SYLLABUS

Name: ***Second level of chromatography (WTCAXCSM-SLoCh)***
Name in Polish: **Chromatografia dla zaawansowanych**
Name in English: ***Second level of chromatography***

Information on course:

Course offered by department: Faculty of Advanced Technologies and Chemistry
Course for department: Faculty of Advanced Technologies and Chemistry
Term: Summer semester 2026/2027 Year
Cordinator of course edition: dr hab. inż. Stanisław Popiel prof. WAT

Default type of course examination report:

Graded pass

Language:

English

Course homepage:

https://www.wtc.wat.edu.pl/

Short description:

The invention and history of chromatography. Gas, liquid and supercritical chromatography. Capillary electrophoresis. The significance and applications of chromatography.

Description:

1. History of chromatography and its contemporary significance - 1 h .

2. Theory of chromatographic process - 1 h.

3. Gas chromatography, instrumentation, columns, stationary phases, detectors, retention parametrs, column efficiency, qualitative and quantitative analysis - 2 h.

4. Liquid column chromatography, instrumentation, columns, mobile phases, stationary phases, detectors - 2 h.

5. Hyphenated techniques - 1 h..

6. Thin layer chromatography, instrumentation, chromatographic plates. chromatographic chambers, development of chromatograms, visualisation of chromatograms, qualitative and quantitative analysis - 1 h.

7. Supercritical fluid chromatography - 2 h.

8. Biochromatography - 2 h.

9. Capillary electrophoresis, instrumentation and application of this analytical techniqe 2 h.

Bibliography:

Z. Witkiewicz, J. Kałużna-Czaplińska, Podstawy chromatografii i technik elektromigracyjnych, WNT, Warszawa 2018

Reverse phase HPLC, Macherey Nagel, 2012

W. Jennings, Analytical gas chromatography, Academic Press, 2002

Sz. Nyiredy, Planar chromatography, Springer, 2011

The LC handbook, Agilent Technologies, 2015

Learning outcomes:

W1 / The student has extended knowledge of analytical chemistry of the selection of the analytical method, allowing for theoretical justification of the choice of the analytical method, determination of the chemical composition of substances or their mixtures / K_W11

W2 / The student knows classical and instrumental analytical methods, their capabilities and theoretical foundations. He knows the methods of checking the reliability of the results of quantitative chemical analysis and using statistical methods of evaluating the results of the analysis. He knows the tendencies of the development of analytical equipment /K_W12 .

U1. The student is able to use scientific and research equipment to analyze mixtures and environmental samples /K_U06 .

U2. The student is able to find the necessary information in literature, databases and other sources, knows the basic scientific journals in the field of chemistry and has the ability to evaluate the information obtained /K_U10.

U3 / The student is able to independently plan and implement lifelong learning and help others in this area / K_U14.

U4 / The student is able to interact with others in teamwork and take a leading role in teams/ K_U16

K1 / The student recognizes the importance of knowledge in solving problems and consulting experts in case of difficulties with self-solving problems
/ K_K01.

K2 /The student is ready to fulfill social obligations, inspire and organize activities for the benefit of the social environment and initiate activities for the benefit of social interest / K_K02.

Assessment methods and assessment criteria:

The student should be familiar with the issues presented during lectures and, to some extent, those acquired through independent study.

After completing seminars and laboratory exercises, the student is eligible to receive credit. The credit is awarded in the form of an oral examination and covers knowledge related to chromatography that has been presented and discussed during lectures, seminars, and laboratory exercises.

Learning effects W1 and W2 are assessed during the credit examination.

Learning effects U1 is verified during laboratory exercises, while learning outcome U2 is verified during seminars.

Practical placement:

Not applicable

Mode of study

full-time studies

Form of study

second-cycle studies

Course

elective

Introductory subjects

- Analytical chemistry

- Physical chemistry

- Instrumental analytical chemistry

Programs

Chemistry

Form of course / number of hours / final requirement

Lectures: 14 hours / pass with grade

laboratory exercises: 8 hours / pass without grade

seminar: 8 hours / pass without grade

Author

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ECTS balance

Activity/load

1. Participation in lectures / 14 hours

2. Independent study of lecture topics / 12 hours

3. Participation in laboratories / 8 hours

4. Independent preparation for laboratories / 6 hours

5. Participation in seminars / 8 hours

6. Independent preparation for seminars / 6 hours

8. Preparation for passing the course / 6 hours

Hours / ECTS
Total student workload: 60 hours /2

Classes with teacher participation: 30 hours / 1

Activities related to scientific activity: 30 hours / 1

Information on course edition:

Default type of course examination report:

Graded pass

Bibliography:

missing bibliography in English