



Adam Mickiewicz University in Poznań

Doctoral School of Exact Sciences AMU

Spectroscopic methods - selected techniques and their application

Zuzanna Pietralik-Molińska

Scientific lecture

Field of science	Physical sciences
Teaching method	Lecture, problem-based learning, laboratory method
Language	English
Numbers of hours	15 h lecture, 5 h laboratory
Aims of the course	To introduce the fundamental principles of key spectroscopic methods and their applications, with a focus on the following techniques: absorption spectroscopy and spectrophotometry, circular dichroism spectroscopy, infrared spectroscopy, Raman scattering, X-ray spectroscopy, NMR spectroscopy. To develop the ability to independently apply knowledge in spectroscopy and utilize these methods in practical research applications.
Course contents	<ol style="list-style-type: none"> 1. Introduction to Spectroscopy 2. UV-Vis and CD Spectroscopy 3. IR and Raman Spectroscopy 4. Fluorescent Spectroscopy 5. X-ray Spectroscopy (XPS and XRD) 6. Nuclear magnetic resonance spectroscopy 7. Analysis of selected cases
Prerequisites and co-requisites	-

Learning outcomes

On completion of the course PhD candidates will be able to:	Assessment mode
understand the physical principles underlying the phenomena used in spectroscopic techniques, understand what spectroscopy is, what it studies, and what kind of information it can provide about the analyzed samples (E_W01, E_W02)	Written test, report
know the basic techniques of electromagnetic radiation spectroscopy, including the principles of operation and the design schemes of measurement systems (E_W01, E_W02)	Written test, report
conduct simple experiments using spectroscopic techniques and analyze the results obtained, especially interpreting information from the spectral parameters of a given spectroscopy (E_U01, E_U02, E_U06)	Written test, report
prepare samples for analysis using selected spectroscopic systems (E_U01, E_U02, E_U06)	Written test, report
critically evaluate acquired knowledge and results, collaborate in a team when conducting experiments, and follow safety and hygiene rules in the laboratory (E_K01, E_K05)	Written test, report

Literature	<ol style="list-style-type: none">1. Gauglitz, G. Handbook of Spectroscopy; 2nd ed.; John Wiley & Sons, Incorporated: Weinheim, 2014; ISBN 978-3-527-32150-6.2. Hesse, M.; Meier, H.; Zeeh, B.; Hesse, M. Spectroscopic Methods in Organic Chemistry: 100 Tables; Thieme foundations of organic chemistry series; 2. ed.; Thieme: Stuttgart, 2008; ISBN 978-1-58890-488-1.
Additional information	