

Name: Instrumental analysis (C-PS.II2-InAn)

Name in Polish:

Name in English: Instrumental analysis

**Information on course:**

Course offered by department: Faculty of Chemistry

Course for department: Faculty of Chemistry

**Default type of course examination report:**

Examination

**Language:**

English

**Course homepage:**

<http://www.analityczna.umcs.lublin.pl>

**Description:**

The module covers the knowledge in the area of:

Lecture:

The subject concerns the basics, principles of operation and construction of modern analytical instrumentation. The following analytical techniques are presented (theoretical basics, interference effects, sample preparation, application examples): spectroscopic (spectrophotometry UV-Vis, spectrophotometric titration, atomic absorption spectrometry, atomic emission spectrometry with inductively coupled plasma mass spectrometry using as a source of ions, atomic fluorescence spectrometry, spectrofluorimetry) and electroanalytical methods (potentiometry, electrogravimetry, coulometry, polarography, voltammetry, stripping voltammetry, conductometry). Furthermore basics of speciation analysis and digestion of samples are presented.

Laboratory:

Determination of chosen elements by AAS.

Interferences in AAS.

Determination of mercury using cold vapour technique.

Determination of chosen elements by stripping voltammetry with the use of various working electrodes (hanging mercury drop electrode, metallic film electrodes).

Catalytic effects.

Interferences in stripping voltammetry.

**Bibliography:**

1. J. Wang, Stripping Analysis. Principles, instrumentation and applications, VCH 1985.
2. F. Settle, Handbook of instrumental techniques for analytical chemistry, Prentice Hall PTR 1997.
3. J. Wang, Analytical Electrochemistry, Wiley-VCH 2000.
4. C. G. Zoski, Handbook of Electrochemistry, Elsevier 2007.

**Learning outcomes:**

KNOWLEDGE

W1. Has a basic knowledge of chemistry mainly in analytical chemistry. K\_W05

SKILLS

U1. Has the ability to plan and perform chemical experiments. K\_U04

U2. Can use basic software packages to elaborate and graphically present the results of experiment. K\_U06

ATTITUDES

K1. Is able to work in a team performing laboratory experiments. K\_K04

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Contact hours (involving academic teacher)  
Lecture 30 hrs  
Laboratory 45 hrs  
Total number of hours involving academic teacher 75 hrs  
Number of ECTS points for hours involving academic teacher 2.5  
Noncontact hours (student's own work)  
Preparation for laboratory classes 20 hrs  
Preparation of reports 25 hrs  
Studying literature 40 hrs  
Preparation and participation in passing a laboratory in a written form 30 hrs  
Preparing to pass the course (to written exam) 20 hrs  
Total number of noncontact hours 135 hrs  
Number of ECTS points for noncontact hours 4.5  
Total number of ECTS points 7  
Consultations 2 hrs

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Lecture - exam; laboratory - final test - W1  
Reports from exercises - U1, U2  
Activity - K1

**Requirements**

Basic knowledge of analytical and physical chemistry.

**Course credits in various terms:****<without a specific program>**

Type of credits	Number	First term	Last term
European Credit Transfer System (ECTS)	7	14/15L	