AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Biomedical Instrumentation								
Course Code	EEE563		Couse Level	Second Cycle (Master's Degree)					
ECTS Credit	8	Workload	200 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	This course aims to present robust control analysis and design methods.								
Course Content	Biopotentials, production and process of biomedical signals, blood flow speed and pressure measurement methods, ECG, EMG, EEG measurement systems, modern medical imaging techniques: X-rays, CT, MRI, ultrasound.								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Demonstration, Discussion, Case Study, Project Based Study, Individual Study, Problem Solving								
Name of Lecturer(s)									

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	30
Final Examination	1	30
Assignment	4	20
Project	1	20

Recommended or Required Reading	
1	Ders notları ve internet yayınları
2	John G. Webster, Medical Instrumentation – Application and Design, 4th Edition, John Wiley and Sons Inc., 2009.
3	Gail D. Baura, System Theory and Practical Applications of Biomedical Signals, Wiley-IEEE Press, 2002.
4	Willis J. Tompkins, ED. Biomedical Signal Processing, Prentice-Hall, 1993.

Week	Weekly Detailed Course Contents	
1	Theoretical	Introduction: Human—Instrumentation system
2	Theoretical	Biomedical signals and related physical quantities
3	Theoretical	Bioelectric concept and biopotentials
4	Theoretical	Biomedical sensors and transducers
5	Theoretical	Biopotential amplifiers, Noise reduction methods in biological signals
6	Theoretical	Biosignal processing, biomedical instrumentation and safety
7	Theoretical	EKG, EEG, EMG, EOG signals
8	Intermediate Exam	Midterm Exam
9	Theoretical	Blood Flow and Pressure Measurement Methods, electro cardiogram equipments
10	Theoretical	Respiratory system and patient treatment equipment
11	Theoretical	Nuclear radiation, dose, and medical applications
12	Theoretical	Medical imaging I: X-rays and CT
13	Theoretical	Medical Imaging II: ultrasound
14	Theoretical	Medical Imaging III: Nuclear medicine and Magnetic Resonance Imaging
15	Theoretical	Some image processing algorithms, Biomedical Optics and applications
16	Final Exam	Final Exam

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	4	3	98
Assignment	4	10	3	52
Project	1	11	3	14
Midterm Examination	1	15	3	18

Final Examination	1	15	3	18
			Total Workload (Hours)	200
			[Total Workload (Hours) / 25*] = **ECTS**	8
**25 hour workload is accepted as 1 ECTS*				

Learning Outcomes	
1	Learn the fundamental principles of biomedical systems and how to obtain human biological electrical signals
2	Learn how to design and establish biomedical devices using cell, muscle, heart and circulation parameters
3	Acquire information about monitoring systems like X-rays, CT, MRI, etc. used in modern medicine
4	To be able to understand the fundamental principles of biomedical systems
5	To be able to discuss the fundamental principles of biomedical systems

Programme Outcomes *(Electrical and Electronics Engineering Master)*	
1	Developing and intensifying knowledge that requires expertise in the area of Electrical-Electronics Engineering, and gaining the skills necessary to analyze and solve problems using this knowledge
2	Grasping the inter-disciplinary interaction related to Electrical-Electronics Engineering, interpreting and forming new types of knowledge by combining the knowledge from Electrical-Electronics Engineering and the knowledge from various other disciplines
3	Developing new approaches to solve the complex problems arising in Electrical-Electronics Engineering, coming up with solutions while taking responsibility and carrying out a specific study independently
4	Assessing the knowledge and skill gained in the area of Electrical-Electronics Engineering with a critical view
5	Transferring the current developments and one’s own work in Electrical-Electronics Engineering, to other groups in written, oral and visual forms
6	The ability to control the collecting, interpreting, practicing and announcing processes of the Electrical-Electronics Engineering related to data taking into consideration scientific, cultural and ethical values and the ability to teach these values to others
7	Developing application plans concerning the subjects related to Electrical-Electronics Engineering and the ability to evaluate the end results of these plans within the frame of quality processes

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	4	4	4	4	4
P2	4	4	4	4	4
P3	4	4	4	4	4
P4	4	4	4	4	4
P5	4	4	4	4	4
P6	4	4	4	4	4
P7	4	4	4	4	4