

FACULTY OF ELECTRICAL  
ENGINEERING**SUBJECT CARD**

Name in Polish: **Optoelektronika**  
 Name in English: **Optoelectronics**  
 Main field of study (if applicable): **Electrical Engineering**  
 Specialization (if applicable): **Industrial Electrical Engineering**  
 Level and form of studies: **2nd level, full-time**  
 Kind of subject: **optional**  
 Subject code: **ELR041215**  
 Group of courses: **NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):	30				
Number of hours of total student workload (CNPS):	60				
Form of crediting:	crediting with grade				
For group of courses mark (X) final course:					
Number of ECTS points:	2				
including number of ECTS points for practical (P) classes :					
including number of ECTS points for direct teacher-student contact (BK) classes:	1.40				

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

1. Knowledge of semiconductors' properties.
2. Knowledge of the basic phenomena in the interaction of light with matter.

**SUBJECT OBJECTIVES**

- C1. Acquisition of structured and theory grounded knowledge, needed for understanding physical basis of solid - state semiconductor radiation sources and radiation detectors.
- C2. Acquisition of structured knowledge on the properties of fiber optic transmission.
- C3. Getting acquainted with the selected applications and the latest trends in the development of optoelectronic components.

**SUBJECT EDUCATIONAL EFFECTS***relating to knowledge:*

- PEK\_W01 He has knowledge about the physical principle of operation of solid-state semiconductor radiation sources and radiation detectors
- PEK\_W02 He has knowledge about the principle of operation and types of dielectric fibers
- PEK\_W03 He has general understanding about the physical effects accompanying the transmission of information in optical fibers. He knows applications of fiber optics

*relating to skills:**relating to social competences:*

- PEK\_K01 He can search for information and critically analyze it.

PROGRAMME CONTENT		
Form of classes - lecture		Number of hours:
Lec 1	Scope of the lecture, literature, credit conditions. Radiative recombination in semiconductors.	2
Lec 2	Radiative and nonradiative recombination in semiconductors. Radiative recombination processes.	2
Lec 3	Spontaneous and stimulated emission, absorption of radiation. Photoelectric effect.	2
Lec 4	Materials and technology of semiconductor light sources.	2
Lec 5	Light-emitting diodes and lasers.	2
Lec 6	Semiconductor light detectors.	2
Lec 7	Materials and technology of optical fibers.	2
Lec 8	Principle of operation and types of dielectric fibers.	2
Lec 9	Transmission of information in optical fibers.	2
Lec 10	Transmission properties of optical fibers.	2
Lec 11	Integrated optoelectronics.	2
Lec 12	Fiber telecommunications.	2
Lec 13	Optical fiber sensors.	2
Lec 14	Other applications of fiber optics.	2
Lec 15	Final test.	2
Total hours:		<b>30</b>

TEACHING TOOLS USED
N1. Traditional lecture with use of computer presentation.
N2. Students' own work.
N3. Office hours.

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT		
Evaluation <i>F - forming (during semester) P - concluding (at semester end)</i>	Educational effect number	Way of evaluating educational effect achievement
F1(w)	PEK_W01 PEK_W02 PEK_W03 PEK_K01	F1 - Written end-of-semester examination on the last lecture
P(w)	P=F1	

PRIMARY AND SECONDARY LITERATURE
<b>PRIMARY LITERATURE:</b> [1] B. Ziętek, Optoelektronika, Wydawnictwo UMK Toruń, 2005 [2] K. Perlicki, Systemy transmisji optycznej WDM, WKŁ 2007 [3] J. E. Midwinter, Y. L. Guo, Optoelektronika i technika światłowodowa, WKŁ, Warszawa, 1995 [4] J. C. Palais, Zarys telekomunikacji światłowodowej, WKŁ, Warszawa, 1991 [5] A. Smoliński., Optoelektronika światłowodowa, WKŁ, Warszawa, 1985 <b>SECONDARY LITERATURE:</b> Recent papers on optoelectronics

SUBJECT SUPERVISOR
Bożena Łowkis, bozena.lowkis@pwr.edu.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT  
**ELR041215 - Optoelectronics**  
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Electrical Engineering**  
AND SPECIALIZATION **Industrial Electrical Engineering**

Subject educational effect	Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)	Subject objectives	Programme content	Teaching tool number
PEK_W01	S2ETP_W12	C.1	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6	N.1 N.2 N.3
PEK_W02	S2ETP_W12	C.2	Lec7 Lec8	N.1 N.2 N.3
PEK_W03	S2ETP_W12	C.2 C.3	Lec9 Lec10 Lec11 Lec12 Lec13 Lec14	N.1 N.2 N.3
PEK_K01	K2ETK_K01	C.1 C.2 C.3	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec9 Lec10 Lec11 Lec12 Lec13 Lec14 Lec15	N.1 N.2 N.3