COURSE DESCRIPTION CARD - SYLLABUS

Course name
Optotelecommunication

Course

Field of study
Electronics and Telecommunications

Year/Semester
2/4 & 3/5

Area of study (specialization)

Profile of study
general academic

Level of study
First-cycle studies

Course offered in
English

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
30	30	
Tutorials	Projects/seminars	
	15	

Number of credit points

6

Lecturers

Responsible for the course/lecturer:
dr inż. Piotr Stępczak

piotr.stepczak@put.poznan.pl

Responsible for the course/lecturer:

Prerequisites

Systematic knowledge of mathematical analysis, algebra and theory of probability.

Detailed, systematic knowledge of the fundamentals of circuit theory, together with the necessary mathematical background; this knowledge allows him/her to understand, analyze and evaluate the operation of electrical circuits.

Ability to extract information from English language literature, databases and other sources.

Ability to synthesize gathered information, draw conclusions, and justify opinions.

Awarness of the limitations of his/her current knowledge and skills; is committed to further selfstudy.

Course objective

Lerning of basic principles and techniques underlying the transmission of optical communication and optical signals in optical fiber communication systems.

Course-related learning outcomes

Knowledge

Has a systematic knowledge, together with necessary mathematical background, of light propagation and methods of its description in the fiber.

Has a wide, systematic knowledge of the properties and characteristics of active and passive components of fiber optic system teletransmission, as well as their classification, selection, analysis and design of opto-electronic circuits.

Has a systematic knowledge, together with theoretical background, of optoelectronics and opto-telecommunication.

Skills

Is able to extract information from Polish or English language literature, databases and other sources. Is able to synthesize gathered information, draw conclusions, and justify opinions.

Is able to evaluate the parameters describing digital signals transmission quality in optical communication channels and fiber optic systems.

Is able to formulate specifications, design and conduct measurements of optoelectronic components parameters. Is able to conduct link analysis, formulate requirements and design an optical fibre link.

Social competences

Demonstrates responsibility and professionalism in solving technical problems. Is able to participate in collaborative projects.

Is aware of the impact electronics and ICT systems and optical networks will have on the development of the information society

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

A series of lectures in semester 4 completes a selection test of 10 to 16 equally scored questions. Passing the test requires at least 50% of points.

Written exam in semester 5 consisting of approximately 10 to 16 tasks, equally graded. Passing the exam requires at least 50% of points. When required, the written exam may be followed by an oral exam. In the final grade also the activity during the classes is considered (homeworks).

The laboratory exercises in semster 5 are graded according to the reports prepared during each session and the involvement in the lab assignments.

As part of the project classes in the 5th semester, skills are verified by a project consisting of a complete system diagram with the selection of catalog elements, from a defined set of elements, justified by correct accounting analysis.

Programme content

Lecture / project: Principles of light propagation. Step index, graded index, and single-mode optical fibers, numerical aperture and acceptance angle. Modes in optical waveguides. Mode and chromatic dispersion. Transmission characteristics. Non-linear effects. Methods of measuring attenuation and dispersion. Optical fibre cables, installation principles. Connecting fibres, joints and connectors. Optical sources, light-emitting and laser diodes, principles of operation, parameters. Photodiodes and optical receivers. Basic elements of an optical transmission system. Design principles. The idea of WDM, WDM couplers, optical filters, OTDM. Fibre optic networks.

Laboratories: Modes in optical waveguides. Optical spectrum analysis. Fiber optic couplers. Fiber fusion splicing. OTDR measurements. Digital fiber optic transmitter / receiver. Single wave system.

Teaching methods

Lecture: multimedial presentation, illustrative examples presented on the board, conversatory lecture.

Laboratory: execution, in two or three person groups, the tasks described in the manuals, performing manual calculations, as instructed by the teacher, building and debugging simple circuits, performing the measurements.

Project: calculation of fiber optic transmission system with given parameters, based on selected elements of based and on available data sheets.

Bibliography

Basic

1. J. Senior, Optical Fiber Communications. Principles and Practice, Prentice Hall, 1992.

2. J.C. Palais, Fiber optic communications, Prentice-Hall, 1998.

3. Govind P. Agrawal, Fiber-Optic Communication Systems, John Wiley & Sons, Inc., 1997

Additional

1. R.J. Hoss, Fiber optic communications design handbook, Prentice Hall, 1990

Breakdown of average student's workload

	Hours	ECTS
Total workload	150	6,0
Classes requiring direct contact with the teacher	98	4,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	52	2,0

[1] delete or add other activities as appropriate