University of Zagreb Faculty of Agriculture
Svetošimunska cesta 25, 10000 Zagreb
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Geomorphology and landscape ecology (169513)

Course coordinator

Assoc. Prof. Kristina Krklec, PhD

Course description

Understanding the processes in the environment is one of the foundations for successful dealing with all forms of agricultural production. Through lectures and exercises, students will gain knowledge about the active and passive factors controlling the formation of relief forms. Students are introduced to a wide range of geomorphology topics such as endogenous effect, climate and climate change, weathering, mass wasting and hillslope processes, glacial, fluvial, eolian, and coastal and karst processes and landforms. In addition students are introduced to specific agricultural landscapes and basics of landscape ecology.
Upon successful completion of the course students will be able to interpret geomorphological processes, relief forms genesis and use obtained knowledge in landscape management.

ECTS: **3.00**

E-learning: **L1**

Teaching hours: 30
Lectures: 20
Seminar: 5
Field exercises: 5

Lecturer

- Assoc. Prof. Kristina Krklec, PhD
- David Domínguez-Villar, PhD

Associate teacher for exercises

- Assoc. Prof. Kristina Krklec, PhD

Associate teacher for seminars

- Assoc. Prof. Kristina Krklec, PhD

Grading

Sufficient (2): 60%
Good (3): 70%
Very good (4): 80%
Excellent (5): 90%

Type of course

- Graduate studies / Environment, agriculture and resource management (Compulsory course, 2 semester, 1 year)

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General competencies

Course will prepare students for understanding the geological structure, relief, and the dynamics of the Earth. Students should be able to identify and describe different types of landforms and geomorphic processes that led to their creation. They will obtain knowledge of basic terminology and methods of geomorphic geomorphological research. This will enable them to do an objective evaluation of relief and connecting with other natural components.

Types of instruction

- Lectures
- Auditory Exercises
- Practicum
- Seminars

Learning outcomes

Learning outcome	Evaluation methods
Describe and explain the structure and dynamics of Earth	Test, final exam
Recognize the basic types of landforms	Test, final exam
Identify the basic processes of formation of different landforms	Test, final exam
Identify types and dynamics of geomorphological processes in nature, and their impact on the natural elements and human	Test, final exam
Understand the effects of physical and chemical processes, and their role in the shaping of relief in terms of practical application of acquired knowledge	Test, final exam

Working methods

Teachers' obligations

To regularly conduct teaching.
Monitor the presence of students in the classroom.
Hold consultations with students if necessary.
Arrange complete exams in regular exam terms.

Students' obligations

Class attendance is mandatory, and during the semester the student is required to prepare and present a seminar whose topic is related to one of the lessons.

Methods of grading

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Evaluation elements	Maximum points or Share in evaluation	Grade rating scale	Grade	Direct teaching hours	Total number of average student workload	ECTS
Class attendance				29	29	
Final exam	100	0-60 61-70 71-80 81-90 91-100	Insufficient (1) Sufficient (2) Good (3) Very good (4) Excellent (5)	1	61	3
Total	100			30	90	3

Weekly class schedule

1. Introduction to the course and geomorphology L - lecture plan/class overview - why is geomorphology important - processes and landscapes (a few definitions, views of landscapes, classic vs. process geomorphology, what drives processes) - geomorphology and relationship between topography and soil formation
2. The endogenous effect L, E, Pe-L - volcanism briefly - earths hypsometry - epeirogeny and orogeny - simple isostasy - surface uplift, uplift of rocks, exhumation of rock
3. Climate and climate change over the Quaternary L, E, Pe-L - what is climate - climatic geomorphology - climate change – observations - climate change – glaciations (glacial, interglacial) – Quaternary - Holocene climate change - climate change: hypothesized causes (atmospheric factors, astronomical factors, tectonics/climate interactions
4. Weathering L, E, Pe-L - - chemical weathering - physical weathering - results of weathering
5. Mass wasting/Hillslope processes L, E, Pe-L - hillslope transport processes - mass movement processes, mass wasting processes – landslides - debris flow or debris avalanche – earthflows – mudflows - preventing landslides – slope stability
6. Fluvial processes and landforms L, E, Pe-L - transport of water (flow regimes…) - fluvial sediments (erosion, transport, deposition) - formation of fluvial landforms
7. Glacial and Periglacial processes and landforms L, E, Pe-L - glacial landforms - glacial erosion - glacial sediments
8. Wind processes and landforms L, E, Pe-L - aeolian landforms – desertification - wind erosion
9. Karst processes and landforms L, E, Pe-L - karst landforms - karst processes - morphological evolution of karst poljes
10. Coastal processes and landforms L, E, Pe-L – coasts - coastal processes - coastal sediments (erosion, transport, deposition)
11. Specific agricultural landscapes L, E, Pe-L - geomorphology and agricultural landscapes - rural landscapes - terraced fields - drystone walls
12. Landscape ecology L, E, Pe-L - principles of landscape ecology – applications - landscape planning
13. Geomorphology and ecology L, E, Pe-L - geomorphic controls on organisms (distribution of soil nutrients, moisture, temperature, elevation, aspect) - particle sizes and sorting in soils and sediments - movement and dispersal (channels as corridors, sightlines) - erosion and mass wasting as disturbance (hillside and channel slope) - effects of organisms on geomorphic processes (weathering)
14. Student seminars S - through the seminar work the students would have to elaborate one of proposed geomorphological themes
15. Exam E

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Obligatory literature

1. Plummer, C.C., McGeary, D., Carlson, D.H. (1999) Physical Geology. McGraw-Hill Book Company, 1-577.
2. Bridge, J. & Demicco, R. (2008): Earth Surface Processes, Landforms and Sediment Deposits. Cambridge University Press, UK, 1-815.
3. Huggett, R.J. (2007): Fundamentals of Geomorphology. Routlege, New York, 1- 466.
4. Thompson, D.M. (2007): Processes That Shape the Earth. Infobase Publishing, New York, 1-116.
5. Wallen, R.N. (1992): Introduction to Physical Geography. (Izabrana poglavlja)

Recommended literature

1. Ford, D., Williams, P. (2007) Karst Hydrogeology and Geomorphology. John Wiley & Sons. 1-562.
2. Bird, E. (2008): Coastal geomorphology. An Introduction 2e. John Wiley & Sons Ltd, Chichester, UK, 1-441.
3. Goudie, A.S. (2004): Encyclopedia of Geomorphology. Routlege, New York, 1- 1156.
4. Anthropogenic Geomorphology, A Guide to Man-Made Landforms. Eds: Szabó, J., Dávid, L. & Lóczy, D. 2010., Springer, New York, 1-297.

Similar course at related universities

- Field research in geomorphology and landscape ecology. Oregon State University, USA.
- Introduction to Geomorphology. University of Victoria, Canada.

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