

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Monitoring Methods of Technological Processes		Code 1010704271010721710
Field of study Chemical Technology	Profile of study (general academic, practical) (brak)	Year /Semester 4 / 7
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) part-time	
No. of hours Lecture: 20 Classes: - Laboratory: 10 Project/seminars: 10		No. of credits 3
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 3 100% 3 100%
Responsible for subject / lecturer: dr inż. Kasylda Miłczewska email: Kasylda.Milczewska@put.poznan.pl tel. 61 665-3722 Faculty of Chemical Technology ul. Piotrowo 3 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	W1. A student has basic theoretical systematic knowledge of inorganic, organic, physical and analytical chemistry. Knows the mathematical tools used in the chemical calculations.
2	Skills	U1. Uses basic laboratory techniques in the separation and purification of chemical compounds
3	Social competencies	K1. A student understands the need for further education and improvement of his professional and personal competences, knows how to interact and work in a group, can think and act in a creative and entrepreneurial way.
Assumptions and objectives of the course: Presentation of the principles of chromatographic processes, their use in the process of qualitative and quantitative analysis. Getting to know with the apparatus used in chromatographic methods. Process Chromatography.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. Has knowledge of techniques, methods and the economic basis of process control - [K_W06, K_W16] 2. The student is able to describe the methods, techniques, tools and materials used in solving simple problems related to the control process - [K_W15]		
Skills: 1. Knows the the operating principle of the chromatograph: the gas and liquid, is able to perform analysis by GC or LC - [K_U14] 2. Student is able to determine the suitability and select tools (methods) to solve the problem of the control process in the field of chemical technology interests - [K_U19]		
Social competencies: 1. A student is aware of the need for lifelong learning and professional development. - - [K_K01] 2. Student is responsible for the tasks performed in the team - [K_K03, K_K04]		
Assessment methods of study outcomes		

1. Current examination of the knowledge associated with laboratory.
2. Final written test.
3. Preparation and presentation of selected industrial technology with taking into account the points and methods of control.

Course description

WYKŁAD:

omówienie podstawowych technik chromatograficznych;
 metody ilościowe w chromatografii;
 przygotowanie próbek do analizy chromatograficznej;
 elementy układów procesowych (np. długa linia transferowa, opóźniony standard, i inne);
 sposoby wykorzystania technik chromatograficznych _w procesach przemysłowych;
 przykłady zastosowań technik chromatograficznych w procesach przemysłowych.

LABORATORY:

1 Determination of the basic parameters of the GC at packed column.

Students learn about the construction and principle of operation of a gas chromatograph; acquire the ability to manually perform normal injections into the column and the reading and interpretation of the results.

2 Getting to know the techniques of SPE-GC.

Students use gas chromatograph autosampler to carry out analyzes of samples (after extraction from the aqueous phase using SPE) capillary column. Comparison of the results of measurements performed under isothermal conditions and temperature program.

3 High Performance Liquid Chromatography.

Acquiring the skills of practical use of liquid chromatography with UV-DAD and interpretation of the results

Basic bibliography:

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. Nomenklatura chromatograficzna, red. Z. Witkiewicz, E. Soczewiński, Z. Suprynowicz, PTChem, Warszawa. 1996

Additional bibliography:

1. Podstawy chromatografii i technik elektromigracyjnych, Z. Witkiewicz, J. Kałużna-Czaplińska, WNT, 2012
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

Result of average student's workload

Activity	Time (working hours)	
1. Participation in lectures	20	
2. Participation in laboratories	10	
3. Preparation for the laboratory excercises	12	
4. Participation in projects	10	
5. preparation for projects	8	
6. exam preparation	10	
Student's workload		
Source of workload	hours	ECTS
Total workload	70	3
Contact hours	40	2
Practical activities	30	1