

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Advanced technologies for surface water treatment		Code 1010134271010137720
Field of study Environmental Engineering Extramural First-	Profile of study (general academic, practical) (brak)	Year /Semester 4 / 7
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) elective
Cycle of study: First-cycle studies	Form of study (full-time, part-time) part-time	
No. of hours Lecture: 14 Classes: - Laboratory: - Project/seminars: -		No. of credits 2
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art		ECTS distribution (number and %)
Responsible for subject / lecturer: dr hab. inż. Alina Pruss email: alina.pruss@put.poznan.pl tel. 61 665 34 97 Faculty of Civil and Environmental Engineering ul. Berdychowo 4, 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Student should have a basic knowledge mathematics, chemistry, fluid mechanics and general knowledge from environmental engineering.
2	Skills	Student should be able to perform mathematical calculations, physical, chemical, mechanics of the fluids.
3	Social competencies	Awareness to constantly update and supplement knowledge and skills.
Assumptions and objectives of the course: Knowledge of water treatment processes as well as principles of design and operation of water treatment facilities. Creation an ability for solving problems concerning designing, investment and operation of installation and facilities of water treatment plants, including sludge management.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Student has structured and theoretically founded knowledge of methods of water treatment. - [[[K2_W03, K2_W04, K2_W07]]		
2. Student has an ordered knowledge of design methods of basic technological processes used in the raw water treatment technology - [K2_W03, K2_W04, K2_W07]		
Skills:		
Social competencies:		
1. Student understands the need for teamwork in solving theoretical and practical problems - [K2_K03]		
2. Student understands the need for a systematic deepening and broadening his/her competences - [K2_K01]		
3. - [-]		
Assessment methods of study outcomes		

Exam (written)		
Written exam - A total of 5 open questions. For each question the maximum number of points 20. Criteria of evaluation depending on the number of points obtained:		
Number of points - rating		
91 -100 very good (5.0)		
81 - 90 good plus (4,5)		
71 - 80 good (4.0)		
61 - 70 sufficient plus (3,5)		
50 - 60 satisfactory (3.0)		
Below 50 points - insufficient (2.0)		
Course description		
Processes and object of water treatment: coagulation, storage and installation of reagents, mixing tanks, flocculation tanks; sedimentation, rectangular and vertical clarifiers, sludge blanket clarifiers, tube settler; slow sand filtration, rapid filtration, direct filtration, rapid filters, granular carbon filters, filtration materials, filter backwashing, drainage systems.		
Learning methods: lecture using multimedia presentations		
Basic bibliography:		
1. Apolinary L. Kowal, Maria Świdorska - Bróż, Oczyszczanie wody, PWN, Warszawa 2009		
2. Anna M. Anielak, Wysokoefektywne metody oczyszczania wody, PWN, Warszawa 2015		
Additional bibliography:		
1. M.M. Sozański, Peter M. Huck, Badania doświadczalne w rozwoju Technologii Uzdatniania Wody, Monografie Komitetu Inżynierii Środowiska PAN, vol. 42, Lublin 2007		
2. MWH, Water Treatment Principles and Design (Secondo Editio, Revised by J. C. Crittenden, R. R. Trussell, D. W. Hanol, K. J. Howe and G. Tchobanoglous), John Wiley & Sons, Inc., Hoboken, NY, 2005.		
Result of average student's workload		
Activity	Time (working hours)	
1. Participation in lectures (contact hours)	14	
2. Consulting (contact hours)	6	
3. Exam preparations	30	
Student's workload		
Source of workload	hours	ECTS
Total workload	50	2
Contact hours	20	1
Practical activities	0	0