



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Metody kontroli procesu technologicznego (Monitoring methods of technological process)

Course

Field of study

Year/Semester

Technologia chemiczna (Chemical Technology)

4/7

Area of study (specialization)

Profile of study

-

general academic

Level of study

Course offered in

First-cycle studies

Polish

Form of study

Requirements

part-time

compulsory

Number of hours

Lecture

Laboratory classes

Other (e.g. online)

20

10

Tutorials

Projects/seminars

10

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

dr hab. inż. Kasylda Milczewska

Prerequisites

Basic knowledge of physical and organic chemistry at the academic level. Knowledge of the basic processes in chemical technology, knowledge of individual processes.

Course objective

Presentation of the basics of chromatographic processes, their use in qualitative and quantitative process analysis. Acquaintance with the apparatus used in chromatographic methods. Presentation of the possibilities of using gas and liquid process chromatography. Learning how to use gas and liquid chromatographs in practice, performing analyzes using these techniques.

Course-related learning outcomes

Knowledge

Acquaintance with chromatographic methods. Understanding the rules of operation of control and measurement process unit of chemical technology. K_W06, K_W08

Skills

Acquaintance with the apparatus used in chromatographic techniques as methods of control of



technological processes. Acquaintance with quantitative and qualitative methods in chromatography. Ways to use chromatographic methods in the control of industrial processes. K_U14, K_U21, K_U32

Social competences

Obtaining necessary information from literature, databases and other sources, interpretation and drawing conclusions as well as justification for selection and opinions. Preparation of presentations and documentation in the field of chemical process control in teams. K_K03, K_K04

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Passing the final test of the theory lectures; current written or oral control, written reports on laboratory exercises; preparation of the presentation and report on the project related to the selected technological process and methods of its control, including chromatographic methods.

Programme content

Include of the following:

1. Basic chromatographic parameters.
2. Gas chromatography technique - equipment and apparatus; theoretical basis of chromatographic separation; selection of conditions for conducting the chromatographic process.
3. The technique of liquid chromatography - types of liquid chromatography; the basics of separation; column in the liquid chromatography; HPLC and TLC equipment.
4. Qualitative and quantitative analysis in chromatographic methods.
5. Process analysis - general principles for the use of process analyzers.
6. System of sample collection and preparation for process analysis.
7. Column switching in gas and liquid chromatography.
8. Application of the delayed standard in process chromatographic analysis.
9. GC and HPLC systems used in process chromatographic analysis.
10. Examples of the use of process chromatographic analysis in the control of selected technological processes.

Teaching methods

lectures with the use of multimedia (movies and animations)

project presentation (using audio-visual techniques)

practical performance of three laboratory exercises in the field of GC and LC



Bibliography

Basic

1. Zastosowanie metod chromatograficznych, K. Bielicka-Daszkiwicz, K. Milczewska, A. Voelkel, Wyd. PP, Poznań, 2010.
2. Podstawy chromatografii, Z. Witkiewicz, WNT, Warszawa, 2005.
3. Chromatografia procesowa, K. Kadlec, A. Voelkel, Wyd. PP, Poznań, 2011.
4. Chromatografia i techniki elektromigracyjne : słownik pięcioletni, red. Zygfryd Witkiewicz, Ewa Śliwka, WNT, Warszawa, 2015.
5. Słownik chromatografii i elektroforezy, red. Jacek Hetper, Zygfryd Witkiewicz, PWN, Warszawa, 2004.

Additional

1. Podstawy chromatografii i technik elektromigracyjnych, Z. Witkiewicz, J. Kałużna-Czaplińska, PWN, 2017.
2. The essence of chromatography, C.F. Poole, Elsevier, 2003
3. Techniques and practice of chromatography, R.P.W. Scott, Marcel Dekker, Inc., Nowy Jork, 1995

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	44	2,0
Student's own work (literature studies, preparation for laboratory classes, preparation for tests, project preparation) ¹	56	2,0

¹ delete or add other activities as appropriate