Sveučilište u Zagrebu Agronomski fakultet
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Global ecology (197967)

Nositelj predmeta

prof. dr. sc. Željka Zgorelec

Opis predmeta

Main Module topic are: History evolution of Ecology; Development, matter and structure of the planet Earth; Global ecology problems; Human influence in atmosphere, pedosphere, lithosphere, hydrosphere and cryosphere; Environmental pollution with chemical substances, biogeochemical cycles of macro elements; Isotopes and nuclear analytical methods and techniques.
Qualification aims: Comprehensive background information on the most important aspects of global ecology problems such as demographic development, urbanization, energy use, global climate change, greenhouse gas emission, national, European and global policy, potential effects of global climate change on agricultural and natural ecosystem.
Applicability of Module: The module provides a broad generalistic view of current ecology and global change problems. It enables student to view particular problems in the framework of holistic general picture.

ECTS: **6.00**

Engleski jezik: **R3**

E-učenje: **R1**

Sati nastave: 60
Predavanja: 26
Vježbe u praktikumu: 14
Seminar: 20

Izvođač predavanja

- prof. dr. sc. Željka Zgorelec
- izv. prof. dr. sc. Ivana Šestak

Izvođač vježbi

- izv. prof. dr. sc. Ivana Šestak
- prof. dr. sc. Željka Zgorelec

Izvođač seminara

- prof. dr. sc. Željka Zgorelec

Ocjenjivanje

Dovoljan (2): 60 - 70 %
Dobar (3): 71 % - 80 %
Vrlo dobar (4): 81 % - 90 %
Izvrstan (5): 91 % - 100 %

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Vrsta predmeta

- Graduate studies / MS Courses taught in English (Izborni predmet, 1. semestar, 1. godina)
- Graduate studies / Environment, agriculture and resource management (Izborni predmet, 3. semestar, 2. godina)

Opće kompetencije

Prerequisites for participation:
Candidates are required to have an above average B.Sc. or equivalent degree in agricultural, environmental, natural or life science, biology, chemistry or related field following at least 3 years of study. Furthermore, applicants have to provide proof of proficiency in English.

Oblici nastave

- Lectures
  are provided as power point presentations by lecturers with assured time for questions and discussions.
- Laboratory practice/exercises
  Module includes two demonstrative Laboratory visits: for Environmental analytics and for radioecology.
- Field work
  include tour of two locations attractive to Global Ecology questions with examples of good management institutions regarding the processes for environment protection.
- Seminars
  on recent tasks in Global Ecology issues include inputs from lectures as instructions on access to scientific literature databases, assistance in translation and understanding of terms, and students obligation is to prepare an oral presentation in power point (max 10 minutes) and to write seminar tasks as word document (max 10 pages).

Ishodi učenja i način provjere

Ishod učenja	Način provjere
define basic ecology terms such as ecology, agro ecology, biocenosis, biotope, niche, succession, environment	Interactive teaching, written exam, oral exam, seminar work
explain matter and energy interactions in an agroecosystem, natural ecosystem and urban ecosystem as well as provide biogeochemical cycles of main earth elements (C, N, O, S, P, H)	Interactive teaching, written exam, oral exam, seminar work
analyze comprehensive background information on the most important aspects of global ecology problems such as demographic development, land use change, energy use, waste problem, biodiversity, land degradation and critically consider current ecology and global change problems such as global climate change and greenhouse gas emissions and think in a sense of environmental protection	Interactive teaching, written exam, oral exam, seminar work
to evaluate particular problems in the framework of a holistic approach and to apply and adopt guidelines for sustainable development in practice on a local, national and global policy scale	Interactive teaching, written exam, oral exam, seminar work

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Način rada

Obveze nastavnika

Lectures are provided as power point presentations by lecturers with assured time for questions and discussions.
Seminar on recent tasks in Global Ecology issues includes inputs from lectures as instructions on access to scientific literature databases, assistance in translation and understanding of terms. Seminar topics are given to students at the beginning of the semester. Students have 15 weeks to prepare. Teachers (at least 2) are obligated to attend on oral seminar presentations. Every teacher evaluates students separately according to the criteria indicated in table. The module coordinator further reads, examines and evaluates the written part of the seminar. The final grade for the seminar is the average, which includes the evaluation of all teachers (due to greater objectivity) and oral and written part of the seminar.
Field classes include tour of two locations in Croatia attractive to Global Ecology questions with examples of good management institutions regarding the processes for environment protection (Zagreb wastewater Ltd, Agroproteinka, Petrokemija, CIOS, ZGOS, etc.).
Module includes two demonstrative Laboratory visits: for Environmental analytics (AF/DGA) and for radioecology (IRB).

Obveze studenta

Lectures
Attendance to classes is compulsory.
Seminars
Students obligation is to prepare an oral presentation in power point (max 10 minutes) and to write seminar tasks as word document (max 10 pages). Properly completed seminar (submitted written part + presented oral presentation + seminar in e version committed to teacher for an institutional archive) is required for signature as confirmation to completed commitments during the semester and permission for applying for written 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
written and oral exam	75 % (60 % written + 15 % oral)	> 60 % 60 % - 70 % 71 % - 80 % 81 % - 90 % 91 % - 100 %	Nedovoljan (1) Dovoljan (2) Dobar (3) Vrlo dobar (4) Izvrstan (5)	40	120	4.0
seminar written part and presentation	25 %	> 60 % 60 % - 70 % 71 % - 80 % 81 % - 90 % 91 % - 100 %	Nedovoljan (1) Dovoljan (2) Dobar (3) Vrlo dobar (4) Izvrstan (5)	20	60	2.0
Total	100			60	180	6

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Tjedni plan nastave

1. Introduction. History evolution of Ecology. L - Relevance of Global Ecology module to modern humankind, Introduction to the module and its rules, structure and aims (Lectures, seminars, field class, exam). Responsible Department and Lecturers. Chronological ecology development (history), basic principles in ecosystem.
2. History evolution of Ecology. Seminar topic distribution. L, S - Term definition: ecology, biocenosis, biotope, environment, ecosystem. Seminars topic selecting and distribution with theme linked to human influence on environment, student introduce to basic and additional literature and to useful links relevant to seminar establishment, demonstration to use and search online data basis for research and academic community.
3. Development, matter, structure of the planet Earth. Global ecology problems. L - Basic structure and formation of the planet Earth, geologic time scale, significant happening in biosphere, Archaeozoic, Proterozoic, Paleozoic, Mesozoic, Cenozoic. The world population, human activities, changes in use of natural resources, changes in flora and fauna, influence of agriculture, industry and transportation on environment, energy resources, waste, waste types and waste management.
4. Consultation about seminar fulfillment. Human influence in atmosphere. S, L - Assistance in seminar realization: Ecology disasters (Černobil, Minamata, Bhopal,...), institutions in RH responsible for Ecology issues (Agencies, Foundations, Ministry, NGO,...). Greenhouse effect, greenhouse gasses emission sources, stratospheric ozone layer depletion, ozone hole, climate change.
5. Consultation about seminar fulfillment. Human influence in atmosphere. S, L - Assistance in seminar realization: International Conferences significant to environment protection (Kyoto, Montreal, Stockholm,...), renewable (natural) energy resources (sunlight, wind, tides).
6. Consultation about seminar fulfillment. Human influence in atmosphere. S, L - Assistance in seminar realization: Film watching: Home (Yann Arthus Bertrand) or An inconvenient truth (Al Gore) with topic link to Climate Change problems.
7. Consultation about seminar fulfillment. Human influence on pedosphere, lithosphere, hydrosphere and cryosphere. S, L - Assistance in seminar realization; Ozone, persistent compounds in environment. Terrestrial land uses, changeover in way of land use, arable land problems, erosion, soil compaction, mineral raw material utilize, urbanization, land degradation: urban sprawl and infrastructural objects spreading.
8. Field class. F - Tour of two locations in Croatia attractive to Global Ecology questions with examples of good management institutions regarding the processes for environment protection. (Zagreb waste water treatment, Agroproteinka, Petrokemija)
9. Field class. F - Tour of two locations in Croatia attractive to Global Ecology questions with examples of good management institutions regarding the processes for environment protection. (Zagreb waste water treatment, Agroproteinka, Petrokemija)
10. Consultation about seminar fulfillment. Environmental pollution with chemical substances, biogeochemical cycles of macro elements. S, L - Assistance in seminar realization: Environmental pollution with different groups of contaminants, organic and inorganic chemical substances.
11. Consultation about seminar fulfillment. Environmental pollution with chemical substances, biogeochemical cycles of macro elements. S, L - Assistance in seminar realization: Biodegradable materials, NOx, CO2 and CH4 emissions from agriculture, modern pollutions: noise, light, electromagnetic radiation.
12. Consultation about seminar fulfillment. Environmental pollution with chemical substances, biogeochemical cycles of macro elements. S, L - Assistance in seminar realization, all tasks. Biogeochemical cycles of main Ecosystem constitute elements (C, N, H, O, S, P).
13. Environmental pollution with chemical substances, biogeochemical cycles of macro elements. Isotopes and nuclear analytical methods and techniques. P, L - Visit to

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Department Analytical Laboratory. Introduce to basics knowledge of instrumental methods and techniques for C, N and S determination and measurement in ecosystem. Radionuclide and microelements in environment; procedures for its determination.

14. Consultation about seminar fulfillment. Isotopes and nuclear analytical methods and techniques. S, P - Assistance in seminar realization, all tasks. Visit to Laboratory for radioecology (LRE) at Division for marine and environmental research, at Rudjer Boskovic Institute. Introduce to basics knowledge of instrumental methods and techniques for radionuclide determination and measurement in ecosystem.
15. Seminar presentation. Exam. S - Oral seminar presentation in power point (maximal 10 minutes) + written seminar as text in word document (10 pages). Exam: written 8 questions from 60 which were given to the students for preparing for examination (2 questions per each learning outcome). Oral Exam.

Obvezna literatura

1. Odum, E. P. and Barrett, G. W. (2005) Fundamentals of Ecology, 5th Ed., Thomson Brooks/Cole, Canada

Preporučena literatura

1. Andrews J. E., Brimbleconibe P., Jickens T. D. Luiss P. S. (1996): An introduction to environmental chemistry. Blackwell Science, Oxford.
2. Bonan, G. B., (2002): Ecological Climatology: Concepts and Applications, Cambridge University Press, Cambridge, UK, 678 p.
3. Chapin F.S., Matson P.A., Vitousek P.M. (2011): Principles of Terrestrial Ecosystem Ecology, 2nd Ed., Springer
4. Chiras, D. D. (2006) Environmental science, 7th Ed., Jones and Bartlett Publishers
5. Essington, M. E. (2004) Soil and Water Chemistry: An Integrative Approach, CRC Press, Florida
6. Jasobson Z.M. (2002): Atmospheric pollution: history, science, and regulation. Cambridge University Press.
7. Kabata-Pendias, A. and Mukherjee, A.B. (2007) Trace Elements from Soil to Human, Springer Science
8. Lal, R., Lorenz, K., Huttl, R.F., Schneider, B.U., Braun, J.V (2013) Ecosystem Services and Carbon Sequestration in the Biosphere, IASS Potsdam, Springer
9. Libes S. M. (1992): An introduction to marine biogeochemistry. John Wiley & Sons, New York.
10. Metz, B. (2010) Controlling Climate Change, Cambridge University Press, Edinburgh, UK
11. Raven, P. H. and Berg, L. R. (2004) Environment, John Wiley & Sons, Inc., USA
12. Sherwood Lollar, B. (2005) Environmental Geochemistry, 1st Ed., Elsevier
13. Schlesinger W. H. (1997): Biogeochemistry, an analysis of global change. Academic Press.

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Sličan predmet na srodnim sveučilištima

- Principles of Ecology, Hohenheim University, Stuttgart, Germany
- Global Ecology and Soil Systems, Aberystwyth University, Aberystwyth, Wales, UK
- Global Change Ecology, University of Natural Resources and Life Sciences (BOKU), Vienna, Austria
- Terrestrial Ecosystem Processes and Global Change, University of Copenhagen, Copenhagen, Denmark
- Man, society and the environment, Swedish University of Agricultural Sciences (SLU), Uppsala, Sweden