

<b>Course title</b> Technologia chemiczna / Chemical technology		<b>ECTS code</b> 13.3.0416	
<b>Name of unit administrating study</b> Faculty of Chemistry			
<b>Studies</b>			
<b>Field of study</b>	<b>Type</b>	<b>Form</b>	
Chemistry	Bachelor	Full-time studies	
<b>Teaching staff</b> Prof. dr hab. inż. Adriana Zaleska-Medynska			
<b>Forms of classes, the realization and number of hours</b>		<b>ECTS credits</b> 5	
<b>A. Forms of classes, in accordance with the UG Rector's regulations</b> lecture, laboratory classes		classes - 60 h tutorial classes – 30 h student's own work – 35 h	
<b>B. The realization of activities</b> in-class learning		Total: 125 h - 5 ECTS	
<b>C. Number of hours</b> 60 h (30 h lecture, 30 h laboratory classes)			
<b>The academic cycle</b> Third year, summer semester			
<b>Type of course</b> obligatory		<b>Language of instruction</b> Polish	
<b>Teaching methods</b>  Experiments designing Experiments conducting Lecture with multimedia presentation		<b>Form and method of assessment and basic criteria for evaluation or examination requirements</b>	
		<b>A. Final evaluation, in accordance with the UG study regulations</b> course completion (with a grade)	
		<b>B. Assessment methods</b> Lecture: written exam Laboratory exercise: written tests, conducting experiments, report preparation	
		<b>C. The basic criteria for evaluation or exam requirements</b>  Lecture: <ul style="list-style-type: none"> <li>• positive grade from the written exam covering the subjects mentioned in the lecture program; the grade scale according to the UG Study Regulatory;</li> </ul> Laboratory exercises:: <ul style="list-style-type: none"> <li>• Presence in the laboratory classes and practical conducting of experiments in accordance with the instructions</li> <li>• Positive evaluation of the written test (colloquium) covering the subjects mentioned in the laboratory class program; the grade scale according to the UG Study;</li> <li>• Positive evaluation of the report on laboratory experiments</li> </ul>	
<b>Required courses and introductory requirements</b> Knowledge of the principles of general chemistry , math, principles of the inorganic chemistry, organic chemistry and analytical chemistry			
<b>Aims of education</b> <ul style="list-style-type: none"> <li>• To gain knowledge in the field of unit operations</li> <li>• To gain knowledge in the field of technological principles</li> <li>• To gain knowledge in the field of the criteria of chemical process concept design</li> <li>• To develop ability to prepare a schematic diagram</li> <li>• To gain the knowledge about selected apparatus and devises used in the chemical and food industry</li> </ul>			

### Course contents

#### A. Lecture

Chemical technology as applied science. New technological process – genesis. Chemical and technological concept of the processes. Process design and process scaling up. The principles of technological process. Process flow diagram. Basis unit operations. Crushing and milling. Screening and separation. Forming and extrusion. Distillation and rectification. Liquids homogenization. Mixing and agglomeration. Extraction. Heat exchange. Heating and cooling. Evaporation. Food freezing. Drying. Basic devices and apparatus in chemical and food industry. Examples of selected chemical process (case studies).

#### B. Laboratory

Energy balance. Fertilizers manufacturing. Heterogeneous catalysis in chemical industry. Distillation and rectification. Reactors in chemical industry.

### Bibliography of literature

#### A. Literature required to pass the course

Warych J., Aparatura chemiczna i procesowa, Oficyna wydawnicza Politechniki Warszawskiej, Warszawa 1996

J. Szarawara, J. Piotrowski, Podstawy teoretyczne technologii chemicznej, WNT, Warszawa, 2010

P. Lewicki, Inżynieria procesowa i aparatura przemysłu spożywczego, WNT, 2005

L. Synoradzki, J. Wisiański, red., Projektowanie procesów technologicznych

#### B. Extracurricular readings

Schmidt-Szałowski K., Sentek J., Podstawy technologii chemicznej. Organizacja procesów produkcyjnych, WPW 2001

S.Kucharski, J.Głowiński, red., Przykłady i zadania do przedmiotu: podstawy technologii chemicznej, Politechnika Wrocławska, Wrocław, 2005

### Knowledge

1. Explaining the criteria of chemical and technological concept design.
2. Explaining and characterizing basis operation units
3. Classifying operation units
4. Characterizing the most important devices and apparatus used in chemical and food industry

### Skills

1. Determine the criteria of chemical and technological concept design
2. Construct of process flow diagram
3. Classify operation units
4. Analyze mass and energy balance
5. Design the selection of basic devices and apparatus used in chemical and food industry

### Social competence

1. Student understands the concept of modern technological process design
2. Student is aware of the value and responsibility for his/her own work results
3. Student understand the needs of future education
4. Student demonstrates creativity in individual and teamwork and keeps open to the suggestions of the teacher and other team members