COURSE DESCRIPTION CARD - SYLLABUS

Course name
Monitoring Methods of Technological Processes

Course

Field of study
Environmental Protection Technologies
Year/Semester
I/2
Area of study (specialization)
Ecotechnology
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
15
Laboratory classes
15
Other (e.g. online)
0
Tutorials
15
Projects/seminars
0

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

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. Process chromatography

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_W09, 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_U01, K_U08, K_U09, K_U14]

2. Student has basic skills for maintenance of gas or liquid chromatograph and to perform the chromatographic analyses - [K_U09]

3. Student can discuss chromatographic problems in English . - [K_U05]

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:

Final written control work. In case of stationary work approx. 10 open questions. In case of on-line work through eKursy approx. 10 open questions and approx. 5 closed questions.

Permanent control before laboratory classes. Written reports from exercices. Short project concerning the selection and design of process control system.

Programme content

1. Gas chromatography technique – equipment, basis theoretical rulet of chromatographic separation ; Basic chromatographic parameters; selection of the conditions of chromatographic analysis.

2. High performance liquid chromatography – various types of liquid chromatography; backgrounds of separation; columns in HPLC; HPLC and TLC equipment.

3. Qualitative and quantitative analysis in chromatography.

4. Process analysis – general rules of application of process analyzers.

5. Economical aspects of process control.

6. GC i HPLC systems used in chromatographic process analysis.

7. Examples of the applications of chromatographic process analysis in the process control of technological systems..

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.

3. Chromatografia gazowa w badaniach adsorpcji i katalizy, T. Paryjczak, PWN, Warszawa, 1986.

4. Adsorpcja i adsorbenty: teoria i zastosowanie, Z. Sarbak, Wydaw. Naukowe Uniwersytetu im. Adama Mickiewicza, Poznań, 2000.

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	5,0
Classes requiring direct contact with the teacher	45	
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	15	

[1] delete or add other activities as appropriate