MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL (Formerly West Bengal University of Technology) Syllabus of BCA (Effective from 2023-24 Academic Sessions)

SEMESTER: V

DEFINITION OF CREDIT

1 HR LECTURE PER WEEK	1 CREDIT
1 HR TUTORIAL PER WEEK	1CREDIT
2 HR PRACTICAL PER WEEK	1 CREDIT

SUBJECT NUMBERING SCHEME:

CODE FOR THE DEPT.	SUBJECT TYPE	SEM	SUBJECT CODE
OFFERING SUBJECT			

C CORE MAJOR

SUBJECT NAME: PHP WITH MYSQL SUBJECT CODE: BCAC501

Credit: 5 (3L + 2P)

COURSE OBJECTIVE:

The primary objective of the PHP with MySQL course is to equip students with the knowledge and skills necessary to design and develop dynamic, data-driven web applications. Through this course, students will learn the fundamentals of server-side scripting using PHP, understand how to interact with MySQL databases for data storage and retrieval, and apply best practices in web development, including security, error handling, and efficient coding techniques. By the end of the course, students will be able to create fully functional web applications that are secure, scalable, and maintainable, preparing them for further studies or entry-level roles in web development.

COURSE OUTCOME		
	Description	
CO1	Understand the fundamentals of web development, PHP syntax, and MySQL database management.	
CO2	Develop dynamic web pages using PHP by incorporating server-side scripting and user input handling.	
CO3	Implement database-driven web applications by integrating PHP with MySQL to perform CRUD operations with proper session management and Error handling.	

CO4	Demonstrate knowledge of advanced PHP concepts such as OOP, security measures, and API integration.
CO5	Design, develop, and deploy a web project using the PHP framework

DETAILED SYLLABUS:

Modul	NAME OF THE TOPIC	HOURS	MARKS
e No:			
1	Introduction to Web Development: Overview of web development, server vs. client-side, HTML basics, introduction to PHP and MySQL Setting up Environment: Installation of XAMPP/WAMP, introduction to Apache, MySQL, and PHP. Configuring a development environment	4	5
2	PHP Basics: PHP syntax, variables, data types, operators, and control structures. Functions in PHP: Defining and using functions, function scope, including files, and built-in functions Arrays and Strings: Working with arrays, array functions, string manipulation, and string functions	8	10
3	Forms Handling and User Input: Handling form data, GET vs. POST methods, validating and sanitizing user input	4	5
4	PHP and MySQL Integration: Connecting PHP to MySQL, executing queries, retrieving data, and displaying data in web pages Implementing Create, Read, Update, Delete (CRUD) operations using PHP and MySQL	6	10
5	Session Management: Understanding sessions and cookies, creating and managing sessions in PHP. User authentication: Building User Login system, Password Hashing. Error Handling andFile Handling In PHP: Reading, Writing and uploading files. Security in PHP: SQL injection prevention, XSS protection, securing file uploads.	4	15
6	Advanced PHP Concepts: Object-Oriented PHP, classes, objects, inheritance, and PHP's built-in OOP features	5	5
7	Introduction to PHP Frameworks: Overview of popular PHP frameworks (e.g., Laravel, CodeIgniter), basic MVC architecture concepts	6	10

8	Laravel FrameWork: Introduction to Laravel, Understanding	8	10
	routing in Laravel, creating and using controllers, passing		
	data to views, and route parameters. Introduction to Blade		
	templating, using Blade directives, template inheritance, and		
	displaying data in views. Overview of Eloquent ORM,		
	defining models, basic CRUD operations, database		
	migrations, and relationships.		
	INTERNAL EXAMINATION	3	30
	TOTAL	48	100

Practical:

SUBJECT NAME: PHP WITH MYSQL LAB SUBJECT CODE: BCAC591

Credit: 2

The practical classes should comprehensively cover the theoretical syllabus, including the implementation of a small-scale project to enhance conceptual understanding and enable students to learn how to apply their knowledge to solve real-world problems

List of Sample Questions

User Registration and Login System

• **Case Study:** A website needs a secure system for user registration and login, allowing users to create accounts and access personalized content.

Develop a PHP and MySQL-based system where users can register with a username and password, and log in to access their profile page. Implement password hashing for security.

2. Content Management System (CMS)

• **Case Study:** A blog site requires a CMS that allows authors to write, edit, and publish articles.

Design a CMS using PHP and MySQL where authors can log in, create new posts, edit existing posts, and delete posts. The system should display posts to the public in a structured format.

3. Online Voting System

• **Case Study:** An organization wants to conduct online elections where members can vote for their preferred candidates.

Create a PHP and MySQL-based voting system where users can register, vote for candidates, and view voting results. Ensure that each user can vote only once.

4. E-commerce Product Catalog

• **Case Study:** An online store needs to manage its product catalog, allowing users to browse products by category and view product details.

Implement a product catalog system in PHP and MySQL where users can browse products by category, search for specific products, and view detailed descriptions and prices.

5. Event Management System

• **Case Study:** A company needs a system to manage events, including registration, scheduling, and participant lists.

Develop a PHP and MySQL-based event management system where users can register for events, view event schedules, and check participant lists.

6. Forum or Discussion Board

• **Case Study:** A community website needs a forum where users can post topics, reply to discussions, and view threads.

Build a forum using PHP and MySQL where users can create new discussion threads, reply to existing threads, and manage their posts. Implement user authentication to control access.

SUGGESTED READING:

- **Gilmore, W. J. (2010).** *Beginning PHP and MySQL: From Novice to Professional* (4th ed.). Apress.
- Naramore, E., Gerner, J., Scouarnec, Y. L., Stolz, J., & Glass, M. (2005). *Beginning PHP5, Apache, and MySQL Web Development.* Wiley India Pvt. Ltd.
- Welling, L., & Thomson, L. (2009). *PHP and MySQL Web Development* (4th ed.). Pearson Education.
- Beighley, L., & Morrison, M. (2008). *Head First PHP & MySQL*. O'Reilly Media.
- Powers, D., & McGrath, M. (2015). *PHP & MySQL in Easy Steps*. McGraw Hill Education.
- Robson, E., & Freeman, E. (2007). *Head First PHP & MySQL*. O'Reilly Media.
- Gosselin, D., Kokoska, R., & Easterbrooks, P. (2010). *PHP Programming with MySQL: The Web Technologies Series* (2nd ed.). Cengage Learning.

- Sharma, V. (2017). PHP with MySQL: A Practical Approach. BPB Publications.
- Narayan, N. (2016). *PHP & MySQL: Server-side Web Development*. McGraw Hill Education. Zandstra, M. (2014). *PHP Objects, Patterns, and Practice* (4th ed.). Apress.

SUBJECT NAME: Object Oriented Programming with JavaCredit: 5 (3L +2P)SUBJECT CODE: BCAC502

COURSE OBJECTIVE:

The primary objective of the Object-Oriented Programming (OOP) with Java course is to provide students with a comprehensive understanding of object-oriented programming principles and their application using Java. The course aims to equip students with the skills needed to design, develop, and maintain robust and scalable software systems. By covering fundamental OOP concepts such as classes, objects, inheritance, polymorphism, and encapsulation, as well as advanced topics like interfaces, abstract classes, and design patterns, students will learn to write efficient, maintainable, and reusable code. The course will also emphasize best practices in Java programming, problem-solving techniques, and real-world application development, preparing students for careers in software development or further studies in computer science.

Course	Outcome
CO1	Understand and apply the fundamental concepts of Java programming, including data types, operators, control structures, and basic syntax, to develop simple applications.
CO2	Demonstrate proficiency in object-oriented programming principles such as classes, objects, inheritance, polymorphism, encapsulation, and abstraction, to design and implement robust software solutions.
CO3	the development of modular and maintainable applications.
CO4	Handle exceptions and errors in Java programs using try-catch blocks, custom exceptions, and other exception-handling mechanisms to ensure the reliability and robustness of software.
C05	Perform file I/O operations and implement serialization in Java to persist data, enabling the storage and retrieval of information across different sessions.
COC	Understand and implement multithreading in Java to develop applications that perform
006	multiple tasks concurrently, improving performance and responsiveness.

DETAILED SYLLABUS:

Module	NAME OF THE TOPIC	HOURS	MARKS
No:			
1	Introduction to Java: Overview of Java, its features,	2	5
	setting up the environment, and writing first Java		
	program. PATH AND CLASS PATH VARIABLE, JVM		
2	Basics of Java Programming: Data types, variables.	8	10
	operators, control structures, and loops. Storing of Big		-
	Integer. Use of Static variable, final variable, initialization		
	of static and final variable.		
3	Object-Oriented Programming Concepts: Access	6	8
	modifiers, encapsulation, and abstraction in Java. Classes,		
	objects, methods, and different types of initialization.		
	chaining a constructor from a constructor, constructor		
4	Inheritance and Polymorphism: Inheritance, method	6	10
-	overloading, method overriding, and polymorphism.		-
	Restriction on method overriding.		
5	Arrays and Strings: Single-dimensional and multi-	6	8
	dimensional array. Use of Arrays class for printing,		
	sorting, searching, string handling, and use of		
6	Interfaces and Abstract Classes: Understanding interfaces	Δ	7
U	abstract classes, and multiple inheritance in Java.		,
7	Exception Handling: Checked and Unchecked Exception,	4	8
	Try-catch blocks, multiple catch blocks, finally, throw,		
	throws, and custom exceptions.		
8	File I/O and Serialization: File handling, reading and	5	6
	writing to files, and serialization in Java.		
9	Multithreading: Basics of threads, thread lifecycle,	4	8
	synchronization, and inter-thread communication.		
	INTERNAL EXAMINATION	3	30
	TOTAL	48	100

Practical:

SUBJECT NAME: Object Oriented Programming with Java LabCredit: 2SUBJECT CODE: BCAC592

The practical classes should comprehensively cover the theoretical syllabus, including the implementation of a small-scale project to enhance conceptual understanding and enable students to learn how to apply their knowledge to solve real-world problems

List of Sample Questions

- A library wants to automate book issuing and returning processes. The system should track available books and issued books. Create classes Book, Library, and Member. Implement methods to issue a book to a member, return a book, and display the list of available books.
- A company requires a payroll system to calculate employee salaries based on hours worked and hourly rate. Develop an Employee class with attributes like name, id, hoursWorked, and hourlyRate. Implement methods to calculate the salary and generate a payroll report for all employees.
- A bank wants to manage customer accounts and transactions, including deposits, withdrawals, and balance inquiries. Create classes Account, Customer, and Transaction. Implement methods to perform deposits, withdrawals, and display account balance. Handle exceptions for insufficient balance during withdrawals.
- A rental service needs to manage its fleet of vehicles, including cars, bikes, and trucks, and keep track of their availability. Develop a hierarchy of classes starting with a base class Vehicle and derived classes Car, Bike, and Truck. Implement methods to check availability, rent a vehicle, and return a vehicle.
- A warehouse needs a system to track inventory levels, including adding new items, updating stock, and generating reports. Develop classes Item, Inventory, and Warehouse. Implement methods to add items to inventory, update stock levels, and generate inventory reports.
- A hotel requires a booking system to manage room reservations, including checking room availability and booking rooms. Design classes Room, Hotel, and Reservation. Implement functionalities to check room availability, book a room, and display booking details.

SUGGESTED READING:

• Schildt, H. (2018). Java: The Complete Reference (11th ed.). McGraw Hill Education.

- Horstmann, C. S., & Cornell, G. (2019). *Core Java Volume I Fundamentals* (11th ed.). Pearson Education.
- **Balagurusamy, E. (2020).** *Object-Oriented Programming with Java* (7th ed.). McGraw Hill Education.
- Sierra, K., & Bates, B. (2005). Head First Java (2nd ed.). O'Reilly Media.
- Deitel, P., & Deitel, H. (2018). Java: How to Program (11th ed.). Pearson Education.
- Liang, Y. D. (2018). *Introduction to Java Programming and Data Structures* (11th ed.). Pearson Education.
- Halterman, R. L. (2005). Object-Oriented Programming in Java. WCB/McGraw Hill.