

**AGH**AGH UNIVERSITY OF SCIENCE
AND TECHNOLOGY

Module name: Advanced chemical analysis

Academic year: 2018/2019 Code: CIM-2-315-BK-s ECTS credits: 3

Faculty of: Materials Science and Ceramics

Field of study: Materials Science Specialty: Biomateriały i kompozyty

Study level: Second-cycle studies Form and type of study: Full-time studies

Lecture language: English Profile of education: Academic (A) Semester: 3

Course homepage: http://galaxy.uci.agh.edu.pl/~kca/studia_stacjonarne.html

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Description of learning outcomes for module

MLO code	Student after module completion has the knowledge/ knows how to/is able to	Connections with FLO	Method of learning outcomes verification (form of completion)
Social competence			
M_K001	Student will upgrade his ability to self-improvement.	IM2A_K08	Activity during classes, Participation in a discussion
Skills			
M_U001	Student gains ability to proper usage of chemical and analytical terminology.	IM2A_U04, IM2A_U03, IM2A_U02	Activity during classes, Presentation, Participation in a discussion
M_U002	Student will be able to plan and realize the analytical procedure relevant to a given problem.	IM2A_U06	Activity during classes, Participation in a discussion, Presentation
Knowledge			
M_W001	Student will gain extended knowledge of the stages of analytical proces	IM2A_W03	Test

M_W002	Student will gain extended knowledge of modern analytical methods.	IM2A_W03	Test
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FLO matrix in relation to forms of classes

MLO code	Student after module completion has the knowledge/ knows how to/is able to	Form of classes										
		Lectures	Auditorium classes	Laboratory classes	Project classes	Conversation seminar	Seminar classes	Practical classes	Fieldwork classes	Workshops	Others	E-learning
Social competence												
M_K001	Student will upgrade his ability to self-improvement.	-	-	-	-	-	+	-	-	-	-	-
Skills												
M_U001	Student gains ability to proper usage of chemical and analytical terminology.	-	-	-	-	-	+	-	-	-	-	-
M_U002	Student will be able to plan and realize the analytical procedure relevant to a given problem.	-	-	-	-	-	+	-	-	-	-	-
Knowledge												
M_W001	Student will gain extended knowledge of the stages of analytical process	-	-	-	-	-	+	-	-	-	-	-
M_W002	Student will gain extended knowledge of modern analytical methods.	-	-	-	-	-	+	-	-	-	-	-

Module content

Seminar classes

Chemical and analytical English terminology. Analytical chemistry – scope, functions and applications. Quality in analytical chemistry – uncertainty and traceability of analytical results. Validation. Stages of the modern analytical processes. Calibration and other methods of quantitative analysis. Standards and certified reference materials. Environment protection and risk assessment in analytical laboratory. Separation methods. Gravimetric analysis. Titration. Electroanalytical methods – basic information, potentiometry, voltammetry. Spectroscopic methods – basic information, atomic absorption and emission methods. Mass spectrometry. X-ray methods. Activation analysis.

Method of calculating the final grade

Final grade = 0.5 grade from final test + 0.4 grade from presentation + 0.1 grade from activity during classes

Prerequisites and additional requirements

Finished basic chemistry course

Recommended literature and teaching resources

- 1.A.Townshend (Ed), "Encyclopedia of Analytical Science" Academic Press, London 1995
- 2.R.Kellner, J.M.Mermet, M.Otto, M.Valcarcel, H.M.Widmer, "Analytical Chemistry: A Modern Approach to Analytical Science", Wiley-VCH, Weinheim 2004
- 3.Southampton Electrochemistry Group, "Instrumental methods in Electrochemistry" Ellis Horwood, Chichester 1990
- 4.A.J.Bard, L.R.Faulkner, "Electrochemical Methods, Fundamentals and Applications", Wiley, New York 1980
- 5.J.Wang, "Analytical Electrochemistry" VCH, New York 1994

Scientific publications of module course instructors related to the topic of the module

Additional scientific publications not specified

Additional information

Every seminar meeting consist of:

- introduction of topic by teacher responsible for particular class,
- 2 - 3 presentaions performed by students
- extended discussion

Student workload (ECTS credits balance)

Student activity form	Student workload
Contact hours	30 h
Realization of independently performed tasks	30 h
Preparation of a report, presentation, written work, etc.	30 h
Summary student workload	90 h
Module ECTS credits	3 ECTS