

COURSE INFORMATION					
Course Title	Code	Semester	L+P Hour	Credits	ECTS
ADVANCED TOPICS IN EMBEDDED SYSTEMS	CSE 640	1	3 + 0	3	10

<b>Prerequisites</b>	
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<b>Language of Instruction</b>	English
<b>Course Level</b>	Graduate
<b>Course Type</b>	Elective
<b>Course Coordinator</b>	
<b>Instructors</b>	Prof. Dr. Sezer Gören Uğurdağ
<b>Assistants</b>	
<b>Goals</b>	The aim of this course is to provide students with knowledge and abilities to do research in Embedded Systems area.
<b>Content</b>	Advanced and recent research issues in Embedded Systems.

Course Learning Outcomes	Program Learning Outcomes	Teaching Methods	Assessment Methods
Ability to conduct experiments, gather data, analyze and interpret results for investigating engineering solutions to embedded systems design, verification, test, and implementation problems.	4, 6, 8	1,2	B,D
Ability to understand a published work, to investigate its cons and pros and to present.	3, 8	1,2	A,C
Ability to write a research paper.	2, 4, 6, 8	1,2	D

<b>Teaching Methods:</b>	1: Lecture, 2: Question-Answer, 3: Lab
<b>Assessment Methods:</b>	A: Testing, B: Experiment, C: Homework, D: Term Project

<b>COURSE CONTENT</b>		
<b>Week</b>	<b>Topics</b>	<b>Study Materials</b>
1	Introduction	
2	Research areas: Computer Arithmetic. High Performance Digital Design. Design Verification and Test. Hardware Security. Secure Hardware Design.	
3	Paper discussion – I	
4	Paper discussion – II	
5	Paper discussion – III	
6	Area specialization and focusing on selected areas and topics	
7	Experimental methodology	
8	Midterm Examination	
9	Deep analysis and simulation of the selected studies	
10	Research proposal, analysis and design details	
11	Implementation of the proposed method	
12	Tests and collection of the test results	
13	Paper write-up	
14	Paper presentation	

<b>RECOMMENDED SOURCES</b>	
<b>Textbook</b>	
<b>Additional Resources</b>	Research papers from the recent top conferences are studied.

<b>MATERIAL SHARING</b>	
<b>Documents</b>	
<b>Assignments</b>	
<b>Exams</b>	

<b>ASSESSMENT</b>		
<b>IN-TERM STUDIES</b>	<b>NUMBER</b>	<b>PERCENTAGE</b>
Mid-terms	1	20
Quizzes		
Assignment (Paper critiques)	6	20
Term Project and Presentation	1	60
<b>Total</b>		<b>100</b>
<b>CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE</b>		0
<b>CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE</b>		100
<b>Total</b>		<b>100</b>

<b>COURSE CATEGORY</b>	Expertise/Field Courses
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<b>COURSE'S CONTRIBUTION TO PROGRAM</b>						
No	Program Learning Outcomes	Contribution				
		1	2	3	4	5
1	Ability to understand and use basic sciences, mathematics and engineering sciences in a high level.					
2	Possession of wide and deep knowledge in the field of Computer Science and Engineering, including the latest developments.					<b>X</b>
3	Ability to reach the new information in the field of Computer Science and Engineering and having high-level competence in necessary methods and skills to make the research by apprehending the new information.					<b>X</b>
4	Ability to bring an innovation that provides different initiatives to the field of Computer Engineering; develop a new approach, method, design, application or apply a present method in a different field.					<b>X</b>
5	Ability to perceive an original research process independently, and design, implement, conclude and lead the process.					
6	Ability to contribute to the literature by publishing the whole scientific research and development efforts he/she has carried out in the field of expertise.					<b>X</b>
7	Ability to comprehend scientific, technological, social and cultural developments, and convey them to society with scientific impartiality and ethical responsibility.					
8	Ability to do critical analysis, synthesis and evaluation of ideas and developments in the field of Computer Engineering.					<b>X</b>

9	Ability to communicate effectively in oral and written ways with the employees in the area of Computer Engineering and wider scientific and social communities, to communicate and discuss in advanced level of written, oral and visual ways by using a foreign language in at least European Language Portfolio C1 General Level.						
10	Ability to evaluate scientific, technological, social and cultural developments and to transmit these developments to society with scientific objectivity and a sense of ethic responsibility.						

<b>ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION</b>			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Excluding the exam weeks: 12x Total course hours)	14	3	42
Hours for off-the-classroom study (Pre-study, practice)	14	5	70
Midterm examination	1	12	12
Homework	5	10	50
Project	1	60	60
Final examination	1	6	6
<b>Total Work Load</b>			240
<b>Total Work Load / 25 (h)</b>			9.6
<b>ECTS Credit of the Course</b>			10