

Software Engineering

Evaluation:

	Theory	Practical	Total
Sessional	40	10	50
Final	50	-	50
Total	90	10	100

Course Objectives:

The course objective is to provide required knowledge on planning, design, development, implementation, and maintenance of software.

Course Contents:

Unit I: Introduction

4 hours

History of software engineering, Introduction, Role of software engineering, Software Development and Software Engineering, Attribute of good software, Different between software engineering and system Engineering, Some challenges of software Engineering. Software Engineering Ethics

Unit II: Software Specification

4 hours

The Uses of Specification: A statement of User requirement, A statement of the interface between the machine and the control environment, A statement of the requirement for the implementation, A reference point during product maintenance, Specification Qualities, Classification of Specification styles, Verification of specifications, Types of Specification: Operational and descriptive specifications, Operational specifications: DFD UML diagrams for specifying Behaviors, Finite State Machine

Unit III: Software Testing Techniques and Strategies

7 hours

Software Testing Fundamentals: Testing objectives, How test information flows, Testing lifecycle, Test Cases (What it is?) **Levels of Testing:** Unit Testing, Integration Testing, System Testing, Acceptance Testing, Alpha testing & Beta testing, Static vs. Dynamic testing, Manual vs. Automatic testing, Testers workbench, steps of testing process (Only steps should be covered)

Different types of Testing: Installation Testing, Usability testing, Regression testing, Performance Testing, Load Testing, Stress testing, Security testing **Black Box & White Box Testing (Test Case Design Techniques):** Functional Testing (Black Box), Structural Testing (White Box), Domain Testing Non functional testing techniques, Validation testing Activities (Low level testing, high level testing) Black box vs. White Box

Unit IV: Software Qualities and Software Quality Assurance

10 hours

Software quality and quality assurance, Software quality factors, Software quality assurance, SQA activates, Software quality standards: SEI, ISO, Software reviews, Cost impact of software defects, Defect amplification and removal, Formal technical reviews, The review meeting, Review reporting and record keeping, Review guidelines, A review checklist, Formal approaches to SQA, Proof of correctness Statistical quality assurance, The clean room process

Unit V: Software reliability

6 hours

Measures of reliability and availability, Software reliability models, Software safety

Unit VI: Management of Software Engineering**7 hours**

Responsibilities of a software project manager, Job responsibilities of a software project manager, Skills necessary for software project management, Project Planning, The SPMP document, Metrics for project size estimation, Line of code (LOC), Function point metric, Project estimation techniques, Empirical estimation techniques, Expert judgment technique, Delphi cost estimation, Heuristic techniques, Basic COCOMO model, Analytical estimation techniques, Scheduling, Organization and team structure, Organization structure, Team structure, Staffing, Quality of software engineer, Risk Management, Risk Identification, Risk assessment, Risk containment, Software configuration management, Necessity of software configuration management, Configuration management activities, Source code control system (SCCS) and RCS

Unit VII: Object-Oriented Concepts and Principles**4 hours**

Object-Oriented Paradigm, Object-Oriented Concepts, Management of Object-Oriented Software Projects

Unit VIII: Emerging Trends**3 hours**

Client server software, CORBA, COM/DCOM, Service oriented architecture (SOA), Software as a service (SaaS) **Case Study:** An individual case study should be given to each student on software project. 10% of sessional marks should be allocated for evaluation, **Text Books:** Pressman. R. S. : Software Engineering a practitioners Approach. McGraw Hill, 2. Mall. R.: Fundamentals of Software Engineering. PHI.

Reference Books:

1. C. Ghezzi, M. Jazayeri, and D. Mandrioli: *Fundamentals of Software Engineering*, Prentice Hall of India, Ltd. Sommerville. I.: *Software Engineering*, Pearson
2. Bali-Bali : *Software Engineering*, S.K. Kataria & Sons
3. Pankaj Jalote's: *Software Engineering- A precise Approach* Wiley India
4. Richard Fairley: *Software Engineering Concepts*, Tata McGraw-Hill Edition
5. Eve Adersson, Philip Greenspun, Andrew Grumet: *Software Engineering or Internet Applications*, PHI