Course name: ***Geographical Information System in Water Management***

ECTS	6.0
Course status	*facultative*
Course final assessment /evaluation of outcomes	*graded credit*
Prerequisite	*basic knowledge and skills in the field of information technologies, geodesy and spatial information systems*

Main field of study: **Engineering and Water Management**

Educational profile	*General academic*
Code of studies and education level	*bachelor*
Semester of studies	*winter*
Language of instruction	*English*

Course offered by:

Name of faculty offering the course	*Environmental Engineering and Land Surveying*
Name of department offering the course	*Land Reclamation and Environmental Development*
Course coordinator	*Tomasz Stachura Ph.D.*

Learning outcomes:

Symbol of outcome	Description of the learning outcome	Reference to main field of study outcomes	Area symbol*
KNOWLEDGE – student knows and understands:			
GIS_K1	*ways of using geographical information systems (GIS) in water management.*	*IGW1_W06*	*T*
SKILLS – student is able to:			
GIS_S1	*obtain spatial data, process information using GIS software, and visualize results on maps and 3D models.*	*IGW1_U04*	*T*
GIS_S2	*plan the work associated with the task and interact with others in the team.*	*IGW1_U20*	*T*
SOCIAL COMPETENCIES – student is ready to:			
GIS_C1	*long life learning related to the possibility of using GIS in engineering and water management*	*IGW1_K01*	*T*

Teaching contents

Lectures:	15 hours
Topics	- Possibilities of using GIS in water management, - Methods of representing the natural environment, - Data acquisition for GIS analyzes, - Spatial data properties, - Modele danych przestrzennych, - Spatial data models, - Advantages and limitations of GIS
Accomplished learning outcomes	*GIS_K1; GIS_C1*

Means of verification, rules and criteria of assessment	*Oral exam; positive assessment should answer at least 51% of tasks with specific guidelines. The share of the lecture grade in the final grade is 40%.*
Classes:	30 hours
Topics	- Introduction to ArcGIS, - Acquiring spatial data for the project, - Transforming data and adapting it to the needs of the project, - Modelling of natural processes for a catchment area, - Visualization of performed GIS analyses, - Presentation and discussion of the completed project.
Accomplished learning outcomes	*GIS_S1; GIS_S2*
Means of verification, rules and criteria of assessment	*Completing the project made during classes and performing project related tasks in the computer room; for a positive grade, at least 51% of tasks should be completed under specific guidelines. The share of the final grade of the exercises in the final grade of the subject is 60%.*

References:

Basic	*1. Bedford M. 2000. GIS for Water management in Europe. Wyd. Esri Press.* *2. Law M., Collins A. 2013. Getting to Know ArcGIS for Desktop. Wyd. Esri Press.* *3. Longley P.A. 2005. Geographical Information Systems: Principles, Techniques, Management and Applications. Wyd. John Wiley & Sons.*
Supplementary	*1. Schmidts M. 2013. Esri ArcGIS Desktop Associate Cert. Study Guide. Wyd. Esri Press.* *2. USGS 1987. Map projections: A working manual, Wyd. U.S. Government Printing Office, https://pubs.er.usgs.gov/publication/pp1395.* *3. Harder Ch., Ormsby T., Balstroem T. 2011. Understanding GIS. ArcGIS Project Workbook.*

Structure of learning outcomes

Area of academic study: R – Agricultural, forestry and veterinary sciences	0.0	ECTS **
Area of academic study: T – technical sciences	6.0	ECTS**

Structure of student activity

Contact hours	59	hrs.	2.4	ECTS**
Including: lectures	15	hrs.		
classes and seminars	30	hrs.		
consultations	10	hrs.		
participation in research	0	hrs.		
obligatory traineeships	0	hrs.		
participation in examination	4	hrs.		
e-learning	0	hrs.	0.0	ECTS**
student own work	91	hrs.	3.6	ECTS**

*Areas of academic study in the fields of: A – the arts; H – humanities; M – medical, sport and health sciences; N – natural sciences; P – biological sciences; R – agricultural, forestry and veterinary sciences; S – social studies; T – engineering and technology

** stated with an accuracy to 0.1 ECTS, where 1 ECTS = 25–30 hours of classes