GUJARAT TECHNOLOGICAL UNIVERSITY (GTU)

Competency-focused Outcome-based Green Curriculum-2021 (COGC-2021)
Semester-IV

Course Title: Web Technologies
(Course Code: 4343205)

Diploma programmer in which this course is offered	Semester in which offered
Information & Communication Technology	4th Semester

1. RATIONALE

This course is essential in today's web development landscape as it equips students with the knowledge and practical skills to create dynamic and interactive web applications using PHP while simultaneously introducing them to the fundamentals of version control and collaboration through GitHub. PHP remains a cornerstone of server-side scripting, and learning it is pivotal for aspiring web developers. Incorporating GitHub enhances students' abilities to work in a collaborative coding environment, promoting teamwork, code versioning, and industry-standard development practices. The course addresses the demand for proficient PHP developers and individuals capable of efficiently managing and collaborating on projects, making it a valuable addition to any web development curriculum.

2. COMPETENCY

The purpose of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

Develop dynamic web applications, interact with databases, and implement server-side functionality.

3. COURSE OUTCOMES (COs)

(a) Develop PHP scripts using variables, operators and control structures
(b) Develop PHP scripts using functions, array and strings.
(c) Develop PHP scripts using various file operations, sessions and cookies.
(d) Integrate PHP with MySQL and execute CRUD operations, and display data in web page.
(e) Establish version control and GitHub collaboration, including repository creation, local project setup, connection, and initial code push.

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P/2)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	CA	ESE	CA	ESE	
0	0	4	2	0	0	25	25	50

5. SUGGESTED PRACTICAL EXERCISES:

The following practical outcomes (PrOs) that are the sub-components of the COs. Some of the PrOs marked '' are compulsory, as they are crucial for that particular CO. These PrOs need to be attained at least at the 'Precision Level' of Dave's Taxonomy related to 'Psychomotor Domain'.*

Sr.No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. Required
1	Configure and install PHP, a web server (WAMP/XAMPP), and MySQL on your machine	1	2
2	Write a PHP script to display a message using echo and print.	1	2
3	Write a PHP script to demonstrate use of global, local, static and constant variables.	1	2
4	Write a PHP script to demonstrate the ability to work with various data types in PHP, including strings, integers, floats, and booleans, by declaring variables, performing operations, and displaying results.	1	2
5	Write a PHP script to illustrate the use of arithmetic, comparison and logical operators.	1	2
6	a) Write a PHP code to find largest number out of three numbers. b) Write a PHP code to check if given number is prime or not.	1	2
7	Write a PHP code to print multiplication table.	1	2
8	Write a script to display Fibonacci numbers up to a given term.	1	2
9	Write a PHP Script for performing function that takes arguments, returns arguments, default argument and variable length argument.	2	2
10	Write a PHP script to implement call by reference and call by value.	2	2
11	Write a PHP script to Demonstrate Include () and require () function.	2	2
12	Write a PHP script to demonstrate index based, Associative array and multidimensional Array.	2	2
13	a) Write PHP Script for addition and multiplication of two 2x2 matrices. b) Write a PHP script to find max, min from array and find average of array elements.	2	2
14	Write a PHP script to : - a) Transform a string in to uppercase letters. b) Transform a string in to lowercase letters. c) Make a string's first character in uppercase. d) Make a string's first character of all the words uppercase.	2	2

15	Write a PHP script to:- a) To generate a random number between the given range. b) To display the binary, octal and hexadecimal of a given decimal number. c) To display the sin, cos and tan of the given angle.	2	2
16	Write a PHP script to demonstrate use of fopen(), fread(), fwrite() and fclose() File functions.	3	2
17	a) Create student registration form using text box, check box, radio button, select, submit button. And display user inserted value in new PHP page using GET Method. b) Create Website Registration Form using text box, check box, radio button, select, submit button. Display user inserted value in new PHP page using POST method.	3	2
18	Write a PHP script to validate form including name, email and url using appropriate.	3	2
19	Write a PHP script to implement error handling.	3	2
20	Implement cookies management using PHP.	3	2
21	Implement session management using PHP.	3	2
22	Write a PHP script to connect with database server from your webpage.	4	2
23	Create a database with student table and write a PHP script to insert a record in student table.	4	2
24	Write a program to read student records from student table and display all these information in table format on output screen.	4	2
25	Write a PHP script to delete and update a specific record from table.	4	2
26	Write a PHP script simple login system that allows user to add a new username if user doesn't exist in the database.	4	2
27	Create a new GitHub repository, add a collaborator, clone the repository locally, and make PHP project changes, and pulling changes before committing.	5	4
	Total Hours		58

Note

i. *More Practical Exercises can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.*

ii. *ii. The following are some sample 'Process' and 'Product' related skills (more may be added/deleted depending on the course) that occur in the above listed Practical Exercises of this course required which are embedded in the COs and ultimately the competency.*

6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

Sr.No.	Equipment Name with Broad Specifications	PrO. No.
1	Computer with latest configuration with Windows/Linux/Mac Operating System.	ALL
2	XAMPP/WAMP/LAMP/MAMP servers.	ALL
3	Text Editor such as VS Code, Sublime, Atom etc.	ALL
4	Web Browser such as Chrome, Firefox, Edge, Safari etc.	ALL
5	Internet Connection	ALL

7. AFFECTIVE DOMAIN OUTCOMES

The following sample Affective Domain Outcomes (ADOs) are embedded in many of the above mentioned COs and PrOs. More could be added to fulfill the development of this competency.

a) Follow Coding standards and practices.
b) Maintain tools and equipment.
c) Search for project ideas.
d) Organize project files and resources.
e) Work as a leader or team member.
f) Present project work.
g) Adhere to ethical practices.
h) Follow safety practices.

The ADOs are best developed through the laboratory/field-based exercises. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:

i. 'Valuing Level' in 1st year
ii. 'Organization Level' in 2nd year.
iii. 'Characterization Level' in 3rd year

8. UNDERPINNING THEORY: NA

The major Underpinning Theory is formulated as given below and only higher level UOs of *Revised Bloom's taxonomy* are mentioned for development of the COs and competency in the students by the teachers. (Higher level UOs automatically includes lower level UOs in them). If

required, more such higher level UOs could be included by the course teacher to focus on attainment of COs and competency.

Unit	Unit Outcomes (UOs)	Topics and Sub-topics
Unit-1 **Introduction to PHP**	1a. Set up a local server environment, integrating PHP, Web Server, and MySQL. 1b. Employ PHP syntax proficiently, utilizing echo and print statements effectively in scripts. 1c. Declare, assign, and manipulate variables and constants in PHP scripts. 1d. classify PHP data types accurately and apply operators with consideration of their precedence. 1e. Execute control structures such as if...else, elseif, while, do-while, for, foreach, switch, break, and continue for effective program flow.	1.1 Configuration and installation of PHP, Web Server, MySQL 1.2 Installing WAMP/XAMPP server 1.3 PHP Syntax, echo and print statements 1.4 PHP Constant, variables 1.5 PHP Data Types 1.6 PHP Operators and their precedence 1.7 Control structures (if..else, Elseif, while, do while, for loop, foreach loop, switch, break, continue
Unit–II **Functions ,array and strings**	2a. Create user-defined functions with arguments, variables, and return values, incorporating default arguments and passing arguments by reference. 2b. Distinguish between local and global variable scopes. 2c. Utilize include() and require() functions effectively. 2d. Use index-based, associative and multidimensional arrays. 2e. Utilize PHP functions for creating, accessing, searching, replacing, and formatting strings, incorporating library functions for string manipulation	2.1 User Defined function, argument function, variable function, Return function, default argument, Passing Arguments by Reference 2.2 Scope of variable: Local, global 2.3 include() and require() function 2.4 Creating index based and Associative array and multidimensional Array 2.5 Accessing array Element 2.6 Library functions of an array. (array_merge, array_fill, count, end, current, sort, rsort, in_array, array_search) 2.7 Creating and accessing String 2.8 Searching & Replacing String and Formatting String 2.9 Library functions for string

Unit–III **Forms Handling, Session, Cookies**	3a. Execute file operations including creation, opening, reading, writing, appending, and closing. 3b. Apply Get and Post methods for submitting form values. 3c. Employ $_GET, $_POST, and $_REQUEST super globals for reading form data. 3d. Create, set, and destroy cookies to handle user-specific data. 3e. Implement exception handling using die(), custom error handling, and try-catch blocks for robust error management.	3.1 Create, Open, read, write and append and close operation on file 3.2 Submitting form values using Get and Post Methods 3.3 Reading data from form using super globals $_GET, $_POST and $_REQUEST 3.4 Creating Cookies, Set Cookies, Destroying Cookies 3.5 Create session, set session, destroying session 3.6 Validate email and URL using filter() function 3.7 Exception Handling in PHP using die() using custom error handling using try and catch
Unit-IV Working with Database in PHP	4a. Integrate MySQL and PHP, demonstrating the ability to work cohesively with the two technologies. 4b. Set up a MySQL database for use in PHP applications. 4c. Configure PHP to connect to a MySQL database, utilizing the mysqli extension, and handle connection errors with security considerations. 4d. Demonstrate proficiency in writing and executing SQL queries within PHP code, performing CRUD operations and handling result sets and errors. 4e. Fetch data from MySQL databases in PHP and display query results in HTML or other desired formats.	4.1 Introduction to MySQL and PHP Integration 4.2 Setting up a MySQL Database 4.3 Establishing Database Connection in PHP: Configuring PHP to connect to a MySQL database, Using the mysqli extension for database connectivity, Handling connection errors and security considerations. 4.4 Executing SQL Queries in PHP: Performing basic CRUD operations (Create, Read, Update, Delete) using PHP, Writing and executing SQL queries within PHP code. Handling result sets and errors. 4.5 Retrieving and Displaying Data in PHP: Fetching data from MySQL databases in PHP, Displaying query results in HTML or other formats.
Unit-V	5a. Explain fundamental concepts of version control systems.	6.1Introduction to Version Control and GitHub: Brief overview of version control systems, Introduction to

Version Control and GitHub	5b. Apply GitHub as a web-based platform for version control. 5c. Create a new repository on GitHub, initialize a local PHP project with Git, and establish a connection between the local project and the GitHub repository. 5d. Demonstrate the ability to push the initial code of a PHP project to the GitHub repository.	GitHub as a web-based platform for version control. 6.2 Setting Up a PHP Project on GitHub: Creating a new repository on GitHub, Initializing a local PHP project with Git, Connecting the local project to the GitHub repository. Pushing the initial code to the repository.

9. SUGGESTED SPECIFICATION TABLE FOR QUESTIONPAPER DESIGN:

Unit No.	Unit Title	Teaching/ Practical Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Introduction to PHP	16	**---Not Applicable---**			
II	Functions ,array and strings	14				
III	Forms Handling, Session, Cookies	12				
IV	Working with Database in PHP	10				
V	Version Control and GitHub	4				
	Total	**56**				

10. SUGGESTED STUDENT ACTIVITIES:

Other than the classroom and laboratory learning, following are the suggested student-related co-curricular activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should perform following activities in group and prepare reports of about 5 pages for each activity. They should also collect/record physical evidences for their (student's) portfolio which may be useful for their placement interviews:

a) Identify tools used for web page development and present its features.

b) Undertake course "PHP & MySQL " available on Swayam online platform. (https://onlinecourses.swayam2.ac.in/aic20_sp32/preview)

c) Undertake course "PHP" available on solo learn online platform. (https://www.sololearn.com/learn/courses/le-php) or any other such site.

d) Undertake course "Building Web application in PHP" available on coursera online platform. (https://www.coursera.org/learn/web-applications-php) or any other such site.

11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

a) Massive open online courses (MOOCs) may be used to teach various topics/sub topics.

b) Guide student(s) in undertaking micro-projects.

c) Managing Learning Environment

d) Encourage students to do Group learning by sharing so that teaching can easily be enhanced.

e) About 20% of the topics/sub-topics which are relatively simpler or descriptive in nature is to be given to the students for self-learning, but to be assessed using different assessment methods.

f) With respect to section No.10, teachers need to ensure to create opportunities and provisions for co-curricular activities.

g) Guide students on how to address issues on environment and sustainability using the knowledge of this course

h) Arrange expert lectures by experts working professionally in the area of webpage development.

i) More focus should be given on practical work which will be carried out in laboratory sessions. If possible some theory sessions may be conducted in labs so that theory and practice can go hand in hand.

j) Faculty should allow students to use their creativity and let them struggle to learn on their own during practical sessions. However, faculty should remain around the students and should help them when they are stuck.

k) Arrange a webpage development competition by making groups of four students each and award the winning group. Give publicity to this competition at institute/city level.

12. SUGGESTED PROJECT LIST

Only one micro-project is planned to be undertaken by a student that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the micro-project is group-based (group of 3 to 5). However, in the fifth and sixth semesters, the number of students in the group should not exceed three.

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. Each student will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar

presentation of it before submission. The total work load on each student due to the micro-project should be about 16 (sixteen) student engagement hours (i.e., about one hour per week) during the course. The students ought to submit micro-project by the end of the semester (so that they develop the industry-oriented COs).

A suggestive list of micro-projects is given here. This should relate highly with competency of the course and the COs. Similar micro-projects could be added by the concerned course teacher:

6.3 Develop a website for managing employee information, including details such as name, position, and contact information.

6.4 Create a system for students to provide feedback on courses. Include a rating system and comments section for each course.

6.5 Build a dynamic website for online ticket booking to events or shows. Include seat selection, payment integration, and booking confirmation.

6.6 Develop a system for tracking student attendance. Include features for marking attendance, generating reports, and notifying absent students.

6.7 Build a weather forecasting application that fetches data from a weather API. Users can enter a location and view the current weather conditions.

6.8 Develop a personal finance manager that allows users to log in, categorize expenses, set budgets, and view financial reports.

13. SUGGESTED LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication with place, year and ISBN
1	PHP and MySQL Web Development	Luke Welling, Laura Thomson	Addisson-Wesley,2016, 978-0-321-83389-1
2	Beginning PHP and MySQL, 4th Edition	W. Jason Gilmore	Apress, 2010 978-1-4302-3114-1
3	Programming PHP: Creating Dynamic Web Pages	Kevin Tatroe; Peter MacIntyre	O'Reilly Media, Inc., 2020, 9781492054085
4	Learning PHP, MySQL, JavaScript, and CSS: A Step-by-Step Guide to Creating Dynamic Websites	Robin Nixon	O'Reilly Media, 2012, 9781449319267
5	Beginning Git and GitHub	Mariot Tsitoara	Apress, 2020, 78-1-4842-5312-0

14. SOFTWARE/LEARNING WEBSITES

i. https://www.php.net/

ii. https://www.freecodecamp.org/news/the-php-handbook/

iii. http://www.w3schools.com/PHP

iv. https://www.phptutorial.net

v. http://www.tutorialspoint.com/php

vi. https://www.geeksforgeeks.org/php-tutorial/

vii. https://www.javatpoint.com/php-tutorial

viii. https://www.geeksforgeeks.org/php-tutorials/

15. PO-COMPETENCY-CO MAPPING:

Semester V	Web Technologies (Course Code: 4343204)						
	POs						
Competency & Course Outcomes	PO 1 Basic & Discipline specific knowledge	O 2 Probler Analysis	PO 3 Design/ development of solutions	PO 4 gineering Tools, xperimentation and Testing	PO 5 Engineering practices for society, sustainability y and environ	O 6 Projec Manageme t	PO 7 Lifelong learning
Competency	**Develop dynamic web applications, interact with databases, and implement server-side functionality.**						
CO a) Develop PHP scripts using variables, operators and control structures	3	2	1	2	-	-	1
CO b) Develop PHP scripts using functions, array and strings.	3	3	1	2	-	-	1
CO c) Develop PHP scripts using various file operations, sessions and cookies.	2	2	2	2	-	3	1
CO d) Integrate PHP with MySQL and execute CRUD operations, and display data in web page.	2	2	2	2	-	3	2
CO e) Establish version control and GitHub collaboration, including repository creation, local project setup, connection, and initial code push.	2	2	2	3	-	3	3

*Legend: '**3'** for high, '**2**' for medium, **'1'** for low and **'-'** for no correlation of each CO with PO.*

16. COURSE CURRICULUM DEVELOPMENT COMMITTEE

GTU Resource Persons

Sr. No.	Name and Designation	Institute	Contact No.	Email
1.	Shri Jigney K Bhimani Lecture in Eelctronic Enginneing	L E College (Diploma) Morbi	9909540917	Jigney.bhimani@gmail.com
2.	Shri Bhailal Limbasiya Lecturer in Computer Engineering	C U Shah Polytechnic Surendranagar	8000068515	bhailal.ldce@gmail.com