5.1 SOFTWARE ENGINEERING

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RATIONALE

The system analysis and design is the backbone of Application software development. After studying the subject the students will be able to develop and design the system according to given requirements. It involves various steps in analysis and design of the system. It includes the knowledge of preparing project systematically. It is important to know about various aspects of the system analysis and design so that the students will be able to understand the responsibilities while designing and implementing the project.

LEARNING OUTCOMES

After undergoing this subject, the students will be able to:

- understanding the problem and corresponding requirement for development of software.
- describe the various phases of the system development life cycle.
- identify the expected benefits and scope of the projects.
- prepare and develop data flow diagrams and decision tables.
- perform a feasibility study of the system.
- write detailed design specifications for programmes and database.
- select methods for evaluating the effectiveness and efficiency of a system.
- apply different testing techniques on simple programme.

DETAILED CONTENTS

1. Introduction to Software Engineering   (10 periods)

   System Concepts: Types of systems : (open, closed, static and dynamic systems).

   Introduction, Programmes v/s Software Products

Emergence of Software Engineering- Early Computer Programming, High-level Language Programming, Control flow based Design, Data Structure Oriented Design,Object Oriented Design

2. Software Life Cycle Models   (12 periods)

Requirement of Life Cycle Model, Classic Waterfall Model, Prototyping Model, Evolutionary Model, Spiral Model, introduction to agile methodology.

Comparison of different Life Cycle Models

3. Software Planning   (10 periods)

Responsibilities of Software Project Manager

- Metrics for Project Size Estimation- LOC(Lines of Code), Function Point Metric

- Project estimation Techniques- Using COCOMO Model.

4. Requirement Analysis and Specification   (06 periods)

Requirement gathering and Analysis, Software Requirement Specifications(SRS), Characteristics of good SRS

5. Software Design and Implementation   (10 periods)

Characteristics and features of good Software Design Cohesion and Cupling, Software design Approaches- Function Oriented Design (Data flow diagrams, Data dictionary, Decision Trees and tables), Object Oriented Design, Structured Coding Techniques, Coding Styles, and documentation

6. Software Testing   (08 periods)

Concept of Testing, Testing type cycle (V-Model), Verification v/s Validations, Unit Testing, Black Box Testing, White Box Testing, Integration testing, System testing, Configuration management, Overview of test cases.

MEANS OF ASSESSMENT

–   Assignments and quiz/class tests, mid-term and end-term written tests
–   Software installation, operation, development and viva-voce

LIST OF PRACTICALS

1.   Develop a SRS on a given topic/project/problem.
2.   Develop DFD Model (level 0 and level 1 DFD) of the problem.
3.   Develop sequence diagram
4.   Develop class diagrams
5.   Use testing tools such as J-meter, Canoo Web Test
6.   Use a project management tool such as Microsoft project or Gantt project etc (Team week, Target process, Gantt project)
7.   Write test cases for any known application
8.   Take any system and study its system specification and report the various bugs.

RECOMMENDED BOOKS

1. Software Engineering by Rajib Mall, PHI Publishers, New Delhi

2.An IntegratedApproach toSoftware Engineering by Pankaj Jalote, Narosa Publishing House Pvt Ltd, Darya Ganj, New Delhi 110002

3. Software Engineering, Sangeeta Sabharwal, New Age International, Delhi

4. Software Engineering by KK Aggarwal and Yogesh Singh

5. Software Engineering – A Practitioner's Approach by RS Pressman, Tata McGraw

Hill Publishers, New Delhi

6. e-books/e-tools/relevant software to be used as recommended by AICTE/NITTTR, Chandigarh.

Websites for Reference:

http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	10	18
2	12	24
3	10	18
4	06	10
5	10	18
6	08	12
Total	**56**	**100**