Course name: ***Hydraulics and River Engineering for Professionals***

ECTS	6.0
Course status	*facultative*
Course final assessment /evaluation of outcomes	*Graded credit*
Prerequisite	*basics of hydraulics, hydrology, river engineering, exploitation of water structures*

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

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

Course offered by:

Name of faculty offering the course	*Environment Engineering and Land Surveying*
Name of department offering the course	*Hydraulic Engineering and Geotechnics*
Course coordinator	*Dr. Eng. Karol Plesiński, 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:			
HRE_K1	*types of any riverbeds. Knows channel forms of rivers and mountain streams and bottom forms of lowland rivers. Knows fluvial forms associated with all water activities in the world.*	*IGW2_W04 IGW2_W05*	*T*
HRE_K2	*appropriate methods for checking hydrological and hydraulic calculations of facilities for maintaining rivers and mountain streams in good condition in accordance with the Water Framework Directive (WFD). Has basic engineering and geomorphological knowledge used in assessing the correct application of engineering solutions for rivers and mountain streams in relation to the WFD.*	*IGW2_W01 IGW2_W08*	*T*
SKILLS – student is able to:			
HRE_S1	*calculate the hydrogeomorphological, sedimentological, channelling and hydraulic features of the mountain stream bed, and is also able to interpret the results obtained when assessing existing river and mountain stream maintenance devices simulating the operation of natural fluvial forms.*	*IGW2_U02 IGW2_U07*	*T*
HRE_S2	*use basic computer applications and perform hydrodynamic and hydromorphological calculations. Can describe phenomena and channelling processes useful for solving design issues in maintaining riverbeds and mountain streams.*	*IGW2_U02 IGW2_U06*	*T*

SOCIAL COMPETENCIES – student is ready to:			
HRE_C1	*solving unusual problems in the field of hydromorphology, hydrogeomorphology and river engineering. Is aware of the responsibility, as well as the importance and consequences for the environment and the community of using known methods of hydromorphological and geohydromorflological analysis.*	*IGW2_K02 IGW2_K04*	*T*

Teaching contents

Lectures:	15 hours
Topics	*1. Basic concepts and definitions of geomorphology. Fluvial sculpture – the morphogenetic activity of rivers.* *2. Geomorphology of lowland riverbeds and mountain streams. Fluvial processes shaping the catchment of rivers and streams. Fluvial forms in riverbeds: bedforms of lowland rivers and mountain stream channel forms.* *3. Principles of operation of hydrotechnical structures close to nature in accordance with the provisions of the Water Framework Directive (with particular emphasis on rapids with increased roughness and channels for fish).* 4. *Impact of hydrotechnical constructions on the water ecosystem, geomorphological and hydrodynamic conditions of the mountain stream.*
Accomplished learning outcomes	*HRE_K1; HRE_K2; HRE_C1*
Means of verification, rules and criteria of assessment	*Choice test, positive assessment should be given at least 50% of correct answers to given questions: <50% – insufficient (2.0); 50–60% – sufficient (3.0); 61–70% – satisfactory plus (3,5); 71–80% – good (4.0); 81–90% – good plus (4,5); 91-100% – very good (5.0). The share of the lecture grade in the final grade is 50%.*
Classes:	30 hours
Topics	*1. Checking the correctness of the existing water equipment.* *2. Performing hydraulic calculations of a hydrotechnical object close to nature.* 3. *Analysis of a selected hydrogeomorphological process in a riverbed or river valley in the context of the impact of a hydrotechnical structure.*
Accomplished learning outcomes	*HRE_S1, HRE_S2*
Means of verification, rules and criteria of assessment	*Passing reports on exercises – a grade from exercises is an arithmetic average of formative grades. The share of the grade for the project exercises in the final grade of the subject is 50%.*

References:

Basic	*1. Radecki-Pawlik A., Hernik J. 2010. Cultural Landscapes of River Valleys. Uniwersytet Rolniczy w Krakowie, Eds., monografia, ss. 260.* *2. Colin R. Thorne, Hey R.D., Newson M.D. 1997. Applied fluvial geomorphology for river engineering and management. John Wiley, s. 376.* *3. Gordon N.D., McMahon T.A., Finlayson B.L., Gippel C.J., Nathan R.J. 2004 Stream Hydrology. An Interoduction for Ecologists. John Wiley & Sons, ltd, Chichester.*
Supplementary	*1. Radecki-Pawlik A., Plesiński K. 2017. Boulder ramps: selected hydraulic, environmental and designing problems. The case of Polish Carpathian streams, Wyd. UR Kraków.*

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	57	hrs.	2.3	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	2	hrs.		
e-learning	0	hrs.	0.0	ECTS**
student own work	93	hrs.	3.7	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