Sveučilište u Zagrebu Agronomski fakultet
Svetošimunska cesta 25, 10000 Zagreb
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Limnology and Oceanology (296592)

Nositelj kolegija

prof. dr. sc. Marina Piria

Opis kolegija

Significance and development of limnology and oceanology. Characteristics of fresh and marine organisms. Energy and productivity. Pollution of fresh and marine waters. Water geology. Water physics (moving, light, transparency, temperature, density). Fresh waters chemistry (dissolved gases and CO2 system, nutrients). Ecology of stagnant waters. Ecology of flowing waters. Specific physical and chemical properties of the sea. General characteristics of the seas and oceans, particularly of the Adriatic. Pelagic and benthic areas. Water physical, chemical and biological analyses. Saprobic system.

ECTS: **6.00**

Sati nastave: 60
Predavanja: 28
Laboratorijske vježbe: 12
Seminar: 12
Terenske vježbe: 8

Izvođač predavanja

- prof. dr. sc. Marina Piria
- prof. dr. sc. Ana Gavrilović
- prof. dr. sc. Tea Tomljanović
- prof. dr. sc. Daniel Matulić

Izvođač vježbi

- dr. sc. Ivan Špelić
- dr. sc. Tena Radočaj

Izvođač seminara

- dr. sc. Ivan Špelić
- dr. sc. Tena Radočaj

Ocjenjivanje

Dovoljan (2): 60-69 %
Dobar (3): 70-79 %
Vrlo dobar (4): 80-89 %
Izvrstan (5): >90%

Vrsta kolegija

- Graduate studies / MS Courses taught in English (Izborni kolegij, 1. semestar, 1. godina)

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Opće kompetencije

The module enables the understanding of the basic processes in the freshwater and the sea water. The student acquires basic knowledge of geology, physics, chemistry and biology of inland and the sea waters, their significance in the fishery, and the ability to self-determination of the assessment of water pollution.

Oblici nastave

- Lectures
  Lectures are performed by assoc. Prof. Marina Piria and prof. dr. sc. Tomislav Treer.
- Laboratory practice/exercises
  Three exercises related to physical and chemical properties of water and biological indicators related organisms will be performed. Exercises are performed in groups of a maximum of 10 students.
- Field work
  Students gets basic knowledge about field sampling of water and bentic macroinvertebrates in inland waters and how to transport samples to the laboratory.
- Seminars
  Seminars are research by students on the topic of physical and chemical properties of water. They are made in a team of up to five students per seminar. Students taking water samples, analyzing water in the lab, describe the results and discuss the literature. At the end of the semester students presenting their work in the form of poster presentations (three slides Microsoft PowerPoint applications) no more than 5 minutes.

Ishodi učenja i način provjere

Ishod učenja	Način provjere
- Identify the problems related to the quality of fishing waters in the area of freshwater and marine aquaculture, as well as open water	Essay and oral presentation
-Make and calculate the assessment of water quality on the basis of physico-chemical and biological parameters for optimal management in open fresh water and sea	Essay and oral presentation
- To use the acquired knowledge in limnology, biology, water and Oceanology in acquiring new knowledge for the proper management of fishing and aquarium	Essay and oral presentation
- Set up research in the field of limnology and oceanology, conduct field and laboratory work, study the relevant literature, statistical process data and write and submit work for publication in the journal	Essay and oral presentation
- Spend hydrobiological part in making fishing management documents	Essay and oral presentation
- Present the results of hydro-biological research, and based on them to propose optimal management	Essay and oral presentation
- Recognize the important developments in the field of Hydrobiology and present in the media and journalism	Essay and oral presentation
- Identify benthic species of organisms on the basis of identification keys and other relevant literature	Essay and oral presentation
- Independently organize and manage the work of Hydrobiology in government and public institutions	Essay and oral presentation
- Use ICT in their daily work	Essay and oral presentation

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Način rada

Obveze nastavnika

Lecture, examination and to prepare seminar topics

Obveze studenta

Prepare seminar, classes attendance and achieve minimal number of points at exam

Polaganje ispita

Elementi praćenja	Maksimalno bodova ili udio u ocjeni	Bodovna skala ocjena	Ocjena	Broj sati izravne nastave	Ukupni broj sati rada prosječnog studenta	ECTS bodovi
First exam	25%	0-59% 60-69 % 70-79 % 80-89 % 90-100 %	Nedovoljan (1) Dovoljan (2) Dobar (3) Vrlo dobar (4) Izvrstan (5)	16		1.5
Second exam	25%	0-59% 60-69 % 70-79 % 80-89 % 90-100 %	Nedovoljan (1) Dovoljan (2) Dobar (3) Vrlo dobar (4) Izvrstan (5)	16		1.5
Third exam	25%	0-59 % 60-69 % 70-79 % 80-89 % 90-100 %	Nedovoljan (1) Dovoljan (2) Dobar (3) Vrlo dobar (4) Izvrstan (5)	16		1.5
Oral exam	25%	0-59 % 60-69 % 70-79 % 80-89 % 90-100 %	Nedovoljan (1) Dovoljan (2) Dobar (3) Vrlo dobar (4) Izvrstan (5)	12		1.5
Total	100 %			60		6

Elementi praćenja	Opis	Rok	Nadoknada
Second exam	Water biology materials	Second quarter of semester	During the examination period
Third exam	Oceanology materials	Third quarter of semester	During the examination period
Oral exam	Seminar preparation and presentation	The end of semester	During the examination period

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Tjedni plan nastave

1. Introduction – limnology. Introduction – oceanology. L - Introduction to limnology and oceanology course. About limnology - past, present and future. About oceanology - past, present and future. Introduction to marine life.
2. Introduction – laboratory practice. Introduction – seminar. L - Introduction to basic principles of field and laboratory studies. Basic equipment. Physical and chemical parameters Scientific papers. How to present scientific data. Statistical methods for limnology data.
3. Limnology – the nature of ponds, lakes and streams. L - Water geology. Water physic (water movements, light and transparency, temperature and density). Thermal stratification and lake mixing. Water chemistry (dissolved substances and nutrient inthe water).
4. Water physics and water chemistry – field and laboratory practice. Water physics and water chemistry – field and laboratory practice. F, L - Water sampling. Physical parameters (temperature, transparency, color). Chemical parameters (dissolved oxygen, chemical oxygen demand (COD), carbon dioxide, pH, alkalinity, phosphorus, nitrogen).
5. Exam I – Limnology. Water biology. Water biology. L - Freshwater life. Energy and productivity. Ecology of standing waters. Ecology of running waters. Pollution and eutrofication.
6. Macroinvertebrate field sampling. F - Equipment for macroinvertebrates sampling. Collecting and preserving macroinvertebrates
7. Classifying macroinvertebrates. P - Using key for determine macroinvertebrates. Taxon determination.
8. Exam II – Water biology. Oceanology. L - Marine physics and chemistry. Adriatic sea. Pelagic zone (pelagic life, depth and layers). Oceanic zone (benthic life, depth and layers).
9. Hydromorphology. L, F - Overview of Stream Habitat. Definition of terms. Stream bank characteristics. In-stream characteristics. Water characteristics. Field work.
10. Exam III – Oceanology, Field sampling. F - Exam, Data collection. Data collection for student investigation.
11. Field sampling F - Data collection for student investigation.
12. Field sampling F - Data collection for student investigation.
13. Data processing L - Data processing, statistical analysis.
14. Data processing. S - Making seminars and preparing presentations.
15. Final student presentations S - Student presentations.

Obvezna literatura

1. GOLDMAN, C. R., AND A. J. HORNE. 1983. Limnology. McGraw-Hill Book Co., New York. 464 p.
2. Sumich J. L. (1992): An Introduction to the Biology of Marine Life. WCB, Wm. C. Brown Publishers, Dubuque
3. Stewart, R. H. (2008): Introduction to Physical Oceanography. Texas A & M. University, Department of Oceanography, p. 353
4. Wetzel, R. (2001): Limnology – lake and river ecosystems. Elsevier, Academic press, USA.

Preporučena literatura

1. Cole G. A. (1983): Textbook of Limnology. C. V. Mosby Co., St. Louis
2. Vinogradov, M. E. (1977): Oceanology: Biology of the Ocean. Translated and reprinted by Us Dept. Of Commerce (Peabody, A.), Woods hale, Massachusetts, 1985, p. 352.

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Sličan kolegij na srodnim sveučilištima

- Applied Limnology – Aquatic ecosystem management, BOKU, Austria
- Introduction into limnology and oceanofraphy, University of Amsterdam, Netherlands

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