



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

Course Title	Course Code
INTRODUCTION TO EMBEDDED SYSTEMS	151228551

Semester in Program	Number of Course Hours per Week		ECTS Credit
	Theory	Practice	
7	3	2	7

Course ECTS Credit Distribution				
Basic Sciences	Engineering Sciences	Design	General Education	Social
	7			

Language of Instruction	Course Level	Course Type
English	Undergraduate	Required

Prerequisite	None
Objectives of the Course	Having a theoretical and practical background on embedded systems which the industry needs commonly today.
Brief Course Content	Reviewing the fundamental hardware and software background needed for embedded system architectures. Studying the theory and applications of the embedded software structures, commonly used hardware sub-modules. Case studies of embedded design examples

Learning Outcomes of the Course	Contributed POs	Teaching Methods *	Assessment Methods **
1 Having introductory level background on embedded software and hardware structures.	1b,1c,1d,2	1,2	A,D
2 Learning about power requirements of embedded systems.	1,2,3,4,5,6	1,2	A,D,I,J
3 Learning about fundamental digital and analog input/output interface requirements.	1,2,3,4,5,6	1,2	A,D,I,J
4 Learning about timing requirements within different software models.	1,2,3,4,5,6	1,2	A,D,I,J
5			
6			
7			
8			

*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	Embedded Hardware, J Ganssle, T Noergaard, F Eady, L Edwards, DJ Katz, R G, Ken Arnold, K Hyder, B Perrin,C Huddleston
Supplementary Resources	Designing Embedded Systems with PIC Microcontrollers Principles and applications, Tim Wilmshurst
Necessary Course Material	STM32 Based development sets will be used with supporting software and hardware materials. Some student contributions for electronic parts may be required for the experimental projects.

Course Weekly Schedule	
1	Introduction
2	Embedded Hardware Basics
3	Power Circuit Requirements
4	Digital Interface Requirements
5	Analog Interface Requirements
6	Communication Requirements
7	Reviewing of Embedded System Examples
8	Mid-Term Exams
9	Interfacing to Sensors and Actuators
10	Choosing a Microcontroller and Discussing on Design Decisions
11	Timing Analysis in Embedded Systems
12	Sequential Software Models
13	Multi-tasking Software Models
14	PC Board Design Issues
15	Other Useful Hardware Design Tips and Techniques
16,17	Final Exams

Calculation of Course Workload			
Activities	Count	Time (Hour)	Total Workload (Hour)
Weekly classroom time	14	5	70
Weekly study time (review, reinforcing, preparation)	14	4	56
Homework			
Taking a quiz			
Studying for a quiz			
Oral exam			
Studying for an oral exam			
Report writing (Preparation and presentation time included)	1	10	10
Project (Preparation and presentation time included)	1	20	20
Presentation (Preparation time included)	1	10	10
Mid-Term Exam	1	2	2
Studying for Mid-Term Exam	1	20	20
Final Exam	1	2	2
Studying for Final Exam	1	20	20
		Total workload	210
		Total workload / 30	7.0
		Course ECTS Credit	7

Assessment	
Activity Type	%
Mid-term	30
Project Observation	30
Final Exam	40
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	1
	b. Sufficient knowledge of basic sciences	3
	c. Sufficient basic engineering and Electrical-Electronics engineering knowledge	5
	d. Skill of applying all these knowledge and experience to complicated Electrical-Electronics engineering problems	5
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.	4
3	Skill of designing a complicated process, system, equipment or product by applying modern design methods under realistic constraints and conditions.	4
4	To analyze and solve the complicated engineering problems:	4
	a. skill of developing, selecting and applying the required techniques and devices	1
5	b. skill of using information technologies effectively	3
	To study the complicated Electrical-Electronics engineering problems and research subjects:	4
6	a. skill of experimental design	3
	b. skill of performing the experiments, collecting the data and analyzing and interpreting the results	3
7	a. Skill of performing individual studies	3
	b. Skill of performing intra and interdisciplinary and multidisciplinary teamwork and studies	3
8	a. Skill of effective oral and writing communication in Turkish	
	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.	
9	Awareness of the necessity of life-long learning and skill of accessing to information and following the improvements in contemporary science and technology	
10	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	
11	a. Knowledge about project management, risk management and change management	
	b. Awareness of the significance of entrepreneurship and innovation	
	c. Knowledge about sustainable development	
12	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	
13	Knowledge about modern problems in local and universal scale	

INSTRUCTORS				
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Date:18.07.2024