# STUDY MODULE DESCRIPTION FORM

| Name of the module/subject | Code |
|---|---|
| **Optical Communications** | **1010804151010830039** |

| Field of study | Profile of study (general academic, practical) | Year /Semester |
|---|---|---|
| **Electronics and Telecommunications** | **general academic** | **3 / 5** |
| Elective path/specialty | Subject offered in: | Course (compulsory, elective) |
| **-** | **Polish** | **obligatory** |

| Cycle of study: | Form of study (full-time,part-time) |
|---|---|
| **First-cycle studies** | **part-time** |

| No. of hours | No. of credits |
|---|---|
| Lecture: **20** Classes: **-** Laboratory: **-** Project/seminars: **-** | **4** |

| Status of the course in the study program (Basic, major, other) | (university-wide, from another field) |
|---|---|
| **major** | **from field** |

| Education areas and fields of science and art | ECTS distribution (number and %) |
|---|---|
| **technical sciences** | **4 100%** |
| **Technical sciences** | **4 100%** |

## Responsible for subject / lecturer:

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## Prerequisites in terms of knowledge, skills and social competencies:

| | | |
|---|---|---|
| 1 | **Knowledge** | K_W01<br>K_W02<br>K_W05<br>K_W08 |
| 2 | **Skills** | K_U01<br>K_U07<br>K_U09 |
| 3 | **Social competencies** | K_K01 |

## Assumptions and objectives of the course:

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

## Study outcomes and reference to the educational results for a field of study

### Knowledge:

1. Has a systematic knowledge, together with necessary mathematical background, of light propagation and methods of its description in the fiber. - [K1_W07]

2. 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. - [K1_W08]

3. Has a systematic knowledge, together with theoretical background, of optoelectronics and opto-telecommunication. - [K1_W21]

### Skills:

1. 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. - [K1_U01]

2. Is able to evaluate the parameters describing digital signals transmission quality in optical communication channels and fiber optic systems. - [K1_U19]

3. 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. - [K1_U20]

### Social competencies:

| |
|---|
| 1. Demonstrates responsibility and professionalism in solving technical problems. Is able to participate in collaborative projects. - [K1_K02] |
| 2. Is aware of the impact electronics and ICT systems and optical networks will have on the development of the information society. - [K1_K04] |

| **Assessment methods of study outcomes** |
|---|
| - Final written exam (theory and solutions of simple problems) |
| **Course description** |
| 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. |
| **Basic bibliography:** |
| 1. J. Senior, Optical Fiber Communications. Principles and Practice, Prentice Hall, 1992. |
| 2. J.C. Palais, Fiber optic communications, Prentice-Hall, 1998. |
| 3. J. Siuzdak, Wstęp do współczesnej telekomunikacji światłowodowej, WKiŁ, 1997. |
| 4. K. Perlicki, Pomiary w optycznych systemach telekomunikacyjnych, WKiŁ, 2002. |
| **Additional bibliography:** |
| 1. J. Siuzdak, Systemy i siecie fotoniczne, WKŁ, 2009. |
| 2. K. Perlicki, System transmisji optycznej WDM, WKŁ, 2009. |
| 3. K. Booth, S. Hill, Optoelektronika, WKŁ, 2001. |

**Result of average student's workload**

| Activity | Time (working hours) |
|---|---|
| 1. Participation in lectures. | 30 |
| 2. Own work of literature, preparation for the exam. | 55 |
| 3. Consultation | 3 |
| 4. Exam | 2 |

**Student's workload**

| Source of workload | hours | ECTS |
|---|---|---|
| Total workload | 100 | 4 |
| Contact hours | 25 | 1 |
| Practical activities | 10 | 1 |