Course code: 02-EMS-CHRE-SP2 **Plan position:**

A. INFORMATION ABOUT THE COURSE

B. Basic information

Name of course	***Chemical reactors engineering***
Field of studies	
Level of studies	
Profile of studies	General academic
Form of studies	Stationary
Specialty	
Unit responsible for the field of studies	Faculty of Chemical Technology and Engineering / Department of Chemical and Biochemical Engineering
Name and academic degree of teacher(s)	Justyna Miłek, Professor Sylwia Kwiatkowska-Marks, PhD, Ilona Trawczyńska, PhD
Introductory courses	
Introductory requirements	

C. Semester/week schedule of classes

Semester	Lectures (W)	Auditorium classes (Ć)	Laboratory classes (L)	Project classes (P)	Seminar (S)	Field classes (T)	Number of ECTS points
Summer	30	30					8

2. LEARNING OUTCOME

No.	Learning outcomes description	The reference to the learning outcomes of specific field of study	The reference to the learning outcomes for the area
	KNOWLEDGE		
W1	Students have detailed knowledge of chemical engineering in the field of chemical reactor engineering.	K_W04	P7S_WG
	SKILLS		
U1	On successful completion of the course students can evaluate the usefulness and ability to use new achievements in materials, apparatus and research methods to design processes run in chemical reactors.	K_U09	P7S_UW
U2	Students can apply mathematical models to select and design suitable reactors for specific chemical process.	K_U10	P7S_UW

SOCIAL COMPETENCES			
K1	On successful completion of the course student is supposed to understand the need for lifelong learning, he can inspire and organize the learning process of the others.	K_K01	P7S_KK P7S_KO

3. TEACHING METHODS

Traditional methods used

Standard lecture with presentation.
Calculations (exercise classes) performed by students under supervision of academic staff

4. METHODS OF EXAMINATION

Written colloquium from lectures and calculations classes

5. SCOPE

Lectures	The basic terms: extent, conversion, product yield and selectivity, independent reactions. Stoichiometric balance. Homogeneous process kinetics. Introduction to reactors design. Ideal reactors for a single reaction: batch and semi-batch reactor, Continuous stirred tank reactors, Plug flow reactor, Mixed flow reactors in series. Real reactors – Residence Time Distribution. Fundamentals of control and reactors optimization.
Calculations Classes	Solving engineering problems discussed during the lectures.

6. METHODS OF VERIFICATION OF LEARNING OUTCOMES

LEARNING OUTCOME	Form of assessment					
	Oral examination	Written exam	Colloquium	Project	Presentation	Reports
W1			×			
U1			×			
U2			×			
K1			×			

7. LITERATURE

Basic literature	1. M.E. Davis, R.J. Davis: Fundamentals of Chemical Reaction Engineering, McGraw – Hill, New York, 2003. 2. G.F. Froment, K. B. Bischoff, J. de Wilde: Chemical Reactor Analysis and Design, John Wiley & Sons, Inc. New York, 2011. 3. O. Levenspiel: Chemical Reaction Engineering, Wiley & Sons, Inc. New York 1999.
Supplementary literature	1. Jean -Pierre Corriou: Process Control. Theory and Applications, Springer-Verlag, London 2004. 2. U. Mann: Principles of Chemical Reactor Analysis and Design, John Wiley & Sons, Inc. New Yersay 2008.

8. TOTAL STUDENT WORKLOAD REQUIRED TO ACHIEVE EXPECTED LEARNING OUTCOMES EXPRESSED IN TIME AND ECTS CREDITS

Student’s activity		Student workload– number of hours
Classes conducted under a direct supervision of an academic teacher or other persons responsible for classes	Participation in classes indicated in point 1B	60
	Supervision hours	20
Student's own work	Preparation for classes	40
	Reading assignments	30
	Other (preparation for exams, tests, carrying out a project etc)	50
Total student workload		**200**
	Number of ECTS points	**8**