

FACULTY OF ELECTRICAL  
ENGINEERING**SUBJECT CARD**

Name in Polish: **Technika światłowodowa**  
 Name in English: **Fiber optics**  
 Main field of study (if applicable): **Electrical Engineering**  
 Specialization (if applicable): **Electrical Power Engineering**  
 Level and form of studies: **2nd level, full-time**  
 Kind of subject: **obligatory**  
 Subject code: **ELR052215**  
 Group of courses: **NO**

|  | Lecture              | Classes | Laboratory           | Project | Seminar |
|--|----------------------|---------|----------------------|---------|---------|
| Number of hours of organized classes in University (ZZU):                        | 15                   |         | 15                   |         |         |
| Number of hours of total student workload (CNPS):                                | 30                   |         | 30                   |         |         |
| Form of crediting:   | crediting with grade |         | crediting with grade |         |         |
| For group of courses mark (X) final course:                                      |                      |         |                      |         |         |
| Number of ECTS points:   | 1                    |         | 1                    |         |         |
| including number of ECTS points for practical (P) classes :                      |                      |         | 1                    |         |         |
| including number of ECTS points for direct teacher-student contact (BK) classes: | 0.70                 |         | 0.70                 |         |         |

**PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES**

1. Has basic knowledge of optics needed to understand optoelectronic phenomenon and fiber guide communication
2. Is able to correctly select, connect and coordinate work of optoelectronic elements in metering and communication networks
3. Is able to properly conduct research of basic passive and active optoelectronic parameters

**SUBJECT OBJECTIVES**

- C1. Acquaintance with rules for exploitation of light guiding elements and their exploitation standards  
 C2. Acquaintance with functions and methods of realization optoelectronic units for light guiding purposes  
 C3. Explanation notions related to optical wave guides, reasons of disturbances appearance and methods of prevention  
 C4. To gain practical skills needed for connecting optoelectronic elements, conducting investigations and researching circuits

**SUBJECT LEARNING OUTCOMES***relating to knowledge:*

- PEU\_W01 Knows structure and specifics of optical path work  
 PEU\_W02 Has knowledge about optical phenomenon and optical elements dedicated for optical transmission

*relating to skills:*

- PEU\_U01 Is able to precise purpose and scope of research, project measurement circuit and select measurement equipment  
 PEU\_U02 Is able to elaborate results and determine conclusions if about fiber guide condition

*relating to social competences:*

- PEU\_K01 Is conscious about responsibility for his own work and is willing to acknowledge teamwork rules

## PROGRAMME CONTENT

| Form of classes - lecture |   | Number of hours: |
|---------------------------|---|------------------|
| Lec 1                     | Overview of lecture program, requirements, assessment methods                 | 1                |
| Lec 2                     | Fundamentals of wave theory of light propagation                              | 2                |
| Lec 3                     | Properties and classification of optical path and its exploitation parameters | 2                |
| Lec 4                     | Emission, transmission and detection units dedicated for optical transmission | 2                |
| Lec 5                     | Transmission medium - construction of the structure, ways to connect          | 2                |
| Lec 6                     | Active and passive auxiliary elements in wave guiding automatics              | 2                |
| Lec 7                     | Digital and analogue modulation of optical signals                            | 2                |
| Lec 8                     | Summarizing and assessment  | 2                |
| Total hours:              |   | 15               |

| Form of classes - laboratory |  | Number of hours: |
|------------------------------|--|------------------|
| Lab 1                        | Presentation of safety regulations and internal regulations of laboratory. Assessment rules. Overview of laboratory stations | 1                |
| Lab 2                        | Examination of multi-connected fiber guide attenuation   | 2                |
| Lab 3                        | Examination fiber guides attenuation   | 2                |
| Lab 4                        | Polarization characteristic measurement  | 2                |
| Lab 5                        | Investigation of radiation angular characteristics   | 2                |
| Lab 6                        | Spectral characteristic measurement for photoemission elements   | 2                |
| Lab 7                        | Investigation of matching efficiency of optical connectors   | 2                |
| Lab 8                        | Assessment and completion of laboratory arrears  | 2                |
| Total hours:                 |  | 15               |

## TEACHING TOOLS USED

- N1. Lecture with use of multimedia techniques  
 N2. Laboratory with measurements traditionally arranged  
 N3. Preparation of tests and measurements report

## EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

| Evaluation<br><i>F – forming (during semester)<br/>P – concluding (at semester end)</i> | Educational effect number | Way of evaluating educational effect achievement |
|---|---------------------------|--|
| F1(W)   | PEU_W01<br>PEU_W02        | Way of evaluating educational effect achievement |
| P(W)  | P=F1                      |  |
| F1(L)   | PEU_U01                   | Report and preparation for laboratory assessment |
| F1(L)   | PEU_U02                   | Assessment of laboratory reports                 |
| P(L)  | P=0,3F1+0,7F2             |  |

## PRIMARY AND SECONDARY LITERATURE

### PRIMARY LITERATURE:

Palais J. C.; Zarys telekomunikacji światłowodowej, WKŁ, Warszawa 1991.  
 Midwinter J. E., Guo Y. L.; Optoelektronika i technika światłowodowa, WKŁ, Warszawa 1995.

### SECONDARY LITERATURE:

Smoliński A.; Optoelektronika światłowodowa, WKŁ, Warszawa 1985

## SUBJECT SUPERVISOR

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