(*faculty stamp*)

Z1-PU7	WYDANIE N1	Strona 1 z 2

COURSE DESCRIPTION

1. Course title: Reactors and Reaction Engineering	**2. Course code**
3. Validity of course description: 2018/2019	
4. Level of studies: 1st cycle of higher education	
5. Mode of studies: intramural studies	
6. Field of study: Industrial and Engineering Chemistry	RCH3
7. Profile of studies: -	
8. Programme: general	
9. Semester: 7	
10. Faculty unit teaching the course: Department of Chemical Engineering and Process Design RCH3	
11. Course instructor: Krzysztof Piotrowski, Ph.D., D.Sc., Assistant Professor	
12. Course classification: field	
13. Course status: compulsory	
14. Language of instruction: English	
15. Pre-requisite qualifications: basic knowledge of Mathematics, Unit Operations and Fluid Mechanics	
16. Course objectives: An objective of the course is to acquaint students with basic methods of chemical reactors calculations	
17. Description of learning outcomes:	

Nr	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1.	Student knows principal reactor types	examination	lecture	K_W01 ++ K_W11+++ K_W14 +
2.	Student knows heat and mass balances of principal reactors	examination	lecture	K_W01 ++ K_W14 +
3.	Student knows elementary rules how to estimate rate constants	examination	lecture	K_W01 ++ K_W14 +
4.	Student is able to predict conversion for different types of reactors sets	Credit test	class	K_W01 ++ K_U07 ++
5.	Student is able to choose reactor type for a simple kinetic expression	Credit test	class	K_W01 ++ K_W09++ K_W11++ K_U07 ++
6.	Student understands the necessity of further professional training and the development of his/her engineering and personal competence	Observation and discussion	Lecture, class	K_K01 +

18. Teaching modes and hours

Lecture / BA /MA Seminar / Class / Project / Laboratory

Lecture Sem 7 - 30 h./ class, Sem 7 - 30 h

19. Syllabus description:

Introduction (independence of reactions, concentration changes with a single reaction and with several reactions, rate of reaction, heat of reaction and its variation, calculation of homogeneous equilibrium compositions).

Kinetics of homogeneous reactions (Elementary and non-elementary reactions. Kinetic models for non-elementary reactions. Testing kinetic models). Mass balances of different reactor types; Batch operation; Continuous stirred tank reactor CSTR: Tubular plug flow reactor; Cascade of

CSTRs.

Homogeneous reactor design. Comparison and choice of reactors for a single homogeneous reaction. Design for multiple reactions. Non-ideal flow; Residence time distribution, Models for non-ideal flow; Dispersion model.

20. Examination: **yes** (semester 7)

21. Primary sources:

1. R. Aris, Elementary Chemical Reactor Analysis, Dover Publications 1989.
2. O. Levenspiel, Chemical Reaction Engineering, John Wiley, 1962.

22. Secondary sources:

H.S. Fogler, Elements of Chemical Reaction Engineering, Prentice-Hall, 1986.

23. Total workload required to achieve learning outcomes

Lp.	Teaching mode :	Contact hours / Student workload hours
1	Lecture	30/15
2	Classes	30/25
3	Laboratory	-/-
4	Project	-/-
5	BA/ MA Seminar	-/-
6	Other	20/20
	Total number of hours	80/60

24. Total hours: 140

25. Number of ECTS credits: 5

26. Number of ECTS credits allocated for contact hours: 3

27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): -

26. Comments: -

Approved:

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(date, Instructor's signature)

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(*date , the Director of the Faculty Unit signature)*