



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Optoelectronic [S1Eltech1P>OptoeI2]

Course

Field of study

Electrical Engineering

Year/Semester

3/6

Area of study (specialization)

–

Profile of study

practical

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

0

Laboratory classes

15

Other

0

Tutorials

0

Projects/seminars

0

Number of credit points

1,00

Coordinators

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Lecturers

Prerequisites

Student starting this item should have basic knowledge of semiconductors, optics, electrotechnics, electronics and metrology. Also should have ability to realize the efficient self-education in the area related to the chosen field of study and have awareness of the necessity of broadening of the competence in the field of electrical engineering and willingness to cooperate in a team.

Course objective

Knowledge of fundamentals of optoelectronics and photonics and the selected applications of modern optoelectronic devices and equipment.

Course-related learning outcomes

Knowledge:

Student:

- has knowledge of the importance and scope of optoelectronics
- has knowledge of the construction and operating principles of optoelectronic devices
- has knowledge of the generation, transmission and detection of optical signals

Skills:

Student:

- has the ability to use basic optoelectronic devices
- has the ability to plan and carry out simple engineering tasks using basic optoelectronic elements

Social competences:

The student is able to think and act in an entrepreneurial manner in the area of optoelectronics and photonic engineering

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:

1. Lectures:

- evaluation of the knowledge with a written test related to the content of lectures (test, computational and problem questions), awarding marks in laboratory exercises)
- continuous estimation in all classes (awarding attendance in lectures, activity and quality of perception).

2. Laboratory exercises:

- continuous estimating with the tests,
- awarding the skill increase,
- the evaluation of knowledge and skills connected with the measuring tasks and prepared reports

Getting additional points for the activity during classes, in particular:

- the efficiency of the use of acquired knowledge to solve a given problem;
- skill of the co-operation within the team practically realizing a given detailed task in the laboratory;
- remarks connected with the improvement of didactic materials;
- the aesthetic qualities of the reports

Programme content

1. Lectures:

Theoretical questions are presented in the exact reference to the practice: influence of optical radiation, basics of laser and fibre-optic cables technique, selected photoemitters and photodetectors.

2. Laboratory exercises:

Implementation of work in teams and carrying out experiments including measurements of electrical parameters of optoelectronics elements

Course topics

1. Lectures:

Theoretical questions are presented in the exact reference to the practice:

- Tendency to development in the area of optoelectronics and photonics
- Influence of optical radiation on elements of the matter
- Selected photoemitters and photodetectors: light-emitting diodes, laser diodes, photodiodes, photocells
- Basics of laser technique
- Fibre-optic cables
- Photosensitive matrices

2. Laboratory exercises:

Implementation of work in teams and carrying out experiments including:

- Acquisition and transmission of measuring information by optical link
- Fibre-optic cables
- Optoelectronic separation of signals
- Measurement of selected photoemitters and photodetectors parameters
- Accuracy of optoelectronic measurements

Teaching methods

1. Lectures: multimedia presentations (included schemes, photos) expanded by examples shown on a board.

2. Laboratory exercises: teamwork and performing experiments including: the connection of a measuring

system, measuring the indicated quantities, preparing a report.

Bibliography

Basic

1. A. Cysewska-Sobusiak, J. Parzych, Optoelektronika i fotonika. Zagadnienia wybrane, Wyd. Politechniki Poznańskiej, Poznań 2020
2. A. Cysewska-Sobusiak, Podstawy metrologii i inżynierii pomiarowej, Wyd. Politechniki Poznańskiej, Poznań 2010
3. Z. Bielecki, A. Rogalski, Detekcja sygnałów optycznych, WNT, Warszawa 2001
4. K. Booth, S. Hill, Optoelektronika WKŁ, Warszawa 2001
5. R. Józwicki Podstawy inżynierii fotonicznej, Oficyna Wyd. Politechniki Warszawskiej, Warszawa 2006
6. Z. Kaczmarek - Światłowodowe czujniki i przetworniki pomiarowe, Agenda Wydawnicza PAK, Warszawa 2006
7. Parzych J., Pomiarowy model detekcji promieniowania w układzie dioda LED - przetwornik CCD, Przegląd Elektrotechniczny, nr 6, 2016, s. 176-179
8. Szlaferek M., Parzych J., Układy chłodzenia diod i matryc LED, Poznan University of Technology Academic Journals, Electrical Engineering No 88, Computer Applications in Electrical Engineering 2016, Poznan 2016, s. 273-287
9. Parzych J., Hulewicz A., Krawiecki Z., Matryce światłoczułe - właściwości, parametry, zastosowania, Poznan University of Technology Academic Journals, Electrical Engineering, No 92, Poznań 2017, s. 189-204

Additional

1. A. Cysewska-Sobusiak - Modelowanie i pomiary sygnałów biooptycznych, Wyd. Politechniki Poznańskiej, Poznań 2001
2. R. Józwicki - Technika laserowa i jej zastosowania, Oficyna Wyd. Politechniki Warszawskiej, Warszawa 2009
3. J. Siudak - Wstęp do współczesnej telekomunikacji światłowodowej, WKŁ, Warszawa 1999
4. A. Szwedowski, R. Romaniuk - Szkło optyczne i foniczne, WNT, Warszawa 2009
5. W. Żagan - Podstawy techniki świetlnej, Oficyna Wyd. Politechniki Warszawskiej, Warszawa 2007
6. www.bipm.org
7. www.gum.gov.pl

Breakdown of average student's workload

	Hours	ECTS
Total workload	30	1,00
Classes requiring direct contact with the teacher	25	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	5	0,00