M-Scheme DETAILED SYLLABUS

35272 – SOFTWARE ENGINEERING

UNIT I INTRODUCTION TO SOFTWARE ENGINEERING

1.1 **Basics of Software Engineering :** Need for Software Engineering – Definition – Software Characteristics – Software Myths – Program versus Software Products

1.2. **Software Development Life Cycle Models:** Introduction –- Waterfall Model – Prototyping model – Spiral Model – Iterative Enhancement model - RAD model – Object Oriented Model - Advantages and Disadvantages of above models – Comparison of various models.

1.3 **Software Requirement Analysis (SRS) :** Value of good SRS – Requirement Process – Requirement Specification – Desirable characteristics of an SRS – Components of an SRS – Structures of a requirements documents - Problems in SRS – Requirements gathering tools – Analysis tools – Data flow diagram – Data dictionary – ER diagram

UNIT – II SOFTWARE DESIGN AND PLANNING

2.1. **Software Design** : Definition of software design – Objectives of software design – Process of software design – Architectural design – Modular design – Structure chart – Coupling and Cohesion – Different types – Interface design – Design of Human Computer Interface

2.2. **CODING:** Information Hiding – Programming style – Internal documentation – Monitoring and Control for coding – Structured programming

2.3. **Software Planning:** Software metrics - Definition – Types of metrics – Product and Project metrics – Function point and feature point metrics – Software project estimation – Steps for estimation – Reason for poor and inaccurate estimation – Project estimation guidelines – Models for estimation – COCOMO Model – Automated tools for estimation.

2.4. **CASE :** CASE and its scope – Architecture of CASE environment – Building blocks for CASE – CASE support in software Life cycle – Objectives of CASE – Characteristics of CASE tools – List of CASE tools – Categories, advantages and advantages of CASE tools.

UNIT – III SOFTWARE MAINTENANCE AND RISK MANAGEMENT

3.1. **Software Maintenance:** Software as an evolution entity – Software configuration management activities – Change control process – Software version control – Software configuration management – Need for maintenance – Categories of maintenance – Maintenance cost – Factors affecting the effort – Modelling maintenance effort

3.2. **Risk management :** Definition of risk – Basics for different types of software risks – Monitoring of risks – Risk management – Risk avoidance – Risk detection – Risk control – Risk recovery – Sources of risks – Types of risks

3.3. **Project scheduling** : Introduction – Factors affecting the task set for the project – scheduling methods – Work breakdown structure – Flow graph – Gant chart - PERT

UNIT – IV SOFTWARE TESTING

4.1. **Software Testing :** Introduction to testing – Testing principles – Testing objectives – Test Oracles - Basic terms used in testing – Fault – Error – Failure - Test cases – Black box and white box testing – Advantages and disadvantages of above testing – Methods for Block box testing strategies – Methods for white box testing strategies – Testing activities – Test plan.

4.2. **Levels of testing:** Unit testing - Integration tests – System testing – Types.

4.3. **Software Testing strategies:** Static testing strategies – Formal technical reviews – Code walkthrough – Code inspection - Debugging – Definition – Characteristics of bugs – Life cycle of a Debugging task – Debugging approaches.

4.4 **Software Testing Tools:** Need for tools – Classification of tools – Functional/Regression Testing tools – Performance/Load Testing Tools – Testing process management Tools – Benefits of tools – Risk Associated with tools – Selecting tools – Introducing the tool in the testing process - Different categories of tools – Examples for commercial software testing tool.

4.5 **Code of Ethics for Software Professionals:** Human Ethics – Professional Ethics – Ethical issues in Software Engineering – Code of Ethics and professional Practice: Software Engineering code of ethics and professional Practice – Ethical issues: Right versus Wrong

UNIT – V SOFTWARE RELIABILITY AND QUALITY ASSURANCE

5.1. **Software Quality Assurance :** Verification and validation – SQA – Objectives and Goals – SQA plan - Definition of software quality – Classification of software qualities - Software quality attributes – Important qualities of software products - Importance of software quality – SEI – CMM - Five levels – ISO 9000 – Need for ISO Certification – Benefits of ISO 9000 certification – Limitation of ISO 9000 certification – Uses of ISO - Salient features of ISO 9000 Requirements – Introduction to ISO 9126

5.2 **Software Reliability :** Definition – Reliability terminologies – Classification of failures – Reliability metrics – Reliability growth modeling – Reliability measurement process

5.3 **Reverse Software Engineering:** Definition – Purpose – Reverse engineering Process – Reverse engineering tasks – Characteristics and application areas of reverse engineering – Software re-engineering – Principle – Re- engineering process – Difference between forward engineering and re-engineering.

REFERENCES

1. Software Engineering Ian Sommerville Pearson Education Sixth Edition
2. Fundamentals of Software Engineering Rajib Mall PHI Learning Pvt Limited, New Delhi 28th Printing – August 2011
3. Software Engineering Bharat Bhusan Agarwal, Sumit Prakash Tayal Firewall Media, New Delhi Second Edition 2008