

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Energy and Renewable Energy Sources		Code
Field of study Chemical and Process Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 4 / 7
Elective path/specialty	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study:	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 2 Classes: - Laboratory: - Project/seminars: -	No. of credits 3	
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 technical sciences Technical sciences		ECTS distribution (number and %) 3 100% 3 100%
Odpowiedzialny za przedmiot / wykładowca: Prof. dr hab. Jan M. Skowronski e-mail: jan.skowronski@put.poznan.pl tel. 61 665 36 41 Wydział Technologii Chemicznej ul. Piotrowo 3, 60-965 Poznań tel.: 61 66 52 303		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	The basic knowledge within mathematics and physical chemistry
2	Skills	Student uses the basic techniques in a laboratory scale
3	Social competencies	Student understands the need for continuous training and improve his professional and personal competences
Assumptions and objectives of the course: Gaining knowledge in term of conventional energy and environmentally friendly renewable energy sources. Mastering the skills of conducting laboratory experiments related to the use of different energy sources.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: knows the principles of environmental engineering related to chemical production and waste management [K_W08]		
Skills: able to use the principle of saving raw materials and energy, and by modernizing equipment and processes is achieved favorable economic indicators and reduce the environmental burden [K_U14]		
Social competencies: understands the need for continuous training and improve his professional and personal competences. - [K_K01]		
Assessment methods of study outcomes		
Rating of written answers within the subjects related to the theme of the laboratory Current control of knowledge and practical skills, the correction for experimentation during laboratory classes. An assessment of the final report achieved on the basis of experimental results. A written final credit course.		
Course description		

1. Conventional energy and methods of reduce the risks associated with this type of energy 2. Water, wind, solar and geothermal energy 3. Biomass and biogas as a renewable energy sources 4. Hydrogen as an energy carrier 5. Electrochemical energy		
Basic bibliography: 1. W.M. Lewandowski, <i>Proekologiczne odnawialne źródła energii</i> , WNT, W-wa 2012 2. A. Czerwiński, <i>Ogniwa, akumulatory, baterie</i> , WNT, W-wa 1999.		
Additional bibliography:		
Result of average student's workload		
Activity	Time (working hours)	
1. Preparation for the credit course and credit course	25	
2. Consultation	5	
3. Lecture	30	
Student's workload		
Source of workload	hours	ECTS
Total workload	60	3
Contact hours	35	3
Practical activities	0	