Course name	Instrumental Methods			
Course code	**Course status**	**Semester**	**Hours of instruction**	**ECTS**
1C16HOS1127	required	VII	3+3	7
Teacher(s)	**Prof. Dijana Jelić PhD**			

Prerequisite course(s)	**Entry requirements**
Physical Chemistry 1, Physical Chemistry 2, Physical Chemistry 3	Passed

Course goals

Introduction to physicochemical principles of methods, apparatus, method of work and application of various instrumental methods: spectroscopic methods, refractometry, polarimetry, potentiometry, conductometry, chromatography, electrophoresis and mass spectrometry.

Learning outcomes

The student is able to independently choose the appropriate instrumental method according to the set problem, independently do the experiment and process the obtained results.

Course content

Principles and classification of instrumental methods. Spectroscopic methods, electromagnetic radiation, absorption and emission, UV-Vis spectroscopy, Lambert-Beers law, chromophores, instrument, qualitative and quantitative analysis. Infrared spectroscopy, principles, molecular vibrations, spectra, instrument. Atomic absorption spectrophotometry and atomic emission spectrophotometry (principles, instrument, application). Polarimetry. Refractometry. Electrochemical methods. Basic phenomena in electrochemistry. Potentiometric titration. Conductometric titration. Ion selective electrodes. Mass spectrometry (basic theories). Separation methods. Classification of chromatography methods. Gas and liquid chromatography. Electrophoresis, principles, application, instrument.

Experimental work: Optical methods (spectrophotometry, polarimetry, refractometry, AAS), Electrochemical methods (conductometry, potentiometry, ion-selective electrode), HPLC, GC/MS

Teaching methods

Lectures, laboratory and calculation exercises

Books and other learning materials

D. Jelić, M. Đermanović, Instrumentalne metode, Banja Luka, 2020
M. Medenica, D. Malešev, Eksperimentalna fizička hemija, Beograd, 2002
N. Mirjanić, Instrumentalne metode analize, metode razdvajanja, Tehnološko-metalurški fakultet, Novi Sad, 2002

Course activities and grading method

Laboratory excercises obligated for exam. Two tests (theory and calculations-51%). First one from part optical methods, second one from the electrochemistry part. Oral exam.

Laboratory exercises	**10**	**Tests - theory**	**15**
Test - tasks	**15**	**Final exam**	**60**

Additional course notes

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Name of the teacher who prepared this form	prof. dr Dijana Jelić, PhD