Title	Code
Optical Fiber Networks	**1018221910108310120**
Field: **Electronics and Telecommunications**	Year / Semester: **5 / 9**
Specialty: **Information Transport Networks**	Course: **core**
Hours: Lectures: **2** Classes: **2** Laboratory: **2** Projects / seminars: **-**	Number of credits: **8**
	Language: **polish**

Lecturer:

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Status of the course in the study program:

Obligatory course for students of Electronics and Telecommunications, specialty: Information Transport Networks.

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):

1. Optical propagation and transmission characteristics of optical fibers: attenuation, modal, chromatic and polarisation dispersion. Dispersion menagement.
2. Properties of modern fibers for metro, high canacity, long hual network applications
3. Network limits caused by optical nonlinear propagation effects.
4. Passive network devices: optical filters, AODMs, RAODMs, optical multiplexers, AWG, tunable filters, wave blockers, dynamic spectral gain equalization. Integrated optics. Optical switching: technology and characteristics.
5. Optical sources and wavelength converters for DWDM. Tunable DWDM lasers. Detectors.
6. Principles of optical amplifiers and classification. Gain and noise characteristics.
7. Application of OA to subscriber loops, trunk and undersea transmission systems. DWDM networks and optical amplifiers.
8. Nonlinear device application of OA.
9. Multiplexing methods: WDM, TCM, SCM and OTDM. Wavelength division multiaccess networks. Subcarier division multiaccess networks. TDM and CDMA networks.
10. Optical multiplexing and amplification as method of upgrading fiber optic transmission systems.
11. Coherent optical fiber systems. Principles of coherent detection. Modulation formats. Demodulation schemes. Noise in coherent optical systems.
12. Soliton transmission systems. Nonlinear wave motion in optical fibers. Soliton theory. Ultra high speed soliton networks.
13. Fiber optic system design methodology. Defining requirements. Component specification. System performance model and analysis. Network availability and cost performance.

List of available lab projects:
- Optical spectrum analyser.
- Semiconductor light sources, laser controllers

- Investigation of passive optical components.
- A/O Bragg cell ? multiwavelength generation
- Mach Zehnder fiber modulator.
- EDFA part I
- EDFA part II
- Tunable fiber ring EDFA laser.
- EDFA DWDM configuration
- State of polarization measurement
- PDL measurements
- PMD / CD measurements
- EDFA Mode-locked pulse laser
- Coherent measurement of spectral linewidth
- E/O switch

List of proposed 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.
- Raman Amplifier.
- Metro Networks.
- DWDM Networks.
- Long Distance Systems.

Introductory courses and the required pre-knowledge:

Optoelectronics.

Courses form and teaching methods:

Lectures, classes, laboratory projects.

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

Tests, written exam.

Basic Bibliography:

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Additional Bibliography:

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