INSTITUTION	NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS						
SCHOOL	SCHOOL OF SCIENCE						
DEPARTMENT	INFORMATICS AND TELECOMMUNICATIONS						
COURSE LEVEL	UNDERGRADUATE						
COURSE TITLE	**Photonics**						
COURSE CODE	**ΕΠ12**		**Semester**	**8**	**ECTS**	**6**	
TEACHING HOURS per week	**THEORY**	**3**	**SEMINAR.**	**-**	**LABORATORY**	**1**	
COURSE TYPE	Electives (ΠΜ)						

K	E1	E2	E3	E4	E5	E6
B				E	E	

URL	URL https://eclass.uoa.gr/courses/D71/
EXPECTED PRIOR KNOWLEDGE/ PREREQUISITES AND PREPARATION:	K19 Electronics
TEACHING AND EXAMINATIONS LANGUAGE:	GREEK
THE COURSE IS OFFERED TO ERASMUS STUDENTS	NO

COURSE CONTENT
Photonics is an elective 8th semester course designed to further familiarize and deepen in optical communication technology, as well as introduce students to modern methods of photonic integration and all optical signal processing. After the introduction to the basic principles of photonic technology, the course refers to the study of lasers and LEDs, continues with the opioelectronic modulators and photoreceivers that implement the transmitters and receivers of optical communication systems, refers to holography and applications and finally introduces students to state-of-the-art technologies of photonic integration and all optical signal processing. In this way covers a wide range of basic and specialized optoelectronic telecommunication techniques, giving the student the opportunity to observe and deepen the most up-to-date techniques of telecommunication systems and optical signal processing and gaining a thorough background in designing and analysis of devices and systems.

STUDENT LEARNING OBJECTIVES
Teaching-Learning Goals-Expected Learning Outcomes Upon successful completion of the course the student will be able to: • Understand the operating principle, parameters and usages of basic optoelectronic components and devices for telecommunications. • Understand the features and performance metrics of modern telecommunication lasers and LEDs. Also evaluate intensity modulation/direct detection systems and understand their limitations. • Understand the operating principle, distinguishe the types of optoelectronic modulators and classifies them according to their characteristics. • Understand the principle of operation distinguishe the types of photodetectors and classifies them according to their characteristics. • Understand the basic technologies of photonic integration technologies, the advantages and disadvantages of each, as well as their representative applications. • Understand the principles of holography and know the basic methods of recording and reproducing holograms. • Understand the basic principles of interferometry and the principle of Mach Zehnder interferometer and propose usages of interferometers in optical telecommunications. • Understand the principles and phenomena related to optical waveguides. Understand the principles of optical signal processing as well as the individual active and passive devices used for this purpose. • Be familiar with the laboratory simulation program, know the basic design techniques, perform simulations and extract the desired results - graphs. He/she should also be able to evaluate the results of the simulations and compare them with theoretical ones.

TEACHING AND LEARNING METHODS - ASSESSMENT		
TEACHING METHOD	In Class (Face to Face)	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	Learning process supported by the e-class platform (Hardware delivery, Announcements, Task assignments, Student groups) Email communication Utilization of educational environments: OptiPerformer (https://optiwave.com/resources/academia/download-area/)	
TEACHING ORGANIZATION *Describe in detail the way and methods of teaching:* *Enhanced Lectures,* *Online Lectures,* *Seminars,* *Tutorial,* *Laboratory,* *Laboratory Exercise,* *Study & analysis of literature,* *Practice (Positioning),* *Interactive teaching,* *Developing a project,*	**Activity**	***Student Workload*** *(hours)*
	Lectures	39
	Seminars	12
	Laboratory	13
	Teamwork in a case study	26
	Study & analysis of literature	30
	Independent Study	30
	Total Course	***150***

Individual / group work *Telework (reference to tools) etc.* *Details of the student's study hours for each learning activity and hours of non-guided study are shown to ensure that the total workload at the semester corresponds to the ECTS*	
ASSESSMENT OF STUDENTS *Description of the assessment process* *Assessment Methods, Formative or Concluding, Multiple Choice Test, Quick Response Questions, Test Development Questions, Problem Solving, Written Work, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Other / Other* *Fully defined evaluation criteria are mentioned and if and where they are accessible to students.*	• Written examination (50% of total grade). • Final work in which each student will individually highlight a state-of-the-art photonics technology based on recent scientific articles and presents it to an audience (30% of the total grade). • Laboratory exercises (20% of total grade).

Assessment methods	***Number***	***Percentage***
Written examination	1	50%
Progress	0	0%
Exercises	0	0%
Laboratory	4	20%
Final work	1	30%

LITERATURE AND STUDY MATERIALS / READING LIST

Ν. Θεοφάνους «Οπτρονική» Εκδόσεις Γ.Β. Βασδέκης
• B. E. A. Saleh and M. C. Teich, Fundamentals of Photonics, New York: John Wiley and Sons, Inc., 1991. ISBN: 0-471-83965-6.
• Paul E. Green «Δίκτυα Οπτικών Ινών» ISNB: 960-7510-00-3
• K. Pettermann “Laser Diode Modulation and Noise” ISNB:0-7923-1204-X
• Ζευγώλης Δημήτριος, «Εφαρμοσμένη οπτική με θέματα οπτικοηλεκτρονικής και Laser» ISNB: 978-960-418-140-7
• J. Wilson, J. Hawkes «ΟΠΤΟΗΛΕΚΤΡΟΝΙΚΗ: Μια Εισαγωγή» Εκδόσεις ΕΜ