



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Methods of Technological Process Control

Course

Field of study

Chemical Technology

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

IV/7

Profile of study

general academic

Course offered in

English

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

Lecturers

Responsible for the course/lecturer:

dr hab. inż. Beata Strzemiecka

Responsible for the course/lecturer:

Prerequisites

Knowledge of physical chemistry, organic chemistry, basics of analytical chemistry, basics of chemical apparatus, mathematics

Course objective

Presentation of the basic principles of selection of control and measuring apparatus in industry, familiarizing students with the types of industrial analyzers and methods of their installation, familiarizing students with the extended knowledge of chromatographic processes as a technique mainly used to control technological processes, the use of chromatographic techniques in process qualitative and quantitative analysis. In practice, students will be familiarized with the apparatus used in chromatographic methods. Presentation of the possibilities of using gas and liquid process chromatography

Course-related learning outcomes

Knowledge

K_W06, P6S_WG, P6SI_WG - knows the necessary principles of operation of control and measurement systems and electronic control systems used in chemical technology



K_W07, P6S_WG, P6SI_WG - knows the rules of environmental protection related to chemical technology and waste management

K_W12, P6S_WG, P6SI_WG - knows the principles of construction, operation and selection of devices, reactors and apparatus used in chemical technology

Skills

K_U02, P6S_UK - can work both individually and as a team in a professional and other environment

K_U05, P6S_UU - has the ability to self-study

K_U06, P6S_UK - has language skills in the fields and disciplines relevant to chemical sciences and chemical technology, in accordance with the requirements specified for level B2 of the European Language Description System

K_U10, P6S_UW - has the preparation and competencies necessary to work in an industrial environment and knows the principles of occupational health and safety

K_U11, P6S_UW, P6SI_UW - is able to make a preliminary technical and economic analysis of engineering activities undertaken in chemical technology

K_U12, P6S_UW, P6S_UO - is able to conduct a critical analysis of the functioning method and assess existing technical solutions in technology and chemical engineering, in particular devices, apparatus, systems and processes

K_U14, P6S_UW, P6SI_UW - is able to assess the suitability of routine methods and techniques appropriate to solve practical engineering tasks in chemical technology, can also choose and apply the appropriate method and technique

K_U21, P6S_UW - selects analytical methods for qualitative and quantitative determination of chemical compounds

K_U25, P6S_UW, P6SI_UW - assess the risks associated with the use of chemical products and processes

K_U25, P6S_UW, P6SI_UW - assesses the risk associated with increasing the scale of chemical operations and processes

K_U26, P6S_UW - applies basic legal regulations and observes OHS rules related to the work performed

K_U29, P6S_UW, P6SI_UW - implements proper waste management through utilization and recycling

K_U32, P6S_UW, P6S_UO - selects analytical methods and techniques for process control and quality assessment of raw materials and products

Social competences

K_K01 - understands the need for further training and raising their professional, personal and social competences



K_K02, P6S_KO, P6S_KK - is aware of the importance and understanding of non-technical aspects and effects of engineering activities, including its impact on the environment and the associated responsibility for decisions made

K_K03, P6S_UO - can interact and work in a group, inspire and integrate engineering environments

K_K05, P6S_KR - correctly recognizes problems and makes the right choices related to the exercise of the profession, in accordance with the principles of professional ethics

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

lecture: written exam

laboratories: oral and written test before each class, exercise reports

Programme content

1. Process analysis - general types and principles of using process analyzers.
2. Tasks of process analysis.
3. Economic aspects of process analysis.
4. System of sample collection and preparation for process analysis.
5. Gas chromatography - basic knowledge (apparatus, principles of separation and chromatographic analysis, retention parameters); selection of conditions for conducting the chromatographic process.
6. Liquid chromatography - types of liquid chromatography; the basics of separation; liquid chromatography column; HPLC and TLC equipment.
7. Qualitative and quantitative analysis in chromatographic methods.
8. Application of the delayed standard in process chromatographic analysis.

Teaching methods

lecture, discussion, practical exercises

Bibliography

Basic

1. Process control, J. Hahn, DOI: 10.1002/0471238961.1618150307091522.a01.pub2 , 2003

Additional

1. The essence of chromatography, C.F. Poole, Elsevier, Amsterdam, 2003



Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	30	1,0

¹ delete or add other activities as appropriate