

Course title: Optoelectronics

ECTS credit allocation (and other scores): 3

Semester: spring

Level of study: ISCED-6 - first-cycle programmes (EQF-6)

Branch of science: Engineering and technology

Language: English

Number of hours per semester: 45

Course coordinator/ Department and e-mail: Seweryn Lipiński; Department of Electrical Engineering, Power Engineering, Electronics and Automation; seweryn.lipinski@uwm.edu.pl

Type of classes: classes and lectures

Substantive content

CLASSES: Health and safety rules; Optical fiber systems: introduction to Optiperformer, attenuation limited fiber length, dispersion limited fiber length, dispersion compensation, gaussian pulse propagation, receiver sensitivity; Readout and display on the LCD of the value measured with the sensor with analog output; Development of infrared barrier software in the CPLD system; Multiplexed control of LED/LCD displays; Prototyping of optoelectronic systems (construction of a simple optoelectronic system with the use of a prototype board).

LECTURES: Laser light and light; basic elements and optical systems; semiconductor light sources - physical basics; structure and phenomena occurring in the light-emitting diode; construction of other optoelectronic elements and systems: photoresistors, photo cells, photo diodes, photo transistors, photothyristors, optocouplers, thermistors, varistors; semiconductor lasers; structure and properties of optical fibers; optical signal modulation techniques, optical amplifiers; fiber optic networks; displays and screens - construction and control.

Learning purpose: Gaining basic knowledge about the operation and design of optoelectronic devices and systems.

On completion of the study programme the graduate will gain:

Knowledge: Knowledge of optoelectronic components and systems, with particular emphasis on fiber optic systems.

Skills: Ability to analyze and design a simple optoelectronic system.

Social Competencies: Understanding the need for lifelong learning and ability to work in a team.

Basic literature: Kasap S.O.: Optoelectronics & Photonics: Principles & Practices, Prentice Hall, 2012; Keiser G.: Optical Fiber Communications, McGraw-Hill, 2010.

Supplementary literature: Saleh B.E.A, Teich M.C: Fundamentals of Photonics, Wiley, 2007; Rosencher E. Vinter B.: Optical Properties of Semiconductors, Cambridge University Press, 2002.

The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 45

Student's independent work: 30