



AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Biophysical Research Methods							
Course Code		BYF502		Course Level		Second Cycle (Master's Degree)			
ECTS Credit	4	Workload	98 (<i>Hours</i>)	Theory	1	Practice	2	Laboratory	0
Objectives of the Course		The purpose of the course is to be able to tell about determination of acid-base equilibrium parameters, methods for blood gas analysis, measurements of pH, PO ₂ , and PCO ₂ , and factors that are affected blood, plasma and serum viscosity are examined. In addition, microscopic and spectrophotometric methods, electro-physiologic and electro-biophysical recording systems, effects of UV and visible light, and biomedical applications of laser.							
Course Content		Determination of acid-base equilibrium parameters, methods for blood gas analysis, measurements of pH, PO ₂ , and PCO ₂ , and factors that are affected blood, plasma and serum viscosity are examined. In addition, microscopic and spectrophotometric methods, electro-physiologic and electro-biophysical recording systems, effects of UV and visible light, and biomedical applications of laser are covered by this course.							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Experiment, Demonstration, Discussion, Individual Study, Problem Solving					
Name of Lecturer(s)									

Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	20
Final Examination	1	40
Practice Examination	1	40

Recommended or Required Reading

1	.Ferit Pehlivan, biophysics, Hacettepe-Taş yayınevi, Ankara, 2011.
2	Guyton ve Hall, Medical Physiology, 2010
3	Şefik Dursun (ed.) Biophysics Lecture Notes, CTF Yayınevi, İstanbul, 2010.
4	Lodish&Baltimore et al (eds.), Molecular Cell Biology, 2004.
5	Lehninger, Biochemistry Lecture Book 2011.
6	Grossweiner LI, The science of phototerapi, CRS Press, ABD, 1994.
7	Elçin A.E., F. Erkoç (eds) BİYOLOJİ LABORATUVARININ TEMELLERİ, Palme Yayıncılık, Ankara 2010.

Week	Weekly Detailed Course Contents	
1	Theoretical	Determination of acid-base equilibrium parameters
2	Theoretical	Methods for analysis of blood gases
3	Theoretical	Determination of pH, PO ₂ and PCO ₂
4	Theoretical	The factors affecting the viscosity in blood plasma and serum, determination of viscosity
5	Theoretical	Microscopic techniques
6	Theoretical	Applications of microscopic techniques
7	Theoretical	Spectroscopic techniques and their applications
8	Intermediate Exam	Midterm exam
9	Theoretical	Electrophysiological recording methods
10	Theoretical	Electrobiophysical recording and analysis
11	Theoretical	UV and effects of visible light
12	Theoretical	The effects of other electromagnetic radiations on biological systems
13	Theoretical	Lasers and biomedical applications of lasers
14	Theoretical	Discussion
15	Theoretical	Practical examination
16	Final Exam	Final exam



Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	0	1	14
Laboratory	13	1	2	39
Reading	13	0	2	26
Practice Examination	1	4	3	7
Midterm Examination	1	4	2	6
Final Examination	1	4	2	6
Total Workload (Hours)				98
[Total Workload (Hours) / 25*] = ECTS				4

*25 hour workload is accepted as 1 ECTS

Learning Outcomes

1	To be able to tell about the determination of the acid-base parameters
2	To be able to recognize the determination of blood gases, pH, PO ₂ and PCO ₂
3	To be able to explain the microscopic and spectroscopic techniques
4	To be able to tell about electrophysiological recording methods
5	To be able to tell about lasers

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	5	5	5	5	5
P3	5	5	5	5	5



P4	5	5	5	5	5
P5	4	5	5	5	5
P6	3	3	3	4	2
P7	2	1	5	2	5
P8	5	5	2	2	2
P9	4	3	2	5	2
P10	3	2	3	5	2
P11	2	1	4	5	4
P12	3	2	3	1	1
P13	3	3	4	5	4
P14	2	1	2	3	2
P15	2	2	4	3	2
P16	4	4	4	5	4
P17	3	4	4	4	3
P18	5	4	5	5	5

