



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Optoelectronic

Course

Field of study

Electrical Engineering

Area of study (specialization)

-

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

4 /8

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

Number of hours

Lecture

10

Laboratory classes

10

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

Joanna Parzych

Responsible for the course/lecturer:

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Engineering

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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 about the importance and scope of the optoelectronics a
- has knowledge about structure and principles of optoelectronic devices
- has knowledge about generation, transmission and detection of optical signals

Skills

Student:

- is ability to characterize the importance and scope of the optoelectronics
- is ability to plan and accomplish a simple engineering task by the use of the selected basic optoelectronic elements

Social competences

Student is especially understanding the need of formulating and information of the relating achievements of optoelectronics and photonic engineering and bringing it clearly into general use

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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).

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

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.
- Basics of laser technique.
- Fibre-optic cables.
- Photosensitive matrices

Laboratory exercises:

Realizacja pracy w zespołach i wykonywanie eksperymentów obejmujących:

- 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 - Podstawy metrologii i inżynierii pomiarowej, Wyd. Politechniki Poznańskiej, Poznań 2010



2. Z. Bielecki, A. Rogalski - Detekcja sygnałów optycznych, WNT, Warszawa 2001
 3. K. Booth, S. Hill, Optoelektronika WKŁ, Warszawa 2001
 4. R. Józwicki Podstawy inżynierii fotonicznej, Oficyna Wyd. Politechniki Warszawskiej, Warszawa 2006
 5. Z. Kaczmarek - Światłowodowe czujniki i przetworniki pomiarowe, Agenda Wydawnicza PAK, Warszawa 2006
 6. Parzych J., Pomiarowy model detekcji promieniowania w układzie dioda LED - przetwornik CCD, Przegląd Elektrotechniczny, nr 6, 2016, s. 176-179
 7. 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
 8. 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 fotoniczne, 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	55	2,0
Classes requiring direct contact with the teacher	25	1,0
Student's own work (literature studies, preparation for laboratory classes/ tutorials , preparation for tests/ exam , project preparation) ¹	35	1

¹ delete or add other activities as appropriate