

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Hydraulics and Hydrology		Code 1010115111010130065
Field of study Civil Engineering Extramural Second-cycle	Profile of study (general academic, practical) general academic	Year /Semester 1 / 1
Elective path/specialty Construction Engineering and Management	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) part-time	
No. of hours Lecture: 20 Classes: 10 Laboratory: - Project/seminars: -		No. of credits 3
Status of the course in the study program (Basic, major, other) other		(university-wide, from another field) university-wide
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 3 100% 3 100%
Responsible for subject / lecturer: dr inż. Marcin Skotnicki email: marcin.skotnicki@put.poznan.pl tel. 61 665 24 69 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Knowledge of the mathematics, physics and fluid mechanics
2	Skills	Student should be capable to apply knowledge to solve practical problems
3	Social competencies	Student should be aware of results of taken decisions
Assumptions and objectives of the course: Presentation of rules of fluid flows in different conditions		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Student knows rules of pressure calculations and laws describing the pressure distribution in fluid - [K_W02]		
2. Student knows rules of calculations of pipelines systems with pump stations - [K_W04, K_W8]		
3. Student knows nonuniform and unsteady flow equations and its application - [K_W08]		
Skills:		
1. Student can compute the forces in fluid - [K_U01]		
2. Student can compute pump parameters - [K_U13]		
3. Student can evaluate water level profiles for different flow conditions - [K_U07, K_U13]		
Social competencies:		
1. Student is aware of the necessity of critical review of calculation results - [K_K02]		
2. Student is aware of the necessity of risk evaluation in drainage and hydraulic structures designing - [K_K02, K_K04]		
Assessment methods of study outcomes		
Lectures - written test (15 -20 questions, duration up to 30 min)		
Exercises - written test (3-4 problems, duration up to 60 min) and activity		

Course description		
<p>Conservation of momentum, nonuniform flows, unsteady flow equations (de Saint-Venant equations), outflow through orifices and nozzles, overflows, complex pipeline systems, pump parameters evaluation, water hammer phenomena; presentation of computer applications EPANET (calculation of flow in complex hydraulic systems) and SWMM (unsteady open-channel flows).</p>		
<p>Basic bibliography:</p> <ol style="list-style-type: none"> Mitosek M.: Mechanika płynów w inżynierii środowiska, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 1997 Orzechowski Z., Prywer J., Zarzycki R.: Mechanika płynów w inżynierii środowiska, Wydawnictwa Naukowo-Techniczne, Warszawa 1997 Pociask-Karteczka J.: Zlewnia. Właściwości i procesy, Wydawnictwo Uniwersytetu Jagiellońskiego, Kraków 2006 		
<p>Additional bibliography:</p> <ol style="list-style-type: none"> Ciesielski J.: Zbiór zadań z mechaniki płynów dla kierunku Inżynieria Środowiska (cz. 1), Wydawnictwo Politechniki Poznańskiej, 1986 Niełacny M.: Uderzenia hydrauliczne w systemach wodociągowych, Wydawnictwo Politechniki Poznańskiej, 2005 Sawicki J.: Przepływy ze swobodną powierzchnią, Wydawnictwo Naukowe PWN, 1998 		
Result of average student's workload		
Activity	Time (working hours)	
1. Participation in lectures	20	
2. Participation in excersises	10	
3. Work at home	25	
4. Preparation for test and the presence on the test	20	
Student's workload		
Source of workload	hours	ECTS
Total workload	75	3
Contact hours	35	1
Practical activities	42	2