



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Inżynieria reaktorów (Chemical reactors engineering)

### Course

Field of study

Technologia chemiczna (Chemical Technology)

Area of study (specialization)

Elektrochemia techniczna (Technical Electrochemistry)

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

I/1

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

15

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

15

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

dr hab. inż. Krzysztof Alejski, prof. PP

Responsible for the course/lecturer:

### Prerequisites

Fundamentals of Chemical Reaction Engineering

### Course objective

Obtaining knowledge and skills in the calculation of real flow reactors, heterogeneous reactors and bioreactors.

### Course-related learning outcomes

Knowledge

1. Has structured and theoretically founded knowledge of advanced chemical reactor models. (K\_W03, K\_W04)

2. Has knowledge of the phenomena occurring in heterogeneous reactors and bioreactors. (K\_W04, K\_W11)

Skills

1. Has the ability to select an advanced reactor or bioreactor model for a specific proces. (K\_U09, K\_U10)



2. Is able to design a real, heterogeneous reactor or bioreactor. (k\_U01, K\_U09)

Social competences

1. Is aware of the need for lifelong learning and professional development. (K\_K01)

2. Adheres to all teamwork rules; is aware of responsibility

for joint ventures and achievements in professional work.(K\_K04)

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Knowledge acquired during the lecture and skills are verified during the written exam. Passing threshold: 50% of points. Knowledge, skills and competences within project classes are verified on the basis of projects made in two-man teams.

### Programme content

1. Characteristics of real reactors.
2. Functions of the distribution of residence time in reactors.
3. Calculation of the conversion in real reactors.
4. Kinetics of heterogeneous reactions.
5. Calculation of heterogeneous reactors.
6. Bioreactors.

### Teaching methods

Lecture: presentation with discussion on the board.

Project: implementation of the reactor design in two-man teams.

### Bibliography

Basic

1. J. Szarawara, J. Piotrowski, Podstawy teoretyczne technologii chemicznej, Warszawa, PWN 2010.
2. Podstawy technologii chemicznej i inżynierii reaktorów, pod red. M. Wiśniewskiego i K. Alejskiego, skrypt, Wydawnictwo Politechniki Poznańskiej, Poznań 20017.
3. Fogler H. Scott, Elements of Chemical Reaction Engineering, Prentice Hall 2016.

Additional

1. A. Burghardt, G. Bartelmus, Inżynieria reaktorów chemicznych, PWN Warszawa 2001.



### Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	40	1,6
Student's own work (literature studies, preparation for tests/exam, project preparation) <sup>1</sup>	35	1,4

<sup>1</sup> delete or add other activities as appropriate