

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Industrial Processes Design</b>		Code <b>1010702211010700082</b>
Field of study <b>Chemical Technology</b>	Profile of study (general academic, practical) <b>general academic</b>	Year /Semester <b>1 / 1</b>
Elective path/specialty <b>Polymer Technology</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>Second-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: - Classes: - Laboratory: - Project/seminars: <b>30</b>		No. of credits <b>2</b>
Status of the course in the study program (Basic, major, other) <b>other</b>		(university-wide, from another field) <b>university-wide</b>
Education areas and fields of science and art <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>2 100%</b> <b>2 100%</b>
<b>Responsible for subject / lecturer:</b>  dr inż. Agnieszka Marcinkowska email: Agnieszka.Marcinkowska@put.poznan.pl tel. 61665-3605 Faculty of Chemical Technology ul. Berdychowo 4 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Student has basic knowledge of polymer, organic, inorganic, physical and analytical chemistry on academic level; knowledge of the mathematical tools used in chemical calculations.
2	<b>Skills</b>	Can use a mathematical programs and programs used for presentation of results
3	<b>Social competencies</b>	Student understands the need to supplement her/his education and increasing personal and professional competences.
<b>Assumptions and objectives of the course:</b> Presentation of the basic knowledge of process design and process rubber processing and production of automobile tires. Design of the plant production of tires.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b> 1. has knowledge of complex chemical processes involving careful selection of materials, raw materials, methods, techniques, apparatus and equipment to the process of manufacture of tires - [K_W03, K_W13] 2. has knowledge of the environmental problems associated with the manufacturing process of - [K_W08] 3. has an established expertise in the field of safety and health at work - [K_W10] 4. has an established and expanded knowledge of the processing of rubber - [K_W11]		
<b>Skills:</b> 1. has the ability to plan technological enterprise which is the production of tires, including analysis of the resources, engineering design, project financial evaluation, environmental impact analysis and marketing - [K_U20] 2. can design and evaluate the experiment and the process in the field of chemical technology and related fields - [K_U12, K_U22]		
<b>Social competencies:</b> 1. The student understands the need for self-study and improve their professional competence. - [K_K01] 2. The student is aware of the principles of engineering ethics in the wider area. - [K_K03, K_K05] 3. Students can interact and work in a group, taking different roles - [K_K04]		

<b>Assessment methods of study outcomes</b>		
Passing the final test.		
Evaluation of the project plant for the production of tires for cars / trucks.		
<b>Course description</b>		
1. Design of industrial processes - basic information including cost-effectiveness of the project in the field of environmental protection and safety rules. 2. Construction of a car tire. 3. Ingredients rubber compound: preparation, properties and applications. 4. Methods of making rubber compound - the mixing process and apparatus. 5. Technology of production of semi-finished products. 6. Technology of tire production. 7. Quality control of raw materials, semi-finished products, by-products and finished product. 8. Trip to the factory producing car tires		
<b>Basic bibliography:</b>		
1. ?Projektowanie procesów technologicznych. Od laboratorium do instalacji przemysłowej?, L. Synoradzki, J. Wisiański, OWPW, 2006 2. ?Technologia ogólna polimerów?, Z. Wirpsza, Politechnika Radomska, 1997 3. ?Produkcja opon i dętek?, B. Jurkowska, B. Jurkowski, WNT, 1975 4. ?Poradnik technologa gumy? J.R. White, S.K. De, Instytut Przemysłu Gumowego ?STOMIL?, 2003		
<b>Additional bibliography:</b>		
1. B. Jurkowska, B. Jurkowski, ?Mieszanie kompozycji polimerowych? WPP, Poznań, 1991. 2. D. Jaroszyńska, R. Gaczyński, B. Felczak, ?Metody badań fizycznych gumy? WNT, Warszawa, 1978		
<b>Result of average student's workload</b>		
Activity	Time (working hours)	
1. Participation in project activities	30	
2. Hours of consultation with the teacher	10	
3. Independent project	10	
4. Preparing to pass	10	
<b>Student's workload</b>		
Source of workload	hours	ECTS
Total workload	60	2
Contact hours	40	0
Practical activities	23	0