

Subject Code	Subject Name	Credits
26CS007	FULL STACK DEVELOPMENT	04

Course Objectives:

1. Understand and use database queries and web technologies to build interactive applications.
2. Apply Flask concepts to develop backend services.
3. Utilize micro services architecture for building scalable applications.
4. Demonstrate version control, and DevOps workflows for software deployment.
5. Explore cloud platforms and AI-assisted coding techniques for modern application development

Learning Objectives:

On successful completion of the course, students will be able to:

1. Use database queries and web technologies to create dynamic web pages:
2. Implement backend services using Flask.
3. Develop micro service-based applications using FastAPI.
4. Apply version control, DevOps and CI/CD practices for application delivery.
5. Explore cloud-enabled applications using cloud services and AI-based coding tools.

Unit 1 - Database Management and Web Development basics (12 Hrs.)

Database Management and Web Development basics: Creating Tables – SELECT statement – Aggregate Functions - Sorting and Filtering Data - Joins - Sub query. Working with Date - Indexes, and Views - Commit, and Rollback - Built- in and User-Defined Functions. HTML5 – Tags in HTML – Design HTML Forms, Handling user inputs - use of required. CSS3 - Box model - Styling forms and layouts. JavaScript for Dynamic Web pages- ES6 features - DOM manipulation – GetElementById - Form validation. Event handling - Mouse click and double click events - Mouse hover - Keyboard events.

Unit 2 – MVC and Object Relational Mapping (12 Hrs.):

Model View Controller and Object Relational Mapping: Simple Flask app - Decorators in Python - Inversion of Control and Dependency Injection using Python libraries. Model View Controller using Flask - Auto-wiring - Object Relational Mapping concepts using SQLAlchemy ORM. ORM-related decorators and model definitions. Data access layer implementation using SQLAlchemy.

Unit 3 - Micro services Programming (12 Hrs.):

Micro services Programming: Micro services architecture and design principles. Development of micro services using Python frameworks such as Flask and FastAPI. Load balancing techniques. REST-based communication between micro services. Unit testing using pits and unit test frameworks.

Unit 4- Version Control (12 Hrs.):

Version Control, DevOps Foundations: Git & GitHub Fundamentals – Repository Management, Branching, Merging, Build - DevOps - Continuous Integration and Continuous Deployment (CI/CD) using Jenkins.

Unit 5 - Cloud Computing and Vibe Coding (12 Hrs.):

Cloud Computing and Vibe Coding: Cloud Services: API Gateway, File Storage, Compute, Relational Database Service - Introduction to AWS, Google Cloud, and Azure - Platform as a Service (PaaS) Infrastructure as a Service (IaaS) - Software as a Service (SaaS) – Cloud applications for business –Vibe Coding - Prompt Engineering – GenAI.

Reference Books:

1. Michael T. Goodrich, Roberto Tamassia & Michael H. Goldwasser, Data Structures and Algorithms in Python, 1st Edition, John Wiley & Sons, 2013.
2. Abraham Silberschatz, Henry F. Korth, & S. Sudarshan. (2019). Database System Concepts, Seventh Edition, McGraw-Hill Education.