

## SYLLABUS

### CS 428 – SOFTWARE TESTING AND QUALITY ASSURANCE **(REQUIRED)** (TESTS DE LOGICIELS ET ASSURANCE QUALITE)

#### Course Catalog Description

The objective of this course is to introduce students to software testing processes, including white and black box testing. The relationship between software development testing and product life cycle support is established by covering unit, integration, system, and acceptance testing. Key concepts, aspects, and techniques of software testing are discussed such as verification, validation, testing metrics, test cases and test plans, and test automation. The course also discusses debugging techniques and best practices. GIT software for software version control and GitHub for source code management will be introduced and their application discussed in the test environment on the cloud.

#### Course Requirements

- **Pre-requisites:** CS 321 (Principles of Software Engineering). CS 321 (OO Software Design & Construction).
- **Credit Hours:** 5 ECTS/TN (2.5 US).
- **Program Outcomes** (“Compétences Programme”): 5, 6, 10, 12, 25.
- **ABET Student Outcomes:** 2, 6.

#### References

- **Textbook:**
  - **Required:** Daniel Galin. *Software Quality Assurance: From Theory to Implementation*. Addison Wesley, 2003.
  - **Required:** Stephen Kan. *Metrics and Models in Software Quality Engineering*. 2nd Edition). Addison Wesley, 2002.
- **Others:**
  - Online guided course on MUST’s learning platform.

#### Instructor/Course Coordinator

Instructor:  
Office:  
Course coordinator:

Email:  
Office Hours:  
Teaching Assistant:

#### Grading Policy

Assessment	Week	Weight
Quizzes	Distributed evenly	15%
Projects	Distributed evenly	15%
Midterm Exam	8	30%
Final Exam	TBD	40%

**Course Learning Outcomes (CLOs)**

No.	CLOs	SO
CLO1.	Demonstrate an understanding of software quality, software testing processes and their application.	1
CLO2.	Describe the relationship between software development testing and product life cycle.	2
CLO3.	Write test cases and plans.	2, 6
CLO4.	Demonstrate an understanding of testing concepts and techniques such as verification, validation, testing metrics, and test automation.	2, 6
CLO5.	Apply debugging techniques and best practices to the development of software applications.	2
CLO6.	Employ modern tools for test automation in the development of software applications.	2, 6

**Topics**

Topic	Weeks
Introduction and background.	1
Software quality factors.	2
Components of software quality assurance.	3
Pre-project components	4
Defect removal effectiveness	5
Reviews	6
Testing	7
Review. Midterm exam.	8
Maintenance and external participants	9
Configuration management	10
Standards	11
Software quality metrics	12
Cost of software quality	13
Software reliability models.	14
Final review. Project presentations.	15

**Student Outcomes (SOs)**

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

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***Approvals***

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Prepared by: \_\_\_\_\_

Signature:

Date:

Approved by the Dept.:

Signature:

Date: