AKADEMIA SZTUK PIĘKNYCH
IM. EUGENIUSZA GEPPERTA
WE WROCŁAWIU

Course name	Spectroscopy non-destructive Testing
Entity running the course	Faculty of Ceramics and Glass / Department of Conservation and Restoration of Ceramics and Glass
Entity for which the course has been prepared	
Course type	Specialty course, compulsory course.
Year of study/semester; Type of studies	Year V, sem. 9 and 10; full time master's degree studies
ECTS credits	2
Academic tutor	M.Sc. Urszula Wawrzaszek
Aim of the course	The aim of the course is to acquaint the student with the theoretical aspects of the most important methods of non-destructive spectroscopic tests.
Prerequisites	The IV year of the study passed.
Learning outcomes:	
– *knowledge*	Having completed the course, the student should demonstrate their knowledge of infrared spectroscopy, nuclear magnetic resonance spectroscopy, laser spectroscopy, X-ray spectroscopy and the spectrometry of masses covering the ranges of methods application, the construction of spectrometers, sample preparation methods. They know where spectroscopic tests are carried out.
– *skills*	The student should be able to match a spectroscopic method to a given problem. They know how to present differences between various spectroscopic methods. They know how to prepare test samples and how to interpret test results. They can present a research problem and explain it to a spectroscopic test contractor.
– *personal and social competence*	The student understands the need for extending their knowledge and uses it in practice. They have the ability to critically analyze research methods. Not only can they independently select research methods, but they can also account for their choice and present the methods in an approachable way.
Course content	Spectroscopic methods. Theoretical fundamentals. The application of magnetic nuclear resonance. Infrared spectroscopy; Apparatus and preparation. Phase analysis. Structural Issues. Fourier spectroscopy in the infrared. Fourier spectroscopy in the infrared of solids. The use of Fourier spectroscopes for measuring spectra in aqueous solutions. Mass spectroscopy. The use of spectroscopy in the infrared. Laser spectroscopy. X-ray spectroscopy.
Course form and number of course hours	Lecture - 2 hours a week (30 hours/ sem.)
Assessment methods and criteria	Semester 9: 50% active participation in classes, 50% a paper; Semester 10: 100% written exam.
Assessment type	A paper at the end of semester 9. Written exam at the end of semester 10.

Literature	J. Rogóż, Zastosowanie technik nieniszczących w badaniach konserwatorskich malowideł ściennych, */The use of non-destructive techniques in the study of conservation of murals*/, Wydawnictwo Naukowe Uniwersytetu Mikołaja Kopernika 2009. (Scientific Publishing House of Mikołaj Kopernik University 2009). Z. Kęcki, Podstawy spektroskopii molekularnej, */Fundamentals of molecular spectroscopy/*, Wydawnictwo Naukowe PWR, Warszawa 1998, (Scientific Publishing House, Warsaw 1998) P. Borowski, Wybrane zagadnienia spektroskopii molekularnej, */Selected topics in molecular spectroscopy/* , Wydawnictwo UMCS, Lublin 2005, (UMCS Publishing House, Lublin 2005), A. Cygański, Metody spektroskopowe w chemii analitycznej, */Spectroscopic methods in analytical chemistry/*, Wydawnictwo Naukowo – Techniczne, (Scientific – Technical Publisher), Warsaw 1993, 2002, M. Szafran Z. Dega- Szafran- Określanie struktury związków organicznych metodami spektroskopowymi (tablice i ćwiczenia), /*Determining the structure of organic compounds by spectroscopic methods (tables and exercises)/* PWN Warszawa 1988.
Teaching aids	
Language of instruction	Polish