Specification for the book of courses

Study program		Communications and Information Technologies		
Module		Communications and Information Processing		
Type and level of studies		Master studies		
The name of the course		Nonlinear Fiber Optics		
Lecturer (for lectures)		Milović M. Daniela		
Lecturer/associate (for exercises)		Anastasov A. Jelena		
Lecturer/associate (for OFE)				
Number of ECTS	4	**Course status (obligatory/elective)**	Elective	
Prerequisites				
Course objectives	The present course provides fundamental understanding of nonlinear optics and its possible applications in fiber optics. The aim of this course is to train students in methods of analysis, design, dimensioning and performance evaluation of optical fibre based communications systems.			
Course outcomes	Students will be well acquainted with the principles of nonlinear optics and to use numerical tools for designing and simulating fiberoptic transmission. Students will be able to dimension and design WDM high bit-rate fibre optic communication systems; analyse, model and implement advanced optical communication systems; use optical communications simulation tools to assess the results obtained from theoretical studies.			
Course outline				
Theoretical teaching	Wave propagation in optical fibers. Chromatic and Polarization Mode Dispersion. Fiber nonlinear effects: self-phase modulation, cross-phase modulation, four-wave mixing, stimulated Raman scattering, and stimulated Brillouin scattering. Compensation (optically and electrically) of propagation effects. Pulse propagation and soliton formation in fibers. Multimode and multicore fibers for enhancing the capacity of optical communication systems through a new type of multiplexing known as the mode-division or space-division multiplexing (SDM).			
Practical teaching (exercises, OFE, study and research	Auditory exercises introduce students to fundamental concepts of nonlinear optics. Design and evaluation of optical systems using Optiwave.			
Textbooks/references				
1	G. Agrawal, Nonlinear Fiber Optica, Academic Press; 5 edition, 2013.			
2	Biswas Anjan, Milovic Daniela, Edwards Matthew, Mathematical theory of dispersion-managed optical solitons, 2010, Springer Verlag, New York, NY. USA. ISBN 978-3-642-10219-6			
3	OptiSystem Tutorial available online: https://optiwave.com/category/optisystem-manuals/optisystem-tutorials/			
4				
5				

Number of classes of active education per week during semester/trimester/year				
Lectures	**Exercises**	**OFE**	**Study and research work**	**Other classes**
2	1	0	0	0
Teaching methods	Lectures, auditory exercises, homeworks, office hours.			

Grade (maximum number of points 100)			
Pre-exam duties	**Points**	**Final exam**	**Points**
Activity during lectures	10	**Written exam**	20
Exercises	30	**Oral exam**	20
Colloquia			
Projects	20		