



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Methods of organic compounds analysis

### Course

Field of study

Chemical Technology

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

3/6

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

15

Tutorials

15

Laboratory classes

15

Projects/seminars

Other (e.g. online)

### Number of credit points

4

### 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; Can use basic laboratory techniques of separation and cleaning of chemical compounds

### Course objective

Gaining the skills of the application of spectroscopic methods for identification of organic compounds and determination of their structure..



### Course-related learning outcomes

#### Knowledge

1. knowledge in the field of techniques, methods connected with identification of organic pollutants in the environment - [K\_W03, K\_W11]
2. can describe methods, techniques, tools and materials used for the solution of simple problems connected with identification of substances during solving the problems connected with the field of study - [K\_W07, K\_W15]

#### Skills

1. Student can select the proper spectroscopic technique for basic qualitative and quantitative determination of organic compounds - [K\_U11, K\_U16, K\_U20]
2. has basic skills for maintenance of basic tools (methods) for solving the problem in the field of environment analysis - [K\_U07, K\_U21]
3. Student can use specialist 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:

Final written control work. In case of stationary work 10-15 open questions. In case of on-line work through eKursy approx. 10 open questions and 5-10 closed questions.

Permanent control before laboratory classes. Written reports from exercises.

### Programme content

Problems of the course are connected with the application of the interaction of electromagnetic radiation with the molecules of organic compounds and its use for identification of organic species. The theoretical background enabling the understanding the rules of UV/VIS spectroscopy, IR, NMR and MS. The possibilities and limitations of these techniques are presented and discussed. Sample preparation methods are discussed and further used during laboratory classes. Experimental technique is presented on level enabling the self-maintenance of popular equipment and contact with the operator of more sophisticated equipment.

### Teaching methods

lecture, laboratory classes



## Bibliography

### Basic

1. Spektroskopowe metody identyfikacji związków organicznych, R.M. Silverstein, F.X. Webster, D.J. Kremler, PWN, Warszawa, 2007
2. Metody spektroskopowe wyznaczania struktury związków organicznych, L.A. Kazicyna, N.B. Kupletska, PWN, Warszawa, 1974
3. Określanie struktury związków organicznych metodami spektroskopowymi, M. Szafran, Z. Dega-Szafran, PWN, Warszawa, 1988
4. Metody spektroskopowe i ich zastosowanie do identyfikacji związków organicznych, W. Zieliński, praca zbiorowa, WNT, Warszawa, 1995.
5. Spektroskopia mas związków organicznych, A. Płaziak, wyd. UAM, Poznań, 1997.

### Additional

1. N.P.G. Roeges, A guide to the complete interpretation of infrared spectra of organic structures, Wiley, Chichester, 1994.
2. J.S. Splitter, F. Turecek, Application of mass spectrometry to organic stereochemistry, VCH, New York, 1994

## Breakdown of average student's workload

	Hours	ECTS
Total workload	60	4
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) <sup>1</sup>	15	

<sup>1</sup> delete or add other activities as appropriate