COURSE DESCRIPTION CARD - SYLLABUS

Course name
Chemical reactors engineering and bioreactors

Course

Field of study
Chemical and process engineering

Year/Semester
1/1

Area of study (specialization)
Bioprocesses and biomaterials engineering

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars
15

Number of credit points

4

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_W04, K_W12)

2. Has knowledge of the phenomena occurring in heterogeneous reactors and bioreactors. (K_W05, 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. Can interact and work in a group, taking on different roles on it. (K_K03)

2. Correctly identifies and resolves dilemmas related to the exercise of the profession.(K_K05)

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	90	4,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for tests/exam, project preparation) [1]	45	2,0

[1] delete or add other activities as appropriate