**Department of CS & IT**

**Course****: Failure Analysis & Recovery**

Course Code: SE-424

Class: BSSE VII

**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 ERRORS, DEFECTS, AND FAILURES | Understanding Error Defect and Failure  Error Defect and Failure in Software Lifecycle  Eight categories of errors, Notorious Bugs | Chapter 1 Ref 1 |
| 2 | Class Work | Detailed Descriptions of S/W Quality Characteristics | Correctness, Reliability, Efficiency, Performance, Usability, Maintainability, Flexibility/Extendibility, Scalability, Synchronization, Security, Testability  Portability, Interoperability | Chapter 1, Ref 2 |
| 3 | Class Work | Requirements Problems and Requirements Defects | Requirements Problems, Impact of Wrong Requirements, Requirements Defects, Prevention Vs Removal, Changing/Creeping Requirements, Guidelines for Writing Requirements, What Should Not be Included in SRS , Quality Attributes of Requirements Document, | Chapter 2 Ref 6  Chapter 1 Ref 1 |
| 4 | Class Work & Quiz # 1 | Design Defects | Design Defects, Defects in Fundamental Design Topics, Quality Design Concepts, Design Process Principles, Design Model Principles, Guidelines for Good Design Model, Quality Design Concepts | Chapter 3 Ref 7  Chapter 1 Ref 1 |
| 5 | Class Work  Quiz-1 | Coding Defects | Effective Modularity Criteria for Design Methods, Category of Coding Defects, Defects in High-Level Languages, Defects in Low-Level Languages, Quality Practices for General-Purpose Programming, Quality Practices Related to Programing | Chapter 8 Ref 8  Chapter 1 Ref 1 |
| 6 | Class Work  Assign-1 | Defect/Failure Elimination strategies | Defect Prevention and Defect Recovery/Removal  Defect Prevention Activities, Education and training, Four Areas to focus, Formal Methods, Design By Contract, What is Contract, Example of Defensive Programming style and DBC style, DBC programming Mechanism, Languages with 3rd Party support | Chapter 3,13 Ref 3  And Ref 4 |
| 7 | Class Work & Quiz 2 | Inspection | Introduction, Inspection vs Testing, Defect Cost Relationship, Defect Origins and Discovery Points with&without Inspection, Inspections Misconception & Preconditions, Success Factor, Inspection Steps, ETVX, ETVX on inspection steps | Chapter 1, 3 Ref 5 |
| 8 | Class Work | Inspection | What inspections are not? Process flow, Inspection Roles, Moderator, Producer, Reader, Recorder, Inspector, Qualities & problems of each Roles. ETVX on Preparation, ETVX on Meeting etc | Chapter 3,4,5 Ref 5 |
| 9 | Mid Term |  | Paper Setting & Marking |  |
| 10 | Class Work | Inspection | * ETVX on Preparation, ETVX on Meeting, ETVX on Rework, ETVX on Follow up, ETVX on Prevention, ETVX on Data Recording & Reports | Chapter 3 Ref 5 |
| 11 | Class Work | Testing: Concepts, Principles Activities | 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 3 |
| 12 | Class Work  Quiz-2  Assign-2 | Test Planning and Preparation | Test Planning Process, Test scopes, Risks, Test case, Test scenario, Test suit, Test Strategies | Chapter 6 Ref 3 |
| 13 | Class Work  Assign-3 | Levels of Testing | Unit Testing, Integration, Subsystem, System and Acceptance Testing | Chapter 4 Ref 2 |
| 14 | Class Work | Defect Management | Defect Life Cycle steps, Defect Management Process (DMP), Details of each step of DMP, Defect States, Defect Priority & Severity | Chapter 7 Ref 2 |
| 15 | Class Work | Defect Analysis | What is analysis of discovered defects, questions during defect analysis, Types of defect analysis, Details of distribution trend and casual analysis | Chap 20 Ref 3 |
| 16 | Class Work | Risk Identification | What is risk, Risk Identification, Predictive modeling for risk identification, New techniques for risk identification. | Chap 21 Ref 3 |
| 17 | Class Work | Course Revision | Summarizing 16 weeks. | Class Work |
| 18 | **Final Term**  **Exam** |  | Paper Setting & Marking |  |

Reference Book/Material

1. Software Quality Assurance by Claude Y. Laporte Alain April, IEEE Press WILEY. 1st Edition 2018.
2. Software Quality Assurance Integrating Testing, Security, and Audit, Abu Sayed Mahfuz, CRC Press Taylor & Francis Group, 2016.
3. Software Quality Engineering Testing, Quality Assurance, and Quantifiable Improvement, Jeff Tian, IEEE Computer Society, WILEY,2005.
4. Design by Contract, By Example, Richard Mitchell and Jim McKim, 1st Edition, ISBN : 978-0201634600, Addison-Wesley
5. Software Inspections by Ronald A. Radice, Tata-McGH, 2003
6. Requirements Engineering: Processes and Techniques’ by G. Kotonya and I. Sommerville, John Wiley & Sons, 1998
7. Software Quality: Analysis and Guidelines for Success by Capers Jones
8. Software Engineering Quality Practices by Ronald K. Kandt

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

**COURSE OBJECTIVES**

Sound familiarity with the

* Entrance of Defects/Failures at different phases of SDLC
* Recovering Defects through Defect Prevention (Inspection)
* Recovering Defects through Defect Removal (Testing)
* Defect management and Analysis

**LEARNING OUTCOMES**

The students are able to start their carriers as a software Inspector or quality assurance personnel, 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