University of Silesia in Katowice

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	**Modern Experimental Physics Methods**
Module code	W4-FZ-BP-S2-1-25-03
Number of the ECTS credits	8
Language of instruction	English
Purpose and description of the content of education	The theme of the module "Modern Experimental Physics Methods" focuses on advanced experimental physics techniques and practical aspects of conducting scientific research in the field of physics. The aim of the module is to familiarize students with the latest achievements in experimental methodology and to develop their experimental skills and data analysis. During the classes, advanced techniques and tools used in contemporary physics experiments in fields such as particle physics, solid-state physics, and nuclear physics will be discussed. Students will learn about the latest achievements in the study of the structure of matter, dynamics of complex systems, and physical phenomena on micro and macroscales. They will also learn about the tools that make such research possible, including high-energy generators, radiation sources, and advanced detectors. Special emphasis is placed on developing practical skills in students related to designing and conducting experiments, analyzing data, and interpreting experimental results.
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	understands the importance of physics and its applications in the progress of science and the development of new technologies	KF_W01	4
E2	has in-depth knowledge of selected branches theoretical and experimental physics	KF_W02	3
E3	knows the theoretical models, mathematical formalisms, and computer methods necessary to solve the problems undertaken in the thesis	KF_W05 KF_W06 KF_W07	5 5 5
E4	is able to use research apparatus, conduct experiments and select an appropriate measurement method for a specific problem and the expected result	KF_U04 KF_U05 KF_U06 KF_U08	4 4 4 4

E5	is able to perform critical analysis and interpret research findings	KF_U08	4
		KF_U09	4
		KF_U10	4
E6	can prepare the research report, assess their impact on the background of other results obtained from the literature, draw conclusions, formulate and justify opinions	KF_U11	4
		KF_U12	4
E7	is able to prepare written reports and multimedia presentations in native language and English within the scope of the conducted research	KF_K07	4
		KF_U15	4
		KF_U16	4
E8	is able to listen to a different opinion and professionally discuss the issue in question	KF_K07	4
		KF_U15	4
E9	understands the need for further education, can implement the process of self-education	KF_K01	5
		KF_U17	5

9. Methods of conducting classes

Code	Category	Name (description)
a01	Lecture methods / expository methods	Formal lecture/ course-related lecture *a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided*
e01	Practical methods	Laboratory exercise / experiment *[also conducted as fieldwork] a method of practical application of knowledge; implemented in three stages: the recognition of a problem induced by the task content, the formulation of the problem and the attempt to solve it accompanied by the assessment of the effects; the goal is to acquire skills, abilities and habits, and to consolidate the acquired knowledge so that it becomes operational; the laboratory method assumes greater independence of learners than carrying out an experiment*

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	45	exam	E1, E2, E9	a01
FZ2	laboratory classes	45	course work	E3, E4, E5, E6, E7, E8	e01

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 *reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class*	No
a03	Preparation for classes	Developing practical skills *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)*	Yes

b01	Consulting the curriculum and the organization of classes	Getting acquainted with the syllabus content *reading through the syllabus and getting acquainted with its content*	No
c02	Preparation for verification of learning outcomes	Studying the literature used in and the materials produced in class *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*	Yes
c03	Preparation for verification of learning outcomes	Implementation of an individual or group assignment necessary for course/phase/examination completion *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*	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 *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*	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.