Faculty of Geoengineering

Course title: GIS MODELLING

ECTS credit allocation (and other scores): 3

Semester: autumn

Level of study: ISCED-7 - second-cycle programmes (EQF-7)

Branch of science: Engineering and technology

Language: English

Number of hours per semester: 45

Course coordinator/ Department and e-mail: Marek Ogryzek, Ph.D., Institute of Geography and Land Management, marek.ogryzek@uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES: Modeling, input data processing, coordinate transformations, georeferencing, creating raster and vector representation, displaying continuous and discrete data, using color, shading, symbols, 3D visualization, visualization for data analysis (lighting, scaling, transparency, animations), basis for analysis continuous and discrete phenomena, spatial interpolation and approximation (mesh), neighborhood operations and buffers, analysis and modeling with map algebra, mathematical and digital representations (point clouds, contour, raster, TIN), DEM, spatial interpolation of elevation data and topographic analysis.
LECTURES: Types of geospatial data, introduction to geospatial modeling, data display and visualization, raster and vector and mixed representation, geospatial analysis, terrain modeling and analysis, 3D modeling.

Learning purpose: The course explains digital representation and analysis of geospatial phenomena and provides foundations in methods and algorithms used in GIS analysis. Special focus is on terrain modeling and analysis from 3D visualization.

On completion of the study programme the graduate will gain:

Knowledge: Knows the basic methods, techniques, tools and materials used in solving complex engineering tasks in the field of the studied field of study.

Skills: Can use the analytical, simulation and experimental methods to formulate and solve engineering problems and simple research problems. Can assess the usefulness of methods and tools for solving the engineering task, characteristic of the studied field of study, including the limitations of these methods and tools.

Social Competencies: Is aware of the importance and understands the non-technical aspects and effects of engineering activities, including its impact on the environment, and the related responsibility for decisions. Is aware of the importance and understands the non-technical aspects and effects of engineering activities, including its impact on the environment, and the related responsibility for decisions.

Basic literature: Smith, Goodchild, and Longley, Geospatial Analysis 5th Edition, wyd. Geospatial Analysis book online – web version, 2015

Supplementary literature: Alias Abdul Rahman, Morakot Pilouk, Spatial Data Modelling for 3D GIS,

The allocated number of ECTS points consists of: 3

Contact hours with an academic teacher: 45

Student's independent work: 5