usually during the last few days of a course, students are required to present their indeks to the course co-ordinator for his or her signature. Obtaining this signature allows you to apply for the final exam. Eligibility for these signatures typically depends on class attendance and activities. When you pass an exam, the examiner fills in your grade and signs your indeks one more time. So remember to bring your indeks to both written and oral exams!

OTHER (HOPEFULLY) USEFUL INFORMATION

IMPORTANT TELEPHONE NUMBERS
In case of an emergency, Croatia has implemented Europe’s wide **EMERGENCY NUMBER 112** which then transfers you to police, emergency or the fire department.

192 - Police
194 - Ambulance emergency
193 - Fire department
1987 - Road help
195 - Search and rescue on the sea
18166 - Weather forecast
18981 - general info
11888 - info about local and national telephone numbers
11802 - info about international telephone numbers

Crime figures rank Zagreb and Croatia significantly lower than most of Europe. Anyhow, you should keep your eyes on your belongings at all time.

POST OFFICES
Jurišićeva 13; 4811-090 (Mon-Fri: 07 am – 20 pm; Sat: 07 am – 13 pm)
Branimirova 4; 4981-300 (Mon-Sun: NON-STOP)

RENTAL ACCOMMODATIONS
It is always a good idea to search for information on social network pages and student groups where you can find rent offers and other students looking for a place to stay and roomate (njuskalo.hr, gohome.hr, very known is Facebook group: Erasmus Zagreb 2014/2015 Official Group, rentinzagreb.com, homeinzagreb.com, sublet.com, realitica.com). You can enter search terms like „najam stana u Zagrebu od 350 eura“).
The approximate average prices You may expect:
- single room: 150-200EUR + charges
- flat: 350-600EUR + charges

PHARMACIES 0-24
Central Pharmacy, Jelačić square 3
Dubrava, Grižanska 4
Ilica, Ilica 301
Ozaljska, Ozaljska 1
Siget, Avenija Većeslava Holjevca 22

NATIONAL HOLIDAYS
National holidays are important to remember while living in Zagreb because, if for no other reason, you need to plan on most shops being closed and classes cancelled for that day. Be sure to ask your professors about changes to your schedule for courses that run during a holiday.
January 1: New Years Day
January 6: Epiphany
Easter and Easter Monday
Corpus Christi: 60 days after Easter
May 1: International Workers Day
June 22: Anti-Fascist Struggle Day
June 25: Statehood Day
August 5: Victory and Homeland Thanksgiving Day
August 15: Assumption of Mary
October 8: Independence Day
November 1: All Saints day
December 25-26: Christmas