Software Testing

Course Code:

CSE 445

Course Period:

Autumn

Course Type:

Area Elective

Credits:

3

Theoric:

3

Practice:

0

Laboratory Hour:

0

ECTS:

5

Prerequisite Courses:

Software Development Methodologies [1]
Course Language:

English

Course Coordinator:

Mert Özkaya [2]
Courses given by:

Mert Özkaya [2]
Course Objectives:

This course aims to provide an introduction for the software testing principles and techniques and the opportunity for students to have some practical knowledge on software testing. In this course, students are expected to learn why software systems need to be tested, the different techniques on software testing, and the tools for automating software testing. The students are also expected to learn the software usability testing and the code inspection. Moreover, the course aims at introducing the software model checking techniques and how to write quality software code using the Design-by-Contract approach. The design-by-contract approach will be used with the Java modelling language.

Course Content:

White-box Testing, Black-box Testing, Unit Testing, Integration Testing, Regression Testing, Acceptance Testing, Usability Testing, Code Inspection, Model Checking, Design-by-Contract, Java Modelling Language

Course Methodology:

1: Lecture, 2: Question-Answer, 3: Lab, 4: Case-study

Course Evaluation Methods:

A: Testing, B: Experiment, C: Homework, D: Project

Course Learning Outcomes	**Program Learning Outcomes**	**Teaching Methods**	**Assessment Methods**
1) Knowledge about the basic principles and techniques in software testing	1,2,5	1,2,4	A,C,D
2) Ability to use knowledge to test software systems using different testing techniques	1,2,5	1,2,4	A,C,D
3) Ability to use the software tools for automating software testing	1,2,4,5	1,2,4	A,C,D
4) Ability to test software usability and inspect software code	1,2,5	1,2,4	A,C,D
5) Ability to write quality software code using Design-by-Contract	1,2,4,5	1,2,4	A,C,D
6) Knowledge about model checking	1,2,4,5	1,2,4	A,C,D
7) Ability to use Java Modelling Language for modelling and testing Java programs	1,2,3,4,5	1,2,4	A,C,D

COURSE CONTENT

Week	Topics	Study Materials
1	Introduction to Software Testing	Textbook
2	Black Box Testing	Textbook
3	White Box Testing	Textbook
4	Different Testing Levels (Unit Testing, Integration Testing, System Testing, Regression Testing, and Acceptance Testing)	Textbook
5	Different Testing Levels (Unit Testing, Integration Testing, System Testing, Regression Testing, Acceptance Testing)	Textbook
6	Testing Tools	Textbook
7	Usability Testing	Textbook
8	Code Inspections	Textbook
9	Model checking	Textbook
10	Model checking	Textbook
11	Design-by-Contract	Publications
12	Java Modeling Language	Publications
13	An industrial seminar on Software Testing	NA
14	Project Presentations	NA

RECOMMENDED SOURCES

Textbook	(Essential) Software Testing 2nd edition, by Ron Patton, Sams Publishing, 2005 (Supplementary) Spin Model Checker, the: Primer and Reference Manual, 1st edition, by Gerard Holzmann, Addison-Wesley Professional, 2003
Additional Resources	Gary T. Leavens and Yoonsik Cheon. Design by Contract with JML. Draft, available from jmlspecs.org., 2005. P. Chalin, J. Kinirya, G. Leavens, and E. Poll. Beyond assertions: Advanced specification and verification with JML and ESC/Java2. FMCO’05, LNCS 4111, 77–101. Springer, 2006.

MATERIAL SHARING

Documents
Assignments
Exams

ASSESSMENT

IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Lab Work	0	0
Assignment	3	30
Midterm	1	30
Final Sınavı	1	40
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		40
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		60
Total		**100**

COURSE'S CONTRIBUTION TO PROGRAM

No	Program Learning Outcomes	
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied knowledge in these areas in complex engineering problems.	√
2	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	√
3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose	√
4	Ability to devise, select, and use modern techniques and tools needed for analyzing and solving complex problems encountered in engineering practice; ability to employ information technologies effectively.	√
5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating complex engineering problems or discipline specific research questions.	√
6	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams; ability to work individually.	

7	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language; ability to write effective reports and comprehend written reports, prepare design and production reports, make effective presentations, and give and receive clear and intelligible instructions.
8	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.
9	Consciousness to behave according to ethical principles and professional and ethical responsibility; knowledge on standards used in engineering practice.
10	Information about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation, and knowledge about sustainable development.
11	Knowledge about the global and social effects of engineering practices on health, environment, and safety, and contemporary issues of the century reflected into the field of engineering; awareness of the legal consequences of engineering solutions.

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION

Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration	14	3	42
Hours for off-the-classroom study (Pre-study, practice)	14	2	28
Project	1	30	30
Homework and Quizzes	2	5	10
Midterm Examination	1	3	3
Final examination	1	3	3
Total Work Load			116
Total Work Load / 25 (h)			4.64
ECTS Credit of the Course			5