

Faculty of Electrical Engineering / ELECTRONICS, TELECOMMUNICATIONS AND COMPUTERS / OPTICAL COMMUNICATIONS

Course:	OPTICAL COMMUNICATIONS			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
5187	Mandatory	1	6	3+0+1
Programs	ELECTRONICS, TELECOMMUNICATIONS AND COMPUTERS			
Prerequisites	No prerequisites required.			
Aims	Students will be introduced with basic elements of signal transmission over optical communication systems. The following topics will be considered: the types of optical fibers, the principles of propagation in the optical fiber, modulation techniques, measurements on optical fibers, the basic concepts of the switching systems and wavelength multiplexing including DWDM. Also, the students will be introduced with the optical tools and basic types of optical cables.			
Learning outcomes	After passing exam, student will be able to: 1. Differ types of optical fibers. 2. Explain the basic causes of signals power loss in optical fibers. 3. Describe the causes of dispersion in optical fibers. 4. Compare optical transmitters with LED and laser diode. 5. Understand the basic parameters of the optical receiver. 6. Understand the wavelength multiplex. 7. Carry out path loss measurement procedure in optical fiber using optical reflectometer.			
Lecturer / Teaching assistant	Prof. dr Zoran Veljović			
Methodology	Lectures, laboratory exercises, consultations.			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Introduction. The importance of optical communication. History and development. Perspectives.			
I week exercises				
II week lectures	The basic of electromagnetic waves propagation in conducting structures and free spaces.			
II week exercises				
III week lectures	Types of optical fibers. The attenuation and loss in optical fiber.			
III week exercises				
IV week lectures	Dispersion. Nonlinear effects.			
IV week exercises				
V week lectures	Optical transmitters. Optical receivers.			
V week exercises				
VI week lectures	Other components of optical communication system.			
VI week exercises				
VII week lectures	I colloquium.			
VII week exercises				
VIII week lectures	Methods for testing characteristics of optical fiber (transmission and optical characteristics).			
VIII week exercises				
IX week lectures	Application of optical reflectometer in testing transmission characteristic of optical fibers.			
IX week exercises				
X week lectures	Geometrical characteristics of fiber. Mechanical features. Resistance to the outer influences.			
X week exercises				
XI week lectures	Wavelength-division multiplexing. DWDM.			
XI week exercises				
XII week lectures	Optical networks. Configuration of optical networks. Perspectives of complete optical network.			
XII week exercises				
XIII week lectures	II colloquium.			

XIII week exercises						
XIV week lectures	Optical switches.					
XIV week exercises						
XV week lectures	Design of optical connecting routs.					
XV week exercises						
Student workload	Per week: Working hours: 5 credits x 40/30 = 6h 40', Working hours: 3 hours for teaching, 1 hour for exercises 2h 40' hours for individual work, including consultations					
Per week			Per semester			
6 credits x 40/30=8 hours and 0 minuts 3 sat(a) theoretical classes 1 sat(a) practical classes 0 excercises 4 hour(s) i 0 minuts of independent work, including consultations			Classes and final exam: 8 hour(s) i 0 minuts x 16 =128 hour(s) i 0 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 8 hour(s) i 0 minuts x 2 =16 hour(s) i 0 minuts Total workload for the subject: 6 x 30=180 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 36 hour(s) i 0 minuts Workload structure: 128 hour(s) i 0 minuts (cources), 16 hour(s) i 0 minuts (preparation), 36 hour(s) i 0 minuts (additional work)			
Student obligations			Lessons attendance is mandatory for students, as well as doing control tests, doing laboratory exercises, and both colloquiums.			
Consultations						
Literature			Aleksandar Marinčić, Optical communications, Univerzity of Belgrade, Belgrade,1997. John M. Senior, Optical Fiber Communications, Principles and Practice, 2nd Edition, Pearson Education Ltd,1992. M.Bjelica,P.Matavulj,D.Gvozdić, Collection of problems			
Examination methods			Activitie during lectures 10 points, Each colloquiums 20 points (40 points in total), Final exam 50 points, Student gets the passing grade by collecting 50 points at least.			
Special remarks						
Comment						
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points