COURSE DESCRIPTION CARD - SYLLABUS

Course name
Dynamics of processes [S2IChiP1>DP]

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

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other (e.g. online)
0

Tutorials
0

Projects/seminars
30

Number of credit points

5,00

Coordinators

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Lecturers

Prerequisites

Knowledge of higher mathematics, basics of chemical engineering and chemical apparatus.

Course objective

Obtaining knowledge and skills regarding the classification of dynamic systems, methods of process dynamics analysis and basic dynamic features of chemical engineering processes.

Course-related learning outcomes

Knowledge:
1. has knowledge of the classification of elementary dynamical systems and their basic properties. (k_w11, k_w12)
2. knows methods of dynamic systems analysis. (k_w11, k_w12)
3. knows the dynamic features of typical chemical engineering objects. (k_w11, k_w12)

Skills:
1. can characterize the dynamics of chemical engineering objects. (k_u09, k_u13, k_u19)
2. is able to use the dynamic properties of chemical apparatus to develop start-up methods and the

impact of process disorders on its course. (k_u09, k_u13, k_u19)

Social competences:
1. can interact and work in a group, taking on different roles in it. (k_k03)
2. is able to properly define the priorites for implementation specified by yourself or other tasks. (k_k04)

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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The knowledge acquired during the lecture and the skills are verified in a written exam. During the exam, the student works out five issues. Passing threshold: 50% of points. In case of doubts regarding the assessment of the answers, the student may be asked to take an additional oral exam. Knowledge, skills and competences during project classes are verified on the basis of completed projects and their defense. The projects include simulation of selected dynamical systems. In the case of remote classes, the exam will be conducted in the eKursy system also in writing. Students answer the question asked, then photograph the card and send the photos at the specified time to the e-mail address provided. In situations where there are doubts regarding the assessment of the answers, the student may be asked to take an additional oral exam in the remote system. The projects will also be defended remotely.

Programme content

1. The role of process dynamics in the design of apparatus an chemical engineering processes.
2. Methods of description and analysis of process dynamics.
3. Elementary dynamical systems and their properties.
4. Complex dynamical systems.
5. Review of the dynamics of typical chemical engineering objects.

Teaching methods

Lecture: presentation with discussion on the board.
Project: performing simulation calculations of selected dynamical systems.
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Bibliography

Basic
1. M. Piekarski, M. Poniewski, Dynamika i sterowanie procesami wymiany ciepła i masy, WNT Warszawa 1994.
2. Dynamic Process Modelling, Ed. by N.Pistikopoulos, M. C. Georgiadis, V. Dua, WILEY-VCH 2011.
Additional
1. J. M. Douglas, Dynamika i sterowanie procesów, WNT Warszawa 1976.
2. J. Ingham, T. J. Dunn, E. Heinzle, J. E. Prenosil, Chemical Engineering Dynamics, WILEY-VCH 2000.

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,00
Classes requiring direct contact with the teacher	60	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	65	2,50