



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Inżynieria chemiczna (Chemical Engineering)

### Course

Field of study

Technologia chemiczna (Chemical Technology)

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

III/5

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

30

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

dr hab. inż. Jacek Różański

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Responsible for the course/lecturer:

dr hab. inż. Sylwia Różańska

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### Prerequisites

Students starting this subject should have basic knowledge in mathematics, physics, chemistry, engineering graphics, and materials technology. They should also have the ability to use spreadsheets, and be ready to work in a team.

### Course objective

The aim of the course is to provide the ability to perform design calculations.

### Course-related learning outcomes

Knowledge

1. Student knows the fundamental methods of scale-up - [K\_W13]

Skills

1. Student can to design equipments where momentum, heat and mass transfer take place - [K\_U15]



#### Social competences

1. The student can cooperate and work in a team [K\_K03]

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Skills and knowledge acquired during project classes are verified on the basis of the heat exchanger project and test, consisting of 3-4 tasks. Minimum threshold: 50% points.

#### Programme content

Course covers the following topics:

1. Convective heat and mass transfer
2. Condensation
3. Overall heat transfer coefficient
4. Calculation of heat transfer area
5. Overall mass transfer coefficient

#### Teaching methods

Multimedia presentation, illustrated with tasks solved on the board.

#### Bibliography

Basic

1. Zarzycki R.: Wymiana ciepła i ruch masy w inżynierii środowiska, WNT, Warszawa 2005.
2. Wiśniewski S., Wiśniewski T.S., Wymiana ciepła, WNT, Warszawa 2012.
3. Hobler T.: Dyfuzyjny ruch masy i absorbery, WNT, Warszawa 1976.
4. Hobler T.: Ruch ciepła i wymienniki, WNT, Warszawa 1986.
5. Koch R., Koziół A., Dyfuzyjno-cieplny rozdział substancji, WNT, Warszawa 1994.
6. Palica M., Gierczycki A., Lemanowicz M., Operacje inżynierii chemicznej, część 1 i 2, Wydawnictwo Politechniki Śląskiej, Gliwice 2013.
7. Broniarz-Press L. i inni: Inżynieria Chemiczna i Procesowa. Materiały Pomocnicze. Części II-III. Wydawnictwo Politechniki Poznańskiej, Poznań 1999-2005.
8. Bandrowski J., Troniewski L.: Destylacja i rektyfikacja, Wyd. Politechniki Śląskiej, Gliwice 1996.



Additional

1. Coulson J.M., Richardson J.F.: Chemical Engineering, vol. I-VI, Butterworth Heinemann, Oxford 1999-2002.
2. Sinnott R.K. Towler G.: Chemical Engineering Design, 5th Edition, Elsevier, 2009.
3. Pohorecki R., Wroński S.: Termodynamika i kinetyka procesów inżynierii chemicznej, WNT, Warszawa 1977.
4. Troniewski L.: Hoblerowskie ujęcie ruchu masy, Wydawnictwo WSI, Opole 1996.

**Breakdown of average student's workload**

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	40	1,6
Student's own work (literature studies, preparation for design classes, preparation for tests, project preparation) <sup>1</sup>	10	0,4

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