

University of Mumbai



Title of the program

- A-** U.G. Certificate in Information Technology
- B-** U.G. Diploma in Information Technology
- C-** B.Sc. (Information Technology)
- D-** B.Sc. (Honours) in Information Technology
- E-** B.Sc. (Honours with Research) in Information Technology

Syllabus for Semester –

Sem I & II

Ref: GR dated 20th April, 2023 for Credit Structure of UG

(With effect from the academic year 2024-25 Progressively)

Major Courses

Name of the Course: Object Oriented Programming using C++

Sr.No.	Heading	Particulars
1	Description the course : Including but Not limited to:	This course provides students knowledge and skills to understand and implement the object oriented skills. It will help them to implement OOP solutions to real-world problems.
2	Vertical :	Major
3	Type :	Theory
4	Credits :	2 credits (1 credit = 15 Hours for Theory in a semester)
5	Hours Allotted :	30 Hours
6	Marks Allotted:	50 Marks
7	Course Objectives(CO):	<p>CO 1. To explain the difference between object oriented programming and procedural programming.</p> <p>CO 2. To understand OOP principles to create modular, reusable, and maintainable code.</p> <p>CO 3. To understand the concept of polymorphism ,virtual functions,inheritance and exception handling.</p> <p>CO 4. To understand file handling concepts using C++.</p>
8	Course Outcomes (OC):	<p>OC 1. Students can explain the key concept of OOP and their application in software development.</p> <p>OC 2. Students can Design and implement classes and objects to model real-world entities.</p> <p>OC 3. Students can apply the concepts of polymorphism, virtual functions, inheritance and exception handling in program.</p> <p>OC 4. Students can apply operator overloading, runtime polymorphism, generic Programming</p> <p>OC 5. Students can implement file handling concepts in program</p>
9	Modules:- Module 1:	<p>1. Object Oriented Methodology: Introduction, Advantages and Disadvantages of Procedure Oriented Languages, Application of OOPS, Principles of OOPS: Objects, Classes, Data Abstraction and Data Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Message Passing.</p> <p>2. Classes and Objects: Simple classes (Class specification, class members accessing), Defining member functions, passing object as an argument, Returning object from functions, friend classes, friend function.</p>
		15 Hrs

	<p>3. Constructors and Destructors: Introduction, Default Constructor, Parameterized Constructor and examples, Destructors.</p> <p>4. Program development using Inheritance: Introduction, Advantages provided by inheritance, choosing the access specifier, Derived class declaration, derived class constructors, class hierarchies, multiple inheritance, multilevel inheritance, hybrid inheritance.</p>	
	Module 2:	
	<p>5. Polymorphism: Concept of function overloading, overloaded operators, overloading unary and binary operators.</p> <p>6. Virtual Functions: Introduction and need, Pure Virtual Functions, this Pointer, abstract classes, virtual destructors.</p> <p>7. Exception Handling: Introduction, Exception Handling Mechanism, Concept of throw & catch with example.</p> <p>8. Working with Files: Introduction, File Operations, Various File Modes, File Pointer and their Manipulation.</p>	15 Hrs
10	<p>Text Books</p> <p>1. Object-oriented Programming C++, Hari Mohan Pandey , Laxmi Publications</p> <p>2. C++ Programming: An Object-Oriented Approach, Behrouz A. Forouzan, Richard F. Gilberg , McGraw-Hill Education</p> <p>3. C++ How to Program , Paul Deitel, Harvey Deitel</p>	
11	<p>Reference Books</p> <p>1. Object Oriented Programming in C++ , E Balagurusamy</p> <p>2. Object-Oriented Programming in C++ , Robert Lafore, Pearson Education.</p> <p>3. Programming with ANSI C++ , Bhushan Trivedi</p> <p>4. Demystified Object- Oriented Programming with C++, Dorothy R. Kirk</p>	
12	Internal Continuous Assessment: 40%	Semester End Examination: 60%
13	<p>Continuous Evaluation through:</p> <p>Class test of 1 of 15 marks</p> <p>Class test of 2 of 15 marks</p> <p>Average of the two: 15 marks</p> <p>Quizzes/ Presentations/ Assignments: 5 marks</p> <p>Total: 20 marks</p>	<p>Format of Question Paper:</p> <p>External Examination (30 Marks)–</p> <p>1 hr duration</p>
14	<p>Format of Question Paper: (Semester End Examination : 30 Marks. Duration:1 hour)</p> <p>Q1: Attempt any two (out of four) from Module 1 (15 marks)</p> <p>Q2: Attempt any two (out of four) from Module 2 (15 marks)</p>	

Name of the Course: Web Designing

Sr.No	Heading	Particulars
1	Description the course : Including but Not limited to:	The objective of Web Designing course is to provide instructions on creating and maintaining a web page for publishing on the Internet. Students will be able to use HTML editor to author pages that include text and graphics..
2	Vertical :	Major
3	Type :	Theory
4	Credits :	2 credits (1 credit = 15 Hours for in a semester)
5	Hours Allotted :	30 Hours
6	Marks Allotted:	50 Marks
7	Course Objectives(CO): CO 1. To understand the fundamentals of Internet, and the principles of web design CO 2. To develop basic websites using HTML and Style Sheets. CO 3. To understand different style sheets used in web designing. CO 4. To implement JavaScript as a tool to add dynamism to static HTML pages.	
8	Course Outcomes (OC): OC 1. Learners will be able to use the HTML programming language OC 2. Learners will be able to execute web pages designed using HTML OC 3. Describe the concepts of World Wide Web, and the requirements of effective web design OC 4. List various tags in html and use these to create web page OC 5 : Gain necessary skills for designing and developing web applications	
9	Modules:- Module 1: 1. Introduction to HTML 5: What Is HTML? Understanding HTML Tags, Setting Up the Document Structure: Specifying the Document Type, Creating the HTML, Specifying a Page Title. Formatting Text by Using Tags: Creating Headings, Applying Bold and Italic Formatting, Applying Superscript and Subscript Formatting, Using Monospace and Preformatted Text. Using Lists and Backgrounds: Creating Bulleted and Numbered Lists, Creating Definition Lists, Inserting Special Characters, Inserting Horizontal Lines, Choosing Background and Foreground Colors. Creating Hyperlinks and Anchors- Hyperlinking to a Web Page, Creating Hyperlinking to an E-Mail Address, Hyperlinking to Other Content. Style Sheets and Graphics: Introduction to Style Sheets: Understanding Styles, Constructing Style Rules, Creating Styles for Nested Tags, Applying Styles to Hyperlinks, Creating and Linking to External Style Sheets.	15 Hrs

	<p>Formatting Text by Using Style Sheets: Specifying a Font Family, Specifying a Font Size and Color, Applying Bold and Italics, Applying Strikethrough and Underlining, Creating Inline Spans, Adjusting Spacing Between Letters. Formatting Paragraphs by Using Style Sheets: Indenting Paragraphs, Applying a Border to a Paragraph, Specifying the Horizontal Alignment of a Paragraph,</p> <p>Displaying Graphics Selecting a Graphics Format, Preparing Graphics for Web Use, Inserting Graphics, Arranging Elements on the Page, Controlling Image Size and Padding, Hyperlinking from Graphics, Using Thumbnail Graphics, Including Alternate Text for Graphics, Adding Figure Captions</p> <p>2. Page Layout and Navigation- Creating Navigational Aids , Creating a Text-Based and Graphical Navigation Bar, Creating an Image Map, Creating Tables, Specifying the Size of a Table, Specifying the Width of a Column, Merging Table Cells. Formatting Tables-Applying Table Borders, Applying Borders by Using Attributes, Applying Borders by Using Styles, Changing Cell Padding, Spacing, and Alignment. Setting Horizontal and Vertical Alignment</p> <p>Creating User Forms- Creating a Basic Form- Creating a Text Box,Special Field types for E-Mail and Web Addresses, Creating a Text Area, Creating a Submit or Clear Button, Creating Check Boxes and Option Buttons, Additional Input Types in HTML5</p> <p>Incorporating Sound and Video- What’s New with Audio and Video in HTML5?,Embedding Video Clips- Introducing the <video> Tag, The <embed> Tag: Your Fallback Plan, Placing a Video Clip on a Web Page. Incorporating Audio on a Web Page- Playing Audio with the <audio> Tag, Placing an Audio Clip on a Web Page</p>	
Module 2:		
	<p>1. JavaScript: Introduction to JavaScript: Variable, statements, Operators, Comments, constructs, Functions, expressions, JavaScript console, Scope, Events, Strings, String Methods, Numbers, Number Methods, Dates, Date Formats, Date,Methods,Arrays, Array Methods, Booleans, Comparisons, Control Structures: Conditions, Switch, Loop For, Loop While, Break.</p> <p>Operators: Arithmetic Operators, Assignment Operators, Comparison Operators, Logical Operators, Bitwise Operators</p> <p>Statements: Conditional Statements – if else, switch, Loops – while, do while, for, for in, for of, Loop Control – break, continue, labels</p> <p>JavaScript Objects: User-defined Objects, with Keyword, Native Objects – Array, String, Date, Math, Number, RegExp, Cookies</p> <p>Events and Event Handlers: HTML Events, DOM Events, DOM Event Listener,onAbort, onBlur, onChange, onClick, onDbIclick, onError, onFocus, onKeyDown,onKeyPress, onKeyUp, onLoad, onMouseDown, onMouseMove, onMouseOut,onMouseOver, onMouseUp, onReset, onResize, onSelect, onsubmit, onunload</p> <p>2. Basics of JQuery, JQuery selection and events, JQuery Effects, JQuery traversal and manipulation, Data attributes and templates, jquery Plugins.</p>	15 Hrs

	3. JSON – JSON: Introduction, JSON Grammar, JSON Values, JSON Tokens, Syntax, JSON vs. XML, Data Types, Objects, Arrays, Creating JSON, JSON Object, Parsing JSON, Persisting JSON, Data Interchange, JSON HTML, JSONP	
10	Text Books <ol style="list-style-type: none"> 1. Step by Step HTML5 by Faithe Wempen, Microsoft Press, 2011 2. The Complete Reference HTML & CSS, Thomas A. Powell. McGrawHill, 5th Edition, 2010 3. The Complete Reference JavaScript Thomas A. Powell & Fritz Schneider McGrawHill 3rd 2012 4. Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, XML and AJAX, Black Book Kindle Edition, by Kogent Learning Solutions Inc 5. HTML 5 Black Book, Covers CSS 3, JavaScript, XML, XHTML, AJAX, PHP and jQuery, 2nd Kindle Edition, by DT Editorial Services 6. JSON at work, Tom MARRS, O'REILLY, First edition, 2017 	
11	Reference Books <ol style="list-style-type: none"> 1. Learning Web Design A Beginner's Guide to Html, CSS, JavaScript, And Web Graphics, Jennifer Niederst Robbins, O'Reilly, 5th Edition, 2018. 2. Ivan Bayross, "Web Enabled Commercial Applications Development using HTML, DHTML, Javascript, Perl CGI", BPB, 2004 3. HTML 5 for Web Designers (By: Jeremy Keith) – http:// freepdf-books.com 4. Introduction to JavaScript Object Notation: A To-the-Point Guide to JSON kindle Edition by Lindsay Bassett, O'REILLY 	
12	Internal Continuous Assessment: 40%	Semester End Examination: 60%
13	Continuous Evaluation through: Class test of 1 of 15 marks Class test of 2 of 15 marks Average of the two: 15 marks Quizzes/ Presentations/ Assignments: 5 marks Total: 20 marks	Format of Question Paper: External Examination (30 Marks)– 1 hr duration
14	Format of Question Paper: (Semester End Examination : 30 Marks. Duration: 1 hour) Q1: Attempt any two (out of four) from Module 1 (15 marks) Q2: Attempt any two (out of four) from Module 2 (15 marks)	

Name of the Course: Major Practical II

Sr.No.	Heading	Particulars
1	Description the course : Including but Not limited to:	Object Oriented Programming using C++ Practical OOP encourages modular objects for reusable code, ensures well-organized and maintainable code via encapsulation, inheritance, and polymorphism, allowing flexibility and easy updates. Additionally, OOP models real-world scenarios, enhancing system understanding. Web Designing Practical Applying basic programming principles to the construction of websites

2	Vertical :	Major Practical
3	Type :	Practical
4	Credits :	2 credits (Total 60 hrs; 1 credit = 15 Hours for Theory or 30 Hours of Practical work in a semester)
5	Hours Allotted :	60 Hours
6	Marks Allotted:	50 Marks
7	Course Objectives(CO): CO 1. To explain the important characteristics of the C++ programming language. CO 2. To combine components of the C++ programming language to develop structured program. CO 3. To demonstrate the skills essential to compile, debug, and test C++ programs correctly. CO 4. To understand how to effectively implement HTML. CO 5. To develop the concept of basic and advanced text formatting. CO 6. To understand Hyper linking, Designing of webpage.	
8	Course Outcomes (OC): OC 1. Utilize C++ characteristics in software design and development. OC 2. Explain object-oriented techniques and explain how C++ supports them. OC 3. Employ C++ to demonstrate practical skill developing object-oriented solutions. OC 4. Examine a problem statements and design and develop object-oriented software using good coding practices and procedures. OC 5. Design static web pages using Hyper Text Markup Language (HTML). OC 6. Use their learned skills, knowledge and abilities to develop web sites OC 7. Collect information from the user with HTML Forms. OC 8. Enhance the look of web pages by implementing audio and video	
9	Module I	
	1. a. Write a C++ program to create a simple calculator. b. Write a C++ program to convert seconds into hours, minutes and seconds. c. Write a C++ program to find the volume of a square, cone, and rectangle. 2. a. Write a C++ program to find the greatest of three numbers. b. Write a C++ program to find the sum of even and odd n natural numbers c. Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user 3. a. Write a C++ program using classes and object Student to print name of the student, roll_no. Display the same. b. Write a C++ program for Structure bank employee to print name of the employee, account_no. & balance. Display the same also display the balance after withdraw and deposit	30 Hrs

c. Design the class Demo which will contain the following methods: readNo(), factorial() for calculating the factorial of a number, reverseNo() will reverse the given number, isPalindrome() will check the given number is palindrome, isArmstrong() which will calculate the given number is armStrong or not. Where readNo() will be private method.

d. Write a program to demonstrate function definition outside class and accessing class members in function definition.

4.

a. Write a friend function for adding the two complex numbers, using a single class

b. Write a friend function for adding the two different distances and display its sum, using two classes.

c. Write a friend function for adding the two matrix from two different classes and display its sum

d. Write a Program to find Maximum out of Two Numbers using friend function.

Note: Here one number is a member of one class and the other number is member of some other class.

5.

a. Design a class Complex for adding the two complex numbers and also show the use of constructor.

b. Design a class Geometry containing the methods area() and volume() and also overload the area() function

c. Design a class StaticDemo to show the implementation of static variable and static function

d. Write a C++ program to overload new/delete operators in a class.

e. Write a C++ Program to generate Fibonacci Series by using Constructor to initialize the Data Members.

6.

a. Overload the operator unary(-) for demonstrating operator overloading

b. Overload the operator + for adding the timings of two clocks, And also pass objects as an argument.

c. Overload the + for concatenating the two strings. For e.g "Py" + "thon" =Python

7.

a. Implement the concept of method overriding.

b. Show the use of virtual function

c. Show the implementation of abstract class.

8.

a. Write a C++ Program that illustrate single inheritance.

b. Write a C++ Program that illustrate multiple inheritance.

c. Write a C++ Program that illustrate multi-level inheritance.

d. Write a C++ Program that illustrate Hierarchical inheritance.

9.

a. Show the implementation of exception handling

- b. Show the implementation for exception handling for strings
 - c. Show the implementation of exception handling for using the pointers.
- 10.
- a. Design a class FileDemo open a file in read mode and display the total number of words and lines in the file.
 - b. Design a class to handle multiple files and file operations
 - c. Design a editor for appending and editing the files

Module II

- 1 Use of Basic and Advanced Tags, Lists and Backgrounds**
- a. Understanding elements, Tags and basic structure of HTML files
 - b. Design a web page using basic and advanced text formatting tags.
 - c. Design a web page using ordered, unordered list and description list.
 - d. Design a web page by choosing Background and Foreground Colors
 - e. Design a web page using Nested list and special characters.
 - f. Write an HTML code to display your CV on a web page.
- 2 Creating Hyperlinks, Anchors and style sheets**
- a. Design a web page with links to different pages and allow navigation between web pages.
 - b. Design a web page that automatically redirects the user to Other Content
 - c. Creating Hyperlinking to an E-Mail Address
 - d. Design a web page for creating Styles for Nested Tags
 - e. Design a web page by applying Styles to Hyperlinks
 - f. Design a web page by Creating and Linking to External Style Sheets.
- 3 Formatting Text and Paragraph by Using Style Sheets and displaying graphics**
- a. Design a web page by using text formatting tags
 - b. Design a web page using Indenting Paragraphs, Applying Border to a Paragraph and Specifying Horizontal Alignment of a Paragraph
 - c Implement a web page by creating inline spans and adjusting space between lines
 - d. Implement a web page by inserting a image and controlling the image size and padding
 - e. Design a web page by making image as a hyperlink
 - f. Develop a web page by using thumbnail graphics and also implement text for graphics
- 4 Tables , Page Layout and Navigation**
- a. Display a time table and display it in tabular format,
 - b. Write an html program to get the following output

30 Hrs

NAME	SUBJECT	MARKS
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	Advanced Web	75
Hillary	Operating System	60
	Advanced Web	80
Lary	Operating System	75
Total Average: 72.5		

- c. Design a table by merging the table cells.
- d. Design a web page by Creating a Text-Based Navigation Bar
- e . Design a web page by Creating a Graphical Navigation Bar
- f. Design a web page with Image Map

5. Forms and Introducing video and audio tags

- a. Design a web page with a form that uses all types of controls.
- b. Design an admission form for any course in your college with text, pass word fields, check boxes, radio button and reset button.
- c. Write a program to get the following output

Sign In	
E-mail address	<input type="text"/>
Password	<input type="password"/>
<input type="button" value="Sign In"/>	

- d. Design a web page by placing a Video Clip on a Web Page
- e. Design a web page by placing an Audio Clip on a Web Page
- f. Design a web page embedding image, audio and video.

6 .Basics of java script

- a. Using JavaScript, design a web page to accept a number from the user and print its Factorial.
- b. Using JavaScript, a web page that prints Fibonacci series/any given series.
- c. Write a JavaScript program to display all the prime numbers between 1 and 100.
- d. Write a JavaScript program to accept a number from the user and display the sum of its digits.

7. Java Script: Validating User fields

- a. Demonstrate the use of Document object methods.
- b. Using java script, demonstrate validating Text Input Fields, Drop-down Lists and Checkboxes
- c. Using java script, demonstrate validating Radio buttons and Validating Multi-Select Boxes
- d. Write a Java script to prompt for users name and display it on the screen.

	<p>8. Java Script : Handling the events</p> <p>a. Using java script, demonstrate the use of onAbort, onBlur, onChange, onClick, onDbClick events</p> <p>b. Using java script, demonstrate the use of onDragDrop, onError, onFocus events</p> <p>c. Using java script, demonstrate the use of onKeyDown, onKeyPress, onKeyUp, onLoad, onReset, onResize, onSelect, onSubmit, onUnload events</p> <p>d. Using java script, demonstrate the use of onMouseDown, onMouseMove, onMouseOut, onMouseOver, onMouseUp, onMouse events.</p> <p>e. Using java script, demonstrate the use of onKeyDown, onKeyPress, onKeyUp, onLoad, onReset, onResize, onSelect, onSubmit, onUnload events</p> <p>9. JQuery</p> <p>a. use JQuery effect in page</p> <p>b. Write a jQuery Code to find the data passed with the on() method for each element.</p> <p>c. Use JQuery Events</p> <p>d. JQuery traversal and manipulation</p> <p>10. JSON Basics and Working with JSON</p> <p>a. Creating JSON</p> <p>b. Parsing JSON</p> <p>c. Persisting JSON</p> <p>d. Demonstrate use of JSON objects in array, print array on web page using document object</p> <p>e. Read data from json file and convert it into a JavaScript object and display the data in web page using document object</p>	
<p>10</p>	<p>Text Books</p> <ol style="list-style-type: none"> Object-oriented Programming C++, Hari Mohan Pandey C++ Programming: An Object-Oriented Approach, Behrouz A. Forouzan, Richard F. Gilberg C++ How to Program, Paul Deitel, Harvey Deitel Step by Step HTML5, Faithe Wempen, Microsoft Press, 2011 The Complete Reference HTML & CSS, Thomas A. Powell. McGraw Hill, 5th Edition, 2010 	
<p>11</p>	<p>Reference Books</p> <ol style="list-style-type: none"> Object Oriented Programming in C++, E Balagurusamy Object-Oriented Programming in C++ by Robert Lafore Programming with ANSI C++, Bhushan Trivedi Demystified Object- Oriented Programming with C++, Dorothy R. Kirk Learning Web Design A Beginner's Guide to Html, CSS, JavaScript, And Web Graphics, Jennifer Niederst Robbins, O'Reilly, 5th Edition, 2018. "Web Enabled Commercial Applications Development using HTML, DHTML, Javascript, Perl CGI", Ivan Bayross, BPB, 2004 HTML 5 for Web Designers (By: Jeremy Keith) – http:// freepdf-books.com 	
<p>12</p>	<p>Internal Continuous Assessment: 40%</p>	<p>Semester End Examination: 60%</p>

13	<p>Continuous Evaluation through: Students are expected to attend each practical and submit the written practical of the previous session. Performing Practical and writeup submission will be continuous internal evaluation. 2.5 marks can be awarded for each practical performance and writeup submission totalling to 50 marks and can be converted to 20 marks.</p>	30 marks practical exam of 2 hours duration
14	<p>Format of Question Paper: Duration 2 hours. Certified copy of Journal is compulsory to appear for the practical examination Practical Slip: Q1. From Module 1 13 marks Q2. From Module 2 12marks Q3. Journal and Viva 05 marks</p>	