Title	Code
Fiber communication systems	**1018051310108330308**
Field: **Electronics and Telecommunications**	Year / Semester: **2 / 3**
Specialty: **-**	Course: **core**
Hours: Lectures: **2** Classes: **-** Laboratory: **1** Projects / seminars: **-**	Number of credits: **0**
	Language: **polish**

Lecturer:

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Status of the course in the study program:

Obligatory course for students of Electronics and Telecommunications.

Assumptions and objectives of the course:

To provide students with theoretical and practical knowledge and understanding of optical communication networks. To prepare students to design, operate and maintain optical networks.

Contents of the course (course description):

Optical propagation, acceptance angle, numerical aperture, optical modes, step index and graded index fibers, cut-off wavelength, single mode fibers. Transmission characteristics of optical fibers: attenuation, modal, chromatic and polarisation dispersion. Linear and nonlinear propagation effects. Optical sources and detectors. Principles of optical amplifiers and classification. Gain and noise characteristics. Application of OA to subscriber loops, trunk and undersea transmission systems. Nonlinear device application of OA. Multiplexing methods: WDM, TCM, SCM and OTDM. Optical multiplexing and amplification as method of upgrading fiber optic transmission systems. Coherent optical fiber systems. Principles of coherent detection. Modulation formats. Demodulation schemes. Noise in coherent optical systems. Soliton transmission systems. Nonlinear wave motion in optical fibers. Soliton theory. Ultra high speed soliton systems. Fiber optic system design methodology. Defining requirements. Component specification. System performance model and analysis. Network availability and cost performance.

Lab projects:
- Optical spectrum analyser
- Semiconductor light sources, laser controllers
- Investigation of passive optical components
- EDFA part I
- EDFA part II
- Tunable fiber ring EDFA laser
- State of polarization measurement
- PDL measurements
- PMD / CD measurements

Computer simulations:
- EDFA - investigating influence of parameters of optical components.

- Longitudal distribution of Er population inversion.
- Longitudal distribution of amplified signal.
- Optimization of EDF length.
- Gain clamped amplifier.
- Ring EDFA laser.

Introductory courses and the required pre-knowledge:

Optoelectronics.

Courses form and teaching methods:

Lectures, laboratory projects.

Form and terms of complete the course - requirements and assessment methods:

Lab reports, written exam.

Basic Bibliography:

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Additional Bibliography:

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