STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
(-)	**1010401241010421142**

Field of study	Profile of study (general academic, practical)	Year /Semester
TECHNICAL PHYSICS	**general academic**	**2 / 4**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
First-cycle studies	**full-time**

No. of hours	No. of credits
Lecture: **2** Classes: **-** Laboratory: **-** Project/seminars: **1**	**3**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
other	**university-wide**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**3 100%**
Technical sciences	**3 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Knowledge of experimental physics and mathematics at the undergraduate engineering course level. Basic knowledge of engineering graphics.
2	**Skills**	Skill in elementary physical problem solving, skill in acquiring information from listed sources, ability to make simple engineering drawing.
3	**Social competencies**	Understanding the necessity of personal competence development, readiness to cooperation in a team.

Assumptions and objectives of the course:

1. Acquaintance of the students with the basic problems concerning structure, parameters and design process of optical instruments.
2. Development of skills in knowledge of physics application to the optical instruments design.
3. Team work ability development.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Student, who has completed the course, is able to explain structure and principle of operation of selected optical instruments. - [K_W01, K_W08, K_W10]
2. Student, who has completed the course, is able to define parameters of components commonly applied to optical instruments constructions. - [K_W01, K_W08]
3. Student, who has completed the course, is able to define the rules of optical instruments design and tools applicable to this process. - [K_W05, K_W10]

Skills:

1. Student, who has completed the course, is able to acquire from literature, databases and other sources information concerning materials, sub-assemblies and modules essential to develop simple optical instrument. - [K_U02]
2. Student, who has completed the course, is able to design simple optical instrument. - [K_U07, K_U21]
3. Student, who has completed the course, is able to select materials, sub-assemblies and modules complying requirements of the technical specification as well as market economic conditions. - [K_U18, K_U13]

Social competencies:

1. Student, who has completed the course, demonstrates creativity in realization of entrusted tasks and activity in personal competence development. - [K_K03]
2. Student, who has completed the course, is able to work in a team, to carry out tasks arising from division of work in a team, to take responsibility for team work results. - [K_K01]

Assessment methods of study outcomes

W01, W02, W03, U04, K02

Assessment of knowledge and skills demonstrated in written work during the last lecture in semester on the grounds of scored points:

3,0 50.1%-70.0%

4,0 70.1%-90.0%

5,0 od 90.1%

U01, U02, U03, K01, K02

Assessment on the grounds of written design documentation:

- assessment of construction assumptions and materials, sub-assemblies and modules selection correctness,
- assessment of design documentation quality,
- assessment of materials, sub-assemblies and modules selection correctness, considering instrument costs in comparison with its functionality.

Course description

1. Geometric an wave optics fundamentals.
2. Properties of optical materials. Phenomena at a boundary of optical media. Coloured glass filters and their parameters.
3. Basic optical components.
4. Lenses, mirrors, prisms ? types and parameters. Polarizers ? basic properties.
5. Image formation by mirrors, lenses and lens systems.
6. Optical aberrations.
7. Interference of light in plane-parallel plate. Antireflection coatings and multilayer dielectric mirror coatings. Interference filters.
8. Photometric and radiometric quantities.
9. Light sources and their properties.
10. Detectors of light.
11. Construction and parameters of selected optical instruments.
12. Dispersing prism and diffraction grating. Construction and parameters of optical spectrometer.
13. Precision mechanical components of optical instruments.
14. Optical mounts and positioners. Vibration isolation in optical systems.
15. Basic rules of optical design and design documentation development.
16. Computer-aided design of optical instruments.

Basic bibliography:

1. Instrumenty optyczne, F. Ratajczyk, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2002
2. Fizyka doświadczalna. Tom IV ? Optyka, S. Szczeniowski, Państwowe Wydawnictwo Naukowe, Warszawa 1983
3. Generacja i detekcja promieniowania optycznego, J. Godlewski, Wydawnictwo Naukowe PWN, Warszawa 1997

Additional bibliography:

1. Practical Optics, N. Menn, Elsevier Academic Press, Boston 2004

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures	30
2. Participation in consultations about a project	15
3. Making of a project	25
4. Preparation for an exam	15

Student's workload

Source of workload	hours	ECTS
Total workload	85	3
Contact hours	45	2
Practical activities	40	1