

## Specification for the book of courses

<b>Study program</b>		Electrical Engineering and Computer Science		
<b>Module</b>		Communications and Information Technologies - Communications and Information Processing		
<b>Type and level of studies</b>		Undergraduate Academic Studies		
<b>The name of the course</b>		Optical Communications		
<b>Lecturer (for lectures)</b>		Milić N. Dejan, Milović M. Daniela		
<b>Lecturer/associate (for exercises)</b>		Anastasov A. Jelena		
<b>Lecturer/associate (for OFE)</b>		Anastasov A. Jelena		
<b>Number of ECTS</b>	5	<b>Course status (obligatory/elective)</b>	Obligatory	
<b>Prerequisites</b>				
<b>Course objectives</b>	Discussing optical communication system details, and the principles of typical systems that use optical data transfer techniques.			
<b>Course outcomes</b>	Acquired knowledge can be used for finding and practical implementation of engineering solutions in optical telecommunications. Students will be able to analyze performance of analogue and digital optical systems, assess the link reach and bandwidth, i.e. maximal bitrate, as well as to make a power budget in an optical link.			
<b>Course outline</b>				
<b>Theoretical teaching</b>	History of optical communications. Geometrical and wave optics, Types and characteristics of optical fibers, waveguiding, modes. Coupling with light sources and detectors. Attenuation and dispersion, fiber bandwidth. Fabrication of optical fibers. Devices and measurement techniques. Generating and modulation of optical carrier. Signal detection. Optical amplifiers. Link noise, quantum limit, and performance. Criteria of power and bandwidth. Coherent receivers and superquantum limit.			
<b>Practical teaching (exercises, OFE, study and research)</b>	Auditory exercises that include detailed solutions of practical problems, including the problems required for colloquia and final exam. Laboratory exercises within the following topics: Geometrical and wave optics. Electrooptical characteristics of LED's and lasers. Coupling efficiency, fiber misalignment and bending losses. Photodiodes and types of preamplifiers. Electrical/optical bandwidth and eye diagram. Analogue link with pulse modulations in wireless optical environment. Bit-error rate in a digital optical link.			
<b>Textbooks/references</b>				
1	G. Agrawal, Fiber Optic Communications Systems, John Wiley & Sons, 2002			
2	D. Milic, Optical communications (in Serbian), Faculty of Electronic Engineering, Nis, 2011.			
3	D. Milic, M. Stefanovic, The collection of solved problem in optical communications (in Serbian), Faculty of Electronic Engineering, Nis, 2011.			
4	J. M. Senior, Optical Fiber Communications, Principles and Practice, Prentice Hall, 1992			
5	A. Marincic, Optical telecommunications (in Serbian), University of Belgrade, Belgrade, 1997			
<b>Number of classes of active education per week during semester/trimester/year</b>				
<b>Lectures</b>	<b>Exercises</b>	<b>OFE</b>	<b>Study and research work</b>	<b>Other classes</b>
3	1	1	0	0
<b>Teaching methods</b>	Theoretical lectures, auditory and laboratory exercises, homework, consultations.			
<b>Grade (maximum number of points 100)</b>				
<b>Pre-exam duties</b>	<b>Points</b>	<b>Final exam</b>	<b>Points</b>	
<b>Activity during lectures</b>	5	<b>Written exam</b>	30	
<b>Exercises</b>	15	<b>Oral exam</b>	20	
<b>Colloquia</b>	30			
<b>Projects</b>				