Addis Ababa Institute of Technology

Center of Information Technology & Scientific Computing

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| Department: Software Engineering  |
| Module Title: *System Integration and Architecture* | Module Code: *ITSE-M4812* |
| Module ECTS: 24 |
| Course Title: **Software Quality Assurance and Testing** | Course Code:ITSE-4213 |
| Course ECTS: 6 |
| Course Duration:16 Weeks |

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| Instructor’s Contact Information: Name: Tigabu DagneEmail: tigabu.dagne@aau.edu.et  | Academic Year: 2018/19  |

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| **Course Objectives** |
| * Study the state-of-the-art and main research challenges of selected topics in software testing and quality assurance.
* Introduce various approaches, techniques, technologies, and methodologies used in software testing and quality assurance.
* Illustrate the above-mentioned topics with examples and papers from current peer-reviewed research literature on software testing and quality assurance.
* Prepare students to conduct independent research on software testing and quality assurance and to apply that knowledge in their future research and practice.
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| **Learning Outcomes** |
| **Practical Skills** * Research the state-of-the-art, and apply their findings to software testing and quality assurance;
* Analyze different approaches to software testing and quality assurance, and select optimal solutions for different situations and projects;
 | **Transferable Skills*** Conduct independent research in software testing and quality assurance and apply that knowledge in their future research and practice;
* Evaluate the work of peers constructively by following proven methods of peer-review, and by using the principles of research ethics.
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| **Prerequisites:** Fundamentals of Software Engineering |
| **Course Content** |
| * **Software Quality Assurance Framework and Standards SQA Framework**: What is Quality? Software Quality Assurance, Components of Software Quality Assurance – **Software Quality Assurance Plan:** Steps to develop and implement a Software Quality Assurance Plan

– **Quality Standards:** ISO 9000 and Companion ISO Standards, CMM, CMMI, PCMM, Malcom Balridge, 3 Sigma, 6 Sigma* **Software Quality Assurance Metrics and Measurement Software Quality Metrics**: Product Quality metrics, In-Process Quality Metrics, Metrics for Software Maintenance, Examples of Metric Programs – **Software Quality metrics methodology:** Establish quality requirements, Identify Software quality metrics, Implement the software quality metrics, analyze software metrics results, validate the software quality metrics – **Software quality indicators** – **Fundamentals in Measurement theory**
* **Software Testing Strategy and Environment:** Establishing testing policy, structured approach to testing, test factors, Economics of System Development Life Cycle (SDLC) Testing

Software Testing MethodologyDefects hard to find, verification and validation, functional and structural testing, workbench concept, eight considerations in developing testing methodologies, testing tactics checklist* **Software Testing Techniques**

Black-Box, Boundary value, Bottom-up, Branch coverage, Cause-Effect graphing, CRUD, Database, Exception, Gray-Box, Histograms, Inspections, JADs, Pareto Analysis, Prototyping, Random Testing, Risk-based Testing, Regression Testing, Structured Walkthroughs, Thread Testing, Performance Testing, White-Box Testing**Software Testing Tools**Taxonomy of Testing tools, Methodology to evaluate automated testing tools, Load Runner, Win runner and Rational Testing Tools, Silk test, Java Testing Tools, JMetra, JUNIT and Cactus.* **Testing Process**

**Eleven Step Testing Process:** Assess Project Management Development Estimate and Status, Develop Test Plan, Requirements Phase Testing, Design Phase Testing, Program Phase Testing, Execute Test and Record Results, Acceptance Test, Report test results, testing software installation, Test software changes, Evaluate Test Effectiveness.**Testing Specialized Systems and Applications**Testing Client/Server – Web applications, Testing off the Shelf Components, Testing Security, Testing a Data Warehouse |
| **Assessment Method:** |
| Assignments (20 %)Mid-Semester Examination & Project (40%)Final Examination (30%) |
| **Course Policies**  |
| 1) Students are divided into several groups, with each group up to 4 people. The groups are chosen by students themselves. Each group has one leader.2) The assignment and project is due in class as it will be notified in the class. The report of project is turned in within 24 hours of the due dates will be penalized by 20%. More than two days late may not get graded at all. |
| **References** |
| *TEXT BOOKS:* None***REFERENCE BOOKS:***1. Effective Methods for Software Testing, 2nd Edition, William E. Perry , Second Edition, Wiley India, 2006
2. Software Testing Tools, K.V.K.K. Prasad, Dream tech press, 2008.
3. Software Testing, Srinivasan Desikan & Gopalaswamy Ramesh, PearsonEducation,2006.
4. Software testing techniques, Scott Loveland & Geoffrey Miller, Shroff Publishers, 2005.
5. Software Quality, Martin Wieczorek & Dirk Meyerhoff, Springer, 2001.
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