1.	**Field of study**	**Biophysics**
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2023/2024 (winter term), 2024/2025 (winter term)
4.	Level of qualifications/degree	first-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	**General information about the module**
Module name	**Geometrical and Physical Optics**
Module code	W4-BF-OO-S1-4-23-37
Number of the ECTS credits	5
Language of instruction	Polish
Purpose and description of the content of education	The aim of the course is to demonstrate fundamental knowledge on physical and geometric optics in order to understand the properties of light and the phenomena it undergoes in optical systems - the eye system as well as optical devices and instruments, as well as to be able to solve issues related to the image formation process and optical correction. As part of the education, students will have an opportunity to acquaint with the following topics in the field of physical optics: propagation and spectrum of electromagnetic waves, light as an electromagnetic wave and particle flux, the interaction of light with matter, polarization, diffraction and interference of light, image resolution and quality. In the field of geometric optics, the education will cover topics related to: the phenomena of light reflection and refraction, refractive index, light dispersion, the path of light rays through a prism, a plane-parallel plate, a hemisphere, mirrors, thin and thick lenses and their systems, optical power and magnification of lenses and their systems, lens aberrations and their correction in optical systems, spherocylindrical lenses, apertures, basic ophthalmic and optical devices.
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	The student knows and understands the basic laws of wave and geometrical optics and is able to use them for the physical phenomena observed in the surrounding world, in different optical systems.	U01 W01 W08	1 1 1
E2	The student has the necessary knowledge about the path of light rays in simple optical instruments and devices: prisms, mirrors, thin converging and diverging lenses, thick lenses, and their systems. In addition, the student is able to describe the aberrations of optical systems and methods of their correction.	U01 W01 W08	1 1 1
E3	The student knows the basic equations characterizing thin spherical lenses (the lens formula and the lensmaker’s equation) and is able to determine the parameters of the formed image and the lens power. The student is able to characterize thick and spherocylindrical lenses. The student is able to determine the role, functions and applications of lenses in the human eye system.	U01 W01 W08	1 1 1

E4	The student has knowledge about the phenomena of polarization, diffraction and interference of light, as well as methods of polarization and polarizers, diffraction gratings and slits, and image resolution, necessary to understand the phenomena that occur in optical systems.	U01 W01 W08	1 1 1
E5	The student is able to analyze problems in the area of physical and geometrical optics and to find solutions based on the known theories and mathematical description of the laws of optics.	U05	1
E6	The student is able to build a simple optical system, conduct an experiment based on the laws of geometrical and physical optics, analyze the observed phenomena and the results obtained, and prepare a report on the experiment.	U03 U04 U05	1 1 1

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*
b07	Problem-solving methods	Activating methods: a case study *a comprehensive description of a phenomenon connected with the selected discipline; reflecting the reality, presenting the 'what', 'where' and 'how' of the phenomenon, i.e., all of its key aspects to be discussed in class; used as a reproduction, presentation, discussion or diagnosis of factors that shape the phenomenon or interact with it; an in-depth qualitative analysis and evaluation of a selected phenomenon*
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	20	exam	E1, E2, E3, E4	a01
FZ2	discussion classes	20	course work	E5	b07
FZ3	laboratory classes	20	course work	E6	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*	Yes
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
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*	No
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*	Yes
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks *reviewing and selecting tasks and activities enabling the elimination of errors indicated by the academic teacher, their verification or correction resulting in completing the task with at least the minimum passing grade*	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.