Software Engineering

Semester – IV	Subject Code: BS41602	Lectures: 60

Objectives:

The syllabus aims in equipping students,

- To learn basics of system analysis and design
- To learn various process models used in practice
- To learn principles of software testing
- To learn to build analysis model

Unit 1: Introduction to system and software	8

1. System concepts

- System definition
- Characteristics of a system : Organization, Subsystem, Interaction, Interdependence, Integration, Central objective, Standards, Black-box
- Elements of a system: Outputs, Inputs, Processor(s), Control, Feedback, Environment, Boundaries, Interface
- Types of systems : Physical and Abstract Systems, Open and Closed Systems, Computer-based Systems (Management Information System and Decision Support System)

[Ref. book 1-Chaper 1]
[Ref. book 2-Chaper 1]

2. Software and Software Engineering

- The Nature of Software-defining software, software application domains, Legacy software
- Software Engineering: A Layered Technology
- The Software Process(Generic process framework , Umbrella activities)

[Ref. book 2-Chaper 1]

Unit 2: SDLC and process model	**22**

3. System Development Life Cycle (SDLC)

- Introduction
- Activities of SDLC-
    - Preliminary Investigation -
        - Requirements engineering tasks(Inception, Elicitation, Elaboration, Negotiation, Specification, Validation, Requirements Management)
        - Fact finding techniques(Interview, Questionnaire, Record Review, Observation)
    - Determination of system requirements
    - Design of a system
    - Development of software
    - System testing (Unit Testing, Integration Testing, System Testing, Acceptance Testing)
    - System implementation and evaluation
    - System maintenance

[**Ref. book 2**-Chaper 1]
[**Ref. book 1**-Chaper 7]

4. Process Models

- A Generic process model
- Prescriptive process models
    - The Waterfall model
    - V-Shape model
- Incremental Process Models
    - The incremental model
    - The RAD model
- Evolutionary Process Models
    - Prototyping
    - Spiral Model
- Concurrent Models
    - The concurrent development model

[**Ref. book 1**-Chaper 2,3]

5. An Agile View of Process

- Introduction to agility, agile process
- Human factors
- Introduction to agile process models(Extreme programming, Adaptive software development, Dynamic system development method, Scrum, Crystal)

  [Ref. book 1-Chaper 4]

Unit 3: Structured analysis and software testing **18**

6. Structured analysis development strategy

- Structured analysis-definition, component, data flow analysis
- Features and tools of data flow analysis
  - ➢ Logical Data Flow Diagram (Logical DFD)- notations, drawing a context diagram, exploding a context diagram into greater detail (1st level, 2nd Level DFD etc…)
  - ➢ Evaluating Data Flow Diagram for correctness
- A Data Dictionary-definition, importance, components
- Structure chart-definition, notation(Module, Condition, Jump, Loop, Data Flow, Control Flow)
- Case study

  [Ref. book 2-Chaper 4]

7. Software Testing

- Introduction
- Quality assurance
- Walkthroughs and Inspections
- Types of testing(Functional testing, System testing, end-to- end testing, regression testing, Acceptance testing, Load testing, Stress testing, Performance testing, Usability testing, install/uninstall testing)
- Unit testing and debugging(Black box, White Box, Grey Box testing)
- System testing(Integration Testing and Acceptance Testing)
- Introduction to Software testing tool

  [Ref. book 3-Chaper 8]

***Contact hours – 12 hours**

Recommended Reference Books:

1. Roger S. Pressman, ***Software Engineering : A Practitioner's Approach***-7th edition-McGraw-Hill International Editions
2. James A. Senn , ***Analysis and Design of Information Systems***-2nd Edition- McGraw-Hill International Editions
3. Richard E. Fairley, ***Software Engineering Concepts***-Tata McGraw- Hill