

AMERICAN INTERNATIONAL UNIVERSITY-BANGLADESH

Faculty of Science and Information Technology

Department of Computer Science

Undergraduate Program

**COURSE OUTLINE**

**I - Course Code and Title:** CSC 4133 (Software Quality and Testing)

**II - Credit:** 3 credit hours (3 hours of theory per week)

**III- Nature:** Major Course for B.Sc. in CSSE and SE, Elective course for CS and CSE

**IV - Prerequisite:** CSC3114 (Software Engineering)

**V - Course Description:**

This course provides a comprehensive study of software quality assurance and testing. Topics include levels and techniques of testing, verification and validation, quality assurance processes and techniques,

ISO 9126 and CMMI models. The course focuses on real-life software quality assurance and testing activities as well. The course covers both manual and automated testing techniques with an introduction to functional and regression testing tools like Selenium.

**VI – Objectives:**

**At the completion of the course, the students will be able to understand-**

* Various approaches, techniques, technologies, and methodologies used in software testing and quality assurance.
* The quality assurance process and its role in software development.
* A variety of testing techniques, methods, and tools used in real life.
* The impact of ISO 9126 and the capability maturity model Integration (CMMI) on software quality assurance
* How to write Test Plan
* How to write Test Cases and execute them, and preparing bug-report
* About the different types of software testing tools used in the IT firms
* How to use Selenium to develop test cases and test suite, how to execute test cases and identify bugs

**VII – Topics to be covered**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **TOPICS** | **Specific Objective(s)** | **Time Frame** | **Suggested Activities** | | **Teaching Strategy(s)** |
| Mission and Vision of AIUB and Faculty of Science and IT, Introduction, Basic concepts & preliminaries | To discuss mission and vision of AIUB, Course introduction, To learn fundamentals of Software Quality Assurance and Testing | Week 1 | Introductory Lecture | | Lecture delivery, Interactive session |
| Software Quality,  Maturity Models | To learn different views of software quality, characteristics of high quality software, software quality models and standards | Week 2 | Lecture | | Lecture delivery, Interactive session with real life examples |
| Quality Assurance, Quality Assurance in context | To learn about software quality assurance and its activities | Week 3 | Lecture | | Lecture delivery, Interactive session with real life examples |
| Quality Engineering | To learn about software quality engineering, its scope- QA, Testing, and QA activities beyond Testing | Week 4 | Lecture | | Lecture delivery, Interactive session with real life examples |
| Testing: Concepts, Issues, and Techniques | To learn fundamentals of software testing, it’s scope, categories, activities, and levels | Week 5 | Lecture | | Lecture delivery, Interactive session with real life examples |
| Testing Activities, Management and Automation | To learn about Test Planning and Preparation, Test Execution and Measurement, Test Automation | Week 6 | Lecture | | Lecture delivery, Interactive session with real life examples |
| **Midterm Exam Week 7** | | | | | |
| Unit Testing,  Control Flow Testing | To learn about unit level testing, To learn about Control Flow Testing | Week 8 | | Lecture | Lecture delivery, Interactive session with real life examples |
| Data Flow Testing, Domain Testing | To learn about data flow testing and domain testing | Week 9 | | Lecture | Lecture delivery, Interactive session with real life examples |
| System Integration Testing, System Testing | To learn about the objectives and techniques of system integration testing and system testing, system testing categories | Week 10 | | Lecture | Lecture delivery, Interactive session with real life examples |
| Performance Testing, Acceptance Testing, | To learn about the objectives and techniques of acceptance testing and performance testing, load, stress and volume testing | Week 11 | | Lecture | Lecture delivery, Interactive session with real life examples |
| Testing Techniques: Adaptation, Specialization, and Integration | To learn about testing sub-phases and applicable testing techniques, specialized test tasks and techniques | Week 12 | | Lecture | Lecture delivery, Interactive session with real life examples |
| Software Testing Tools | To learn about testing tools for functional and regression testing, performance testing, and bug-tracking | Week 12 | | Lecture | Lecture delivery, Interactive session with real life examples |
| QA Techniques beyond Testing: Defect Prevention, Inspection, Formal Verification, Fault Tolerance | To learn about the alternative quality assurance techniques besides software testing | Week 13 | | Lecture | Lecture delivery, Interactive session with real life examples |
| QA Team Organization, Software Reliability Engineering | To learn about how a QA team is typically formed, various structures of QA team, and basic concepts and general approaches of software reliability engineering | Week 13 | | Lecture | Lecture delivery, Interactive session with real life examples |
| **Final Exam Week 14** | | | | | |

**VIII- Course Requirements**

1. **Student Attendance**

All students are expected to attend all scheduled classes on time. Attendance will be taken at the beginning of each class period. A student must have at least 75% attendance to pass this course.

1. **Class Participation & Peer Evaluation**

Students are expected to participate actively in the class. Your contribution towards your team will be counted as well.

1. **Quiz & Exam**

For both terms, there will be more than two quizzes of which only the best two quizzes will be counted for grading. The details will be announced in due time. A student must attend the major exams (midterm and final exam).

1. **Project and Assignment**

There will be project and assignment. The project will be to develop a test plan based on the requirements and functionalities of a system. The assignment will be to design and write test cases, to execute those test cases and identify the defects/bugs if any. Students must submit their projects in groups of four; however each student must work actively. Students must submit the project on time; late submission is not allowed. There will be project presentation and defense at the end of the semester.

**IX – Evaluation**

|  |  |  |
| --- | --- | --- |
| **Midterm** | Class Attendance | 10 |
| Quizzes | 40 |
| Midterm Exam | 50 |
| **Midterm Total** | **100** |
| **Final term** | Class Attendance | 10 |
| Quizzes | 20 |
| Projects | 20 |
| Final Exam | 50 |
| **Final term Total** | **100** |
| **Grand Total** | **50% of Midterm + 50% of Final term** | |

**VIII – Textbook/ References/Study Materials**

1. *Software Quality Engineering: Testing, Quality Assurance and Quantifiable Improvement*, by Jeff Tian, published by Wiley, ISBN 0-471-71345-7, is the required text.
2. *Software Testing and Quality Assurance: Theory and Practice*, by Kshirasagar Naik, Priyadarshi Tripathy
3. *Software Quality Assurance: From Theory to Implementation*, by Daniel Galin
4. *Software Testing and Continuous Quality Improvement*, by William E. Lewis
5. *The Art of Software Testing*, by Glenford J. Myers, Corey Sandler and Tom Badgett
6. *Software Testing Fundamentals: Methods and Metrics* by Marnie L. Hutcheson
7. http://www.sei.cmu.edu/cmmi
8. http://www.istqb.org/
9. http://istqbexamcertification.com
10. http://www.softwaretestingfundamentals.com
11. ISTQB study materials
12. Lecture notes will be posted at the course website on a regular basis
13. Additional handouts/photocopies will be provided by the Instructor