



AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Introduction to Laser							
Course Code		BYF533		Course Level		Second Cycle (Master's Degree)			
ECTS Credit	4	Workload	102 (<i>Hours</i>)	Theory	2	Practice	0	Laboratory	0
Objectives of the Course		The purpose of the course is to be able to tell about the working principle of lasers and the use of lasers in medicine							
Course Content		Nature of light, light emission and absorption, principles of laser action, characteristics of gas lasers, organic dye lasers, solid state lasers, and laser applications.							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Discussion, Individual Study					
Name of Lecturer(s)		Prof. Mehmet BİLGEN							

Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	40
Final Examination	1	60

Recommended or Required Reading

1	Biophysics Lecture Book (İÜ cerraahpaşa)
2	Biophysics (Ferit Pehlivan)

Week	Weekly Detailed Course Contents	
1	Theoretical	Basic properties of lasers
2	Theoretical	The formation mechanism of laser light
3	Theoretical	The formation mechanism of laser light
4	Theoretical	Types of lasers
5	Theoretical	Types of lasers and their properties
6	Theoretical	Gas lasers
7	Intermediate Exam	Midterm exam
8	Theoretical	Solid lasers
9	Theoretical	Laser application methods
10	Theoretical	Laser tissue interactions
11	Theoretical	Lasers used in surgery and their properties
12	Theoretical	Lasers used in dermatology and their properties
13	Theoretical	Lasers used in gastroentology and other fields of internal medicine and their properties
14	Theoretical	Photodynamic treatment laser and its properties
15	Theoretical	Photodynamic treatment laser and its properties
16	Final Exam	Final exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	0	2	28
Reading	14	0	4	56
Midterm Examination	1	6	2	8
Final Examination	1	8	2	10
Total Workload (Hours)				102
[Total Workload (Hours) / 25*] = ECTS				4

*25 hour workload is accepted as 1 ECTS

Learning Outcomes

1	To learn about the acquisition and properties of laser light
---	--



2	To gain knowledge on the types of lasers and their properties
3	To comprehend laser application methods
4	To be able to explain laser tissue interactions
5	To be able to explain the application methods of lasers and their usage areas in medicine

Programme Outcomes (Biophysics Master)

1	To be able to acquire an up-to-date theoretical and practical background on biophysical and electrophysiological research
2	To be able to acquire a background needed for basic biophysical research and having the ability to use the theoretical and practical knowledge in the field
3	To be able to attain the ability to get access to the up-to-date knowledge, interpret and improve the information in the field of biophysics
4	To be able to attain the ability to perform experimental methods in the field, produce new approaches and ability to produce analytical solutions to the problems faced during application of new methods
5	To be able to reach a level to follow research in the field, to possess written and spoken communication skills and be able to join discussions
6	To be able to acquire knowledge and skill to apply scientific principles of ethics.
7	To be able to gain knowledge and skill about the basic issues of electric and magnetic fields, the interaction of light with matter, spectroscopy, radiation biophysics such as radiation, electromagnetic spectrum, ionizing radiation and radioactivity; learn about the physical properties of these issues and to be able to evaluate biological effects of radiation on tissues
8	To be able to construct knowledge and skill about the molecular structure and function in living systems, bioenergetic concepts, information theory and the processing of information in living systems
9	To be able to master about the basic principles of bioelectrical incidents that occur in cells, such as transport across membranes, electrical properties of membranes, resting membrane potential, and to be able to discuss the bioelectrical behaviour of excitable membranes
10	To be able to define the kinds, sources and biophysical properties of bioelectrical signals, to store knowledge in areas of biophysical concepts and characteristics such as nerve action potential and compound nerve action potential and to record to record these potential variants, analyze and evaluate the results
11	To be able to define basic biophysical principles of the visualization techniques used in medical field and the techniques used to determine biological signals, such as electromyography (EMG), electroencephalography (EEG), and electrocardiography (ECG), and attain the ability to apply these techniques
12	To be able to attain knowledge on molecular biophysics and its basic principles
13	To be able to attain the ability to plan and conduct projects in the field of biophysics, and attain the ability to write and publish scientific results
14	To be able to acknowledge the national and international laws and regulations about the concepts related to biophysics
15	To be able to attain the skills to organize activities together with non-governmental organizations or to conduct collaborative projects with other disciplines
16	To be able to acquire the ability of critical thinking, making judgements and solving problems in the field of biophysics
17	To be able to use statistical, computational and communicational tools, which can be applied in the field of biophysics
18	To be able to use basic knowledge and skills of the field; be able to evaluate data, identify problems and propose solutions

Contribution of Learning Outcomes to Programme Outcomes 1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High

	L1	L2	L3	L4	L5
P1	5	5	5	5	5
P2	4	4	4	4	4
P3	5	5	5	5	5
P4	4	4	4	4	5
P5	5	5	5	5	5
P6	3	2	2	3	2
P7	5	5	5	5	5
P8	4	4	4	4	3
P9	4	4	4	4	4
P10	4	4	4	4	4
P11	4	4	4	4	5
P12	4	4	4	4	4
P13	4	4	4	4	4
P14	4	4	4	4	4
P15	3	3	2	3	4
P16	4	4	4	5	5
P17	4	4	4	4	4



P18	5	4	5	5	5
-----	---	---	---	---	---

