COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
Parallel Processing	**CSE574**	**1**	**3**	**3**	**7**

Prerequisites	

Language of Instruction	English
Course Level	Graduate Degree
Course Type	Elective
Course Coordinator	
Instructors	Assist.Prof. Esin Onbaşıoğlu
Assistants	
Goals	The aim of this course is to provide an introduction to the parallel computing hardware, and to present the software aspects of parallel systems. The course prepares students to effectively design and implement software for modern parallel computer systems.
Content	Hardware and software aspects of parallel computer architectures, design methodology of parallel software, parallel programming models, parallel algorithms, performance aspects of parallel programs, hands-on experience with modern hardware/software systems.

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1. Knowledge in programming parallel computer systems	1,2,4	1	A
2. Ability to design a complex software under realistic constraints and conditions; ability to apply modern parallel software design methodologies for this purpose	1,2,4	1,3	A,C
3. Ability to select and use modern techniques and tools to design and develop parallel software on modern computer systems	1,2,4	1,3	A,C

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

COURSE CONTENT

Week	Topics	Study Materials
1	Introduction	
2	Taxonomy of parallel architectures, interconnection networks	
3	Methodological design of parallel software	
4	Parallel programming models (Message-passing)	
5	Parallel programming models (Shared-address-space)	
6	Parallel programming models (Data-parallel)	
7	Heterogeneous parallel programming	
8	MIDTERM EXAM	
9	Performance evaluation of parallel programs (Metrics, granularity, overhead)	
10	Performance evaluation of parallel programs (Scalability, isoefficiency)	
11	Parallel algorithms (Matrix algorithms)	
12	Parallel algorithms (Sort/search algorithms)	
13	Parallel algorithms (Graph algorithms)	
14	Advanced topics in parallel programming	

RECOMMENDED SOURCES	
Textbook	V.P. Kumar, A. Grama, A. Gupta, G. Karypis, "Introduction to Parallel Computing", Benjamin/Cummings Lab material: http://cse.yeditepe.edu.tr/v2/en/academic/course-pages
Additional Resources	B. Wilkinson, M. Allen, "Parallel Programming", Prentice-Hall I. Foster, "Designing and Building Parallel Programs", Addison-Wesley

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**

Mid-terms	1	46
Quizzes	6	54
Assignment		
Term Project		
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		35
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		65
Total		**100**

COURSE CATEGORY	Expertise/Field Courses

COURSE'S CONTRIBUTION TO PROGRAM

No	Program Learning Outcomes	Contribution				
		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 (Including the exam week: 14x Total course hours)	14	3	42
Hours for off-the-classroom study (Pre-study, practice)	13	4	52
Mid-terms	1	2	2
Homework	6	13	78
Term Project			
Final examination	1	3	3
Total Work Load			177

Total Work Load / 25 (h)			7,08
ECTS Credit of the Course			7