

1.	Field of study	Physics
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (winter term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	General information about the module	
Module name		Set of Diploma Courses II: Photoemission Spectroscopy
Module code		W4-FZ-NM-S2-3-22-30
Number of the ECTS credits		2
Language of instruction		English
Purpose and description of the content of education		<p>1.Electronic structure. Orbitals: quantum mechanical background. Angular momentum in spectroscopy. Classification of electronic states.</p> <p>2.The Theory of Photoemission. Core-Level Photoemission. Valence-State Photoemission. Three-Step and One-Step models</p> <p>3.Conventional X-ray photoelectron spectroscopy (XPS). Information obtained from electronic and photoelectron spectra. Core Levels and Final States. Charge-Excitation Final States: Satellites. Surface effects. Examples.</p> <p>4.Ultraviolet photoelectron spectroscopy (UPS).</p> <p>5.Angle-Resolved Photoelectron Spectroscopy (ARPES).</p> <p>6.Synchrotron radiation in photoelectron spectroscopy. X-ray absorption spectroscopy (XAS) and Resonant photoemission spectroscopy (ResPES).</p> <p>The lecture will be given online by lecturers from the University of Silesia for polish and french students. Mandatory examination.</p>
List of modules that must be completed before starting this module (if necessary)		not applicable

8.	Learning outcomes of the module			
	Code	Description	Learning outcomes of the programme	Level of competenc (scale 1-5)
	E1	has extensive knowledge of quantum mechanics and statistical physics	KF_W03	5
	E2	has in-depth knowledge of condensed phase physics and photoemission spectroscopy with the use of X-ray source and synchrotron radiation	KF_W04	4
	E3	knows the structure and principle of operation of scientific equipment	KF_W08	4
	E4	on the basis of the acquired knowledge, he can explain the physical processes taking place in the world around him	KF_U03	2
	E5	on the basis of the acquired knowledge, knows how to explain the operation of research equipment	KF_U04	5
	E6	understands the need to systematically read scientific and popular science journals, to broaden and deepen knowledge of physics	KF_K04	3

9.	Methods of conducting classes					
	Code	Category	Name (description)			
	a01	Lecture methods / expository methods	Formal lecture/ course-related lecture <i>a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided</i>			
10.	Forms of teaching					
	Code	Name	Number of hours	Assessment of the learning outcomes of the module	Learning outcomes of the module	Methods of conducting classes
	FZ1	lecture	15	exam	E1, E2, E3, E4, E5, E6	a01
11.	The student's work, apart from participation in classes, includes in particular:					
	Code	Category	Name (description)			Is it part of the BUNA?
	a02	Preparation for classes	Literature reading / analysis of source materials <i>reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class</i>			No
	a03	Preparation for classes	Developing practical skills <i>activities involving the repetition, refinement and consolidation of practical skills, including those developed during previous classes or new skills necessary for the implementation of subsequent elements of the curriculum (as preparation for class participation)</i>			Yes
	b01	Consulting the curriculum and the organization of classes	Getting acquainted with the syllabus content <i>reading through the syllabus and getting acquainted with its content</i>			No
	c02	Preparation for verification of learning outcomes	Studying the literature used in and the materials produced in class <i>exploring the studied content, inquiring, considering, assimilating, interpreting it, or organizing knowledge obtained from the literature, documentation, instructions, scenarios, etc., used in class as well as from the notes or other materials/artifacts made in class</i>			Yes
	c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/ examination completion <i>a set of activities aimed at performing an assigned task, to be executed out of class, as an obligatory phase/element of the verification of the learning outcomes assigned to the course</i>			Yes
	d01	Consulting the results of the verification of learning outcomes	Analysis of the corrective feedback provided by the academic teacher on the results of the verification of learning outcomes <i>reading through the academic teacher's comments, assessments and opinions on the implementation of the task aimed at checking the level of the achieved learning outcomes</i>			No

Information on the details of the module implementation in a given academic year can be found in the syllabus available in the USOS system: <https://usosweb.us.edu.pl>.