

BACHELOR 'S PROGRAMME
3rd YEAR OF STUDY, 2nd SEMESTER

COURSE TITLE	TRANSMISSION OF INFORMATION BY OPTICAL FIBERS
COURSE CODE	
COURSE TYPE	full attendance
COURSE LEVEL	1 st cycle (bachelor's degree)
YEAR OF STUDY, SEMESTER	3 rd year of study, 2 nd semester
NUMBER OF ECTS CREDITS	5
NUMBER OF HOURS PER WEEK	4 (2 lecture hours + 2 seminar hours)
NAME OF LECTURE HOLDER	Prof. Habil. LIVIU LEONTIE
NAME OF SEMINAR HOLDER	Prof. Habil. LIVIU LEONTIE
PREREQUISITES	Advanced level of English
A	GENERAL AND COURSE-SPECIFIC COMPETENCES
	<p>General competences:</p> <ul style="list-style-type: none"> → Implementation of intellectual property rights (including technology transfer), product certification methodology, principles, norms and values in the context of compliance → the code of professional ethics in its rigorous, efficient and responsible work strategy. → Identifying roles and responsibilities in a plurispecialized team, decision making and task assignment, applying effective relationship and work techniques within the team → Effective use of information sources and communication and training resources (portals, Internet, specialized software applications, databases, on-line courses, etc.) both in Romanian and in an international language <p>Course-specific competences:</p> <ul style="list-style-type: none"> → Identification of basic concepts of applied engineering sciences. → Explanation of structure and function of components of different types of equipment using specific theories and tools (schemes, mathematical, physical, chemical, biological, etc.). → Application of design techniques and construction principles of components of different types of equipment specific to the field and specialization. → Use of validation methods for constructive solutions for the designed components and structures. → Implementation of applications in engineering practice in the field of specialization, using the theoretical foundations of applied engineering sciences. Validation means: Individual themes and medium complexity projects. → Description of methods of modeling physical phenomena using notions and theories specific to physical and mathematical modeling. → Explanation and interpretation of physical phenomena and operationalization of key concepts based on the appropriate use of laboratory equipment. → Designing experiments and planning the use of equipment, physical and computer tools using appropriate methods and techniques. → Critical evaluation of experimental results, including the degree of uncertainty of the experimental results obtained. → Implement, improve and expand the use of physical models and their validation using experimental devices capable of validating a physical model. Validation means: Individual project with practical achievement. → Description of the processes, concepts and phenomena underlying instrumental methods and analysis techniques and specific measures. → Associate experimental and theoretical models with physical or physicochemical phenomena in the context of formulating and addressing a specific research-production problem. → Use of specific algorithms to develop a working methodology allowing the steps to be taken to complete a process of investigation (making measurements / calculations, data processing, interpretation, etc.) → Critical analysis of the data acquired and processed in order to correctly apply the methods and criteria for choosing the right solutions for achieving performance. → Drawing up the technological documentation for a project. Validation means: Laboratory work, individual themes and / or a team project.
B	LEARNING OUTCOMES
	<ul style="list-style-type: none"> • Upon successful completion of this discipline, students will be able to: • Describe the propagation of light in waveguides • Describe the application of different fiber optic communications standards • Use transmission standards in communications

	<ul style="list-style-type: none"> Analyze the characteristics of optical fiber Calculates propagation modes for certain optical fibers
C	LECTURE CONTENT
	<ul style="list-style-type: none"> Propagation of light through waveguides - planar waveguides Propagation of light through waveguides - optical radiation coupling in waveguides Optical fiber - Optical fibers with refractive index jump Optical fiber - Fiber optic with refractive index gradient The use of optical fibers in communications - Transmission line components The use of optical fibers in communications - modulation, multiplexing and signal coupling
D	RECOMMENDED READING FOR LECTURES
	<ol style="list-style-type: none"> Catalin Agheorghiesei, Transmission of Fiber Optic Information, Course Notes: http://www.plasma.uaic.ro/didactica, 2004. V. Diaconu, M Pârvulescu, Fiber Optic Transmission, Military Publishing House, Bucharest, 1994. Sergiu Sişianu, Teodor Şşianu and Oleg Lupan. Optical fiber communications. "Tehnica Info" Publishing House, Chisinau, 2003. E.A. Bahaa Saleh and Carl Teich Malvin. Fundamentals of photonics. Wiley series in pure and applied optics. John Wiley and Sons, Inc, New York, 1991. Fiber-Optic Communications Systems, Third Edition. Govind P. Agrawal, 2002 John Wiley & Sons, Inc Understanding Fiber Optics (5th Edition), Jeff Hecht Fundamentals of Optical Fiber Communications, 2nd Edition, Michael Barnoski, Academic Press
E	SEMINAR / LABORATORY CONTENT
	<ul style="list-style-type: none"> Introduction. Devices and materials required for fiber optic communications Laser diodes used as a light source for transmitting information through optical fibers Light receivers Determination of the numerical aperture of an optical fiber Study of the optical propagation propagation modes through an optical fiber Modulation of the optical signal for the transmission of information: amplitude modulation Modulation of the optical signal for the transmission of information: frequency modulation Modulation of the optical signal for the transmission of information: modulation in digital communications Design of fiber optic communication systems Optical fiber making and maintenance technologies Quality control in the transmission of information through optical fibers Evaluation
F	RECOMMENDED READING FOR SEMINARS
	<ol style="list-style-type: none"> Catalin Agheorghiesei, Transmission of Fiber Optic Information, Course Notes: http://www.plasma.uaic.ro/didactica, 2004. V. Diaconu, M Pârvulescu, Fiber Optic Transmission, Military Publishing House, Bucharest, 1994. Sergiu Sişianu, Teodor Şşianu and Oleg Lupan. Optical fiber communications. "Tehnica Info" Publishing House, Chisinau, 2003. E.A. Bahaa Saleh and Carl Teich Malvin. Fundamentals of photonics. Wiley series in pure and applied optics. John Wiley and Sons, Inc, New York, 1991. Fiber-Optic Communications Systems, Third Edition. Govind P. Agrawal, 2002 John Wiley & Sons, Inc Understanding Fiber Optics (5th Edition), Jeff Hecht Fundamentals of Optical Fiber Communications, 2nd Edition, Michael Barnoski, Academic Press
G	EDUCATION STYLE
LEARNING AND TEACHING METHODS	Lecture; Intercative Lecture, Description Didactic experiment Report, Discussions
ASSESSMENT METHODS	Oral/written Practical test
LANGUAGE OF INSTRUCTION	English