



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering

Level: Diploma

Branch: Computer Engineering / Computer Science & Engineering

Subject Code: DI05000121

Subject Name: Application Design & Development using Vibe Coding

w. e. f. Academic Year:	2026-27
Semester:	5 th
Category of the Course:	PEC-04

Prerequisite:	Basic knowledge of Python, database concepts, HTML, CSS, JavaScript, Bootstrap, and basic programming practices.
Rationale:	Modern software development increasingly incorporates AI-assisted tools to improve productivity, code quality, and development speed. This subject introduces students to Vibe Coding, where AI coding assistants are used to generate, improve, and manage application code. Students learn to develop web applications using the Laravel framework, implement database-driven functionality, and manage projects using GitHub and version control practices. The course also covers deployment using SSH hosting and Git-based updates. In addition, students are introduced to desktop application development using Python frameworks such as Tkinter and PyQt, including GUI design and database integration with SQLite. Through the use of AI-assisted development tools, students gain experience in building, managing, and maintaining modern applications, preparing them for entry-level roles in AI-assisted web and desktop application development environments.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Use AI coding tools and GitHub for managing application code using Vibe Coding practices.	Apply
02	Develop basic web applications using Laravel with AI-assisted code generation.	Apply
03	Implement Laravel CRUD applications using AI tools and deploy them using SSH hosting and Git.	Apply
04	Design desktop GUI applications using Python frameworks (Tkinter / PyQt) with AI coding tools.	Apply



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05	Develop desktop applications with database integration using AI-assisted development tools.	Apply
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Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				ESE(E)	PA(M)	PA(I)	ESE(V)	
0	2	4	4	00	00	20	30	50

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1	Introduction to Vibe Coding - AI-assisted development (Vibe Coding) - Evolution of coding: Traditional vs AI-assisted development - Benefits and limitations of AI coding tools - Use cases of Vibe Coding in real-world development Prompt Engineering Practice: - Writing prompts for code generation, debugging and optimization, refining prompts using iterative techniques - Prompting Techniques: Zero-shot prompting, few-shot prompting, role-based prompting, instruction-based prompting Vibe Coding Tools Setup and GitHub Integration - Introduction to AI-assisted coding workflow (Vibe Coding) - Installing and configuring VS Code for development - Installing AI coding assistants: Codex / Claude Code / Google Code Assistant - Exploring AI IDEs such as Cursor, Emergent, Replit AI - Writing prompts to generate code using AI tools	05	17



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	GitHub Integration with VS Code • Creating and configuring GitHub account • Installing Git and GitHub extensions in VS Code • Creating new repository • Cloning repository in VS Code • Creating and switching branches • Git operations: stage, commit, push, pull, sync Git File Status Indicators in VS Code • M – Modified file • U – Untracked file • A – Added file • D – Deleted file • R – Renamed file • C – Copied file • ! – Ignored file Merge conflict indicators in code files		
2	Laravel Basics Laravel Environment Setup • Installing required tools: PHP, Composer, Laravel Installer • Creating a new Laravel application • Running Laravel development server Understanding Laravel Project Structure • Overview of important folders: app, routes, resources, public, database • Understanding .env configuration file Basic Routing and Views • Creating simple routes	07	23



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	• Returning text and views from routes • Creating Blade template views Frontend Generation using AI Tools • Generating HTML layouts using AI prompts • Generating CSS components using AI assistants • Improving generated UI using AI tools GitHub Project Management • Creating Laravel project repository on GitHub Pushing project code to GitHub		
3	Laravel CRUD & Deployment Database Configuration • Connecting Laravel application with database • Configuring database in .env file Database Migrations • Creating migration files • Running migrations to create tables Laravel MVC Components • Creating Models • Creating Controllers • Understanding MVC workflow in Laravel CRUD Application Development • Creating forms to insert data • Displaying records from database • Updating records • Deleting records • Generating CRUD code using AI prompts Debugging with AI Tools	06	20



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	- Using AI assistants to detect and fix code errors Deployment using SSH Hosting - Accessing hosting server using SSH - Uploading project to server - Setting project permissions Updating Project using Git - Connecting hosting server with GitHub repository - Pulling latest changes using git pull Updating deployed application		
4	GUI and Application Structure Desktop Development Environment - Python-based desktop frameworks: Tkinter / PyQt - Development environment using VS Code with AI coding assistants - AI tools such as Codex / Claude Code / Google Code Assistant / Cursor for generating desktop application code GUI Design using AI Tools - Application window structure and layout generation using AI prompts - UI components: labels, buttons, text fields, forms, layouts and menus - Event handling and user interaction in desktop applications Application Logic Generation using AI - Generating application functions and logic using AI prompts - Handling user input and displaying results in GUI applications File Handling in Desktop Applications - Reading and writing data using files (text / JSON) Managing application data files	06	20



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5	Database Applications	06	20
	Database for Desktop Applications		
	• SQLite database for local desktop applications • Database connectivity in desktop software using Python • Creating tables and managing application data		
	Desktop Applications with Database		
	• Data input forms for application data entry • Storing and retrieving records from database • Displaying database records in application interface		
	CRUD Operations using AI Tools	06	20
	• Generating CRUD operations using AI prompts • Insert, update, delete, and display operations in desktop applications		
	Application Integration using AI Tools		
	• Integration of GUI, database, and application logic • Debugging and improving application code using AI assistants		
	Desktop Application Workflow		
	Structure of a complete desktop application developed using AI-assisted coding tools		
Total		30	100

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
0	0	0	0	0	0

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)



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References / Suggested Learning Resources

(a) Books:

1. Matt Stauffer, “Laravel: Up & Running – A Framework for Building Modern PHP Apps”, O’Reilly Media.
2. Mark Lutz, “Learning Python”, 5th Edition, O’Reilly Media.
3. Alan D. Moore, “Python GUI Programming with Tkinter”, Packt Publishing Ltd.
4. Martin Fitzpatrick, “Create GUI Applications with Python & Qt”, Apress.

(b) Open-Source Software and Websites:

1. <https://laravel.com/docs>
2. <https://www.php.net/manual/en/index.php>
3. <https://docs.python.org/3>
4. <https://docs.python.org/3/library/tkinter.html>
5. <https://www.riverbankcomputing.com/software/pyqt/intro>
6. <https://www.sqlite.org/docs.html>
7. <https://git-scm.com/docs>
8. <https://docs.github.com>
9. <https://code.visualstudio.com/docs>

(c) AI Coding Tools and Learning Resources:

1. <https://code.visualstudio.com> (VS Code Editor)
2. <https://github.com/features/copilot> (GitHub Copilot)
3. <https://cursor.sh> (Cursor AI IDE)
4. <https://docs.anthropic.com/claude> (Claude AI / Claude Code)
5. <https://developers.google.com/assistant> (Google Code Assistant resources)
6. <https://openai.com/codex> (Codex AI code generation)
7. <https://replit.com> (Replit AI coding platform)

Suggested Project List:

** Some AI coding assistants such as Codex, Claude Code, and Google Code Assistant may have limited or paid access depending on availability and future updates. In such cases, students may use other freely*



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available AI coding tools and extensions such as Windsurf, Cline, Continue.dev, Cursor, or similar AI development tools for completing the practical exercises.

1. Configure VS Code with AI coding assistants (Codex / Claude Code / Google Code Assistant) and generate simple Python programs using prompts.
2. Generate a basic web page (HTML + CSS) using AI prompts and edit/refine the generated code in VS Code.
3. Explore AI-enabled development environments such as Cursor, Emergent, and Replit AI for generating and modifying code using AI prompts.
4. Create a GitHub repository, clone it in VS Code, and push AI-generated code to the repository.
5. Perform Git operations (stage, commit, push, pull) using VS Code source control with AI-generated project files.
6. Create and manage branches in GitHub, merge changes, and resolve conflicts.
7. Create a Laravel project using Composer, run the development server, and explore project structure.
8. Create Blade templates and layouts using AI-assisted code generation.
9. Generate a responsive web page interface using AI tools with HTML, CSS, and Bootstrap.
10. Implement navigation between multiple Laravel views using routes and templates.
11. Use AI tools to analyze and debug Laravel code in VS Code.
13. Configure the database connection in Laravel using the .env file and create database tables using Laravel migrations.
14. Generate Laravel models and controllers using Artisan commands and connect them with application routes.
15. Create a data entry form and store records in the database using AI-assisted code generation.
16. Retrieve and display database records in Laravel views using Blade templates.
17. Develop a complete web-based CRUD application using Laravel (mini project with 6–7 pages/modules) integrating user interface design, database management using migrations, and AI-assisted code generation tools.
18. Access a hosting server using SSH and upload Laravel project files.
19. Connect hosting server with GitHub repository and update project using Git pull.



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21. Configure Python environment with Tkinter or PyQt in VS Code and generate a basic GUI window using AI prompts.
22. Create a desktop application interface with labels, buttons, and input fields using AI-generated code.
23. Implement event handling (button click actions) in a GUI application using AI assistance.
24. Generate a simple calculator desktop application using AI coding tools.
25. Implement file read/write operations in a desktop application using Python and AI-generated code.
26. Develop a notes or text editor GUI application using AI prompts.
27. Create a SQLite database and connect it with a Python desktop application using AI-generated code.
28. Develop a data entry form that stores records into SQLite database from a GUI application.
29. Display, update, and delete records in a desktop GUI application using SQLite database.
30. Develop a complete desktop CRUD application (mini project with 6-7 pages/forms) integrating GUI, database, and AI-assisted code generation.

List of Laboratory / Learning Resources Required

1. Computer system with minimum 8 GB RAM
2. Operating system: Windows / Linux / macOS
3. Visual Studio Code (VS Code)
4. Git and GitHub account
5. PHP, Composer, Laravel Framework
6. Python (3.x) with Tkinter / PyQt libraries
7. SQLite database
8. AI coding assistants such as Codex / Claude Code / Google Code Assistant / GitHub Copilot
9. AI IDE tools such as Cursor / Replit AI / Emergent
10. Internet access for documentation and AI tools



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Suggested Activities for Students

1. Develop a mini project using Vibe Coding tools (web or desktop application).
2. Maintain a GitHub repository portfolio of developed applications.
3. Prepare a presentation on AI-assisted software development workflows.
4. Participate in coding competitions, hackathons, or AI development challenges.
5. Explore MOOCs related to AI-assisted programming and modern web frameworks.
