

Course Description					
Name	Code	Semester	T+A Hour	Credit	ECTS
BIOMEDICAL OPTICS	EEE4210773	Spring Semester	3+0	3	6
<b>Prerequisites Courses</b>	FOTONİK VE ELEKTRO-OPTİĞİN TEMELLERİ; SİNYALLER VE SİSTEMLER				
<b>Recommended Elective Courses</b>	Introduction to Optics or Optics Course				
<b>Language of Instruction</b>	English				
<b>Course Level</b>	First Cycle (Bachelor's Degree)				
<b>Course Type</b>	Elective				
<b>Course Coordinator</b>	Assoc.Prof. Muhammed Fatih TOY				
<b>Name of Lecturer(s)</b>	Assoc.Prof. Muhammed Fatih TOY				
<b>Assistant(s)</b>					
<b>Aim</b>	The aim of this course is to develop novel solutions to problems in the fields of biology and medical sciences utilizing optical methods and to evaluate existing solutions.				
<b>Course Content</b>	This course contains; Overview of basic principles in optics,Light sources and detectors,Linear and nonlinear spectroscopy,Light propagation in turbid media,Interaction of light with cells and tissues,Optical microscopy methods,Optical coherence tomography,Diffuse optical tomography,Photoacoustic tomography,Optical biosensors,Microarray technology for genomics and proteomics, Flow cytometry,Laser tweezers,Photodynamic therapy.				
<b>Course Learning Outcomes</b>		<b>Teaching Methods</b>		<b>Assessment Methods</b>	
Apply optical concepts to monitor biomedical parameters		6, 9		A, F	
Analyze the light propagation in turbid media		2, 9		A, F	
Explain various biomedical optical techniques and systems		2, 6, 9		A, F	
Design application specific microscopy systems		6, 9		A, F	
Evaluate the performance of various optical methods for biomedical applications		6, 9		A, F	
<b>Teaching Methods</b>	2: Project Based Learning Model, 6: Experiential Learning, 9: Lecture Method				
<b>Assessment Methods</b>	A: Traditional Written Exam, F: Project Task				
<b>Lecture Schedule</b>					
<b>Sequence</b>	<b>Topics</b>	<b>Preliminary Preparation</b>			
1	Overview of basic principles in optics				
2	Light sources and detectors				
3	Linear and nonlinear spectroscopy				
4	Light propagation in turbid media				
5	Interaction of light with cells and tissues				
6	Optical microscopy methods				
7	Optical coherence tomography				
8	Diffuse optical tomography				
9	Photoacoustic tomography				
10	Optical biosensors				
11	Microarray technology for genomics and proteomics				
12	Flow cytometry				
13	Laser tweezers				
14	Photodynamic therapy				
<b>Evaluation Methods</b>		<b>Weight(%)</b>			
Midterm Exam		30			
General Exam		70			

**Resources**

Introduction to Biophotonics, by Paras N. Prasad (John Wiley & Sons, Inc., 2003).Biomedical Optics: Principles and Imaging by Lihong V. Wang and Hsin-i Wu, (John Wiley & Sons, Inc., 2007).