

COURSE INFORMATION					
Course Title	Code	Semester	L+P Hour	Credits	ECTS
RECONFIGURABLE COMPUTING	CSE526	1	3+0	3	7

Prerequisites	-
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Language of Instruction	English
Course Level	Graduate Degree
Course Type	Technical Elective
Course Coordinator	
Instructors	Assoc. Prof. Sezer Gören Uğurdağ
Assistants	-
Goals	This course introduces the state-of-the-art in reconfigurable computing both from a hardware and software perspective. Students learn how to architect reconfigurable systems and how to apply them to solve challenging computational problems. The purpose of this course is to prepare students for engaging in research on reconfigurable computing. Specific contemporary reconfigurable computing systems are examined to identify existing system limitations and to highlight opportunities for research in dynamic and partial configuration areas. Assignments will allow students to gain hands on experience in FPGA design cycle and programming paradigms (verilog/hdl).
Content	FPGA design flow; reconfigurable architectures; reconfiguration management; dynamic/static (partial) reconfiguration; multi-boot; hardware acceleration (C to Verilog); evolvable FPGAs; FPGA vs. multi-cores.

Course Learning Outcomes	Program Learning Outcomes	Teaching Methods	Assessment Methods
1) Adequate knowledge in reconfigurable computing concepts.	1,2,3,4,5	1,2,3	A,B,C,D
2) Ability to design reconfigurable systems.	1,2,3,4,5	1,2,3	B,D
3) Ability to debug, verify, simulate FPGA-based designs.	4,5	1,2,3	B,D
4) Ability to devise, select, and use modern techniques and tools needed reconfigurable computing.	4,5	1,2,3	B,D
5) Ability to work in a team.	6	3	B,D

Teaching Methods:	1: Lecture, 2: Question-Answer, 3: Lab (Unofficial), 4: Case-study
Assessment Methods:	A: Testing, B: Experiment, C: Homework, D: Project

COURSE CONTENT		
Week	Topics	Study Materials
1	INTRODUCTION TO RECONFIGURABLE COMPUTING	Textbook
2	THE WHAT/WHY/HOW OF ICS, FPGAS, DESIGN FLOW. VERILOG AND BASIC DIGITAL DESIGN PRINCIPLES.	Textbook
3	VERILOG AND BASIC DIGITAL DESIGN PRINCIPLES.	Textbook
4	RECONFIGURABLE COMPUTING ARCHITECTURES	Textbook
5	RECONFIGURABLE COMPUTING APPLICATIONS	Textbook
6	RECONFIGURATION MANAGEMENT	Textbook
7	MIDTERM 1	Textbook
8	DYNAMIC RECONFIGURATION, MULTI-BOOT, DYNAMIC PARTIAL RECONFIGURATION	Textbook
9	COMPUTE MODELS AND SYSTEM ARCHITECTURES	Textbook
10	COMPILING C FOR SPATIAL COMPUTING	Textbook
11	DISTRIBUTED ARITHMETIC	Textbook
12	EVOLVABLE FPGAS	Textbook
13	FPGAS VS. MULTICORE ARCHITECTURES	Textbook
14	PROJECT DEMOS	-

RECOMMENDED SOURCES	
Textbook	Reconfigurable Computing: The Theory and Practice of FPGA-Based Computation by Scott Hauck, André DeHon
Additional Resources	FPGA Prototyping By Verilog Examples by Pong P. Chu, Wiley

MATERIAL SHARING	
Documents	http://groups.yahoo.com/group/cse526/
Assignments	http://groups.yahoo.com/group/cse526/
Exams	http://groups.yahoo.com/group/cse526/

ASSESSMENT		
IN-TERM STUDIES	NUMBER	PERCENTAGE
Mid-terms	1	25
Assignment	5	25
Lab Work (unofficial)	10	20
Term Project	1	30
Total		100
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		30
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		70
Total		100

COURSE CATEGORY	Expertise/Field Courses
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COURSE'S CONTRIBUTION TO PROGRAM							
No	Program Learning Outcomes	Contribution					
		0	1	2	3	4	5
1	Knowledge in the advanced computer architecture field						X
2	Knowledge in advanced system design for computer engineering						X
3	Knowledge in the theoretical topics of computer science						X
4	Ability to comprehend, analyse and critique academic publications and conduct scholarly research at the frontiers of computer engineering						X
5	Ability and knowledge in the fields of Next-Generation and contemporary computer networks		X				

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration (Excluding the exam weeks: 14x Total course hours)	14	3	42
Hours for off-the-classroom study (Pre-study, practice)	14	4	56
Midterm examination	1	6	6
Homework	5	4	20

Project	1	45	45
Final examination	1	6	6
Total Work Load			175
Total Work Load / 25 (h)			7
ECTS Credit of the Course			7