COURSE DESCRIPTION CARD - SYLLABUS

Course name

Geographic information systems

Course

Field of study	Year/Semester
Transport	3/5
Area of study (specialization)	Profile of study
	general academic
Level of study	Course offered in
First-cycle studies	Polish
Form of study	Requirements
full-time	elective

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
30	15	
Tutorials	Projects/seminars	

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

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Faculty of Civil and Transport Engineering

ul. Piotrowo 3, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

KNOWLEDGE: The student has basic knowledge of information technology provided in the program of the first-cycle studies.

SKILLS: The student is able to use modern electronic communication tools at a basic level, uses office applications.

SOCIAL COMPETENCES: The student is aware of the globalization and intensification of information processing and exchange in social and economic life.

Course objective

Acquainting with the problems and existing IT solutions in the field of geographic information systems. Developing the ability to optimize the use of technology and computer tools, taking into account the effectiveness of the created solutions, economic aspects and design assumptions.

Course-related learning outcomes

Knowledge

The student has ordered and theoretically founded general knowledge in the field of key issues of technology and detailed knowledge in the field of selected issues in this discipline of transport engineering.

The student knows the basic techniques, methods and tools used in the process of solving tasks in the field of transport, mainly of an engineering nature engineering.

Skills

The student is able, when formulating and solving tasks in the field of transport, to apply appropriately selected methods, including analytical, simulation or experimental methods.

The student has the ability to formulate tasks in the field of transport engineering and their implementation using at least one of the popular tools.

Social competences

The student understands that in technology, knowledge and skills very quickly become obsolete.

The student can think and act in an entrepreneurial way, incl. finding commercial applications for the created system, taking into account not only business benefits, but also social benefits of the conducted activity.

The student is aware of the social role of a technical university graduate, in particular, he/she understands the need to formulate and transfer to the society, in an appropriate style, information and opinions on engineering activities, technological achievements, as well as the achievements and traditions of the transport engineer profession.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Assessment of student activity during laboratory classes; assessment of the degree of implementation of laboratory tasks on the basis of the submitted reports and generated result files.

Assessment taking into account the activity of students during lectures and a test of the material studied (checking the understanding of basic concepts and knowledge of the issues covered by the program of the course).

Programme content

Lecture: Introduction to GIS, historical review, raster and vector data, representing continuous fields, digital and paper map, measuring the Earth: latitude and longitude, projections and coordinates,

measuring latitude, longitude, and elevation: GPS, GIS software, geographic data modeling; CAD, graphical, and image data models (raster data model, vector data model, object data model); geographic data modeling in practice; data collection (data collection workflow, primary geographic data capture, raster data capture, vector data capture, secondary geographic data capture), capturing attribute, data creating and maintaining geographic databases, cartography and map production, geovisualization, spatial data analysis, spatial analysis and inference, spatial modeling with GIS, managing GIS, information and decision making (in logistic and transportation).

Teaching methods

Lecture with multimedia presentation.

Laboratories - creating solutions to illustrate the issues discussed during lectures using GIS software.

Bibliography

Basic

Bielecka E.: Systemy informacji geograficznej: teoria i zastosowania. Wydawnictwo Polsko-Japońskiej Wyższej Szkoły Technik Komputerowych, Warszawa 2006.

Iwańczak B.: QGIS 2.14.3. Tworzenie i analiza map. Wydawnictwo Helion, wydanie II, Warszawa 2016.

Jan Van Sickle: Ebasic GIS Coordinates Wydawnictwo CRC Press, wydanie III, 2017.

Longley P.A., Goodchild M.F., Maguuire D.J., Rhimd D.W.: GIS. Teoria i praktyka. Wydawnictwo Naukowe PWN, Warszawa 2006.

Szczepanek Robert, Zmuda-Trzebiatowski P.: 3.12 QGIS. Wstęp do QGIS - samouczek Politechnika Poznańska, Poznań 2020. Materiał dostępny na stronie: www.dts.put.poznan.pl

Additional

Jian Guo Liu, Philippa J. Mason: Image Processing and GIS for Remote Sensing: Techniques and Applications Wydawnictwo Wiley Blackwell, wydanie II, 2016.

Kwiecień J.: Systemy informacji geograficznej - podstawy. Wydawnictwa Uczelniane ATR w Bydgoszczy, Bydgoszcz 2004.

Shashi Shekhar, Shashi Shekhar, Hui Xiong: Encyclopedia of GIS Wydawnictwo Springer, wydanie II, 2017.

Breakdown of average student's workload

	Hours	ECTS
Total workload	90	4,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	45	2,0

[1] delete or add other activities as appropriate