

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Process Equipment - design of stirred vessel</b>		Code <b>1010701131010723469</b>
Field of study <b>Chemical and Process Engineering</b>	Profile of study (general academic, practical) <b>general academic</b>	Year /Semester <b>2 / 3</b>
Elective path/specialty <b>-</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>elective</b>
Cycle of study: <b>First-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: - Classes: - Laboratory: - Project/seminars: <b>1</b>		No. of credits <b>1</b>
Status of the course in the study program (Basic, major, other) <b>basic</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>1 100%</b> <b>1 100%</b>
<b>Responsible for subject / lecturer:</b> dr hab. inż. Szymon Woziwodzki email: szymon.woziwodzki@put.poznan.pl tel. +48 61 6652147 Faculty of Chemical Technology ul. Berdychowo 4 61-131 Poznań		
<b>Responsible for subject / lecturer:</b>		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	- basics of math, physics and chemistry - principles of creation of design documentation, - basis of materials science and mechanical engineering - principles of technical drawing
2	<b>Skills</b>	- ability to use CAD software (AutoCAD) - ability to use calculation software - ability to create a design digital documentation - ability to obtain information from international standards and catalogues
3	<b>Social competencies</b>	- A student is aware of the advantages and limitations of individual and group work in solving the problems of an industrial nature and design, - A student knows the limits of his knowledge and sees the need to deepen their knowledge
<b>Assumptions and objectives of the course:</b> Knowledge about design of the stirred vessel.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. A student knows construction of impellers and stirred vessel - [K_W12]		
2. A student knows methods and principles of design of stirred vessel - [K_W15]		
<b>Skills:</b>		

<p>1. A student knows how to design a stirred vessel for chosen two-phase systems - <b>[K_U01]</b></p> <p>2. A student knows how to solve computational problems appearing during the design. - <b>[K_U06, K_U19]</b></p> <p>3. A student knows how to obtain information from databases, international standards and catalogues - <b>[K_U20]</b></p>
<p><b>Social competencies:</b></p> <p>1. A student has the awareness and understanding of aspects of the practical application of knowledge. - <b>[K_K01]</b></p> <p>2. A student knows the limits of his own knowledge and understands the need for continuing education. - <b>[K_K02]</b></p>

<b>Assessment methods of study outcomes</b>		
<p><b>Knowledge:</b>                      Activity during course: 1                      Project defence: 2</p> <p><b>Skills:</b>                      Project defence: 1-3                      Activity during course: 2</p> <p><b>Social competencies:</b>                      Project defence: 1-2</p>		
<b>Course description</b>		
<p>During the course are discussed:                      principles of design of stirred vessel; calculation of physicochemical properties, minimal impeller speed; mixing power; calculation of engine power; calculation of shaft diameter; calculation the strength of the shaft; calculation of vessel support; selection of clutch and moto-reducers; application of inverters; calculation of drop diameter and interfacial area; discharge time</p>		
<p><b>Basic bibliography:</b></p> <p>1. F. Stręk, Mieszanie i mieszalniki, WNT, Warszawa 1981.                      2. J. Kamieński, Mieszanie układów wielofazowych, WNT, Warszawa 2004.                      3. J. Pikoń, Podstawy konstrukcji aparatury chemicznej, Wydawnictwo Politechniki Śląskiej, Gliwice 1973.                      4. T. Wilczewski, Pomoce projektowe z podstaw maszynoznawstwa chemicznego, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2008.</p>		
<p><b>Additional bibliography:</b></p> <p>1. Aparatura chemiczna, Pikoń J., Państwowe Wydawnictwa Naukowe, Warszawa, 1983                      2. A. Heim, B. Kochanski, K.W. Pyć, E. Rzycki, Projektowanie aparatury chemicznej i procesowej, Wydawnictwo Politechniki Łódzkiej, Łódź 1993.</p>		
<b>Result of average student's workload</b>		
Activity	Time (working hours)	
1. Participation in lectures	15	
2. Consultations	5	
3. Making the project and project defence	5	
<b>Student's workload</b>		
Source of workload	hours	ECTS

Total workload	25	1
Contact hours	20	1
Practical activities	15	1