

Course: BIOLOGY AND PATHOLOGY OF AQUATIC ORGANISMS

UNIVERSITY OF ZAGREB

FACULTY OF VETERINARY MEDICINE

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Division: ANIMAL PRODUCTION AND BIOTECHNOLOGY AND PRE-CLINICAL SCIENCES DIVISION

Organizational unit: BIOLOGY AND PATHOLOGY OF FISH AND BEES

E-mail of the course leader: kresimir.matanovic@vef.unizg.hr

Register No of the organisational unit: 251-61-14/26-16

Zagreb, 29/1/2026

COURSE SYLLABUS

Course name: Biology and Pathology of Aquatic Organisms
Academic year 2025/2026

Course leader: Assoc. Prof. Krešimir Matanović

Deputy course leader: Full Prof. Emil Gjurčević

Teachers: Full Prof. Emil Gjurčević
Assoc. Prof. Krešimir Matanović
Valerija Benko, PhD

First day of classes: 12/3/2026

Last day of classes: 11/6/2026

Activities - Biology and Pathology of Aquatic Organisms (1/2)

| Start Date | Start T | End Ti | Course | Group | Note | Length | Instructor | Room |
|------------|---------|--------|--|------------------|------|--------|--------------|----------------|
| 12/03/2026 | 8:15 | 9:45 | p01 Introduction, The aquatic environment, Breeding | 8E-1, 8E-2, 8E-3 | | 1:30 | Matanović K. | P_ribe i pčele |
| 16/03/2026 | 15:00 | 16:30 | v01 Systematic of freshwater fish | 8E-1, 8E-2, 8E-3 | | 1:30 | Gjurčević E. | P_ribe i pčele |
| 19/03/2026 | 12:15 | 13:45 | p02 Gonads,Artificial spawning of common carp | 8E-1, 8E-2, 8E-3 | | 1:30 | Gjurčević E. | P_ribe i pčele |
| 20/03/2026 | 8:00 | 9:30 | v02 Systematic of marine fish | 8E-1, 8E-2, 8E-3 | | 1:30 | Matanović K. | P_ribe i pčele |
| 23/03/2026 | 13:30 | 15:00 | v03 Fish anatomy I | 8E-1, 8E-2, 8E-3 | | 1:30 | Gjurčević E. | P_ribe i pčele |
| 25/03/2026 | 8:00 | 9:30 | v04 Fish anatomy II | 8E-1, 8E-2, 8E-3 | | 1:30 | Gjurčević E. | P_ribe i pčele |
| 30/03/2026 | 13:15 | 14:45 | v05 Dissection of common carp and rainbow trout | 8E-1 | | 1:30 | Gjurčević E. | P_ribe i pčele |
| 30/03/2026 | 16:00 | 17:30 | v05 Dissection of common carp and rainbow trout | 8E-2, 8E-3 | | 1:30 | Gjurčević E. | P_ribe i pčele |
| 31/03/2026 | 8:15 | 9:45 | p03 Artificial spawning of salmonids,Bacterial fish diseases | 8E-1, 8E-2, 8E-3 | | 1:30 | Matanović K. | P_ribe i pčele |
| 01/04/2026 | 8:15 | 9:45 | v06 Dissection of marine fish and molluscs anatomy | 8E-2, 8E-3 | | 1:30 | Matanović K. | P_ribe i pčele |
| 01/04/2026 | 13:15 | 14:45 | v06 Dissection of marine fish and molluscs anatomy | 8E-1 | | 1:30 | Matanović K. | P_ribe i pčele |
| 14/04/2026 | 15:30 | 17:00 | p04 Viral fish diseases | 8E-1, 8E-2, 8E-3 | | 1:30 | Gjurčević E. | P_ribe i pčele |
| 17/04/2026 | 15:45 | 17:15 | p05 Parasitic fish diseases I | 8E-2, 8E-3 | | 1:30 | Gjurčević E. | P_ribe i pčele |
| 21/04/2026 | 9:00 | 9:45 | p06 Parasitic fish diseases II | 8E-1, 8E-2, 8E-3 | | 0:45 | Gjurčević E. | P_ribe i pčele |
| 22/04/2026 | 8:15 | 9:45 | v07 External examination and biopsy I | 8E-1, 8E-2 | | 1:30 | Gjurčević E. | P_ribe i pčele |

Activities - Biology and Pathology of Aquatic Organisms (2/2)

| Start Date | Start T | End Ti | Course | Group | Note | Length | Instructor | Room |
|------------------|---------|--------|--|----------------------------------|----------|--------------|--------------|----------------|
| 23/04/2026 | 9:15 | 10:45 | v07 External examination and biopsy I | 8E-3 | | 1:30 | Gjurčević E. | P_ribe i pčele |
| 27/04/2026 | 8:15 | 9:45 | v08 External examination and biopsy II | 8E-2, 8E-3 | | 1:30 | Gjurčević E. | P_ribe i pčele |
| 27/04/2026 | 11:45 | 13:15 | v08 External examination and biopsy II | 8E-1 | | 1:30 | Gjurčević E. | P_ribe i pčele |
| 05/05/2026 | 13:15 | 14:45 | v09 Virological and bacteriological procedures | 8E-2 | | 1:30 | Gjurčević E. | P_ribe i pčele |
| 14/05/2026 | 8:15 | 9:45 | v09 Virological and bacteriological procedures | 8E-1, 8E-3 | | 1:30 | Gjurčević E. | P_ribe i pčele |
| 25/05/2026 | 9:00 | 10:30 | v10 Ichthyosanitary measures | 8E-1, 8E-2, 8E-3, V_ribe i pčele | | 1:30 | Matanović K. | P_ribe i pčele |
| 01/06/2026 | 9:15 | 10:15 | Biology and Pathology of Aquatic Organisms | 8E-1, 8E-2, 8E-3 | Kolokvij | 1:00 | Gjurčević E. | P_ribe i pčele |
| 08/06/2026 | 8:00 | 16:00 | v11 Field Work - Cyprinid fish farm | 8E-3 | | 8:00 | Gjurčević E. | |
| 08/06/2026 | 8:00 | 16:00 | v11 Field Work - Cyprinid fish farm | 8E-1, 8E-2 | | 8:00 | Gjurčević E. | |
| 11/06/2026 | 8:00 | 16:00 | v12 Field Work - Trout fish farm | 8E-3 | | 8:00 | Matanović K. | |
| 11/06/2026 | 8:00 | 16:00 | v12 Field Work - Trout fish farm | 8E-1, 8E-2 | | 8:00 | Matanović K. | |
| 12/06/2026 | 9:00 | 10:00 | Biology and Pathology of Aquatic Organisms | 8E-1, 8E-2, 8E-3 | Kolokvij | 1:00 | Gjurčević E. | P_ribe i pčele |
| Total: 27 | | | | | | 64:45 | | |

STUDENT OBLIGATIONS

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|------------------------------------|---|
| Lecture attendance | Lecture attendance: 3-6 points (1 lecture hour equals 0.54 point). |
| Practicals attendance | Practicals attendance: 8-12 points (1 practicals hour equals 0.48 point). Student must attend at least 17 hours of practicals to achieve a minimum of 8 points. |
| Active participation in practicals | Active participation in practicals: 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 studying in the University Integrated Undergraduate and Graduate Study Programme <i>Veterinary Medicine</i> (Article 64). Given the above, the student may be absent from classes in an individual course up to 50 percent of the class hours of lectures, 30 percent of the class hours of seminars, and 30 percent of the class hours of practicals. An exception is any course with a small number of hours of specific teaching form (12 hours or less per semester), where absence of greater than 50 percent is permitted, with mandatory justification of the absence and that all missed classes are made up in line with the conditions set by the head of the course. |

GRADING AND EVALUATING STUDENT WORK

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| Continuous knowledge-checking (mid-terms) | Continuous knowledge checking: 1 preliminary written exam (32 points). Student must achieve a minimum of 20 points to pass the exam. |
| Final exams (dates) | 1/7/2026, 10/7/2026, 11/9/2026 and 21/9/2026 |
| Form of final exam | Oral |

LITERATURE

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| Obligatory literature | <ol style="list-style-type: none">1. BARDACH, J. E., J. H. RYHER, 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 Press, Ames.4. ROBERTS, R. J. (2001): Fish pathology, 3rd ed. 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, Wallingford.6. PP presentations of lectures and practicals. |
| Optional literature | <ol style="list-style-type: none">1. BOYD, C. E. (1990): Water Quality in Ponds for Aquaculture. Auburn University, Alabama.2. 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.3. GREENBERG, D. B. (1960): Trout farming. Chilton company – book division, Philadelphia, New York.4. HORVATH, L., G. TAMAS, C. SEAGRAVE (1992): Carp and pond fish culture. Fishing News Book, Oxford.5. PLUMB, J. A. (1999): Health maintenance and principal microbial diseases of cultures fishes. Iowa State University.6. SINDERMANN, C. J. (1990): Principal diseases of marine fish and shellfish. Academic Press, London. |

OBJECTIVES AND LEARNING OUTCOMES

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| 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 recognizing 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 | <ul style="list-style-type: none">- Distinguish fish species and other aquatic organisms important for breeding- Understand the basic principles of farming of aquatic organisms- Explain the importance and role of veterinarians in maintenance of fish health and human health- Perform routine diagnostic examination, recognize clinical signs of disease- Collect and transport samples for laboratory examinations- Apply therapeutic measures and measures for prevention of disease. |

GRADING SCHEME

| <i>Points</i> | <i>Grade</i> |
|---------------|--------------|
| Up to 59 | 1 (F) |
| 60-76 | 2 (D,E) |
| 77-84 | 3 (C) |
| 85-92 | 4 (B) |
| 93-100 | 5 (A) |

Course leader

Mateen

Head of organizational unit:

Mateen

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