SEMESTER II

23MX21 SOFTWARE ENGINEERING

3 1 0 4

Software Engineering :Engineering approach to software development – role of Software Engineering towards success of large software projects – Project Estimation Techniques - Software development methodologies - Software life cycle models – Agile Development, Extreme Programming, Scrum; DevOps, DevOps Vs Agile. Case study: Identify the suitable development method for real world problems. (11+3)

REQUIREMENTS GATHERING: Requirements gathering tasks – Requirements Engineering Process - Qualities of good requirements -Types of Requirements-Requirements elicitation - Requirements Specification, Characteristics and components of SRS, Structure of SRS (IEEE format). Case study- Develop Software Requirement Specification for real world applications. (11+4)

OBJECT ORIENTED ANALYSIS & DESIGN: UML Diagrams to support Object Oriented Analysis and Design. - Software Design Documentation – User Interface Design. Case Study-Develop Object oriented models for real world applications. (11+4)

SOFTWARE TESTING FUNDAMENTALS: Testing fundamentals - Black-Box and White-Box testing – Basis Path testing – Boundary value analysis - Requirements phase testing - Design phase testing - Program phase testing - debugging and program

peer view test tools - Evaluating test results - Installation phase testing - Acceptance testing – Testing GUI – Testing Web Applications. Case study- Software testing using open source tools. (12+4)

Total L: 45, T: 15 = 60

REFERENCES:

1. Roger Pressman S and Bruce Maxim "Software Engineering: A Practitioner's Approach", Tata McGraw-Hill, 2020.
2. Ian Sommerville, "Software Engineering", Pearson Education, 2018.
3. Pankaj Jalote's "Software Engineering: A Precise Approach", Wiley,2010
4. James Rumbaugh, Ivar Jacobson and Grady Booch, "The Unified Modeling Language Reference Manual", Pearson Education, 2009.

23MX22 DESIGN AND ANALYSIS OF ALGORITHMS

3 1 0 4

SEARCH TREES: Algorithmic complexity- Asymptotic Notations -AVL trees: Definition– Height – Operations: search– insert, delete - AVL rotations – Examples. **MULTI-WAY SEARCH TREES**: M-way search trees– B-Tree – B+ trees - Tries – Operations: Insert, delete, retrieve- Example. (11+4)

DIVIDE AND CONQUER: Method – Finding the maximum and minimum- Binary Search – Merge sort, Quick sort – Performance Analysis. **GREEDY METHOD**: Method – Knapsack Problem- Minimum cost spanning tree- Prim's algorithm- Single source shortest path- Optimal storage on tapes – Optimal merge patterns: Huffman Coding. (12+4)

DYNAMIC PROGRAMMING: Method –Principles of Optimality- All pairs shortest path problem – 0/1 Knapsack Problem - Traveling salesman problem-Multi stage decision graph- Single source shortest path - String Editing- Flow Shop Scheduling- Longest Common Subsequence. (11+3)

BACK TRACKING: Method – Eight queen's problem, Sum of subsets, Knapsack Problem, Graph coloring. **BRANCH AND BOUND**: Method - LC Search – FIFO Branch and Bound-0/1 Knapsack. (11+4)

Total L: 45+T :15=60

REFERENCES:

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithms" Universities Press, 2010.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Pearson Education, 2006.
3. Thomas H Cormen, Charles E Leiserson, Ronald L Rivest and Clifford Stein "Introduction to Algorithms", The MIT Press, 2022.
4. Stevens S Skiena, "The Algorithm Design Manual", Springer, 2020

23MX23 OBJECT ORIENTED PROGRAMMING USING JAVA

3 0 0 3

OBJECT ORIENTATION: Object Orientation Programming - Basic Concepts - Abstraction – Classes and Objects – Encapsulation - Inheritance – Polymorphism - **JAVA FUNDAMENTALS**: Features of Java – Java Development Environment – Bytecode - Data types- Variables -Operators – Expressions – Functions – Static Members - Arrays - Strings. (11)

INHERITANCE: Inheritance – Types - Access rules, super – final – Abstract classes – Inner classes **POLYMORPHISM**: Static binding – Dynamic binding – Method overloading - Runtime Polymorphism. Package: Defining, Creating and Accessing a Package, Understanding CLASSPATH, Importing package - Interface: Create – Implement. **EXCEPTION HANDLING**: Exception - Types – try and catch - Multiple catch - Nested try – throw - throws – finally - User defined exception. (12)

INPUT / OUTPUT: Stream classes: Byte – Character - File class - File operations - Console class – Serialization – Garbage Collection. **MULTITHREADING**: Thread -based multitasking - Process-based multitasking - Java thread model - Creating threads - Thread priorities - Synchronization - Inter thread communication. (10)

EVENT DRIVEN PROGRAMMING: Basics - Applets Vs Applications – AWT: Containers, Components, Layout Managers – Event handling – Event Delegation model. **COLLECTIONS FRAMEWORK:** Collection: Interface – Classes – Generics. **JDBC:** JDBC Drivers, JDBC API, Executing statements, prepared statements and callable statements, Design and development of database applications. (12)

Total L: 45

REFERENCES:

1. Herbert Schildt, "JAVA - The Complete Reference", 12th Edition, Tata McGraw Hill, 2021.
2. Cay S Horstmann, "Core Java Volume I: Fundamentals", 12th Edition, Oracle Press, 2021.
3. Cay S Horstmann, "Core Java Volume II: Advanced Features", 12th Edition, Oracle Press, 2022.

4. Deitel and Deitel, "JAVA - How to Program", 11th Edition, Prentice Hall International Inc, 2017.
5. Y. Daniel Liang, Pearson, "Introduction to JAVA Programming, 7th Edition, Tata McGraw Hill, 2017.

23MX24 ENTERPRISE COMPUTING USING FULL STACK

3 2 0 5

ENTERPRISE FOUNDATIONS: Enterprise software characteristics – Enterprise Architectural overview- Component Based software development. Multi-tier/multilayer system - Use of patterns, frameworks, and software stacks for Enterprise application development. Enterprise software for Hospital, University and manufacturing firm. (12+6)

ENTERPRISE DATA ENABLING: Enterprise Data - Basis of JDBC, Drivers, Connection, Statement, Result Set, Advanced JDBC features, CRUD operations and Query Languages. NOSQL in Enterprise applications. **ENTERPRISE WEB ENABLING:** Enterprise-Web Programming, Java Servlets - Java Server pages, State and session management- MVC architecture- **Java based Frame works:** ORM, JPA, Hibernate, SPRING and SPRING BOOT (13+ 8)

JAVA SCRIPT BASED FRAME WORKS: Basics- MERN stack- MERN Components-React, Node.js, Express, MongoDB. React Components-React classes, composing components, passing data- using properties, property validation. Angular Component - CLI- Property Bindings, and Expressions - Event Bindings and Statements. (10+10)

DISTRIBUTED ENTERPRISE COMMUNICATIONS ENABLING: Distributed Enterprise Communications Basis – distributed object middleware – synchronous and asynchronous communications, Java web services using SOAP and RESTFUL. REST: HTTP method as Actions, JSON, Express, Routing Hander function, Request Object, Response objects - Micro services for Enterprise applications. (10+6)

Total L: 45 + P:30 = 75

REFERENCES:

1. SebatianDaschner, "Architecting modern Java EE applications", Packt Publishing, 2017
2. Prashantpadmanaban, "Java EE 8 and Angular", Packt Publishing, 2018.
3. Kogent Solutions Inc. "Java Server Programming",Dreamtech Press, 2018.
4. Peter Späth , "Beginning Jakarta EE Enterprise Edition for Java: From Novice to Professional", Apress publishing2020.
5. Carnell, John, and Illary Huaylupo Sánchez "Spring micro services in action", Manning, 2021.
6. Shama Hoque , "Full-Stack React Projects: Learn MERN stack development by building modern web apps using MongoDB, Express, React, and Node.js", Packt Publishing, 2020

23MX26 JAVA PROGRAMMING LABORATORY

0 0 4 2

- Implement the following concepts, using the problem sheets given during the lab sessions:
  - i) Object-oriented features.
  - ii) Arrays and strings.
  - iii) Inheritance
  - iv) Interfaces and packages.
  - v) User-defined exceptions.
  - vi) Stream classes.
  - vii) Multithreading.
  - viii) Operations on objects using Collections framework.
  - ix) Event driven programming with database connectivity.
- Design, develop and deploy packages to apply features of Java in solving real world problems.

Total P: 60

23MX27 MOBILE APPLICATION DEVELOPMENT

0 0 4 2

Study and Develop experiments in the following topics:

1. Design of simple apps using Text and Page Layout
2. Create apps using various Controls, Styles and Page Navigation.
3. Creating apps with menu, list, grid layouts and multimedia controls
4. Design apps with notification management
5. Design apps using server less functions
6. Creating apps with data storage, cloud and content provider support
7. Designing apps that supports Mobility and Location Based APIs

8. Design of apps using Jetpack Compose
9. Design of apps using cross platform mobile SDKs
10. Design of apps using MVVM pattern

Develop and deploy applications not limited to the following areas:

i) Ecommerce Apps
ii) Chatting Apps
iii) Social media Apps
iv) Location based Apps

Total P: 60

23MX28 PROFESSIONAL COMMUNICATION AND PERSONALITY DEVELOPMENT

0 0 2 1

1. Introduction to Personality Development

The Concepts of Personality – Significance of Personality development – Definition of success and failure – SWOT analysis (2)

2. Attitude and Motivation

Definition of attitude – Concepts –Positive and negative attitude – Advantages and disadvantages. Concepts of motivation – Significance – Internal and External motives – Importance of self motivation. (2)

3. Self esteem and other aspects of Personality Development

Self esteem – Interpersonal relationships – Lateral Thinking – Problem solving – Conflict and stress Management – Decision making – Leadership skills – Team work – Workplace Etiquette (6)

4. Professional Communication

Types of Professional Communication – Oral and Written forms Body Language – Group Communication – Resume building – Interview Techniques – Academic Writing (5)

PRACTICALS – Group Discussions (4)
Self Introduction (Oral) (3)
Listening activities (5)
Mock Interviews (3)
Written Assignments – E mails and Case Studies

Total P:30

References

1. Prashant Sharma, "Soft Skills - Personality Development for Life Success", BPB Publication, New Delhi, 2021
2. Barun K Mitra, "Personality Development and Soft Skills", Oxford University Press, New Delhi, 2016
3. V B Rao, "Personality Development and Soft Skills", BS Publication, Hyderabad, 2020
4. Shikha Kapoor, "Personality Development and Soft Skills", IK International, Bengaluru, 2018