COURSE DESCRIPTION CARD - SYLLABUS

Course name
Process optimization

Course

Field of study
Chemical and process engineering

Year/Semester
1/2

Area of study (specialization)
Chemical 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
30

Number of credit points

4

Lecturers

Responsible for the course/lecturer:
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60-965 Poznań

Ul. Berdychowo 4

Responsible for the course/lecturer:

Prerequisites

The student starting this course should have basic knowledge of mathematics, numerical methods, chemical engineering. He should also have the ability to obtain information from the indicated sources and be ready to cooperate as part of the team.

Course objective

Provide students with basic knowledge in the field of modeling and optimization of chemical processes.

Course-related learning outcomes

Knowledge

1. K_W01 has extended and deepened knowledge in the field of mathematics and computer science necessary for modeling, planning, optimization and characterization of industrial chemical processes as well as planning experiments and processing the results of experimental research.

Skills

1. K_U01 has the ability to obtain and critically evaluate information from literature, databases and other sources and to formulate opinions and reports on this basis.

2. K_U09 has the ability to analyze and solve problems related to chemical technology and process engineering, using for this purpose theoretical, analytical, simulation and experimental methods.

Social competences

1. K_K01 understands the need for lifelong learning; is able to inspire and organize the learning process of other people; is aware of the importance and non-technical aspects and effects of engineering activities, including its impact on the environment, and the related responsibility for decisions made.

2. K_K06 can think and act in a creative and entrepreneurial way.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The acquired knowledge is verified during the design classes. Each class begins with a 10-minute entry in theory, which consists of 3 open or open test questions with various points. The knowledge acquired during the design classes is verified by two 60-minute tests with 3 - 4 tasks with different scores, carried out in 7 and 15 classes. Lecture pass threshold: 51% of pass points. Passing the project classes: tickets 40% of the test of the tasks 60%. Project passing threshold: 51% of points.

Programme content

1. Basic information about optimization methods.

2. Optimality conditions for tasks without constraints.

3. Optimum conditions for tasks with equality constraints.

4. Optimum conditions for tasks with inequality constraints.

5. Duality of optimization tasks.

6. Linear programming.

7. Numerical methods used in optimization.

Teaching methods

Lecture: multimedia presentation. Project: Solving selected optimization problems.

Bibliography

Basic

1. Roman Krupiczka, Henryk Merta, Optymalizacja Procesowa, Wydawnictwo Politechniki Śląskiej, 1998.

2. Krzysztof Urbaniec, Optymalizacja w projektowaniu aparatury procesowej, Wydawnictwa Naukowo_Techniczne, Warszawa 1979.

3. Stanisław Sieniutycz, Optymalizacja w inżynierii procesowej, Wydawnictwo Naukowo - Techniczne, 1991.

Additional

1. W. W, Kafarow, Metody cybernetyki w chemii i technologii chemicznej, Wydawnictwa Naukowo_Techniczne, Warszawa 1979.

2. Andrzej Nowak, Optymalizacja. Teoria i zadania, Wydawnictwo Politechniki Śląskiej, 2007.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	4,0
Classes requiring direct contact with the teacher	60	2,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	15	1,5

[1] delete or add other activities as appropriate