**COURSE DESCRIPTION CARD – SPECIMEN**

<table>
<tr><td colspan="10">Faculty of Civil Engineering and Environmental Sciences</td></tr>
<tr><td>Field of study</td><td colspan="6">Environmental Engineering</td><td>Degree level and programme type</td><td colspan="2">Bachelor's degree; stationary</td></tr>
<tr><td>Specialization/ diploma path</td><td colspan="6">n/a</td><td>Study profile</td><td colspan="2"></td></tr>
<tr><td rowspan="2">Course name</td><td colspan="6" rowspan="2">GIS</td><td>Course code</td><td colspan="2">19284205H/IS1S21012</td></tr>
<tr><td>Course type</td><td colspan="2"></td></tr>
<tr><td rowspan="2">Forms and number of hours of tuition</td><td>L</td><td>C</td><td>LC</td><td>P</td><td>SW</td><td>FW</td><td>S</td><td>Semester</td><td colspan="2">summer</td></tr>
<tr><td>1</td><td></td><td></td><td>1</td><td></td><td></td><td></td><td>No. of ECTS credits</td><td colspan="2">2</td></tr>
<tr><td>Entry requirements</td><td colspan="9">Basic knowledge of information technology; basis of geodesy, cartography and remote sensing is greatly appreciated</td></tr>
<tr><td>Course objectives</td><td colspan="9">The course provides an introduction to Geographic Information Systems and the class will focus on teaching through practical examples. The main objectives for the course are: Basic definition of maps and GIS; Difference between cartography and GIS; Theory of coordinate systems; Sources of spatial data (including paper maps and remote sensing data); Structured Query Language; Methods for modeling of environmental spatial data; Methods for visualizing and analyzing spatial data; Digital Elevation Models in Environmental Engineering.<br>Students will be able to create spatial databases, to analyze spatial data and to visualize cartographic data.</td></tr>
<tr><td>Course content</td><td colspan="9">• Providing an understanding of the basic skills necessary to work with GIS.<br>• Introducing students to software and techniques.<br>• Teaching spatial data visualization techniques along with introductory knowledge of effective cartography and additional software for the production of maps, models and other information graphics.<br>• Identifying and accessing publicly available data sets.<br>• Teaching the skills necessary to create GIS data through a variety of methods including those offered by global positioning system (GPS) technologies and remote sensing.</td></tr>
<tr><td>Teaching methods</td><td colspan="9">Lecture - Informative and problem-based lectures (multimedia presentation method); Project - exercises in the computer lab (The GIS course includes 8 classes taking two teaching hours each, during which a selection of computer software and special data will be successively discussed. There are an introductory lecture and lab components for each class meeting).</td></tr>
<tr><td>Assessment method</td><td colspan="9">Lecture - written test; Project - written works from project tasks together with computer presentation (Students are expected to design, research, and complete a final project by the end of the semester. The project is required to be a specific research question explored using GIS tools).</td></tr>
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| Symbol of learning outcome | Learning outcomes | Reference to the learning outcomes for the field of study |
|---|---|---|
| **LO1** | knows theoretical basics of spatial information systems, has knowledge of technologies used in GIS and legal aspects of spatial databases construction | IS1_W01 |
| **LO2** | classifies data sources for creating spatial databases, knows thematic content and accuracy of data acquired by direct measurements, remote techniques and based on cartographic data, provides principles of data collection, modeling and analysis | IS1_W03; IS1_U04; IS1_U05; IS1_K01; IS1_K01 |
| **LO3** | knows examples of design solutions for spatial databases and spatial information systems, knows techniques of visualization, data presentation and sharing of spatial data | IS1_W01; IS1_U04 |
| **LO4** | is able to select data sources to solve problems in the field of environmental engineering, is able to apply basic technologies for data processing and transformation, uses spatial information from WebGIS systems | IS1_W01; IS1_U04 |
| **LO5** | is able to formulate queries to databases and apply standard data models in spatial analysis, together with interpretation and cartographic visualization of results | IS1_W03; IS1_U05 |
| **LO6** | is able to design and create a thematic GIS database | IS1_W01; IS1_U04 |

| Symbol of learning outcome | Methods of assessing the learning outcomes | Type of tuition during which the outcome is assessed |
|---|---|---|
| **LO1** | Written exam | L |
| **LO2** | Written exam | L |
| **LO3** | Written exam; project work | L; P |
| **LO4** | project work | P |
| **LO5** | project work | P |
| **LO6** | project work | P |

| Student workload (in hours) | | No. of hours |
|---|---|---|
| **Calculation** | Participation in lectures | 2 x 8 |
| | Preparation for the exam | 6 |
| | Participation in computer classes | 2 x 8 |
| | Preparation for the workshop | 6 |
| | Participation in consultations related to a project | 2 |
| | Implementation of project tasks (including preparation of a final project) | 6 |
| | **TOTAL:** | **52** |

| Quantitative indicators | HOURS | No. of ECTS credits |
|---|---|---|
| **Student workload – activities that require direct teacher participation** | **34** | **2** |

| | | | |
|---|---|---|---|
| **Student workload – practical activities** | | **32** | **2** |
| **Basic references** | GIS, Environmental Modeling and Engineering. Allan Brimicombe CRC Press, 2020; Geographical information systems: principles, techniques, management, and applications. Paul A Longley (ed.), 2005 | | |
| **Supplementary references** | QGIS Desktop 3.16 User Guide (online access at QGIS Project website) | | |
| **Organisational unit conducting the course** | Department of Agri-Food Engineering and Environmental Management | **Date of issuing the programme** | |
| **Author of the programme** | Andrzej Kamocki, PhD Eng. | **March 10, 2022** | |

**L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work, S – seminar**