

## DESCRIPTION OF THE COURSES

- Course code: **ELR2211**
- Course title: **FIBER OPTICS COMMUNICATIONS AND SENSORS**
- Language of the lecturer: **ENGLISH**

<i>Course form</i>	<i>Lecture</i>	<i>Classes</i>	<i>Laboratory</i>	<i>Project</i>	<i>Seminar</i>
<i>Number of hours/week*</i>	<b>2</b>		1		
<i>Number of hours/semester*</i>	<b>30</b>		15		
<i>Form of the course completion</i>	<b>Quiz</b>		Completion		
<i>ECTS credits</i>	<b>2</b>		1		
<i>Total Student's Workload</i>	<b>60</b>		30		

- Level of the course (basic/advanced): **basic**
- Prerequisites: **Courses in Applied Physics, Electronics, Electromagnetic Theory**
- Name, first name and degree of the lecturer/supervisor: **Prof. Bogdan Miedziński, Ph.D., D.Sc.**
- Names, first names and degrees of the team's members:  
**Grzegorz Wiśniewski, Ph.D.**
- Year:.....**I**..... Semester:.....**2**.....
- Type of the course (obligatory/optional): **obligatory**
- Aims of the course (effects of the course):
- To acquire student with problems of processing and transmission of information by means of fibre optics technic and applicability of fibre sensors in practice.
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- Form of the teaching (traditional/e-learning): **traditional**
- Course description: Wave theory of a light propagation. Signals transmission and processing. Problems of generation and detection. Communication systems;expanding the system capacity by multiplexing.Optical phenomena used in fibre sensors,applicability of right and remote sensors in practice
- Lecture:

<i>Particular lectures contents</i>	<i>Number of hours</i>
<b>1. General introduction ,requirements,program</b>	<b>1</b>
<b>2. Basis of a wave propagation theory of a light</b>	<b>2</b>
<b>3. Dielectric waveguides,properties.,manufacturing</b>	<b>3</b>
<b>4. Problems of the light transmission;dispersion and loss mechanisms</b>	<b>3</b>
<b>5. Classification of optical fibres and fiber parameters</b>	<b>2</b>
<b>6. LED and LD light sources</b>	<b>3</b>
<b>7. Photodiodes,phototransistors and photoresistors in detection systems</b>	<b>2</b>
<b>8. Splices and connectors</b>	<b>2</b>
<b>9. Auxiliary components for optical fiber systems</b>	<b>2</b>

<b>10. Expanding communication system capacity by multiplexing</b>	<b>3</b>
<b>11. Modulation format of optical signals</b>	<b>2</b>
<b>12. Optics phenomena used in sensors; structure and application of right and remote sensors in practice</b>	<b>3</b>
<b>13. Quiz</b>	<b>2</b>

- Classes – the contents:
- Seminars – the contents:
- Laboratory – the contents
- 1.Introduction.,general requirement and completion
- 2.Investigation of light sources parameters (LED,LD)
- 3.Testing of photodetectors
- 4.Investigation of transmissions quality on the fibre guide parameters
- 5.Testing of auxiliary ,passive elements
- 6.Analog and digital modulation format testing
- 7.Investigation of splices and connectors
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- Project – the contents:
- Basic literature:
  - 1. Chai Yeh: Handbook of Fiber Optics – Theory and Applications, Academic Press. Inc, London 1990**
  - 2. J.L. Horner: Optical Signal Processing. Academic Press Inc. London 1987**
  - 3. R.M.Gagliardi,S.Karp: Optical Communications;Wiley-Int.Pub.**
- Additional literature:
  - 1. CIGRE Working Group 35.04: Optical Fibre Cable Selection for Electricity Utilities, Febr. 2001**
- Conditions of the course acceptance/creditation: **Passing grade of quiz and lab completion**

\* - depending on a system of studies