TOROS ÜNİVERSİTESİ

Faculty Of Engıneerıng
Electrıcal And Electronıcs Engıneerıng (Englısh)

Course Information

OPTOELECTRONICS					
Code	**Semester**	**Theoretical**	**Practice**	**National Credit**	**ECTS Credit**
		Hour / Week			
EEE413	Fall	3	0	3	5

Prerequisites and co-requisites	
Language of instruction	English
Type	Elective
Level of Course	Bachelor's
Lecturer	Asst. Prof. Ali Kemal HAVARE
Mode of Delivery	Face to Face
Suggested Subject	
Professional practise (internship)	None
Objectives of the Course	The aim of this course is to analyze electronic semiconductor circuit elements that emit, detect and control light.
Contents of the Course	This course focuses on the interaction of photons with semiconductor materials, examines the fundamentals of optical and optoelectronic phenomena and the classical and quantum properties of optical circuit elements.

Learning Outcomes of Course

#	Learning Outcomes
1	Students will have knowledge in photonic and basic optics.
2	Students will explain selected optoelectronic circuit elements and their operating principles.
3	Students will be able to analyze state-of-the-art semiconductor circuit elements.
4	Students will analyze the physical structures of semiconductor circuit elements very well, including quantum-mechanics, carrier dynamics and transport

Course Syllabus

#	Subjects	Teaching Methods and Technics
1	Basic optical concepts	Lecture
2	Semiconductors, conductors and insulators	Lecture
3	Reflection of light and transmission	Lecture
4	Black body radiation, Photoelectric effect	Lecture
5	Schrödinger equations and harmonic oscillators	Lecture
6	Semiconductor-Light interaction	Lecture
7		
8	Optical absorption	Lecture
9	Solar cells	Lecture
10	Photoconductors, photodiodes, phototransistors	Lecture
11	Photoluminescence and electroluminescence	Lecture

12	Light emitting diodes	Lecture
13	Laser Diodes	Lecture
14		
15		
16	Final Exam	

Course Syllabus

#	Material / Resources	Information About Resources	Reference / Recommended Resources
1	1.Saleh, B. E. A., and M. C. Teich, Fundamentals of Photonics, New York, NY: John Wiley and Sons, 1991. 2.Donald Neamen, Semiconductor Physics and Devices, Third Edition, , McGraw-Hill, 2003. 3.S. M. Sze, Kwok K. Ng, Physics of Semiconductor Devices, John Wiley&Sons, 2007.		

Method of Assessment

#	Weight	Work Type	Work Title
1	40%	Mid-Term Exam	Mid-Term Exam
2	60%	Final Exam	Final Exam

Relationship between Learning Outcomes of Course and Program Outcomes

#	Learning Outcomes	Program Outcomes	Method of Assessment
1	Students will have knowledge in photonic and basic optics.	1	1,2
2	Students will explain selected optoelectronic circuit elements and their operating principles.	1	1,2
3	Students will be able to analyze state-of-the-art semiconductor circuit elements.	1	1,2
4	Students will analyze the physical structures of semiconductor circuit elements very well, including quantum-mechanics, carrier dynamics and transport	1	1,2

PS. The numbers, which are shown in the column Method of Assessment, presents the methods shown in the previous table, titled as Method of Assessment.

Work Load Details

#	Type of Work	Quantity	Time (Hour)	Work Load
1	Course Duration	14	3	42
2	Course Duration Except Class (Preliminary Study, Enhancement)	14	2	28
3	Presentation and Seminar Preparation	0	0	0
4	Web Research, Library and Archival Work	0	0	0
5	Document/Information Listing	0	0	0
6	Workshop	0	0	0
7	Preparation for Midterm Exam	1	8	8
8	Midterm Exam	1	1	1
9	Quiz	0	0	0
10	Homework	0	0	0
11	Midterm Project	0	0	0
12	Midterm Exercise	0	0	0
13	Final Project	0	0	0
14	Final Exercise	0	0	0

15	Preparation for Final Exam	1	10	10
16	Final Exam	1	1	1
				90