STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Optional CAD		**1010134231010130660**
Field of study	Profile of study (general academic, practical)	Year /Semester
Environmental Engineering Extramural First-	**(brak)**	**2 / 3**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**obligatory**
Cycle of study:	Form of study (full-time,part-time)	
First-cycle studies	**part-time**	
No. of hours		No. of credits
Lecture: **12** Classes: **-** Laboratory: **18** Project/seminars: **-**		**3**
Status of the course in the study program (Basic, major, other)	(university-wide, from another field)	
(brak)	**(brak)**	
Education areas and fields of science and art		ECTS distribution (number and %)
technical sciences		**3 100%**
Technical sciences		**3 100%**

Responsible for subject / lecturer:

dr inż. Rafał Brodziak
email: rafal.brodziak@put.poznan.pl
tel. 61 6652443
Faculty of Civil and Environmental Engineering
ul. Piotrowo 5 60-965 Poznań

Responsible for subject / lecturer:

dr inż. Alicja Bałut
email: alicja.balut@put.poznan.pl
tel. 61 6652436
Faculty of Civil and Environmental Engineering
ul. Piotrowo 5 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic in mathematics, logic, computer science. Good knowledge of MS Excel.
2	**Skills**	Personal computer support, ability to use Excel.
3	**Social competencies**	Awareness of the need to continually update and refine knowledge and skills.

Assumptions and objectives of the course:

Educate student in formal thinking adapted to the need to use the capabilities of computer tools in the context of applications in environmental engineering specially geographic information systems. Familiarize students with the spatial data analysis environment and languages.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Student knows the basics of SQL (obtained during lectures and laboratory exercises) - [[K_W07]]
2. Student knows the capabilities of the QGIS program in the field of creating and using spatial-descriptive queries for data analysis (obtained on lectures and laboratory exercises) - [[K_W07]]
3. Student knows the basic spatial data models, i.e. raster and vector, and knows the basic QGIS functionalities related to the support of these layers (obtained on the lecture and laboratory exercises) - [[K_W07]]
4. Student knows the theoretical foundations of the construction of a numerical model of terrain of its application in environmental engineering and mathematical interpolation methods (obtained during lectures and laboratory exercises) - [[K_W05]]

Skills:

1. Student is able to create new vector and raster layers in the QGIS program (obtained during the lecture and laboratory exercises) - [[K_U02, K_U07, K_U09]]
2. The student is able to build a simple database, defining their attributes (obtained on the lecture and laboratory exercises) - [[K_U02, K_U07, K_U09]]
3. Student is able to create any spatial-descriptive queries using these functionalities to solve simple engineering queries (obtained during lecture and laboratory exercises) - [[K_U01, K_U05, K_U07]]

Social competencies:

1. Student is aware of the value of information and knowledge (obtained during the lecture and laboratory exercises) - [[K_K07]]

Assessment methods of study outcomes
-The basic way to check the learning outcomes: in the course of the lecture (K_W07, K_K07) the written test - multiple choice test and open questions, carried out on the last classes. As part of laboratory exercises (K_U02, K_U07, K_U09) on the last class of the colloquium in the form of a multiple-choice test along with the execution of 6 tasks based on the given database by the teacher (using the QGIS software). Passing threshold: 50%. Detailed point criteria and grading scale are given before crediting
Course description
Traditional lecture with elements of problem lecture and multimedia presentations, presenting basic information about software used in environmental engineering, in particular spatial information systems, with particular emphasis on techniques that can be used for engineering calculations and creating advanced analyses of spatial-descriptive data. Thematic scope of lectures: Introduction to GIS type systems, Spatial data models (raster, vector), Elements of SQL language, Numerical terrain models and interpolation methods of point data, Basic functions of the QGIS program. The scope of laboratory exercises includes the use of knowledge acquired during lectures in practice. Laboratory classes are conducted using the project method and a case study, based on a database provided by the person conducting the exercises using the software QGIS.
Basic bibliography:
1. Robert Szczepanek, Systemy informacji przestrzennej z QGIS, część I i II, Wydawnictwo PK, Kraków, 2017. 2. Longley Paul A., Goodchild Michael F., Maguire David J., Rhind David W, GIS teoria I praktyka, PWN, Warszawa, 2006. 3. Mastering QGIS, Kurt Menke, Richard Smith Jr., Luigi Pirelli, John Van Hoesen, Packt Publishing, 2015.
Additional bibliography:
1. Spatial Data Analysis, Models, Methods and Techniques, Manfred M. Fischer, Jinfeng Wang, Springer, 2011. 2. Geographic Information Science and Technology Body of Knowledge, David DiBiase, Michael DeMers, Ann Johnson, Karen Kemp, Ann Taylor Luck, Brandon Plewe, and Elizabeth Wentz, AAG, 2006.

Result of average student's workload

Activity	Time (working hours)
1. Attend lectures (hours of contact)	12
2. Participation in laboratory classes (hours of contact, practical)	18
3. Preparation for laboratory exercises (self-study)	15
4. Preparing for the final pass and credit (self-study)	5

Student's workload

Source of workload	hours	ECTS
Total workload	50	3
Contact hours	30	2
Practical activities	15	1