



SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)

QUESTION BANK

Year / Semester: III B.Tech VI Semester

Regulation: R23

Subject and Code: Full Stack AI Development & 23CAI362T

SYLLABUS:

UNIT – I: INTRODUCTION TO FULL STACK AI DEVELOPMENT

Overview of Full Stack Development, Introduction to Artificial Intelligence in Web Applications, Components of Full Stack AI System: – Frontend– Backend– Database– AI / Machine Learning Model Architecture of AI-Based Web Applications MVC and MVVM Architecture RESTful APIs and Microservices AI Application Development Life Cycle Design and Development of AI Dashboards Challenges in Building Scalable AI Applications

UNIT – II: FRONTEND TECHNOLOGIES FOR AI APPLICATIONS

Fundamentals of HTML, CSS, JavaScript Introduction to React.js Components, Props, and State React Hooks Virtual DOM Concept, State Management using Redux, API Integration using Fetch and Axios Data Visualization using Chart.js and D3.js, UI/UX Principles in AI Applications, Responsive Web Design, Displaying AI Model Predictions in User Interface

UNIT – III: BACKEND & AI MODEL INTEGRATION

Introduction to Backend Development, Node.js and Express.js Framework, Python Flask for AI APIs, Creating RESTful APIs, JSON Data Exchange, Integrating Machine Learning Models into Web Applications, Overview of TensorFlow, PyTorch, and Scikit-learn, Middleware and Error Handling API Security Practices, Building Prediction APIs, Backend Architecture for Recommendation Systems

UNIT – IV: DATABASES, AUTHENTICATION & AI WORKFLOWS

Introduction to Databases in AI Applications, SQL vs NoSQL Databases, MongoDB for AI Applications, CRUD Operations, Storing AI Inputs and Outputs, Database Schema Design for AI Systems, Authentication and Authorization, JWT (JSON Web Token), OAuth Authentication Role-Based Access Control, Secure AI Workflows, AI Feedback Loop, Data Logging and Monitoring

UNIT – V: DEPLOYMENT, SCALING & CASE STUDIES

Deployment of AI Applications, Docker and Containerization, Writing Dockerfiles, CI/CD Pipeline in AI Development, GitHub Actions and Jenkins Overview, Cloud Deployment (AWS, Azure, GCP) Monitoring AI Applications, Load Testing and Performance Optimization, Vertical and Horizontal Scaling, Auto Scaling in Cloud Environments, Model Versioning, Model Drift and Retraining End-to-End AI Case Studies (Chatbot, Healthcare, Recommendation System)

Case Study 1: AI Chatbot, **Case Study 2:** Fraud News Detection, **Case Study 3:** Sentimental Analysis



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Max Marks: 10

| S.No. | CO | Questions | BT |
|--|----|---|----|
| Unit I: INTRODUCTION TO FULL STACK AI DEVELOPMENT | | | |
| 1 | 1 | Define Full Stack AI Development. Explain its components. | L2 |
| 2 | 1 | Explain the architecture of a Full Stack AI application with diagram. | L4 |
| 3 | 1 | Differentiate traditional web apps and AI-powered web applications. | L4 |
| 4 | 1 | Explain MVC and MVVM architecture in AI applications. | L3 |
| 5 | 1 | Describe AI application development lifecycle. | L2 |
| 6 | 1 | Discuss AI dashboards and their importance. | L3 |
| 7 | 1 | Explain REST architecture and API integration. | L2 |
| 8 | 1 | Analyze challenges in scalable AI web applications. | L4 |
| 9 | 1 | Explain Full Stack AI workflow. | L2 |
| 10 | 1 | Design architecture for an AI Chatbot system. | L6 |



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| Unit II: Frontend Technologies for AI Applications | | | |
| 1 | 2 | Explain role of React.js in AI dashboards. | L2 |
| 2 | 2 | Discuss state management using Hooks and Redux. | L3 |
| 3 | 2 | Compare React.js and traditional JavaScript. | L4 |
| 4 | 2 | Explain data visualization using Chart.js and D3.js. | L3 |
| 5 | 2 | Describe UI/UX principles in AI applications. | L2 |
| 6 | 2 | Demonstrate API integration using Axios. | L3 |
| 7 | 2 | Design frontend for AI sentiment analysis system. | L6 |
| 8 | 2 | Explain responsive design in AI web apps. | L2 |
| 9 | 2 | Explain Virtual DOM and performance benefits. | L4 |
| 10 | 2 | Create React component to display AI predictions. | L6 |



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| Unit III: (Backend & AI Model Integration) | | | |
| 1 | 3 | Explain Node.js and Express.js in AI backend. | L2 |
| 2 | 3 | Describe Flask for ML model APIs. | L3 |
| 3 | 3 | Explain steps for ML model integration in web apps. | L4 |
| 4 | 3 | Compare TensorFlow, PyTorch and Scikit-learn. | L4 |
| 5 | 3 | Explain JSON data exchange in AI apps. | L2 |
| 6 | 3 | Discuss middleware and error handling. | L3 |
| 7 | 3 | Demonstrate creation of prediction API using Flask. | L6 |
| 8 | 3 | Analyze performance issues in AI backend deployment. | L4 |
| 9 | 3 | Explain API security in AI systems. | L3 |
| 10 | 3 | Design backend for recommendation system. | L6 |



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| Unit IV: (Databases, Authentication & AI Workflows) | | | |
| 1 | 4 | Explain MongoDB role in AI applications. | L2 |
| 2 | 4 | Differentiate SQL and NoSQL databases. | L4 |
| 3 | 4 | Describe CRUD operations in AI systems. | L3 |
| 4 | 4 | Explain JWT authentication mechanism. | L3 |
| 5 | 4 | Compare JWT and OAuth. | L4 |
| 6 | 4 | Explain secure AI workflows. | L5 |
| 7 | 4 | Design database schema for AI chatbot. | L6 |
| 8 | 4 | Discuss feedback loop in AI systems. | L4 |
| 9 | 4 | Explain role-based access control. | L3 |
| 10 | 4 | Evaluate indexing techniques in AI databases. | L5 |



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| Unit V: (Deployment, Scaling & Case Studies) | | | |
| 1 | 5 | Explain Docker in AI deployment. | L2 |
| 2 | 5 | Describe CI/CD pipeline in AI development. | L3 |
| 3 | 5 | Compare vertical and horizontal scaling. | L4 |
| 4 | 5 | Explain cloud deployment of AI applications. | L3 |
| 5 | 5 | Discuss monitoring tools in AI systems. | L4 |
| 6 | 5 | Evaluate model drift and retraining strategies. | L5 |
| 7 | 5 | Design scalable architecture for real-time AI chatbot. | L6 |
| 8 | 5 | Describe load testing for AI APIs. | L3 |
| 9 | 5 | Analyze AI healthcare case study. | L4 |
| 10 | 5 | Develop deployment workflow for Full Stack AI app. | L6 |
| 11 | 5 | Explain Docker in AI deployment. | L2 |

Note: L1-Remembering, L2-Understanding, L3-Appling, L4-Analyzing, L5-Evaluating, and L6-Creating



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Instruction to Faculty Members:

The Six Levels of Bloom's Taxonomy:

1. **Remembering:** Retrieving, recognizing, and recalling relevant knowledge from long-term memory (e.g., list, define, name, locate).
2. **Understanding:** Constructing meaning, explaining ideas, or concepts (e.g., summarize, interpret, classify, compare).
3. **Applying:** Using information in new situations or implementing procedures to solve problems (e.g., solve, use, demonstrate, implement).
4. **Analyzing:** Breaking material into constituent parts, determining how the parts relate to one another and to an overall structure (e.g., contrast, categorize, distinguish, diagram).
5. **Evaluating:** Making judgments based on criteria and standards through checking and critiquing (e.g., judge, critique, justify, defend, argue).
6. **Creating:** Putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure (e.g., design, construct, develop, formulate).