PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE
Autonomous
Siddhartha Nagar, Vijayawada-520010
Re-accredited at 'A+'by the NAAC

Offered to: M.Sc. (Computational Data Science)

CourseName	Dynamic Web Programming Using Python		**L**	**T**	**P**	**C**	**CIA**	**SEE**	**TM**
CourseCode	22DS4E8		4	0	0	4	30	70	100
Year of Introduction: 2005	**Year of Offering:** 2021	**Year of Revision**: 2022			**Percentage of Revision:**				
L-Lecture, T-Tutorial, **P**-Practical, **C**-Credits, **CIA**-InternalMarks, **SEE**-ExternalMarks, **TM**-TotalMarks									

CourseDescriptionandPurpose: Dynamic Web Programming Using Python is a course that illustrates *concepts of.Dynamic Web Programming, Basic Concepts of Server-Side Development, Advanced JavaScript and DOM Manipulation, Frontend Frameworks, Server-Side Frameworks, Database Integration, Building RESTful APIs, Security in Web Development and Emerging Trends in Dynamic Web Development*

Course Objectives: Thiscoursewillhelp enable the students t o understand and learn various *Concepts* of*Dynamic Web Programming, Basic Concepts of Server-Side Development, Advanced JavaScript and DOM Manipulation, Frontend Frameworks, Server-Side Frameworks, Database Integration, Building RESTful APIs, Security in Web Development and Emerging Trends in Dynamic Web Development.*

Course Outcomes:
On successful completion of course, students should be able to
CO1: Recall Evolution of Web Development, Basics of HTML, CSS, and JavaScript, Server-Side Development Basics
CO2: Demonstrate advanced JavaScript and Frontend Frameworks, Database Integration
CO3: Apply and integrate server-side frameworks, Security in Web Development.
CO4: Analyze Security in Web Development, showcasing synthesis and evaluation in web development.
CO5: Evaluate RESTful APIs, emerging trends in dynamic web development and DOM manipulation.

CO-PO MATRIX								
COURSE CODE	**CO-PO**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
22DS4E8	**CO1**	M	M					
	CO2			M				L
	CO3			M			**M**	
	CO4				H			
	CO5					H		**L**

UNIT-I (12 Hours)

Introduction to Dynamic Web Programming: Evolution of Web Development-Static vs. Dynamic Websites,Emergence of Dynamic Content, Client-Side vs. Server-Side Programming-Roles and Responsibilities, Communication between Client and Server**,** Basics of HTML, CSS, and JavaScript-

HTML Structure and Tags, CSS Styling and Layout, JavaScript Fundamentals ,Setting up a Development Environment - Code Editors (e.g., Visual Studio Code) ,Local Web Servers (e.g., Node.js).

Server-Side Development Basics: Server-Side Scripting Languages-Overview of PHP, Python, Node.js- Choosing the Right Language for the Task, Handling Form Submissions- Form Elements and Attributes

, Processing Form Data on the Server,Introduction to Databases and Server-Side Data Handling-
Basics of Database Design, Connecting to Databases from Server-Side. Code- Server Virtualization and its Relevance-Virtual Machines vs. Containers, Benefits of Server Virtualization.

UNIT-II (12 Hours)

Advanced JavaScript and DOM Manipulation

Advanced JavaScript Concepts-Closures, Promises, Async/Await**,** Manipulating the Document Object Model (DOM)**-**Selecting and Modifying DOM Elements, Creating and Appending Elements**,** Event Handling and Delegation-Responding to User Interactions**,** Delegating Events for Efficiency**,** Asynchronous Programming and AJAX**-**Making Asynchronous Requests**,** Handling Responses with Callbacks and Promises

Introduction to Frontend Frameworks: Overview of Frontend Frameworks- React, Angular, Vue.js

Component-Based Architecture-Building Reusable Components, Managing State in Components
State Management in Frontend Applications- Local State vs. Global State, Tools for State Management (e.g., Redux, Context API), Building a Simple Frontend Application using a Framework- Creating a Project Structure ,Implementing Basic Functionality

UNIT-III (12 Hours)

Server-Side Frameworks: Introduction to Server-Side Frameworks**-**Express.js, Django, Flask,Routing and Middleware in Server-Side Frameworks-Defining Routes and Handling HTTP Methods,Implementing Middleware for Request Processing**-**Handling Requests and Responses-Processing Client Requests**,** Constructing Server Responses**,** Building a Basic Server-Side Application- Structuring the Project**,** Implementing CRUD Operations.

Database Integration: Connecting to Databases-MySQL, MongoDB, SQLite**,** Establishing Database Connections**,** CRUD Operations (Create, Read, Update, Delete)- Writing SQL Queries and Commands. Handling Database Transactions**,** Data Modeling and Schema Design-Entity-Relationship Diagrams

,Normalization and Denormalization, Database Security Considerations- SQL Injection Prevention
,Authentication and Authorization

UNIT-IV (12 Hours)

Building RESTful APIs: Introduction to RESTful Architecture-Principles and Constraints**,** RESTful API Design Best Practices**,** Creating APIs with Server-Side Frameworks**-**Defining Endpoints and Methods

,Handling API Requests and Responses, Consuming APIs on the Client Side-Making API Requests from Frontend Applications, Handling API Responses and Errors, Authentication and Authorization in APIs-

Token-Based Authentication, Role-Based Authorization

Security in Web Development: Common Web Vulnerabilities-Cross-Site Scripting (XSS), Cross-Site Request Forgery (CSRF)**,** Securing Web Applications-Input Validation and Sanitization**,** Secure Communication (HTTPS)**,**Best Practices for Web Security-Content Security Policy (CSP)**,** Two-Factor Authentication (2FA)

UNIT-V (12 Hours)

Emerging Trends in Dynamic Web Development: Progressive Web Apps (PWAs)-Offline Capabilities, Push Notifications, WebAssembly and its Applications**-**Running Native Code in Browsers,

Serverless Architecture-Functions as a Service (FaaS),Benefits and Use Cases,Future Trends in Dynamic Web Development- Voice Interfaces, Artificial Intelligence in Web Development

Prescribed Text Books

	Author	Title	Publisher
1	Steve Holden	Python Web Programming"	New Riders,2022

Reference Text Books			
	Author	Title	Publisher
1	Miguel Grinberg,	Flask Web Development/; Developing Web Applications with Python	O'Reilly Media.2020
2	William S. Vincent,	Django for Beginners: Build websites with Python and Django"	William S. Vincent.2022

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M.Sc.(Computational Data Science) **Semester :IV**

Course Code: 22DS4E8Course Name: Dynamic Web Programming Using Python

Time: 3 Hours **Max Marks: 70**

SECTION-A

Answer the following questions. (5×4=20Marks)

1. (a) Explain the basics of CSS styling and layout in web development, emphasizing their role (CO1,L2)

(or)

(b) Explain the fundamentals of JavaScript and their importance in dynamic web content creation (CO1,L2)

2. (a) How do three advanced concepts in JavaScript contribute to enhancing web interfaces?(CO2,L1)

(or)

(b) How does JavaScript manipulate the Document Object Model (DOM)? (CO2,L1)

3. (a) Define routing in the context of server-side frameworks.?(CO3,L1)

(or)

(b) Define authentication and authorization in the context of server-side applications.? (CO3,L1)

4. (a) Explain the concept of Cross-Site Request Forgery (CO3,L2)

(or)

(b) Explain*the c*oncept of token-based authentication in the context of RESTful APIs.(CO5,L2)

5. (a) Discuss the significance of push notifications in PWAs and how they enhance user engagement. (CO5,L6)

(or)

(b) Discuss the emerging trend of voice interfaces in dynamic web development. (CO5,L6)

SECTION-B

Answer the following questions. **(5×10=50Marks)**

6. (a) Explain the evolution of web development, highlighting the differences between static and dynamic websites.. (CO1,L2)

(or)

(b)Explain the importance of a development environment in dynamic web programming. (CO1,L2)

7. (a) Compare and contrast Callbacks and Promises in asynchronous JavaScript. (CO2,L2)

(or)

(b) Compare and contrast local state and global state in the context of frontend applications. (CO2,L2)

8. (a) Explain the implementation of CRUD operations with examples (CO2,L5)

(or)

(b) Explain the importance of handling database transactions in server-side applications.

Give one example (CO3,L5)

9. (a)Explain in detail the key principles and constraints of the RESTful architecture. (CO5,L2)

(or)

(b) Explain the principles of role-based authorization and its implementation in the context of REST ful

API's (CO5,L2)

10 (a) Explain the concept of server less architecture and highlight its key distinctions from traditional

server-based models.(CO5,L5)

(or)

(b) Explain specific applications where leveraging Web Assembly is advantageous for web developers.

(CO5,L5)