



**ESOGU ELECTRICAL-ELECTRONICS ENGINEERING DEPARTMENT
COURSE INFORMATION FORM**

Course Title	Course Code
BIOMEDICAL DESIGN	15128XXX

Semester in Program	Number of Course Hours per Week		ECTS Credit
	Theory	Practice	
8	2	4	9

Course ECTS Credit Distribution				
Basic Sciences	Engineering Sciences	Design	General Education	Social
		9		

Language of Instruction	Course Level	Course Type
English	Undergraduate	Elective

Prerequisite	NONE
Objectives of the Course	To develop innovative solutions to real-world problems in the field of biomedical electronics by applying design principles and engineering methodologies.
Brief Course Content	Teaching the steps of engineering design process.

Learning Outcomes of the Course	Contributed POs	Teaching Methods *	Assessment Methods **
1 Apply Design Principles: Students will be able to apply fundamental design principles to develop effective solutions for complex biomedical engineering problems.	2, 3, 4a, 4b	2, 4, 12, 13, 14	G, J, L
2 Prototype Development: Students will gain the ability to design, develop, and test prototypes that address specific needs in biomedical applications.	2, 3, 4a, 4b	2, 4, 12, 13, 14	G, J, L
3 Problem-Solving in Biomedical Contexts: Students will develop the ability to analyze and solve biomedical challenges by integrating engineering concepts with medical and biological knowledge.	2, 3, 4a, 4b	2, 4, 12, 13, 14	G, J, L
4			
5			
6			

*Teaching Methods 1:Lecture, 2:Discussion, 3:Experiment, 4:Simulation, 5:Question-Answer, 6:Tutorial, 7:Observation, 8:Case Study, 9:Technical Visit, 10:Problem Solving, 11:Individual Work, 12:Team/Group Work, 13:Brain Storm, 14:Project Design / Management, 15:Report Preparation and/or Presentation

**Assessment Methods A:Exam, B:Quiz, C:Oral Exam, D:Homework, E:Report, F:Article Examination, G:Presentation, I:Experimental Skill, J:Project Observation, K:Class Attendance; L:Jury Exam

Main Textbook	“Design of Biomedical Devices and Systems, 4th Edition”, Paul H. King, Richard C. Fries, Arthur T. Johnson, CRC Press, Taylor & Francis Group, 2018, ISBN: 978-1138748499.
Supplementary Resources	None
Necessary Course Material	None

Course Weekly Schedule	
1	Introduction to Biomedical Design
2	Design Thinking and Innovation in Biomedical Research
3	Design Thinking and Innovation in Biomedical Research
4	Human-Centered Design
5	Materials and Manufacturing for Biomedical Devices
6	Concept Generation and Evaluation
7	Prototyping Techniques
8	Mid-Term Exams
9	Biomedical Sensors and Instrumentation
10	Biomedical Sensors and Instrumentation
11	Design for Clinical Trials and Validation
12	Design for Clinical Trials and Validation
13	Design for Clinical Trials and Validation
14	Report Preparation
15	Final Project Presentations and Course Wrap-Up
16,17	Final Exams

Calculation of Course Workload			
Activities	Count	Time (Hour)	Total Workload (Hour)
Weekly classroom time	14	2	28
Weekly study time (review, reinforcing, preparation)	14	15	210
Homework			
Taking a quiz			
Studying for a quiz			
Oral exam			
Studying for an oral exam			
Report writing (Preparation and presentation time included)	1	15	15
Project (Preparation and presentation time included)	1	10	10
Presentation (Preparation time included)	1	1	1
Mid-Term Exam			
Studying for Mid-Term Exam			
Final Exam			
Studying for Final Exam			
		Total workload	264
		Total workload / 30	8,80
		Course ECTS Credit	9

Assessment	
Activity Type	%
Presentation	30
Jury Exam	70
Homework	
Final Exam	
Total	100

COURSE CONTRIBUTION TO THE PROGRAM OUTCOMES

(5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)

NO	PROGRAM OUTCOMES	Contribution
1	a. Sufficient knowledge of mathematics	
	b. Sufficient knowledge of basic sciences	
	c. Sufficient basic engineering and Electrical-Electronics engineering knowledge	
	d. Skill of applying all these knowledge and experience to complicated Electrical-Electronics engineering problems	
2	Skill of defining, identifying, formulating and solving the complicated problems in Electrical-Electronics engineering and related areas by applying appropriate analysis and modelling methods.	5
3	Skill of designing a complicated process, system, equipment or product by applying modern design methods under realistic constraints and conditions.	5
4	To analyze and solve the complicated engineering problems: a. skill of developing, selecting and applying the required techniques and devices	5
	b. skill of using information technologies effectively	3
5	To study the complicated on the complicated Electrical-Electronics engineering problems and research subjects: a. skill of experimental design	
	b. skill of performing the experiments, collecting the data and analyzing and interpreting the results	
6	a. Skill of performing individual studies	
	b. Skill of performing intra and interdisciplinary and multidisciplinary teamwork and studies	
7	a. Skill of effective oral and written communication in Turkish and English	
	b. Skill of improving and using foreign language knowledge	
	c. Skill of effective reporting, understanding the reports and preparing the design and production reports	
	d. Skill of effective presentation and giving and getting clear and understandable instructions.	
8	Awareness of the necessity of life-long learning and skill of accessing to information and following the improvements in contemporary science and technology	
9	a. Awareness of necessity of behaving in accordance with the ethical principles and awareness of the importance of having professional ethical responsibilities	
	b. Knowledge about legal regulations and standards of engineering	
10	a. Knowledge about project management, risk management and change management	
	b. Awareness of the significance of entrepreneurship and innovation	
	c. Knowledge about sustainable development	
11	Knowledge about the effects of engineering applications and practices on the global and social health, ecology and safety, knowledge about the current problems in relation to the working areas of Electrical-Electronics engineering; and awareness of the legal issues resulting from engineering solutions	
12	Knowledge about modern problems in local and universal scale	

INSTRUCTORS

Prepared by	Dr. Semih ERGİN			
--------------------	-----------------	--	--	--

Date:25.10.2024