**Department of CS & IT**

**Course****: Software Quality Engineering**

Course Code: SE311

Class: BSSE V

**Instructor: Dr. Faisal Bahadur**

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| **Weekly schedule for Fall 2023** | | | | |
| **Week**  **No** | **Activity** | **Course Topic** | **Detail of Topics** | **Reference Material** |
| 1 | Class Work | Software Quality & Quality Engineering | Quality, Software Quality and Perspectives, SQA, SQE, Quality Engineering, Defect Origins, Defect Tracking, Causes of Poor software quality, Categories of Quality Attributes, Software Quality Models/Frameworks and attributes. | Chapter 2,5 Ref 1 |
| 2 | Class Work | S/W Quality Assurance, S/W Inspection, | SQA, Overview of SQA Alternatives, Defect Prevention, Defect Removal/Reduction, S/W Inspection, Defect cost relationship, Defect origin & Discovery Points, Inspection Preconditions, Reasons of no Inspection, Success Factors | Chapter 3,4 Ref 1 |
| 3 | Class Work | **Inspection checks and metrics** | Inspection Steps, Inspection Process, ETVX on inspection Process, Monitoring Inspection, Inspection metrics, Inspection checklist, Code and requirement inspection checklists, | Chapter 4 Ref 1 |
| 4 | Class Work & Quiz # 1 | Testing: Concepts, Issues, and Techniques | Definitions, A broader perspective of S.T, Why s/w testing industry is continuously evolving, Purpose of S.T, Testing Philosophy/Principles, Activities of Testing, Introduction to testing process/ Software Testing Life Cycle, | Chapter 6 Ref 1  Chapter 1 Ref 2 |
| 5 | Class Work | Test Planning and Preparation | Test Planning Process, How to create a Test Plan, Test scope, Risks, Test case, Test scenario, Test suit, Test Case Preparation | Chapter 6 Ref 1 |
| 6 | Class Work | Test documentation Reporting and historical data recording | Test Plan document, Test design document, Test cases details, Test Scenarios/Procedures details, Test report | Chapter 5 Ref 2 |
| 7 | Class Work & Quiz from Week 6 | Levels of Testing | Unit Testing, Integration, Subsystem, System and Acceptance Testing | Chapter 2 Ref 2 |
| 8 | Class Work & Quiz from Week 7 | Testing Techniques:  Black Box Techniques | Ad hoc , Equivalence Partitioning, Boundary Value Analysis, Decision Table Testing, State Transition Testing, Use Case Testing, Detailed Examples of all these testing | Chapter 4 Ref 2 |
| 9 | Mid Term |  | Paper Setting & Marking |  |
| 10 | Class Work | Testing Techniques:  White Box Techniques | White Box in detail, Code Coverages, Statement Coverage with examples  Path Coverage with examples  Decision Coverage with examples  Branch Coverage with examples  Conditional Coverage with examples | Chapter 4 Ref 2 |
| 11 | Class Work | Testing Strategies | Analytical , Methodical/Standard-compliant  Dynamic/heuristic, Consultative, Regression-averse, Model Based, Testing using Models (FSM, State charts) | Chapter 5 Ref 2 |
| 12 | Class Work  Quiz-2  Assign-2 | Test Automation,  Slicing | Automated testing Preface, Manual Vs Automation w.r.t different aspects, Benefits of automation, Automation process, choosing manual vs automation, Automation Myths, Key differences b/w both, Slicing introduction & types with example codes. | Chapter 7 Ref 1 |
| 13 | Class Work  Assign-3 | Software reliability models and engineering | Reliability, S/w Reliability Eng, Reliability Models, Reliability Growth Models, IDRM, SRGM , Jelinski & Moranda Model, Exponential Model, Execution Time Model | Chapter 22 Ref 1 |
| 14 | Class Work | Quality Models | Models for quality assessment, Product quality metrics, Quality Measurements | Chapter 19 Ref 1 |
| 15 | Class Work | In-Process metrics for software testing | QA Monitoring And Measurement,  Direct vs. Indirect quality measurements,  Result and defect measurements, environmental, product internal, and activity measurements | Chapter 18 Ref 1 |
| 16 | Class Work | Open issues/ Challenges in Software Testing | Communication Issues, Lack of Resources, Dealing with Changes  Time Constraints, Missing Documentation, Inadequate Testing, Unstable Environment...etc | Ref 3 |
| 17 | Class Work | Revision of all course from week 1 to 16 | | |
| 18 | **Final Term**  **Exam** | Paper Setting & Marking | | |

Reference Book/Material

1. Software Quality Engineering Testing, Quality Assurance, and Quantifiable Improvement, Jeff Tian, IEEE Computer Society, WILEY,2005.
2. Fundamentals of Software Testing, Bernard Homes, ISTE, Wiley, 2012
3. <https://www.softwaretestingmaterial.com/software-testing-challenges/>

Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Signature:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Course Objectives:** This course aims to equip the students with a good grasp of software quality metrics and models. The students would learn software testing techniques, approaches and software reliability analysis techniques.

The following is an itemized list of objectives:

• to introduce quality assurance and quality control techniques and develop a QA plan and Test Plan • to be able to document and report the findings

• to carry out inspections and carry out testing in a production environment

**Learning Outcomes:** The students are able to start their carriers as quality engineer and as test professionals in leading software houses both domestic and international. Student would be able to: CLO-1: (C1) outline software testing and software quality assurance principles.

CLO-2: (C3) prepare test case and test suites for completely testing all aspects of a system under test (SUT)

CLO-3: (C5) compile findings of a quality assurance cycle