

Course Number: CSc/ISYS 639

Course Title: Software Testing and Quality Assurance

Number of Credits: 3

Schedule: Three hours of lecture/discussion per week.

Prerequisite: Prerequisites: CSc 413, or ISYS 367, or ISYS 368, or consent of instructor. Students are advised to take this class concurrently with CSc 640 and/or ISYS 663.

Catalog Description

Technical and managerial aspects of testing and quality assurance in software development with emphasis on practical projects. Tools for testing and QA. Performance evaluation, verification and validation of software. Managing and documenting software testing and QA activities in local and outsourced projects.

Cross listed with ISYS 639 and team taught with SFSU ISYS Department

Expanded Description

- Software system quality components and activities that support software quality
- QA objectives: reliability, correctness, testability, maintainability, flexibility, portability, efficiency, integrity, usability, reusability, and interoperability.
- Theoretical background: program correctness proofs, cyclomatic complexity, software reliability modeling.
- Software unit testing to verify unit specifications
- Integration testing to verify design specifications
- System testing to verify requirements specifications
- Usability testing
- Performance, reliability, and regression testing
- Alpha, beta and acceptance testing
- Software testing and quality assurance tools. Open source testing using NUnit and JUnit.
- Software testing and QA project
- Planning, organizing, and budgeting test procedures
- Cost management of test projects: cost estimating, cost budgeting, project financing, cash flow management
- Time management of test projects: schedule development, resource planning and allocation, network diagrams
- Project quality management: standards, documentation, objectives, planning and control
- Human resource management: QA project HR planning, staff acquisition and deployment, team building and training, team management
- Managing outsourced QA projects: virtual team management, offshore team management

Course Objectives and Role in Program

The course was designed to bring focus to QA and testing since many jobs and opportunities are available in this area. The course covers both technical foundations and tools, as well as managerial and organizational aspects.

Learning Outcomes

The student should be able to:

- Understand software testing and quality assurance as a fundamental component of software life cycle
- Define the scope of SW T&QA projects
- Efficiently perform T&QA activities using modern software tools
- Estimate cost of a T&QA project and manage budgets
- Prepare test plans and schedules for a T&QA project
- Develop T&QA project staffing requirements
- Effectively manage a T&QA project

Method of Evaluation

Lectures, discussion, case studies, student projects.

Evaluation based on final and midterm examinations, student projects, assignments

Required Textbooks

Recommended References

Marick, B., *The Craft of Software Testing*. Prentice Hall 1995.

Tamres, L., *Introducing Software Testing*. Addison-Wesley, 2002
DeMillo, R.A., McCracken, W.M, Martin, R.J., Passafiume, J.F., *Software Testing and Evaluation*. Benjamin Cummings, 1987.

Black, Rex, *Managing the Testing Process: Practical Tools and Techniques for Managing Hardware and Software Testing*, 2nd Edition

Hutcheson Marnie L., *Software Testing Fundamentals: Methods and Metrics*

Galín, D., *Software Quality Assurance*. Addison-Wesley, 2004

Schulmeyer, G.G., McManus, J.I., *Handbook of Software Quality Assurance*. Prentice Hall 1999.

Unhelkar, B., *Process Quality Assurance for UML-Based Projects*. Addison-Wesley, 2003.
Ginac, F.P, *Customer Oriented Software Quality Assurance*. Prentice Hall 1998.

Kathy Schwalbe, *Information Technology Project Management*, Course Technology
Eclipse Distilled, Carlson, David, Addison-Wesley, [2005] (recommended)

Notes:

Students are expected to have advanced level of programming experience in Java and/or C++ and basic understanding of information systems

Modified by: D. Petkovic, J. Dujmovic, S. Gill (ISYS)

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