PHOTONICS AND APPLICATIONS

1	Course Title:	PHOTONICS AND APPLICATIONS	
2	Course Code:	EEM5309	
3	Type of Course:	Optional	
4	Level of Course:	Second Cycle	
5	Year of Study:	1	
6	Semester:	1	
7	ECTS Credits Allocated:	6.00	
8	Theoretical (hour/week):	3.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:		
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Doç. Dr. Şekip Esat Hayber	
15	Course Lecturers:		
16	Contact information of the Course Coordinator:	sehayber@uludag.edu.tr	
17	Website:		
18	Objective of the Course:	The aim of the course is to teach the basic steps for the design of photonic systems by including theoretical topics such as geometric optics, wave optics, electromagnetic optics, and also to understand issues such as safety in laser systems.	
19	Contribution of the Course to Professional Development:	Properties of light: Ray, wave and photon models. Photonic devices, fibers and lasers. Basic photonics applications: Imaging, signal processing, sensing, communication and display devices. Have knowledge about their fields.	
20	Learning Outcomes:		
		1	It can solve geometric optics problems.
		2	It can solve wave optics problems.
		3	It can solve electromagnetic optics problems.
		4	Can define and explain black body radiation.
		5	Can describe and explain the interaction of light with matter.
		6	Can explain the biological effects of optical radiation.
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21	Course Content:		

Course Content:

Week	Theoretical	Practice
1	Geometric optics: Fermat's principle.	
2	Geometric optics: Reflection, refraction and Fresnel relations.	
3	Geometric optics: Total internal reflection, fiber guidance.	

4	Geometric optics: Optical fiber communication.	
5	Wave optics: Interference and diffraction.	
6	Wave optics applications: Interferometric sensors.	
7	Electromagnetic optics: Introduction, polarization.	
8	Electromagnetic optics: Optical crystals and their applications.-Midterm Exam.	
9	Black body radiation.	
10	Photon characteristic of light, interaction of light with matter.	
11	Absorption, spontaneous radiation and forced radiation.	
12	Lasers and their applications.	
13	Biological effects of optical radiation.	
14	Security in photonic systems.	

22	Textbooks, References and/or Other Materials:	CHANG W. S. C., Principles of Lasers and Optics, Cambridge University Press,2005. Saleh, Bahaa E. A.Fundamentals of photonics, John Wiley and Sons Inc., 2nd ed. 2007 Quimby R. S., Photonics and Lasers: An Introduction, Wiley, 2006. Lecture notes

Midterm Exam	1	40.00
Quiz	0	0.00
Home work-project	0	0.00
Final Exam	1	60.00
Total	2	100.00
Contribution of Term (Year) Learning Activities to		40.00
Contribution of Final Exam to Success Grade		60.00
Total		100.00
Measurement and Evaluation Techniques Used in the	Measurement and evaluation are carried out according to ... Education Regulation.	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	5.00	70.00
Homeworks	0	0.00	0.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	28.00	28.00
Others	0	0.00	0.00
Final Exams	1	40.00	40.00
Total Work Load			208.00
Total work load/ 30 hr			6.00
ECTS Credit of the Course			6.00

25	**CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS**															
	PQ1	**PQ2**	**PQ3**	**PQ4**	**PQ5**	**PQ6**	**PQ7**	**PQ8**	**PQ9**	**PQ10**	**PQ11**	**PQ12**	**PQ13**	**PQ14**	**PQ15**	**PQ16**
ÖK1	4	0	3	4	4	0	0	0	0	0	0	0	0	0	0	0
ÖK2	4	3	0	0	4	0	0	0	0	0	0	0	0	0	0	0
ÖK3	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK4	0	0	0	4	0	3	0	0	0	0	0	0	0	0	0	0

ÖK5	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK6	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0

LO: Learning Objectives PQ: Program Qualifications

Contribution Level:	**1 very low**	**2 low**	**3 Medium**	**4 High**	**5 Very High**