UNIVERSITY OF ZAGREB
FACULTY OF VETERINARY MEDICINE
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Division: ANIMAL PRODUCTION AND BIOTECHNOLOGY
Department: DEPARTMENT FOR BIOLOGY AND PATHOLOGY OF FISH AND BEES
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Register no.:
File no.: 251-61-14/21-18
Zagreb, 1st February 2021.

COURSE SYLLABUS

Course name: BIOLOGY AND PATHOLOGY OF AQUATIC ORGANISMS

Academic year 2020-21

Course leader: Associate Professor Emil Gjurčević

Teachers: Assistant Professor Krešimir Matanović

First day of classes: 29th March 2021.

Last day of classes: 9th June 2021.

Timetable for LECTURES academic year 2020-2021

LECTURES				
Date	**Methodological unit**	**Teacher**	**Location / time**	**Literature**
29.03.2021.	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 I.	Associate Professor Emil Gjurčević	Department for Biology and Pathology of Fish and Bees 8-10h	Obligatory literature No. 1, 6 Optional literature No. 7, 9, 10
07.04.2021.	Breeding of aquatic organisms II; Viral fish diseases (Diseases prevented by Regulations of veterinary medicine and others important for breeding).	Associate Professor Emil Gjurčević Assistant Professor Krešimir Matanović	Department for Biology and Pathology of Fish and Bees 16-18h	Obligatory literature No. 1 – 6 Optional literature No. 8, 9, 11, 12
13.04.2021.	Viral fish diseases (Diseases prevented by Regulations of veterinary medicine and others important for breeding).	Associate Professor Emil Gjurčević	Department for Biology and Pathology of Fish and Bees 8-10h	Obligatory literature No. 1 – 6 Optional literature No. 8, 11, 12
14.04.2021.	Bacterial fish diseases (Diseases important for breeding).	Assistant Professor Krešimir Matanović	Department for Biology and Pathology of Fish and Bees 8-10h	Obligatory literature No. 1 – 6 Optional literature No. 8, 11, 12
26.04.2021.	Parasitic fish diseases	Associate Professor	Department for Biology and	Obligatory literature

	(Diseases important for breeding).	Emil Gjurčević	Pathology of Fish and Bees 8-10h	No. 1 – 6 Optional literature No. 8, 11, 12
29.04.2021.	Parasitic fish diseases (Diseases important for breeding); Fungal fish diseases and diseases caused by abiotic factors; Diseases of other aquatic organisms (Diseases prevented by Regulations of veterinary medicine).	Associate Professor Emil Gjurčević	Department for Biology and Pathology of Fish and Bees 9-10h	Obligatory literature No. 1 – 6 Optional literature No. 8, 11, 12

Timetable for PRACTICALS academic year 2020-2021

PRACTICALS						
Date	**Methodological unit**	**Teacher**	**Type of practical**	**Group**	**Location / time**	**Literature**
30.03. 2021.	Systematic of freshwater fish	Associate Professor Emil Gjurčević	Laboratory work	1	Department for Biology and Pathology of Fish and Bees 8-10h	Obligatory literature No. 6
31.03. 2021.	Systematic of marine fish and shellfish; Shellfish anatomy	Assistant Professor Krešimir Matanović	Laboratory work	1	Department for Biology and Pathology of Fish and Bees 8-10h	Obligatory literature No. 6
06.04. 2021.	Fish anatomy I (Integument system, musculoskeletal system, respiratory system)	Associate Professor Emil Gjurčević	Laboratory work	1	Department for Biology and Pathology of Fish and Bees 8-10h	Obligatory literature No. 3, 4, 6 Optional literature No. 8
08.04. 2021.	Fish anatomy II (circulatory system, digestive system, excretory system, nervous and sensory system)	Associate Professor Emil Gjurčević	Laboratory work	1	Department for Biology and Pathology of Fish and Bees 8-10h	Obligatory literature No. 3, 4, 6 Optional literature No. 8

09.04. 2021.	Dissection of common carp	Associate Professor Emil Gjurčević	Clinical work	1	Department for Biology and Pathology of Fish and Bees 8-10h	Obligatory literature No. 2, 4, 6 Optional literature No. 8
15.04. 2021.	Dissection of rainbow trout	Associate Professor Emil Gjurčević	Clinical work	1	Department for Biology and Pathology of Fish and Bees 8-10h	Obligatory literature No. 4, 6 Optional literature No. 8
27.04. 2021.	Dissection of marine fish and shellfish; Diseases of shellfish	Assistant Professor Krešimir Matanović	Clinical work	1	Department for Biology and Pathology of Fish and Bees 8-10h	Obligatory literature No. 4, 6 Optional literature No. 12
03.05. 2021.	Post-mortem examination of fish (necropsy)	Associate Professor Emil Gjurčević	Clinical work	1	Department for Biology and Pathology of Fish and Bees 8-10h	Obligatory literature No. 3, 4, 6 Optional literature No. 8
04.05. 2021.	Virological and bacteriological procedures	Associate Professor Emil Gjurčević Assistant Professor Krešimir Matanović	Clinical work	1	Department for Biology and Pathology of Fish and Bees 8-10h	Obligatory literature No. 3, 4, 5, 6
06.05. 2021.	Collection of samples for laboratory examinations;	Assistant Professor Krešimir Matanović	Laboratory work	1	Department for Biology and Pathology of Fish and Bees 8-10h	Obligatory literature No. 3, 4, 6 Optional literature No. 11

	Diseases prevention and treatment					
10.05. 2021.	Breeding of warmwater fish	Associate Professor Emil Gjurčević	Field work	1	Cyprinid fish farm 7-18h	Obligatory literature No. 1, 6 Optional literature No. 7, 10
09.06. 2021.	Breeding of salmonid fish	Associate Professor Emil Gjurčević	Field work	1	Trout fish farm 7-18h	Obligatory literature No. 1, 6 Optional literature No. 7, 9

STUDENT OBLIGATIONS

Lecture attendance	Attending lectures: 3-6 points (1 lecture hour equals 0.54 point)
Practicals attendance	Attending practicals: 8-12 points. Student must attend at least 17 hours of practicals to achieve minimum of 8 points.
Active participation in seminars and practicals	Participation at exercises: 5-10 points (evaluated with short oral tests)
Final exam	Final exam – oral: 24-40 points (5 questions): 1 question equals 8 points
Examination requirements	Student requirements are defined in the Regulations on the Integrated Undergraduate and Graduate Study of Veterinary Medicine. Given the above, the student must acquire a minimum number of points from all assessment elements in order to take the final exam. **Article 45:** a student can justifiably be absent from up to 50 % of the lectures; 30% of the seminars and 30 % of the exercises.

GRADING AND EVALUATING STUDENT WORK

Continuous knowledge-checking (mid-terms)	Continuous knowledge checking (1 preliminary exam – 20 questions): 20-32 points (1 question equals 1.6 points)
Final exams (dates)	25.06.2021., 09.07.2021., 08.09.2021. and 23.09.2021.
Form of final exam	Oral

LITERATURE

Obligatory literature	1. BARDACH, J. E., J. H. RYTHER, W. O. McLARNEY (1972): Aquaculture: The Farming and Husbandry of Freshwater and Marine organisms. Wiley-Interscience, New York-London-Sydney-Toronto. 2. HOLE, D., D. BUCKE, P. BURGESS, I. WELLBY (2001): Diseases of carp and other cyprinid fishes. Fishing News Books, London. 3. NOGA, E. J. (2000): Fish disease: Diagnosis and treatment. Iowa State University. 4. ROBERTS, R. J. (2001): Fish pathology. W. B. Saunders. London. 5. WOO, P. T. K., D. W. BRUNO (1999): Fish Diseases and disorders. Vol. 3.: Viral, bacterial and fungal infections. CABI Publishing. 6. PP presentations of lectures and exercises.
Optional literature	7. BOYD, C. E. (1990): Water Quality in Ponds for Aquaculture. Auburn University, Alabama, USA. 8. 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. 9. GREENBERG, D. B. (1960): Trout farming. Chilton company – book division, Philadelphia-New York. 10. HORVATH, L., G. TAMAS, C. SEAGRAVE (1992): Carp and pond fish culture. Fishing News Book, Oxford. 11. PLUMB, J. A. (1999): Health maintenance and principal microbial diseases of cultures fishes. Iowa State University. 12. SINDERMANN, C. J. (1990): Principal diseases of marine fish and shellfish. Academic Press, London.

OBJECTIVES AND LEARNING OUTCOMES

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.
Learning outcomes	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. Learning outcomes: 1. Recognize fish species and other aquatic organisms important for breeding 2. Obtain general knowledge about breeding of aquatic organisms 3. Comprehend the importance and role of veterinarians in maintenance of fish health and human health 4. Perform routine diagnostic examination, recognize clinical signs of disease 5. Professional sampling and transport of samples for laboratory examinations 6. Apply therapeutic measures and measures for prevention of disease.

GRADING SCHEME

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)

Course leader:

Head of Department/Clinic:

Note: The course leader is required to submit a Course Syllabus to all teachers and associates pertaining to the Course.