COURSE INFORMATON					
Course Title	*Code*	*Semester*	*L+P Hour*	*Credits*	*ECTS*
PERFORMANCE EVALUATION OF COMPUTER SYSTEMS	**CSE524**	**1**	**3**	**3**	**10**

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 methods and techniques of performance analysis of computer systems. The course prepares students to effectively solve computer performance analysis problems related to measuring performance of computer systems, planning the capacity, predicting the future performance under different configurations, designing new applications that meet performance requirements, and comparison of computer systems.
Content	Hardware and software aspects of computer systems, performance metrics, performance measurement tools and techniques, benchmarking, statistical analysis of performance experiments, design of experiments, simulation, queueing theory, using these techniques to study the processor performance, cache memory performance and the performance of multiprocessor systems, hands-on experiments with modern hardware/software systems.

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1. Knowledge in performance aspects of computer systems	1,3,5	1	A
2. Ability to identify, formulate, and solve performance problems in computer systems; ability to select and apply proper analysis and modeling methods for this purpose	1,3,5	1,3	A,C
3. Ability to design and conduct experiments, gather data, analyze and interpret results for investigating performance problems in computer systems	1,3,5,6	1,3	A,B,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	Hardware and software aspects of computer systems	
3	Performance metrics	
4	Performance measurement tools and techniques (Timing, profiling, and tracing)	
5	Benchmarking	
6	Statistical analysis of performance experiments	
7	Design of experiments	
8	MIDTERM EXAM	
9	Processor performance	
10	Cache memory performance	
11	Performance of multiprocessor systems	
12	Simulation	
13	Queueing theory	
14	Queueing theory	

RECOMMENDED SOURCES	
Textbook	D. Lilja, "Measuring Computer Performance: A Practitioner's Guide", Cambridge University Press Lab material: http://cse.yeditepe.edu.tr/v2/en/academic/course-pages
Additional Resources	P.J. Fortier, H.E. Michel, "Computer Systems Performance Evaluation and Prediction", Digital Press R. Jain, "The Art of Computer Systems Performance Analysis", John Wiley K.R. Wadleigh, I.L. Crawford, "Software Optimization for High Performance Computing", Prentice-Hall J.L. Hennessy, D.A. Patterson, "Computer Architecture", Morgan & Kaufmann

	B. O'Hallaron, "Computer Systems: A Programmer's Perspective", Pearson

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Mid-terms	1	50
Quizzes		
Assignment	8	50
Term Project		
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		40
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		60
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.						
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 communicate process and the results in the Computer Science and Engineering field, in national and international platforms 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 (Including the exam week: 14x Total course hours)	14	3	42
Hours for off-the-classroom study (Pre-study, practice)	13	8	104
Mid-terms	1	2	2
Homework	8	12	96
Term Project			
Final examination	1	3	3

Total Work Load			247
Total Work Load / 25 (h)			9,88
ECTS Credit of the Course			10