COURSE DESCRIPTION CARD - SYLLABUS

Course name
Monitoring methods of technological processes

Course

Field of study
Chemical and process engineering

Year/Semester
4/7

Area of study (specialization)

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
30	30	
Tutorials	Projects/seminars	

Number of credit points

5

Lecturers

Responsible for the course/lecturer:
prof. dr hab. inż. Adam Voelkel

Responsible for the course/lecturer:

Prerequisites

Basic physical, inorganic, organic and analytical chemistry on academic level; knowledge of mathematical tools used in chemical calculations; Can use basic laboratory techniques of separation and cleaning of chemical compounds

Course objective

Process chromatography. Presentation of the fundamentals of chromatographic processes; their application in qualitative and quantitative analysis as well as physicochemical characterization of organic and inorganic substances. The chromatographic equipment is discussed.

Course-related learning outcomes

Knowledge

knowledge in the field of techniques, methods connected with the application of chromatographic techniques in process control - [K_W03,K_W11]

2. can describe methods, techniques, tools and materials used for the solution of simple problems connected with process control - [K_W07, K_W15]

Skills

Student can select the proper technique for process control - [K_U11, K_U16, K_U20]

2. Student has basic skills for maintenance of gas or liquid chromatograph and to perform the chromatographic analyses - [K_U07, K_U21]

3. Student can discuss chromatographic problems in English - [K_U03]

Social competences

Student understands the need to supplement her/his education and increasing professional competences. - [K_K01]

2. Student has the awareness to obey the engineer ethic rules. - [K_K02, K_K05]

3. Student can act and cooperate in the group accepting different roles. - [K_K03]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

written control work.

Permanent control before laboratory classes. Written reports from exercices.

Programme content

1. Chemical risk in technological process..
2. Risk assessment in the technological systems.
3. Control and monitoring systems.
4. High performance liquid chromatography – various types of liquid chromatography; backgrounds of separation; columns in HPLC; HPLC and TLC equipment.
5. Qualitative and quantitative analysis in chromatography.
6. Process analysis – general rules of application of process analyzers.
7. Economical aspects of process control.
8. Collection and sample preparation systems for process analysis.
9. Column switching in gas and liquid process chromatography.
10. Application of deferred standard in chromatographic process analysis.
11. Application of GC i HPLC in chromatographic process analysis.
12. Examples of application of chromatographic process analysis in the control of selection technological processes.

Teaching methods

lecture laboratory classes

Bibliography

Basic

1. Podstawy chromatografii, Z.Witkiewicz, WNT, Warszawa, 2005.

2. Zastosowanie metod chromatograficznych, K. Bielicka-Daszkiewicz, K. Milczewska, A. Voelkel, Wyd. PP, Poznań, 2005, 2010.

Additional

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

2. 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	125	5,0
Classes requiring direct contact with the teacher	65	2,6
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	60	2,4

[1] delete or add other activities as appropriate