



## AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Methods in Recording and Analysing of the Biological Signals							
Course Code		BYF534		Couse Level		Second Cycle (Master's Degree)			
ECTS Credit	4	Workload	100 ( <i>Hours</i> )	Theory	1	Practice	2	Laboratory	0
Objectives of the Course		The purpose of the course is to be able to explain the sources of biological signals, signal recording mechanisms and signal analysis							
Course Content		Source and characteristics of the biological signals, biomedical transducer and biosensors, bio-potential electrodes, characteristics of the Ag/AgCl, analogue pro operation, sampling and numerations of the biological signals, recording of the bio-signals, numerical filters, and methods of the frequency analyze.							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Discussion, Individual Study					
Name of Lecturer(s)									

### Assessment Methods and Criteria

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

### Recommended or Required Reading

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

Week	Weekly Detailed Course Contents	
1	Theoretical	Biological signals and their sources
2	Theoretical	Biomedical transducers
3	Theoretical	Biosensors
4	Theoretical	Biopotential electrodes
5	Theoretical	Construction of an Ag/AgCl electrode
6	Theoretical	Analog preprocessing: amplifiers
7	Intermediate Exam	Midterm exam
8	Theoretical	Filters 1
9	Theoretical	Filters 2
10	Theoretical	Digitization of biomedical signals by sampling
11	Theoretical	Giving value to the sample voltage in binary system
12	Theoretical	Electromyography
13	Theoretical	Electrocardiography
14	Theoretical	Electrocardiography
15	Theoretical	Discussion
16	Final Exam	Final exam

### Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	0	1	14
Lecture - Practice	14	0	2	28
Reading	14	0	3	42
Midterm Examination	1	6	2	8
Final Examination	1	6	2	8
Total Workload (Hours)				100
[Total Workload (Hours) / 25*] = ECTS				4

\*25 hour workload is accepted as 1 ECTS



**Learning Outcomes**

1	To be able to explain biological signals and their sources
2	To learn about biosensors and their properties
3	To gain knowledge on the digitization of biomedical signals by sampling
4	To be able to identify and use the electrophysiological/biophysical devices used to record, process, sample and evaluate physiological signals
5	To be able to record, operate, sample and evaluate physiological signals

**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	5	5	5	5	5
P6	3	2	2	3	3
P7	4	4	5	4	4
P8	4	4	4	4	4
P9	4	4	4	4	4
P10	5	5	5	5	5
P11	4	4	4	4	4
P12	4	4	4	4	4
P13	4	4	4	4	4
P14	4	4	4	4	4



P15	3	3	3	3	4
P16	4	4	4	5	5
P17	4	4	4	5	5
P18	5	5	5	5	5

