

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Basics of Chemical Technology		Code
Field of study Environmental Protection Technologies	Profile of study (general academic, practical) general academic	Year /Semester
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) compulsory
Cycle of study: I-step	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 30 Classes: - Laboratory: 30 Project/seminars: -		No. of credits
Status of the course in the study program (Basic, major, other) Basic		(university-wide, from another field)
Education areas and fields of science and art		ECTS distribution (number and %) 4
Responsible for subject / lecturer: prof. Krystyna Prochaska e-mail: Krystyna.prochaska@put.poznan.pl Tel. 61 6653601 Wydział Technologii Chemicznej, Instytut Technologii i Inżynierii Chemicznej ul. Berdychowo 4, 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	basic knowledge in the field of general and organic chemistry, physical chemistry, thermodynamics, and chemical engineering.
2	Skills	ability to solve elementary problems in the field of chemical technology, including the ability to assess the feasibility of the process on an industrial scale and control its course; analysis of its impact on the natural environment, the ability to obtain information from the indicated sources.
3	Social competencies	understanding of the need to expand your competences, thinking in a creative way, the ability to make responsible decisions.
Assumptions and objectives of the course: Obtaining theoretical and practical knowledge in the field of creating a technological project; material balance and energy balance of processes; calculating of homogeneous chemical reactors.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. The student has a structured, theoretically founded knowledge of the basics of chemical technology. 2. The student has knowledge of chemical processes, including the appropriate selection of materials, apparatus and devices for their effective implementation. 3. The student knows the basic processes, techniques, methods and tools used in chemical technology. 4. The student has a basic knowledge of the construction and selection of apparatus used in various chemical processes		
Skills:		
1. The student is able to effectively solve elementary problems in the field of chemical technology based on literature and experimental data. 2. The student is able to effectively assess the impact of a particular technology on the natural environment. 3. The student is able to plan and design a technological installation. 4. The student has the ability to adapt knowledge in the field of chemistry and related fields to solve technological problems.		
Social competencies:		

1. The student is aware of the effects of engineering activities and its impact on the environment and related responsibilities.
2. The student is aware of the responsibility for jointly carried out tasks related to team work.
3. The student understands the need to provide the public with information about beneficial as well as unfavorable aspects of activities related to the production and use of chemical compounds, can provide such information in a way commonly understood.

Assessment methods of study outcomes

written /oral exam
 assessment of student's activity in laboratory and project classes,
 assessment of teamwork and solving scientific problems

Course description

The lectures cover the following topics:

1. Stages of creating a technological project.
2. Chemical process concept
 - a) stoichiometric analysis of the process (basic concepts, mass balance of the reaction);
 - b) thermodynamic analysis of the process (thermodynamic data sources, chemical equilibrium constant and thermodynamic potential, calculation of post-reaction mixture composition, calculation of the reaction equilibrium constant)
 - c) kinetic analysis of the process (speed of chemo-technological process and chemical reaction, speed of homogeneous reaction, temperature effect, pressure effect, kinetic curves).
3. Technological concept of the process (technological principles and principles of green chemist
4. Increasing the scale of the process (semi-technical scale, semi-technical scale, pilot plant)
5. Technological scheme (process schematic diagram, mass balance, energy balance).
6. Enthalpy graphs (stoichiometric process).

Classification of chemical reactors and calculation methods for basic types of homogeneous reactors.

Basic bibliography:

1. script „Podstawy technologii chemicznej i inżynierii reaktorów”, eds. M. Wiśniewski, K. Alejski, Wydawnictwo Politechniki Poznańskiej, Poznań 2006.
2. A. Burghardt, G. Bartelmus, *Inżynieria reaktorów chemicznych*, PWN Warszawa 2001.
3. E. Bortel, H. Konieczny, *Zarys technologii chemicznej*, Warszawa, WNT 1992.
4. J. Szarawara, J. Skrzypek, A. Gawdzik, *Podstawy inżynierii reaktorów*, Warszawa, WNT 1980.

Additional bibliography:

1. P.W. Atkins, *Chemia fizyczna*, Wyd. Nauk. PWN, Warszawa 2003.
2. S. Bretsznajder, *Podstawy ogólne technologii chemicznej*, Warszawa, WNT 1973.

Result of average student's workload

Activity	Time (working hours)	
Preparation for the exam and exam	10	
Participation in lectures	30	
Preparation for laboratory exercises and participation in laboratory classes	40	
Student's workload		
Source of workload	hours	ECTS
Total workload	80	4
Contact hours	60	
Practical activities	30	