

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Process Equipment - design of static mixer</b>		Code
Field of study <b>Chemical and Process Engineering</b>	Profile of study (general academic, practical) <b>general academic</b>	Year /Semester <b>2 / 4</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>15</b>		No. of credits <b>1</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>1 100%</b> <b>1 100%</b>
<b>Responsible for subject / lecturer:</b> <span style="float: right;"><b>Responsible for subject / lecturer:</b></span> 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>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	- basics math, physics and chemistry - principles of creation of design documentation, - basis of materials science and mechanical engineering - principles of technical drawing - construction and principles of design of stirred vessels - construction of momentum exchange equipment
2	<b>Skills</b>	- ability to use CAD software (AutoCAD) - ability to use calculation software - ability to create a digital design 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> The major objectives of the course are to obtain skills and knowledge about design of static mixers		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. A student knows construction of static mixers -		<b>[K_W12]</b>
2. A student knows principles of mixing dynamics in static mixer		<b>[K_W14]</b>
3. A student knows methods and principles of design of static mixers -		<b>[K_W15]</b>
<b>Skills:</b>		

1. A student knows how to select static mixer in various flow regimes -	[K_U01]
2. A student knows how to estimate homogeneity degree in static mixer. -	[K_U06]
3. A student knows how to calculate the pressure drop in static mixer -	[K_U07]
4. A student knows how to calculate shear rate and shear stress in static mixer -	[K_U19]
5. A student knows how to estimate an effect of physiochemical properties on mixing in static mixer	[K_U21]
<b>Social competencies:</b>	
1. A student has the awareness and understanding of aspects of the practical application of knowledge. -	[K_K01]
2. A student knows the limits of his own knowledge and understands the need for continuing education. -	[K_K04]
3. A student knows the limitation of work in group.	[K_K04]

<b>Assessment methods of study outcomes</b>		
<b>Knowledge:</b> Activity during the course: 1-3 Project defence: 2-3		
<b>Skills:</b> Project defence: 1-5 Activity during the course: 1-5		
<b>Social competencies:</b> Project defence: 1-3		
<b>Course description</b>		
During the course are discussed: principles of construction of static mixers; pressure drop in static mixers; calculation of the drag coefficient for static mixers; calculation of the homogeneity degree in static mixers; length of static mixer; mixing of two-phase systems in static mixers		
<b>Basic bibliography:</b> 1. F. Stręk, Mieszanie i mieszalniki, WNT, Warszawa 1981. 2. J. Kamieński, Mieszanie układów wielofazowych, WNT, Warszawa 2004. 3. E.L. Paul, V.A. Atiemo-Obeng, S.M. Kresta, Handbook of industrial mixing. Science and practice, Wiley&Sons, Hoboken 2004.		
<b>Additional bibliography:</b> 1. Pikoń J., Aparatura chemiczna, Państwowe Wydawnictwa Naukowe, Warszawa, 1983		
<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 Exam project	5	
<b>Student's workload</b>		
Source of workload	hours	ECTS
Total workload	25	1

Contact hours	20	1
Practical activities	15	1