# COURSE OUTLINE

## 1. Study programme information

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|---|---|
| 1.1 Higher education institution | Universitatea de Vest din Timişoara |
| 1.2 Faculty / Department | Chimie, Biologie, Geografie / Departamentul de Geografie |
| 1.3 Sub-department | Geografie |
| 1.4 Field of study | Geography |
| 1.5 Level of study | Master's degree |
| 1.6 Study programme / Qualification | Geographic Information Systems |

## 2. Course information

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| 2.1 Course title | | | | **Geomorphometry** | | | |
| 2.2 Course convenor/ Lecturer | | | | Prof. Dr. Habil. Lucian DRĂGUŢ | | | |
| 2.3 Teaching assistant | | | | Prof. Dr. Habil. Lucian DRĂGUŢ | | | |
| 2.4 Year of study | II | 2.5 Semester | 1 | 2.6 Type of assessment | E | 2.7 Course type | DS/ DO |

## 3. Total estimated time (hours of didactic activities per semester)

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|---|---|---|---|---|---|
| 3.1 Number of hours per week | 4 | of which: 3.2 lecture | 2 | 3.3 seminar/laboratory | 2 |
| 3.4 Total hours in the curriculum | 56 | of which: 3.5 lecture | 28 | 3.6 seminar/laboratory | 28 |
| **Time distribution:** | | | | | **hours** |
| Studying textbooks, course materials, bibliography and notes | | | | | 20 |
| Further research in libraries, on electronic platforms and in the field | | | | | 15 |
| Preparing seminars/ laboratories, homework, research papers, portfolios and essays | | | | | 20 |
| Tutoring | | | | | 10 |
| Examinations | | | | | 4 |
| Other activities …… | | | | | |

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| **3.7 Total hours of individual study** | **69** |
| **3.8 Total hours per semester** | **125** |
| **3.9 Number of credits** | **5** |

## 4. Prerequisites (if applicable)

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| 4.1 based on curriculum | |
| 4.2 based on competencies | |

## 5. Conditions (if applicable)

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| 5.1 for the course | • Computer / laptop with audio-video system for the teacher and students<br>• internet access;<br>• video projector |
| 5.2 for the seminar/laboratory | • complete fulfilment of tasks of laboratory work and projects<br>• Computer / laptop with audio-video system for the teacher and students;<br>• internet access;<br>• video projector |

**6. Objectives of the discipline - expected learning outcomes to the formation of which contribute to the completion and promotion of the discipline**

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| Knowledges | • Knowledge of concepts in geomorphometry<br>• Understanding Digital Elevation Models (DEMs) and their processing<br>• Understanding the differences between general and specific geomorphometry<br>• Knowledge on computing the basic geomorphometric variables<br>• Knowledge on analysis and classification of geomorphometric objects<br>• Understanding the impact of DEM errors on geomorphometric analysis<br>• Understanding the importance of algorithms and differences they can lead to<br>• Understanding the role of scale in analysis |
| Skills | • Operational skills in ArcGIS Pro, SAGA GIS, Whitebox Tools, and eCognition<br>• Compute the basic geomorphometric variables in specific software<br>• Compare the graphic results of morphometric variables using different methods<br>• Classify and analyse geomorphometric objects<br>• Analyse different types of Digital Elevation Models |
| Responsibility and autonomy | • Understanding of ethics in academic conduct (correct citations, avoiding plagiarism, avoiding fabrication)<br>• Developing team working abilities<br>• The ability to solve specific tasks autonomously<br>• The ability to identify/select appropriate solutions and generate innovative ideas<br>• The ability to correctly/effectively identify and plan tasks specific to a particular project<br>• The application of effective and responsible work strategies, based on the principles, norms and values of the code of professional ethics<br>• Application of effective work techniques in a multidisciplinary team, ethical attitude, respect for diversity and multiculturalism, acceptance of diversity of opinion<br>• Self-assessment of the need for continuous professional training for the purpose of insertion and adaptability to the requirements of the labor market |

**7. Content**

| **7.1 Lecture** | **Teaching methods** | **Observations** |
|---|---|---|
| Geomorphometry: general framework Online | Lecture, Interactive presentations, heuristic conversation, problematization and hands-on examples | 2 hours |
| Mathematical and digital models of the land surface Online | | 4 hours |
| DEM production methods and sources Online | | 4 hours |
| Preparation of DEMs for geomorphometric analysis Online | | 2 hours |
| Error propagation in geomorphometry Online | | 2 hours |
| Basic land-surface variables | | 4 hours |
| Scale in geomorphometric analysis | | 2 hours |
| Geomorphometric objects and their classification | | 4 hours |
| Software packages used in geomorphometry | | 2 hours |
| Applications of geomorphometric analysis in geography and related fields. | | 2 hours |

**References**


- Hengl, T., Reuter, H.I. (Eds.) 2009, *Geomorphometry. Concepts, Software, Applications.* Elsevier.
- https://geomorphometry.org/
- Bishop, M.P. Young, B. W. Huo, D. 2018, Geomorphometry: Quantitative Land-Surface Analysis and Modeling, Elsevier, https://doi.org/10.1016/B978-0-12-409548-9.11469-1.
- Guth, P.L., Niekerk, A.V., Grohmann, C.H., Muller, J.-P., Hawker, L., Florinsky, I.V., Gesch, D., Reuter, H.I., Herrera-Cruz, V., Riazanoff, S., López-Vázquez, C., Carabajal, C.C., Albinet, C., Strobl, P., 2021 – *Digital Elevation Models: Terminology and Definitions. Remote Sensing*, 13(18):3581. https://doi.org/10.3390/rs13183581

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| • Additional references and course presentations are posted on Google Classroom | | |
| **7.2 Seminar / laboratory** | **Teaching methods** | **Observations** |
| Acquisition of SRTM DEMs and their visual analysis Online | Hands-on exercises, case studies, scientific explanation and demonstration. | 2 hours |
| TIN representation and comparison with gridded models Online | | 2 hours |
| Identification and removal of errors in DEMs Online | | 2 hours |
| Derivation of basic land-surface variables using different algorithms and quantitative comparison of the results Online | | 4 hours |
| Statistical analysis of land-surface variables Online | | 4 hours |
| Conducting geomorphometric analysis at various scales and comparing the results | | 4 hours |
| Derivation of stream network and basins | | 2 hours |
| Segmentation and classification of DEMs | | 4 hours |
| Team project | | 4 hours |
| **References**<br>• Literature will be selected individually, according to research interests of the students.<br>• Additional references and presentations are posted on Google Classroom | | |

**8. Corroborating course content with the expectations held by the representatives of the epistemic community, professional associations and typical employers in the field of the study programme**

The content of the discipline was developed in accordance with the curriculum and meets the didactic and scientific requirements corresponding to similar specializations in other universities. Course content will offer the students the necessary skills to start-up research projects leading to MSc Theses. Some projects are expected to end-up in journal publications. Skills acquired here and developed further will enable students starting a PhD program. The software used in the practical applications are among the most modern and frequently used in specialized institutions. Such applied training makes students compatible with the job market in the field of geographic information systems, or research activity.

**9. Assessment**

| Type of activity | 9.1 Assessment criteria | 9.2 Assessment methods | 9.3 Weight in the final mark |
|---|---|---|---|
| 9.4 Lecture | Understanding and assimilation of theoretical knowledge | Evaluation/test | 20% |
| 9.5 Seminar / laboratory | Practical projects | The degree to which students are able to conduct geomorphometric analysis. | 80% |
| 9.6 Minimum performance standard | | | |
| • Minimum mark 5 at course evaluation.<br>• Minimum mark 5 at practical activities. | | | |

Date

12.09.2024

Course convenor's signature

Prof. Dr. Habil. Lucian DRĂGUŢ

Date of approval in the department

Head of department's signature