Savitribai Phule Pune University, Pune

Faculty of Commerce and Management

Bachelor of Commerce – Computer Application (BCom-CA)

Revised Curriculum (2024 Pattern as per NEP-2020)

w.e.f. Academic Year: 2025-2026

SYBCom - CA Semester IV								
Course Type	Course	Course Code	Paper Title	Credits		Hours / Week	Marks	
				Theory	Practical		Int.	Ext.
Major Mandatory	Major Mandatory 9	MJ-251-CA	Object Oriented Programming using C++	4	-	4	30	70
	Major Mandatory 10	MJ-252-CA	Advance PHP	4	-	4	30	70
Minor	Minor	MNP-251-CLAB	Computer Laboratory based on CPP, Adv PHP	-	4	8	30	70
Open Elective (OE)	Open Elective 5		To be selected from the OE basket of Faculty of S&T, Faculty of Humanities and Faculty of Interdisciplinary Studies	2	-	2	15	35
Vocational Skill Development Course (VSC)	Vocational Skill Development Course (VSC)	VSC-251-CA	Computer Network	2	-	2	15	35
Ability Enhancement Course (AEC)	Ability Enhancement Course (AEC)		Modern Indian Languages 2– Marathi/Hindi/Sanskrit	2	-	2	15	35
Community Engagement and Service	Project	CEP-251-CEPSA	Community Engagement through Social Awareness	-	2	4	50	-
Co-Curricular Courses (CC)	Co-Curricular Courses (CC)		NSS/NCC/Yoga Education/Health and Wellness/Fine Arts-I	2	-	2	50	-
			Sub-Total	**20**	**2**		**235**	**315**
			Total	**22**			**550**	

Semester IV					
Semester No.	**Course Code**	**Type of Course**	**Course Title**	**Credits**	**Lecture Hours/Week**
IV	MJ-251-CA	Major Mandatory	Object Oriented Programming using C++	04	04

Course Objectives	
1	To acquire an understanding of basic object-oriented concepts and the issues involved in effective class design.
2	To enable students for writing programs using C++ features
3	To provide understanding of inheritance and polymorphism, virtual functions, pointers to objects, and dynamic binding.
4	Train students in file handling and templates, covering file operations, error handling, class/function templates, and exception handling in C++.

Course Outcome: After completing the course students will be able to	
1	Explain the fundamental concepts, features, and advantages of Object-Oriented Programming and describe the structure, features, and basic I/O operations of C++.
2	Write simple C++ programs using appropriate data types, variables, operators, manipulators, and functions
3	Apply different types of inheritance, operator overloading, function overloading, and runtime polymorphism to create flexible and extensible C++ programs.
4	create, open, read, write, and close files using C++ standard library functions and implement function templates to create reusable, type-independent code.

Unit	**Title and Contents**	**No. of Lecture Hours**
1	**Introduction to C++** 1.1 Basic concepts, features, advantages and applications of OOP 1.2 Introduction, applications and features of C++ 1.3 Input and Output operator in C++ 1.4 Simple C++ program 1.5 Data type and Keywords 1.6 Declaration of variables, dynamic initialization of variables, reference variable 1.7 Operators: 1.7.1 Scope resolution operator 1.7.2 Memory management operators 1.8 Manipulators	12

	1.9 Functions: 1.9.1 Function prototyping, call by reference and return by reference 1.9.2 Inline functions 1.10 Default arguments	
2	**Classes and Objects** 2.1 Structure and class, Class, Object 2.2 Access specifiers, defining data member 2.3 Defining member functions inside and outside class definition. 2.4 Simple C++ program using class 2.5 Memory allocation for objects 2.6 Static data members and static member functions 2.7 Array of objects, objects as a function argument 2.8 Friend function and Friend class 2.9 Constructors and Destructors 2.9.1 Constructors 2.9.2 Types of constructor: Default, Parameterized, Copy 2.9.3 Multiple constructors in a class 2.9.4 Constructors with default argument 2.9.5 Dynamic initialization of constructor 2.9.6 Destructor	**16**
3	**Inheritance, Polymorphism & Console Input-Output Handling in C++** **3.1 Introduction to inheritance** 3.1.1.Defining Base class and Derived class 3.1.2 Types of Inheritance 3.1.3 Virtual Base Class 3.1.4 Abstract class 3..1.5 Constructors in derived class **3.2 Polymorphism** 3.2.1 Compile Time Polymorphism 3.2.2 Introduction, rules for overloading operators 3.2.3 Function overloading 3.2.4. Operator Overloading unary and binary 3.2.5 Operator Overloading using friend function 3.2.6 Overloading insertion and extraction operators 3.2.7. String manipulation using operator overloading 3.2.8 Runtime Polymorphism 3.2.9 this Pointer, pointers to objects, pointer to derived	**20**

	classes 3.2.10 Virtual functions and pure virtual functions	

4	**Working with Files & Templates** 4.1 Stream Classes for File operations 4.2 File operations - Opening, Closing and updating 4.3 File updating with random access. 4.4 Error handling during File operations 4.5 T Introduction to Template 4.6 Class Template and class template with multiple parameters 4.7 Function Template and function template with multiple parameter 4.8 Exception Handling Introduction	**12**

Reference Material

Reference Books

Sr.No	Title of the Book	Author/s	Publication
1	Object Oriented programming with C++	E Balagurusamy	McGraw-Hill Education
2	Object Oriented Programming with C++	Robert Lafore	Galgotia Publications
3	The Complete Reference C++	Herbert Schildt	Tata-McGraw Hill
4	Programming in C++	Ashok Kamthane	Pearson Education
5	C++ for Beginners	Herbert Schildt (Simplified Edition)	Tata-McGraw Hill

Other Learning Material E- Resource:

1. YouTube Playlists - Code With Harry – C++ Full Course
2. Neso Academy – C++ OOP Tutorials
   https://www.youtube.com/playlist?list=PLLy_2iUCG87CQHHuz4x2ZR4U9WmG3P-l0
3. Apna College – C++ Placement Course (Beginner Friendly)
   https://www.youtube.com/watch?v=tv0JZlvfI-0
4. Jenny's Lectures – File Handling & OOP Concepts
   https://www.youtube.com/watch?v=s3d0-9c8e5c
5. e-PGPathshala

Semester IV					
Semester No.	**Course Code**	**Type of Course**	**Course Title**	**Credits**	**Lecture Hours/Week**
IV	**MJ-252-CA**	**Theory**	**Advance PHP**	**4**	**4**

Course Objectives	
1	To know & understand concepts of internet programming**.**
2	Understand namespaces, traits, generators, late static binding, and advanced OOP concepts.
3	Work with MVC architecture, routing systems, templating engines, and modern PHP frameworks (e.g., Laravel).

Course Outcome: After completing the course students will be able to	
1	Apply advanced PHP language features—including namespaces, traits, exceptions, and OOP principles—to build modular and reusable applications.
2	Develop secure, database-driven web applications using PDO, prepared statements, transactions, and ORM tools.
3	Use MVC architecture and modern PHP frameworks (e.g., Laravel) to create scalable and maintainable projects.

Unit	**Title and Contents**	**No.of Lecture Hours**
1	**Introduction to Object Oriented Programming in PHP** 1.1 Classes 1.2 Objects 1.3 Introspection 1.4 Serialization 1.5 Inheritance 1.6 Interfaces 1.7 Encapsulation 1.8 Web Techniques 1.8.1 Server information 1.8.2 Processing forms 1.8.3 Sticky forms	**20**

2	**XML & Ajax with PHP** 2.1 Introduction XML 2.2 XML document Structure 2.3 PHP and XML 2.4 XML parser 2.5 The document object model 2.6 The simple XML extension 2.7 Changing a value with simple XML 2.8 Ajax with PHP 2.8.1 Understanding java scripts for AJAX 2.8.2 AJAX web application model 2.8.3 AJAX –PHP framework 2.8.4 Performing AJAX validation 2.8.5 Handling XML data using php and AJAX	**20**

3	**Introduction to Web Services** 3.1 Definition of web services 3.2 Basic operational model of web services, tools and technologies enabling web services 3.3 Benefits and challenges of using web services. 3.4 Web services Architecture and its characteristics 3.5 Core building blocks of web services	**10**

4	**PHP Framework** 4.1 Introduction to Laravel ? 4.2 Advantages of Laravel 4.3 features of Laravel 4.3 Introduction of MVC Pattern 4.4 Installation of Laravel 4.5 Laravel PHP Framework Sample program	**10**

Reference Material

Reference Books

Sr. No.	Title of the Book	Author/s	Publication
1	Php: A Beginner's Guide 1st Edition	McGraw-Hill Osborn	
2	PHP: The Complete Reference Paperback	Steven Holzner	
3	Murach's PHP and MySQL (2nd Edition)	Joel Murach and Ray Harris	

Semester IV					
Semester No.	**Course Code**	**Type of Course**	**Course Title**	**Credits**	**Hours/ Week**
IV	**MNP-251-CLAB**	**Minor**	**Computer Laboratory based on CPP, Adv. PHP**	**4**	8

Detail Lab book will be shared soon.

Semester IV					
Semester No.	**Course Code**	**Type of Course**	**Course Title**	**Credits**	**Lecture Hours/Week**
IV	VSC-251-CA	VSC	Computer Network	2	2

Course Objectives	
1	To gain knowledge about Computer Networks concepts.
2	To know about working of networking models, addresses and connectivity devices.
3	To acquire information about network security and cryptography.

Course Outcomes: On successful completion of the course, the student will be able to:	
1	Student will have knowledge of networking devices, types of addresses
2	Student will understand types of network and its uses
3	Student will gain knowledge on cryptography and its types and understand security mechanism

Unit	**Title and Contents**	**No of Lecture (Hours)**
1	Introduction to Computer Network 1.1 Basics of Computer Network 1.1.1 Definition 1.1.2 Goals 1.1.3 Applications, 1.1.4 Network Hardware –Broadcast, Point to Point 1.1.5 Components of Data Communication 1.2 Network Topologies 1.2.1Mesh 1.2.2 Star, 1.2.3 Bus, 1.2.4 Ring 1.3 Types of Networks 1.3.1 LAN,MAN,WAN, 1.3.2 Internetwork, 1.3.3 Wireless Network 1.4 Modes of Communication	**15**

	1.4.1 Simplex, 1.4.2 Half Duplex, 1.4.3 Full Duplex 1.5. Server Based LANs & Peer-to-Peer LANs 1.6. Protocols and Standards 1.7. Network Software 1.7.1 Protocol Hierarchies, Layers, Peers, Interfaces 1.7.2 Design Issues of the Layers 1.7.3 Connection Oriented and Connectionless Service 1.8 Network Connectivity Devices 1.8.1 Active and Passive Hubs 1.8.2 Repeaters 1.8.3 Bridges- Types of Bridges 1.8.4 Switches 1.8.5 Router 1.8.6 Gateways	
2	Network Models 2.1 OSI Reference Model : Functions of each Layer 2.2 TCP/IP Reference Model, Comparison of OSI and TCP/IP 2.3 TCP/IP Protocol Suite 2.4 Addressing 2.4.1 Physical Addresses 2.4.2 Logical Addresses 2.4.3 Port Addresses, 2.4.4 Specific Addresses 2.5 IP Addressing 2.5.1 Classfull Addressing 2.5.2 Classless Addressing 2.6 Introduction to Network 2.6.1 Security Need for Security, 2.6.2 Security Services Message- -Confidentiality, Integrity, Authentication, Non repudiation 2.6.3 Types of Attack 2.6.4 Cryptography, Plain Text, Cipher Text, Encryption, Decryption 2.6.5 Symmetric Key and Asymmetric Key Cryptography	**15**

Reference Material

Reference Books

Sr. No.	Title of the Book	Author/s	Publication	Place
1	Computer Networks	Andrew Tanenbaum	Pearson Education.[4th Edition]	
2	Data Communication and Networking	Behrouz Forouzan	TATA McGraw Hill. .[4th Edition]	
3	Computer Networking: A Top-Down Approach	James F. Kurose & Keith W. Ross	7th Edition, Pearson.	
4	Data and Computer Communications	William Stallings	10th Edition, Pearson.	

Other Learning Material E- Resource:

1. https://www.tutorialspoint.com/computer_networking
2. https://www.geeksforgeeks.org/computer-network-tutorials/

Semester IV					
Semester No.	**Course Code**	**Type of Course**	**Course Title**	**Credits**	**Hours/ Week**
IV	**CEP-251-CEPSA**	**Community Engagement Program**	**Community Engagement Program through Social Awareness**	**2**	4

This will be of 60 Hrs. Duration and to be conducted on field in collaboration with any NGO. Detail guidelines will be shared soon.