COURSE SYLLABUS
CSC13003 – Software Testing

1. GENERAL INFORMATION

Course name: Software Testing
Course name (in Vietnamese): Kiểm chứng phần mềm
Course ID: CSC13003
Knowledge block: Major Selective
Number of credits: 4
Credit hours for theory: 45
Credit hours for practice: 30
Credit hours for self-study: 90
Prerequisite: OOP, Database, Software Engineering, Web Application Development.
Prior course:
Instructors: LAM QUANG VU, PhD

2. COURSE DESCRIPTION

This course is for professionals and students who wish to gain a better understanding of software testing techniques and/or specialize in software quality engineering. The course will cover selected techniques for black box and white box testing, testing tools, and process and management issues. The seminar will be a blend of software testing concepts and theories with practical hands-on experience…

3. COURSE GOALS

At the end of the course, students are able to:

ID	Description	Program LOs

G1	Describe the fundamentals of software testing and its application through the software life cycle	2.4.1, 2.4.3, 2.4.4, 2.4.5, 6.1
G2	Practice skills in designing and executing software tests suitable for different stages in the software life cycle.	2.2.2, 4.1, 6.1.1, 6.1.3
G3	Apply teamwork skills to complete small projects required by the subject.	2.2.2, 6.1
G4	Produce the test plan for software projects.	4.1.1, 4.1.3, 5.1, 6.1.1
G5	Design and evaluate the test cases based on the software testing techniques	6.1
G6	Explain the role of software testing in systems development, deployment, and maintenance.	5.1, 1.4.7
G7	Develop a continuing interest in software testing, and obtain satisfaction from its study and practice	2.1.1, 2.1.2, 2.1.8
G8	Use appropriate methods and CASE Tools to test the software.	1.3.7, 6.1.1

4. COURSE OUTCOMES

By the end of the course, students should:

CO	Description	I/T/U
G1.1	Apply software testing knowledge and engineering methods.	T, U
G1.2	Identify contemporary issues in software testing, such as component-based software testing problems	I, T
G2.1	Practice designing and conducting a software test process for a software testing project.	T
G3.1	Use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects.	T, U
G4.1	Identify various software testing problems and solve these problems by designing and selecting software test models, criteria, strategies, and methods.	T, U

G4.2	Prepare test plans and schedules for a T&QA project	T
G5.1	Design test cases using different techniques	T
G5.2	Execute test cases efficiently	T
G6.1	Identify the role of software testing in systems development, deployment, and maintenance	I, T
G7.1	Develop a continuing interest in software testing, and obtain satisfaction from its study and practice	I, T
G8.1	Identify the needs of software test automation and define and develop a test tool to support test automation.	T
G8.2	Use software testing methods and modern software testing tools for their testing projects	T

5. TEACHING PLAN

ID	Topic	Course outcomes	Teaching/Learning Activities (samples)
1	+ Course Introduction + List of seminar topics + Software Testing Concepts + Apply AI-First	G1	Lecturing Q&A, Group discussion
2	+ Software Testing Process (cont.) + Software Testing Classification ● Black box ● White box + Software Testing Tools + Apply AI-First	G1, G2	Lecturing Demonstration, Q&A Games PRJ-SM#1 PRJ#1
3	+ Test Case template + Test Plan + Problem Report + Test Automation	G4, G5	Lecturing, Group Discussion Q&A, Discussion Game (Role Play)

	+ Bug Tracking System + Test Management + Test Roles + Apply AI-First		
4	+ Domain Testing + State Transition Testing + Apply AI-First	G3, G5	Lecturing, Group Discussion Q&A, Discussion
5	+ Scenario testing + Agile Testing + Test AI products + Apply AI-First	G3, G5	Lecturing, Group Discussion Q&A, Discussion PRJ#2
6	+ Code Coverage + Unit testing (Control Flow) + Document Testing + Apply AI-First	G3, G5	Lecturing, Group Discussion Q&A, Discussion PRJ-SM#2 PRJ#3
7	Seminar + DB Testing + GUI Testing	G5, G6, G8	Seminar Demonstration Q&A, Feedbacks PRJ-SM#3
8	Seminar + Automation Testing for Web + Automation Testing for Mobile + Automation Testing for Desktop	G5, G6, G8	Seminar Demonstration Q&A, Feedbacks PRJ-SM#3 PRJ#4
9	Seminar + Performance Testing + CI/CD Tools	G5, G6, G8	Seminar Demonstration Q&A, Feedbacks PRJ-SM#3 PRJ#5
10	Seminar + Mock/API Testing	G5, G6, G8	Seminar Q&A, Feedbacks

	+ Security Testing		Demonstration PRJ-SM#3 PRJ#6
11	Review		Lecturing Q&A, Discussion PRJ#7
12			PRJ#8

For the practical laboratory work, there are 10 weeks which cover similar topics as it goes in the theory class. Each week, teaching assistants will explain and demonstrate key ideas on the corresponding topic and ask students to do their lab exercises either on a computer in the lab or at home. All the lab work submitted will be graded. There would be a final exam for lab work.

6. ASSESSMENTS

Project Case-study For the case study project, students are required to utilize all the testing methods they have learned to thoroughly test a designated system.

Project Seminar The project seminar requires students to learn testing tools for a specific testing method, write a report, demonstrate their work, and present it to the class.

Examinations Exam will be based on the lecture notes, reading assignment, homework, and project. Each student will be responsible for completing a final examination. Students may not use any reference materials during the exams. The final examination will be cumulative. No makeup examinations will be given.

ID	Topic	Description	Course outcomes	Ratio (%)
A1	**Projects Case-study**		**G2, G3, G4, G5, G8**	**45%**
A11	PRJ#1	Environment Setup: software, test management tools	G2, G8	

A12	PRJ#2	Domain Testing	G2, G5	5%
A13	PRJ#3	Scenario Testing	G2, G5	5%
A14	PRJ#4	GUI Testing	G2, G8	5%
A15	PRJ#5	Automation Testing	G2, G8	5%
A16	PRJ#6	Performance Testing	G2, G8	5%
A17	PRJ#7	API Testing	G2, G8	5%
A18	PRJ#8	Final Reports + Test plan + Test case + Test cases summary + Bug reports + Test reports	G4, G5	15%
A2	**Projects Seminar**		**G3, G7, G8**	**15%**
A21	PRJ-SM#1	Seminar Plan	G3	2%
A22	PRJ-SM#2	Demo Scenario	G7	2%
A23	PRJ-SM#3	Seminar Demo	G8	11%
A4	**Exams**		**G1, G2, G4, G5, G6**	**40%**
A41	Final exam	Closed book exam. Describe the understanding of different topics, analyze & program to solve problems	G1, G2, G6 G4,G5,G6	40%

- **Project Seminar:**
  - Objectives: improve the reading, researching, and presentation skills
  - List of topics:

Topic	Name	Guideline
A	Database Testing Tools (DB Unit + Data Generation)	Unit Test for Database DB Generation Tools

B	GUI Testing & Usability Testing	GUI Testing & Usability Testing Browser Compatibility Link Checker
C	Automation for Web (Selenium+CubicTest)	Selenium automates browsers. That's it! What you do with that power is entirely up to you. Primarily, it is for automating web applications for testing purposes, but is certainly not limited to just that. Boring web-based administration tasks can (and should!) also be automated as well. CubicTest is a graphical Eclipse plug-in for writing Selenium and Watir tests. It makes tests faster and easier to write, and provides abstractions to make tests more robust and reusable.
D	Automation for Mobile Apps (Appium.io)	Appium is an open source test automation framework for use with native, hybrid and mobile web apps. It drives iOS and Android apps using the WebDriver protocol.
E	Automation for Desktop Apps (AutoIT)	AutoIt v3 is a freeware BASIC-like scripting language designed for automating the Windows GUI and general scripting. It uses a combination of simulated keystrokes, mouse movement and window/control manipulation in order to automate tasks in a way not possible or reliable with other languages (e.g. VBScript and SendKeys). AutoIt is also very small, self-contained and will run on all versions of Windows out-of-the-box with no annoying "runtimes" required!
F	Performance Testing tools (Jmeter)	Performance testing is a type of software testing that evaluates the speed, responsiveness, stability, and scalability of an application under different load conditions. It aims to identify performance bottlenecks, ensure the system meets required performance benchmarks, and provide insights for optimization.
G	Continuous Integration (Unit Test + SCM + Auto Build)	Continuous Integration (CI) is a software development practice where code changes are automatically tested, integrated, and built frequently to ensure rapid feedback and maintain code quality. http://cruisecontrol.sourceforge.net/

H	Mock/API Testings	Mock testing involves simulating the behavior of real components, such as databases, APIs, or external services, to isolate the code under test. API testing focuses on validating the functionality, reliability, performance, and security of APIs. It ensures that API endpoints behave as expected.
I	Security Testing	Security testing is the process of evaluating a software system or application to identify vulnerabilities, weaknesses, and potential security risks. Its primary goal is to ensure that the application is protected against unauthorized access, data breaches, and malicious attacks.

- **Report for each topic:**
  - Introduction: what, why, when, where, who, how?
  - Main Functions
  - Setup Instructions
  - User Manual
  - Pros & Cons of CASE Tools

7. RESOURCES

8. Textbooks

- Testing computer Software, Second Edition, by Kaner, Falk, and Nguyen, Wiley Publishers, 1999.
- Effective Methods for Software Testing, Second Edition, by William E. Perry, Wiley Publishers, 2006.

9. Others

- Software Testing Course by Cem Kaner. http://www.testingeducation.org/
- Software Testing Tutorials https://www.guru99.com/software-testing.html

10. Softwares

- Test Complete, Winrunner
- Mantis Bug Tracking
- JUnit, NUnit. Unit test framework.

- CPPUnit. Same thing for C++.
- Simple Test(PhP Unit), Dunit (Dotnet Unit)
- Gcov: Test coverage tools...

11. GENERAL REGULATIONS & POLICIES

- All students are responsible for reading and following strictly the regulations and policies of the school and university.
- Students who are absent for more than 3 theory sessions are not allowed to take the exams.
- Mobile phones, etc. must be silenced during all classroom lectures. Those not heeding this rule will be asked to leave the classroom immediately to not disrupt the learning environment.
- Course assignments and tests are designed to have educational value; the process of preparing for and completing these exercises will help improve your skills and knowledge. Material presented to satisfy course requirements is therefore expected to be the result of your own original scholarly efforts.
- Plagiarism and cheating - presenting another's ideas, arguments, words or images as your own, using unauthorized material, or giving or accepting unauthorized help on assignments or tests - contradict the educational value of these exercises.
- For any kind of cheating and plagiarism, students will be graded 0 for the course. The incident is then submitted to the school and university for further review.
- Students are encouraged to form study groups to discuss the topics. However, individual work must be done and submitted on your own.

12. Class Attendance and Participation

- Regular class attendance is strongly advised and is necessary for students to fully grasp many of the course concepts.
- Please be on time and prepared for class each day.
- If you miss a class session, it will be your responsibility to find out the materials that were covered.

- Students in attendance are expected to be active participants in the course. This participation includes contributing to class discussions, providing insight into the class discussion topics, raising questions, and relating class material to personal experiences and other course topics.

13. Computer Usage

Moodle and e-mail will be used to communicate with students and disseminate materials and assignments throughout the course. So, students should check Moodle and their e-mail at least once per day.

- When sending e-mail to the instructor, please begin the "Subject:" of the message with the following: [Software Testing] <*Subjects*>

Ho Chi Minh City, May 8 th, 2025

DEAN OF FACULTY

Dinh Ba Tien