COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
RECONFIGURABLE COMPUTING	**CSE526**	**1**	**3+0**	**3**	**10**

Prerequisites	-

Language of Instruction	English
Course Level	Graduate Degree
Course Type	Technical Elective
Course Coordinator	
Instructors	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.	5, 6	1,2,3	B,D
4) Ability to devise, select, and use modern techniques and tools needed reconfigurable computing.	1, 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

	COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution					
		0	1	2	3	4	5
1	Ability to reach wide and deep knowledge through scientific research in the field of Computer Science and Engineering, evaluate, interpret and apply.						X
2	Ability to use scientific methods to cover and apply limited or missing knowledge, and to integrate the knowledge of different disciplines.						
3	Ability to construct Computer Science and Engineering problems, develop methods to solve the problems and use innovative methods in the solution.						X
4	Ability to develop new and/or original ideas and algorithm; develop innovative solutions in the design of system, component or process.						X
5	Ability to have extensive knowledge about current techniques and methods applied in Computer Engineering and their constraints.						X
6	Ability to design and implement analytical modeling and experimental research, solve and interpret complex situations encountered in the process.						X

7	Ability to use a foreign language (English) at least at the level of European Language Portfolio B2 in verbal and written communication.						
8	Ability to lead in multidisciplinary teams, develop solutions to complex situations and take responsibility.						
9	Ability to pass process and the results in Computer Science and Engineering field, in national and international area in or outside of the field, systematically and clearly in written or oral form.						
10	Awareness of the social, legal, ethical and moral values, and the ability to conduct research and implementation work within the framework of these values.						
11	Awareness of the new and emerging applications in Computer Science and Engineering field, and the ability to examine them and learn if necessary.						
12	Ability to describe the social and environmental dimensions of Computer Science and Engineering applications.						

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	5	70
Midterm examination	1	10	10
Homework	5	10	50
Project	1	60	60
Final examination	1	10	10
Total Work Load			242
Total Work Load / 25 (h)			9.6
ECTS Credit of the Course			10