POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Geographic Information Systems [S1Inf1>SIG]

Course

Field of study
Computing

Year/Semester
3/6

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture	Laboratory classes	Other
24	30	0
Tutorials	**Projects/seminars**	
0	0	

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

Basic knowledge of mathematics (analytical geometry) and geography at the high school level, knowledge of the syntax of XML-based languages, knowledge of database systems and SQL language. Ability to design simple relational databases, use advanced programming and image processing environments, when working on graphics - ability to use layers

Course objective

1. to provide students with knowledge of the specifics of geographic information systems, with particular emphasis on the characteristics of spatial databases, methods of acquiring spatial data, processing and use of satellite images, construction and use of satellite navigation systems. 2. to develop in students the ability to prepare advanced analysis of geographic data in extensive dedicated GIS environments 3. to develop in students the ability to work in a team during the implementation of the project in laboratory classes.

Course-related learning outcomes

Knowledge:
1. has a structured and theoretically supported general knowledge in the key issues of computer science

and detailed knowledge in the specifics of geographic databases
2. has knowledge of the significant directions of development and the most important achievements of computer science and other related scientific disciplines, in particular satellite image processing, satellite field positioning methods
3. knows the basic techniques, methods and tools used in the process of solving computer tasks, mainly of an engineering nature, in the field of key issues of computer science

Skills:
1. the student is able to obtain information from literature, hardware specifications and other sources (in the native language and English), integrate them, interpret and critically evaluate them, draw conclusions and formulate and fully justify opinions
2. is able to appropriately use information and communication techniques (including free multimedia training), applicable at various stages of the implementation of IT projects
3. is able, when formulating and solving IT tasks, to apply appropriate tools that simulate the use of a mobile device in the field for the purpose of obtaining geographic information
4. is able - according to the given specification - to prepare advanced analysis of geographic data using appropriate methods, techniques and tools
5. has the ability to formulate simple algorithms for determining position in the field and their implementation using at least one of the popular software environments for mobile devices
6. is able to plan and implement the process of his own permanent learning and is aware of the possibilities of further education (studies of the second and third degree, postgraduate studies, courses and examinations conducted by universities, companies and professional organizations

Social competences:
1. the student understands that in information technology, knowledge and skills become obsolete very quickly
2. the student is aware of the importance of knowledge in solving engineering problems, and knows examples and understands the reasons for malfunctioning information systems that have led to serious financial, social losses, or serious loss of health or even life

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment: in terms of lectures - on the basis of answers to questions on the material discussed in previous lectures and discussed in the current lecture; in terms of laboratories - on the basis of evaluation of the current progress of the tasks.
Summative evaluation: evaluation of the knowledge and skills acquired during the lecture classes is made on the basis of a test, containing single-choice questions. The grade received is proportional to the number of points earned. The minimum number of points necessary to pass the test is 50% of the total number of points; in terms of laboratories, verification of the established learning outcomes is carried out by: evaluation of partial tasks carried out during the course of classes, implementation of a credit project. In addition, the activity of students during classes is rewarded, as manifested by: preparing an essay on a specific topic, discussing additional aspects of the issue, making comments that affect the improvement of teaching materials, informing the instructor about difficulties in understanding the material taught.

Programme content

Lecture: The course will cover: geographic data models, quality of geographic data, fundamentals of geodesy, elements of astronavigation, spatial reference systems, geographic databases, geographic data processing, spatial analysis of vector and raster data, visualization of geographic data, basic languages for describing geographic data (GML, KML), examples of map services on the Internet, analysis of geographic data in a selected advanced GIS environment using free external sources of raster and vector data .
Laboratories: methods for creating and processing vector data, methods for processing raster data, methods for using available routing services, building your own map services, creating advanced virtual tours using KML language and GoogleEarth geo-viewer environment, using available APIs for GIS solutions, preparing geographic data analysis in QGIS environment.

Course topics

none

Teaching methods

Lecture: multimedia presentation, presentation illustrated by examples given on the blackboard, discussion and analysis of problems.
Laboratory exercises: implementation of partial tasks of acquisition, retrieval, presentation and analysis of geographical data, discussion, teamwork.

Bibliography

Basic:
1. Geoinformacja. Wprowadzenie do systemów organizacji danych i wiedzy, D. Felcenloben, GALL, 2011
2. Podstawy teledetekcji. Wprowadzenie do GIS, Stanisław Mularz, Politechnika Krakowska 2004

Additional:
1. GIS w geografii fizycznej, Artur Magnuszewski, PWN, 1999
2. Wykorzystanie systemów informacji geograficznej w biznesie, Różycki R., Sroczan M., Inteligentne systemy w inżynierii i ochronie środowiska, praca zbiorowa, Futura, Poznań 2007, s.143 153.

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	54	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	46	2,00