

COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Science		
ACADEMIC UNIT	Physics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	10EK202	SEMESTER	7
COURSE TITLE	Optoelectronics and Optical Communications		
INDEPENDENT TEACHING ACTIVITIES <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>	WEEKLY TEACHING HOURS	CREDITS	
Lectures (theory and exercises)	4	6	
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Specialised Knowledge		
PREREQUISITE COURSES:	No		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No		
COURSE WEBSITE (URL)	https://eclass.uoa.gr/courses/PHYS240/		

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

In this course the student acquires the necessary knowledge for the understanding of the operation of optoelectronic devices and optical communications systems and their structural elements including optical signal propagation in optical fibres as well as devices light sources, detectors and amplifiers.

With the completion of the course the student is able to:

A. Describe the generic operation of optoelectronic devices. Define their suitability to support more complex systems with emphasis on optical communications systems and combine these appropriately to achieve the required system operation and performance.

B. Explain the principle of operation of different optoelectronic devices and evaluate their suitability for different systems with emphasis on optical communications. Examine the efficiency of these systems and classify these according to their performance for a range of operation parameters.

C. Combine functions and construction elements, in order to design optoelectronic systems with given specifications. Develop relevant mathematical models to evaluate these systems. Compare different systems and propose optimal solutions regarding their operation and performance.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas

Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
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Others...
.....

The course aims at the following general competences

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations
- Decision-making
- Working independently
- Showing social, professional and ethical responsibility and sensitivity to gender issues
- Production of free, creative and inductive thinking
- Analytical and synthetic thinking
- Critical thinking
- Time management
- Planning
- Information management
- Meeting Deadlines and Keeping Schedules
- Flexibility / Adaptability
- Problem solving

(3) SYLLABUS

- Waveguiding in optical fibres: geometrical and electromagnetic wave analysis
- Dispersion in optical fibres
- Optical Fibre Amplifiers
- Structure and characteristics of Light Emitting Diodes (LEDs) LED, semiconductor lasers and semiconductor optical amplifiers.
- Light detectors, typical photodiode structures, phototransistors, MSM and photovoltaic elements.
- Modern optical communication systems and networks

(4) TEACHING and LEARNING METHODS - EVALUATION

<p>DELIVERY <i>Face-to-face, Distance learning, etc.</i></p>	Face-to-face	
<p>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<p>Yes</p> <p>Electronic communication with the students using ICT (Information and Communications Technology) Computer-aided lectures, use of Overhead Projectors, eclass platform</p>	
<p>TEACHING METHODS <i>The manner and methods of teaching are described in detail.</i> <i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i></p> <p><i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i></p>	Activity	Semester workload
	Lectures	13week x 4hrs/weeks = 52 hrs
	Individual Study/ Study and Analysis of bibliography / Preparation	95 hrs
	Written exam	3 hrs
	Course Total	150
<p>STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i></p> <p><i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>Final written exams in Greek Oral examination during the lectures</p>	

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- Fiber Optic Communication Systems, Govind P. Agrawal, Έκδοση 4^η, ΕΚΔΟΣΕΙΣ Α. ΤΖΙΟΛΑ & ΥΙΟΙ Α.Ε., 2011, Αθήνα, Κωδικός Εύδοξου 18548902
- Optoelectronics, New Improved, Singh Jasprit (μετάφραση: Μ. Δρακάκη), ΕΚΔΟΣΕΙΣ Α. ΤΖΙΟΛΑ & ΥΙΟΙ Ο.Ε., 2007, Αθήνα, Κωδικός Εύδοξου 50655998

- Related academic journals:

- Optics Letters, OSA
- Optics Express, OSA
- IEEE Photonics Technology Letters
- IEEE Journal of Lightwave Technology
- IEEE Journal of Optical Communications and Networking
- IEEE Journal on Selected Areas in Communications
- IET Optoelectronics
- Optoelectronics Letters, Springer
- Optics Communications Journal - Elsevier
- Photonic Network Communications, Springer