COURSE DESCRIPTION CARD - SYLLABUS

Course name
Process engineering project [S1TOZ1>PzIP]

Course

Field of study
Circular System Technologies

Year/Semester
2/4

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
0

Laboratory classes
0

Other (e.g. online)
0

Tutorials
0

Projects/seminars
15

Number of credit points

1,00

Coordinators

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Lecturers

Prerequisites

The student has basic knowledge of mathematics, physics and chemistry acquired during the 1st degree classes, enabling the understanding of design tasks in process engineering in the field of fluid mechanics, heat and mass transfer. Has the ability to self-educate, is able to work individually and in a team, interpret the results obtained and draw conclusions. He is able to apply health and safety rules related to the performed work. Understands the need for continuous training and setting ambitious goals on the way to higher education, is aware of the responsibility for tasks carried out in teamwork.

Course objective

Obtaining knowledge in the field of modeling and design of flow, thermal and diffusion processes, thermodynamics of humid air and the basics of the theory of filtration and filtering and apparatus for the implementation of processes in the issues of process engineering.

Course-related learning outcomes

Knowledge:
1. has extended and in-depth knowledge of mathematics necessary for modeling, planning, optimization and characterization of processes in engineering practice as well as planning experiments and

developing the results of experimental research - k_w01.
2. has extended knowledge of physics allowing for understanding of physical processes related to process engineering - k_w02.
3. has basic knowledge of devices and installations used in circular system technologies - k_w12.
4. has knowledge of the basis of physical unit operations of circular system technologies - k_w22.
5. has knowledge of heat, mass and momentum exchange processes - k_w23.

Skills:
1. has the ability to obtain and critically evaluate information from literature, databases and other sources, and to formulate opinions and reports on this basis - k_u01.
2. can pursue self-education, prepare in polish and english a problem study related to the field of study - k_u04.
3. can plan and organize work individually and in a team - k_u08.
4. can make mass and energy balances of unit processes in circular system technologies - k_u17.
5. can, with the use of analytical and experimental methods, formulate assumptions and methods of their implementation for simple engineering tasks in the design of circular system installations - k_u22.

Social competences:
1. acts in accordance with the moral principles and the principles of professional ethics - k_k01.
2. can think and act in a creative and entrepreneurial manner - k_k06.
3. has a well-shaped awareness of the limitations of science and technology related to the protection of the natural environment and is aware of the negative impact of humans on the state of the environment - k_k10.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
The skills acquired during the project classes are verified on the basis of microprojects made in class or on-line, depending on the method of conducting the classes.

Programme content

Project classes are an integral part of the subject, which covers the basics of process engineering. The tasks solved in the classroom concern process-oriented design, which is aimed at, among others modification of processes taking into account optimization criteria, e.g. changing process conditions or media. From the point of view of the structure of the design process, students carry out issues related to the microstructure of the project, i.e. elementary tasks related to the search for possible solutions that meet the design requirements. This involves, for example, the selection of appropriate materials and the possibility of redesigning the element, taking into account the necessary criteria and using the potential possibilities of the material. Students also solve problems in the balance of momentum, mass and energy, which are an integral part of process engineering projects.

Teaching methods

Project classes: solving examples on the blackboard and carrying out the tasks given by the teacher.

Bibliography

Basic
1. Kowalski S.J., Teoria procesów przepływowych cieplnych i dyfuzyjnych, Wydawnictwo Politechniki Poznańskiej, Wyd. 1999 oraz 2008.
2. Kembłowski Z., Michałowski S., Strumiłło Cz., Zarzycki R., Podstawy teoretyczne inżynierii chemicznej i procesowej, Warszawa, PWN 1985.
3. Malczewski J., Piekarski M., Modele procesów transportu masy, pędu i energii, Warszawa, PWN 1992.
4. Zadania projektowe z inżynierii procesowej, Biń A., Huettner M., Kopeć J., Kozłowski M., Nowosielski J., Sieniutycz S., Szembek-Stoeger M., Szwast Z., Wolny A., Wyd. Politechniki Warszawskiej 1986.
5. Ciborowski, J., Inżynieria procesowa, Warszawa, WNT 1973.
6. Hobler T., Ruch ciepła i wymienniki, wyd. 4, Warszawa, PWN 1971.
7. Bennet C.O., Myers J.E., Przenoszenie pędu, ciepła i masy, Warszawa, WNT 1962.
8. Wiśniewski S., Wiśniewski T.S., Wymiana ciepła, Warszawa, WNT 2000.

9. Popkiewicz M., Rewolucja energetyczna, ale po co?, Katowice, Sonia Draga 2015.
Additional
1. Brodowicz K., Teoria wymienników ciepła i masy, PWN-Warszawa, 1982.
2. Malczewski J., Piekarski M., Modele procesów transportu masy, pędu i energii, PWN-Warszawa, 1992.

Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,00
Classes requiring direct contact with the teacher	16	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	9	0,50