COURSE DESCRIPTION CARD - SYLLABUS

Course name
Photonic materials

Course

Field of study
Technical Physics

Year/Semester
1/2

Area of study (specialization)

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
30		
Tutorials	Projects/seminars	

Number of credit points

2

Lecturers

Responsible for the course/lecturer:
dr hab. Dobrosława Kasprowicz

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Faculty of Material Science and Technical Physics

Piotrowo 3, 60-696 Poznań

Responsible for the course/lecturer:

Prerequisites

Knowledge in the field of experimental physics, optics, laser optics - implemented as part of the study program at the first degree of education in the field of Technical Physics. Ability to obtain information from indicated sources and their assimilation. Understanding the necessity of expanding one's competences, understanding the necessity of education in order to obtain qualifications appropriate for the future profession and performing social functions.

Course objective

1. Provide students with knowledge about the properties of the latest photonic materials and related issues.

2. Developing the ability of students to obtain information with the use of specialized scientific literature.

Course-related learning outcomes

Knowledge

1. has knowledge of selected issues carried out during the lecture [K2_W02, K2_W04]

2. knows the application of laws and phenomena in the scope of selected issues carried out during the lecture to describe phenomena in the surrounding world [K2_W04, K2_W10]

Skills

1. is able to see and explain physical phenomena in the surrounding world on the basis of theoretical knowledge concerning selected issues of physics [K2_U02]

2. can use the understanding of the indicated sources of knowledge (list of basic literature) and is active in acquiring knowledge from other sources [K2_U09]

Social competences

1. understands the need to expand knowledge in the field of selected problems in physics in order to apply them in innovative solutions to technological, technical and engineering problems [K2_K04]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Effect	Form of evaluation	Evaluation criteria
W01, W02	Written / oral examination	50.1% -70.0% (3)
		70.1% -90.0% (4)
		from 90.1% (5)
U01, U02	Written / oral examination	50.1% -70.0% (3)
		70.1% -90.0% (4)
		from 90.1% (5)
K01	Written / oral examination	50.1% -70.0% (3)
		70.1% -90.0% (4)
		from 90.1% (5)

Programme content

1. Wprowadzenie do zagadnień.

2. Widmo fal elektromagnetycznych. Właściwości falowe światła (prawo odbicia światła, prawo załamania światła, polaryzacja, interferencja, dyfrakcyja, zjawisko kablowe światło odbicia światła, kąt Brewstera).

3. Naturalne i sztuczne źródła światła.

4. Absorpcja i emisja światła.

5. Luminescencja światła.

6. Właściwości spektroskopowe jonów ziem rzadkich.

7. Luminofory.

8. Holografia - techniki otrzymywania trójwymiarowych obrazów.

9. Optyczne nośniki danych.

10. Optyczne listy kryształów.

11. Nieliniowe Plany optyczne kryształów.

12. Kryształy fotoniczne.

13. Światłowody fotoniczne.

14. Półprzewodnikowe kropki kwantowe.

15. Metamateriałyoptyczne.

Teaching methods

Lecture: multimedia presentation, presentation illustrated with examples given on the board.

Bibliography

Basic

1. PodstawyFizyki, D. Halliday, R. Resnick, J. Walker, t. 1 - 5, PWN 2004.

2. Spektroskopia ciała stałego, skrypt pod red. M. Drozdowskiego, WPP 2001.

3. Handbook of Nonlinear Optics, R. L. Surtherland, 1996 New York.

Additional

1. Wybrane artykuły z czasopism naukowych: Optics Express, Nature Photonics, Scientific American.

Breakdown of average student's workload

	Hours	ECTS
Total workload	65	2,0
Classes requiring direct contact with the teacher	35	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	30	1,0

[1] delete or add other activities as appropriate