ABDULLAH GUL UNIVERSITY
GRADUATE SCHOOL OF ENGINEERING & SCIENCE
BIOENGINEERING DEPARTMENT
COURSE DESCRIPTION AND SYLLABUS

Course Name	CODE	SEMESTER	T+L Hour	CREDIT	ECST
BIOMEDICAL INSTRUMENTATION AND SIGNAL ANALYSIS	ECE 543	Fall-Spring	3+0	3	10

Prerequisite Courses	N/A

Course Type	Selective
Course Language	English
Course Coordinator	Assistant Prof. Kutay İçöz
Lecturers	Assistant Prof. Kutay İçöz
Course Assistants	N/A
Course Objectives	Learning the fundamentals of circulation, neural and muscle systems and the origin of biological signals. Learning the transducers, and instrumentation circuitry.
Learning Outcomes	• Learning the fundamental anatomy and physiology. • Learning the fundamentals of biomedical instrumentation. • Learning the types of electronics measurement setups. • Detailed study of the frequency and time domain features of bio-signals • Gaining the ability to proses the bio signals and extracting data.
Course Content	• Origin of bio-signals. • Circulation, neural and muscle systems • Transducers, and instrumentation circuitry • Classification of bio-signals and fundamental features • Bio-signal processing • Frequency Domain characterization.

WEEKLY SUBJECTS AND RELATED PRELIMINARY PAGES		
Week	Subjects	Preliminary
1	Bioelectricity, Cell membrane potential, Ionic currents ve resting potential	The relevant articles from the literature
2	Fundamentals of Electrophysiology : Action Potential	The relevant articles from the literature
3	Electrical Stimulation	The relevant articles from the literature
4	Fundamentals of circulation, neural and muscle systems	The relevant articles from the literature
5	Fundamentals of Instrumentation: Transducers	The relevant articles from the literature
6	Various Transducers	The relevant articles from the literature
7	Midterm	
8	Amplifiers	The relevant articles from the literature
9	Filters	The relevant articles from the literature
10	Fundamentals of Bio-signals: ECG, EEG, EMG, ENG, EGG	The relevant articles from the literature
11	Bio-signal Processing	The relevant articles from the literature
12	Time and Frequency domain analysis of bio-signals	The relevant articles from the literature
13	Midterm	
14	Frequency domain anaylsis: FFT, filtering, artifact removal	The relevant articles from the literature
15	Data extraction	The relevant articles from the literature

16	Final Exam	

RESOURCES

Course Notes	Lecture Slides
Other Resources	**Course Textbook:** "Bioinstrumentation", John G. Webster 1st Edition, 2003, Wiley

MATERIAL SHARING

Documents	Lecture notes, slides
Homework	Students will be given one homework each week
Exams	2 Midterms and 1 Final Exam

RATING SYSTEM

SEMESTER WORKS	NUMBER	CONTRIBUTION
Midterm	2	40
Homework	10	20
TOTAL	10	10
Success Rate of Semester		70
Success Rate of Final		70
TOTAL	1	30

Course Category

Basic Sciences and Mathematics	%50
Engineering Sciences	%50
Social Sciences	%0

THE RELATIONSHIP BETWEEN THE LEARNING OUTCOMES AND PROGRAM COMPETENCE

No	Program Outcomes	Contribution Level				
		1	2	3	4	5
1	The skills of using mathematics, science and engineering information in advanced research,					X
2	The skills of analysing, designing and/or implementing an original system that will be able to solve an engineering problem,					X
3	The skills of using the required software, hardware and modern measurement equipments in their field of research					X
4	The skills of planning independent research and implementing in detail,					X
5	The skills of following literature, listening to and making technical presentation, writing a paper in academic level,				X	
6	The skills of innovative and interrogative thinking and finding original solutions					X

*From 1 to 5, it increasingly goes.

ECTS / WORK-LOAD TABLE

Activities	Activities	Duration (Hour)	Total (Work-Load)
Course Duration (Including exam week: 16x total course hour)	16	3	48
Out of Class Exercise Time (Pre-study, reinforcement)	16	8	128
Searching on Internet, library study	16	3	48
Presentation	5	3	15
Homework	10	3	30
Midterms	2	15	30
Final	1	15	15
Total Work-Load			314
Total Work-Load / 30			314/30
Course ECTS Credit			10