



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

part-time

Year/Semester

III/6

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

Number of hours

Lecture

Laboratory classes

Other (e.g. online)

40

Tutorials

Projects/seminars

20

Number of credit points

7

Lecturers

Responsible for the course/lecturer:

dr hab. inż. Jacek Różański

Responsible for the course/lecturer:

e-mail: Jacek.Rozanski@put.poznan.pl

tel. 61 665 2147

Prerequisites

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

Course objective

The aim of the course is to familiarize the student with experimental methods of solving problems of momentum, heat and mass transfers as well as performing design calculations of mass exchangers.

Course-related learning outcomes

Knowledge

1. Student knows the theoretical basis of drying, mixing and fluidization processes – [K_W13]
2. Student knows the basic measurement methods used in chemical engineering – [K_W15]



Skills

1. Student can assess the suitability of experimental methods for solving engineering tasks – [K_U14]
2. Student is able to perform process calculations related to mass transfer – [K_U08]
3. Student can design mass exchanger – [K_U15]
4. Student can perform experimental research and design calculations in a team – [K_U02]

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:

Knowledge acquired during the lecture is verified during the exam. The exam consists of 6 open questions for the same number of points. Minimum threshold: 50% points. Exam issues, on the basis of which questions are formed, will be sent to students by e-mail using the university e-mail system.

Skills and knowledge acquired as part of the laboratory are verified on a daily basis based on oral answers.

Skills and knowledge acquired during project classes are verified on the basis of the mass exchanger project.

Programme content

Design issues: mass balance, mass transfer coefficients, overall mass transfer coefficients, calculation of packed exchanger.

Subjects of laboratory exercises:

1. Study of rheological properties of Newtonian and non-Newtonian fluids
2. Analysis of the mixing process of the homogeneous fluids
3. Study of falling liquid film on a flat plate
4. Study of sedimentation process
5. Study of filtration process on a filter press
6. Study of pressure drop in a packed tower
7. Study of solid-liquid fluidization process
8. Determination of the heat transfer coefficient under forced flow
9. Study of the drying kinetics



Teaching methods

1. Laboratory exercises: performing experiments related to heat, mass and momentum transfer processes.
2. Project: Multimedia presentation, illustrated with tasks solved on the board.

Bibliography

Basic

1. Bandrowski J., Merta H., Ziolo J.: Sedymentacja zawiesin. Zasady i projektowanie, Wydawnictwo Politechniki Śląskiej, Gliwice 2001.
2. Bandrowski J., Troniewski L.: Destylacja i rektyfikacja, Wyd. Politechniki Śląskiej, Gliwice 1996.
3. Broniarz-Press L. i inni: Inżynieria chemiczna i procesowa. Materiały pomocnicze. I-III. Wydawnictwo Politechniki Poznańskiej, Poznań 1999-2002.
4. Broniarz-Press L. i inni: Inżynieria chemiczna i procesowa. Laboratorium, Wydawnictwo Politechniki Poznańskiej, Poznań 2000.
5. Broniarz-Press L.: Hydrodynamika spływu filmowego cieczy i zjawiska przenoszenia w aparatach warstewkowych, Wyd. Politechniki Poznańskiej, Poznań 2004.
6. Dziubiński M., Kiljański T., Sęk J.: Podstawy reologii i reometrii płynów, Wydawnictwo Politechniki Łódzkiej, Łódź 2009.
7. Koch R., Noworyta A.: Procesy mechaniczne w inżynierii chemicznej, WNT, Warszawa 1995.
8. Zarzycki R., Wymiana ciepła i ruch masy w inżynierii środowiska, WNT, Warszawa 2009.
9. Troniewski L.: Hoblerowskie ujęcie ruchu masy, Wydawnictwo WSI, Opole 1998.

Additional

1. Orzechowski Z., Prywer J., Zarzycki R.: Mechanika płynów w inżynierii środowiska, WNT, Warszawa 1997
2. Coulson J.M., Richardson J.F.: Chemical Engineering, vol. I-VI, Butterworth Heinemann, Oxford 1999-2002.
3. Sinnott R.K. Towler G.: Chemical Engineering Design, 5th Edition, Elsevier, 2009.
4. Pohorecki R., Wroński S.: Termodynamika i kinetyka procesów inżynierii chemicznej, WNT, Warszawa 1977.



Breakdown of average student's workload

	Hours	ECTS
Total workload	175	7,0
Classes requiring direct contact with the teacher	75	3,0
Student's own work (literature studies, preparation for laboratory classes, preparation for tests/exam, project preparation) ¹	100	4,0

¹ delete or add other activities as appropriate