Tytuł **PO Zaawansowane systemy światłowodowe**	Kod **1018321010108310127**
Kierunek **Elektronika i Telekomunikacja**	Rok / Semestr **5 / 10**
Specjalność **Systemy telekomunikacyjne**	Przedmiot **obowiązkowy**
Godziny Wykłady: **2** Ćwiczenia: **1** Laboratoria: **2** Projekty / seminaria: **-**	Liczba punktów **8**
	Język prowadzenia przedmiotu **polski**

Prowadzący:

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Wydział:

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60-965 Poznań
tel. (061) 665-2293, fax. (061) 665-2572
e-mail: office_det@put.poznan.pl

Miejsce przedmiotu w programie studiów:

Elective course for students of Electronics and Telecommunications, specialty: Telecommunication Systems.

Założenia i cele przedmiotu:

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

Treści programowe przedmiotu (opis przedmiotu):

Course description:

1. Optical propagation, acceptance angle, numerical aperture, optical modes, step index and graded index fibers, cut-off wavelength, single mode fibers.

2. Transmission characteristics of optical fibers: attenuation, modal, chromatic and polarisation dispersion. DWDM fibers. Photonic cristal fibers.

3. Linear and nonlinear propagation effects.

4. Passive network components. Integrated optics. Optical switching: technology and characteristics.

5. Optical sources and detectors.

6. Principles of optical amplifiers and classification. Gain and noise characteristics.

7. Application of OA to subscriber loops, trunk and undersea transmission systems.

8. Nonlinear device application of OA.

9. Multiplexing methods: WDM, TCM, SCM and OTDM.

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 systems.

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.

http://www.put.poznan.pl/

- 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

Proposed list of 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.

Przedmioty wprowadzające i wymagane wiadomości wstępne:
Optics. Optoelectronics.

Forma zajęć i metody dydaktyczne:
Lectures, classes, laboratory projects.

Forma i warunki zaliczenia przedmiotu – wymagania i system oceniania:
Tests, lab project reports, written exam.

Bibliografia podstawowa:
1. J. M. Senior Optical Fiber Communications ? Principles and Practice Prentice Hall N. York 1994
2. D. M. Spirit High Capacity Optical Transmission Explained John Wiley & Sons 1995
3. E. Desurvire Erbium Doped Fiber Amplifiers John Wiley & Sons 1994
4. R. J. Hoss Fiber Optic Communications Design Handbook Prentice Hall 1990
5. D.J.G. Mestadagh Fundamentals of Multiaccess Optical Fiber Networks Art. House 1995
6. P. E. Green Fiber Optic Networks Prentice Hall 1993
7. K. Perlicki Pomiary w optycznych systemach telekomunikacyjnych WKŁ Warszawa 2002

Bibliografia uzupełniająca:
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