Dr.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

CIRCULAR NO.SU/B.Sc./CBC&GS /65/2023

It is hereby inform to all concerned that, the syllabi prepared by the Board of Studies, Ad-hoc Boards and recommended by the Dean, Faculty of Science & Technology, the Hon'ble Vice-Chancellor has accepted the **following syllabi of Bachelor of Science with Practical Pattern of Question Paper under the scheme of Choice Based Credit & Grading System** in his emergency powers under section 12(7) of the Maharashtra Public Universities Act, 2016 on behalf of the Academic Council as appended herewith.

Sr.No.	Courses	Semester
1.	B.Sc. Home Science (Degree)	IIIrd & IVth semester
2.	B.Sc. Information Technology (Degree)	IIIrd & IVth semester
3.	Bachelor of Computer Application (Degree)	IIIrd & IVth semester
4.	B.Sc.Botany (Optional)	IIIrd & IVth semester
5.	B.Sc.Dairy Science & Technology(Optional)	IIIrd & IVth semester
6.	B.Sc.Fisheries Science (Optional)	IIIrd & IVth semester
7.	B.Sc.Computer Science (Optional)	IIIrd & IVth semester
8.	B.Sc.Zoology (Optional)	IIIrd & IVth semester

This is effective from the Academic Year 2023-24 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO.SU/2023/30210-26
Date:- 26.05.2023.

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Deputy Registrar,
Academic Section

Copy forwarded with compliments to :-

1] **The Principal of all concerned Colleges,**
Dr. Babasaheb Ambedkar Marathwada University,

2] **The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.**

Copy to :-

1] The Director, Board of Examinations & Evaluation, Dr.BAMU,A'bad.

2] The Section Officer,[B.Sc.Unit] Examination Branch,Dr.BAMU,A'bad.
3] The Programmer [Computer Unit-1] Examinations, Dr.BAMU,A'bad.
4] The Programmer [Computer Unit-2] Examinations, Dr.BAMU,A'bad.
5] The In-charge,[E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr.BAMU,A'bad.
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Dr. Babasaheb Ambedkar Marathwada University
Aurangabad- 431004(MS) India.

Undergraduate Bachelor Degree Program
In Science (B.Sc.)
Computer Science (Optional Subject)

Second Year Syllabus
(III and IV semester)

Course Structure and Curriculum
(Outcome based Curriculum)
Choice Based Credit System
(Effective from Academic Year 2023-24)

Dr. BabasahebAmbedkarMarathwada University
Aurangabad – 431004 (MS) India.

Dean
Faculty of Science & Technology
Dr. Babasaheb Ambedkar Marathwada
University, Aurangabad

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1. Preamble

Education is the key to development of any society. Role of higher education is crucial for securing right kind of employment and also to pursue further studies in best available world class institutes elsewhere within and outside India. Quality education in general and higher education in particular deserves high priority to enable the young and future generation of students to acquire skill, training and knowledge in order to enhance their thinking, creativity, comprehension and application abilities and prepare them to compete, succeed and excel globally. Sustained initiatives are required to reform the present higher education system for improving and upgrading the academic resources and learning environments by raising the quality of teaching and standards of achievements in learning outcome s across all undergraduate programs in science, humanities, commerce and professional streams of higher education including computer science.

Education is the key to development of any society. Role of higher education is crucial for securing right kind of employment and also to pursue further studies in best available world class institutes elsewhere within and outside India. Quality education in general and higher education in particular deserves high priority to enable the young and future generation of students to acquire skill, training and knowledge in order to enhance their thinking, creativity, comprehension and application abilities and prepare them to compete, succeed and excel globally. Sustained initiatives are required to reform the present higher education system for improving and upgrading the academic resources and learning environments by raising the quality of teaching and standards of achievements in learning outcome s across all undergraduate programs in science, humanities, commerce and professional streams of higher education including computer science.

2. Structure and Curriculum for Bachelor of Science (B. Sc.) Computer Science (Optional Subject)

(Choice Based Credit System)

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

Choice Based Credit System (CBCS) Curriculum
For
Faculty of Science and Technology
Course Structure and Scheme of Examination
B.Sc. Three Year Undergraduate Degree Program

Semester I

	Course Code	Course Title	Teaching time/week	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1A) Core Courses	CMP-111	Computer Fundamental	2 hours	2	50	10	40	20
	CMP-112	Operating System	2 hours	2	50	10	40	20
	CMP-121	Lab course 1 (based on CMP-111 and CMP-112)	3 hours	1.5	50	10	40	20
Ability Enhancement compulsory courses (AECC-1)	CMP-131	Communication skills in English-I	3 hours	3	50	10	40	20
	CMP-132	Marathi/Hindi/Urdu/Sanskrit A student can opt for any one of these languages (SL-I)	3 hours	3	50	10	40	20
Non-Credit Course	CMP-113	Constitution of India	2 hours					
			13	11.5	250	50	200	100

Total Credits for Semester I : 11.5 (Theory : 10 ; Laboratory : 1.5)

Semester II

	Course Code	Course Title	Teaching time/week	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1B) Core Courses	CMP-211	Digital Electronic	2 hours	2	50	10	40	20
	CMP-212	Basic C Programing	2 hours	2	50	10	40	20
	CMP-221	Lab course 2 (based on CMP-211 and CMP-212)	3 hours	1.5	50	10	40	20
Ability Enhancement compulsory courses (AECC-2)	CMP-231	Communication skills in English-II	3 hours	3	50	10	40	20
	CMP-232	Marathi/Hindi/Urdu/Sanskrit A student can opt for any one of these languages (SL-II)	3 hours	3	50	10	40	20
Non-Credit Course	CMP-213	Constitution of India	2 hours					
			15	11.5	250	50	200	100

Total Credits for Semester Ii : 11.5 (Theory : 10 ; Laboratory : 1.5)

Semester III								
	Course Code	Course Title	Teaching time/week	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1D) Core Courses	CMP-311	Data Structure	2 hours	2	50	10	40	20
	CMP-312	Advance C Programming	2 hours	2	50	10	40	20
	CMP-321	Lab course 3 (based on CMP-311)	3 hours	1.5	50	10	40	20
	CMP-322	Lab course 4 (based on CMP-312)	3 hours	1.5	50	10	40	20
Skill Enhancement course (SEC-2)	CMP-313	(Select any one from CMP313(A) and CMP313(B) CMP313(A) :- Office Automation CMP313(B):-HTML Programming	2 hours	2	50	10	40	20
Ability Enhancement compulsory courses (AECC-4)	CMP-331	Communication skills in English-III	3 hours	3	50	10	40	20
	CMP-332	Marathi/Hindi/Urdu/Sanskrit A student can opt for any one of these languages (SL-III)	3 hours	3	50	10	40	20
Non-Credit Course	Non-Credit Course							
Total Credits for Semester III : 15 (Theory : 12 ; Laboratory : 3)								

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Semester IV								
	Course Code	Course Title	Teaching time/week	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1D) Core Courses	CMP-411	DBMS using SQL	2 hours	2	50	10	40	20
	CMP-412	Object Oriented Programing using C++	2 hours	2	50	10	40	20
	CMP-421	Lab course 5 (based on CMP-411)	3 hours	1.5	50	10	40	20
	CMP-422	Lab course 6 (based on CMP-412)	3 hours	1.5	50	10	40	20
Skill Enhancement course (SEC-2)	CMP-413	**Select any one from CMP413(A) and CMP413(B)** CMP413(A): **Digital Marketing** CMP413(B):- **PHP Programming**	2 hours	2	50	10	40	20
Ability Enhancement compulsory courses (AECC-4)	CMP-431	Communication skills in English-IV	3 hours	3	50	10	40	20
	CMP-432	Marathi/Hindi/Urdu/Sanskrit A student can opt for any one of these languages (SL-IV)	3 hours	3	50	10	40	20
Non-Credit Course	CMP-413	Environment Science	2 hours					
			20	15	350	70	280	140
Total Credits for Semester IV : 15 (Theory : 12 ; Laboratory : 3)								

Curriculum for

Semester III

Course Code: **CMP-311**
Course Title: **Data Structure**
Total Credits: 02
Contact Hours: 30 (Clock Hours)
Marks: 50
Periods: 45 (45 minutes each)

Objective:

- To provide fundamental knowledge of data structures and how they are organized/arranged in computer memory.
- To provide knowledge on how data structures are implemented and processed.
- To familiarize with basic techniques of algorithm analysis.
- To equip with the implementation techniques of complex algorithms of insertion, deletion and modification of data stored in various data structures.
- To provide knowledge of the basic functioning of searching and sorting algorithms.

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UNIT-1: Introduction to Data Structures and Algorithm Analysis: (10 period)

Introduction , Need of Data Structure ,Definitions - Data and information, Data type, Data object, ADT, Data Structure ,Types of Data Structures

Algorithm analysis: Space and time complexity, Graphical understanding of the relation between, different functions of n, examples of linear loop, logarithmic, quadratic loop etc. Best, Worst, Average case analysis, Asymptotic notations (Big O, Omega Ω,Theta)

UNIT-2: Array: (10 period)

ADT of array, Operations Array applications - Searching Sequential search, variations - Sentinel search, Probability search, ordered list search, Binary Search Comparison of searching methods , Sorting Terminology- Internal, External, Stable, In-place Sorting

Comparison Based Sorting - Lower bound on comparison based sorting, Methods- Bubble Sort, Insertion Sort, Selection Sort, Algorithm design strategies - Divide and Conquer strategy, Merge Sort, Quick Sort, complexity analysis of sorting methods

UNIT-3: Linked List: (10 period)

List as a Data Structure, differences with array. Dynamic implementation of Linked List, internal and external pointers, Types of Linked List – Singly, Doubly, Circular

Operations on Linked List - create, traverse, insert, delete, search, sort, reverse, concatenate, merge, time complexity of operations.

Applications of Linked List – polynomial representation, Addition of two polynomials

Generalized linked list – concept, representation, multiple-variable polynomial representation using generalized list

UNIT-4: Stack and Queue (10 period) Introductionof Stack: Operations – init(), push(), pop(), isEmpty(), isFull(), peek(), time complexity of operations. Implementation- Static and Dynamic with comparison, Applications of stack Expression types - infix, prefix and postfix, expression conversion and evaluation (implementation of infix to postfix, evaluation of postfix) Introduction of Queue: Operations - init(), enqueue(), dequeue(), isEmpty(), isFull(),peek(),time complexity of operations, differences with stack. Types of Queue - Linear Queue, Circular Queue, Priority Queue, Double Ended Queue
UNIT-5: Tutorial and Assignment (05 period)

References

1. Classic Data Structures-D. Samanta, Prentice Hall India Pvt. Ltd.

2. Fundamentals of Data Structures in C- Ellis Horowitz, SartajSahni,Susan Anderson-Freed, 2nd Edition, Universities Press.

3. Data Structures using C and C++-YedidyahLangsam, Moshe J. Augenstein, Aaron M.Tenenbaum, Pearson Education

4. Data Structures: A Pseudo code approach with C, Richard Gilberg ,Behrouz A. Forouzan, Cengage Learning.

5. Introduction to Data Structures in C-Ashok Kamthane, Pearson Education

6. Algorithms and Data Structures, Niklaus Wirth, Pearson Education

Course Code: **CMP-312**
Course Title: **Advance C Programming**
Total Credits: 02
Contact Hours: 30 (Clock Hours)
Marks: 50
Periods: 45 (45 minutes each)

Objective:

The students would be able

1. To obtain in depth knowledge of C language.
2. To understand advanced features of C Programming Language .

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UNIT-1: Functions: (10 period)

User Defined Functions : Introduction, Elements of UDF

Categories of UDF : No argument no return value , Arguments but no return value, No argument but returns a value, Arguments with return value

Recursion , Nesting Function, Variable Scope , Visibility and lifetime in function, Storage Classes

UNIT-2: Structures, Unions: (10 period)

Structures : Defining a structure, Accessing a structure variable, Operations on structure members, Copying and comparing variables, Arrays of structure

Arrays within Structures ,

Unions: introduction, example.

UNIT-3: Pointer: (10 period)

Definition and Concept : Advantage of using pointer, Pointer arithmetic

Pointer: Array of pointers, Pointers and Functions

Dynamic Memory Allocation: Memory Allocation Function, malloc() , calloc(), realloc(), free()

UNIT-4: Files and Preprocessors (10 period)

Files : Concepts of File Management , Files functions – fopen(), fclose(), fprintf(), fscanf(), fseek(), ftell(), rewind(), putc(), getc(), putw(), getw() , Error handling functions . Command line argument

Preprocessors: Types of Preprocessors, Macro substitution directives

File inclusion directives, Compiler control directives

UNIT-5: Tutorial and Assignment (05 period)

References

1. Simplifying C (First Edition 2010) , Publication : Dreamtech, by Harshal Arolkar and Sonal Jain

2. Programming in ANSI C (Fifth Edition 2011), Publication : Mc Graw Hill, by Balagurusamy

3. Programming in C (First Edition 2011), Publication : Oxford Higher Education, by Reema Thareja

4. Programming In C (Second Edition), Publication : Pearson Education, by Ashok N. Kamthane

Course Code: **CMP-321**
Course Title: **Lab course 3 (based on CMP-311)**
Total Credits: 1.5
Contact Hours: 03 Hours (Week)
Marks: 50

1. Write a program to store the elements in 1-D array and perform the operations like searching, sorting and reversing the elements.
2. Read the two arrays from the user and merge them and display the elements in sorted order
3. Write a program to perform the Matrix addition, Multiplication and Transpose Operation.
4. Write a program to implement the concept of Stack with Push, Pop, Display and Exit operations
5. Write a program to convert an infix expression to postfix and prefix conversion
6. Write a program to implement Tower of Hanoi problem.
7. Write a program to implement the concept of Queue with Insert, Delete, Display and Exit operations.
8. Write a program to implement the concept of Circular Queue
9. Write a program to implement the concept of Deque.
10. Write a program to create the tree and display the elements.
11. Write a program to construct the binary tree
12. Write a program for inorder, postorder and preorder traversal of tree
13. Write a program to create a single linked list and display the node elements in reverse order
14. Write a program to search the elements in the linked list and display the same

Minimum three practical on each unit

Course Code: **CMP-322**
Course Title: **Lab course 4 (based on CMP-312)**
Total Credits: 1.5
Contact Hours: 03 Hours (Week)
Marks: 50

1. Write a program to calculate average temperature of five days. Create temp() function.
2. Write a program that uses recursive function fibo() that generates a Fibonacci series containing N elements.
3. Write a program that uses a recursive function fact() that finds the factorial of a given number N.
4. Program to find if the given no. is prime or not. The function should accept the number as argument and return if the no. is prime or not.
5. Write a function which accepts a character array as argument from the user. The function should print the ASCII equivalent of all the characters in the string.
6. Write a program to define structure with tag state with fields state name, number of districts and total population. Read and display the data.
7. Write a program to create a list of books details. The details of a book include title, author, publisher, publishing year, number of pages, and price.
8. Define a structure called Item with members : Item_code, Item_name, Price. Create an array of five Items. Create a function which accepts the Item array and modifies each element with an increase of 10% in the price.
9. Define a structure to represent a date. Use your structures that accept two different dates in the format mm dd of the same year. Write a C program to display the month names of both dates.
10. Define a structure that can describe a Hotel. It should have members that include name, address, grade, room charges, grade and no of rooms. Write a function to print out all hotel details with room charges less than a given value
11. 1 Write a program to display contents of file on the screen. The program should ask for file name. Display the contents in capital case.
12. Write a program to find size of the file.
13. Write a program to combine contents of two files in a third file. Add line number at the beginning of each line.
14. Write a program to display number 1 to 100. Redirect the output of the program to text file.
15. Write a program to write contents of one file in reverse into another file

Minimum three practical on each unit

Course Code: **CMP-313(A)**
Course Title: **Office Automation**
Total Credits: 02
Contact Hours: 30 (Clock Hours)
Marks: 50
Periods: 45 (45 minutes each)

Objective:

The students would be able

1. To obtain in skill regarding the office tool and its related applications.
2. To understand advanced features office tool.

UNIT-1: DOS and Windows Environment: (10 period)

DOS organization, DOS commands, Operating System: Batch, multi-programming, Time sharing, Networks operating system, On-line and Real time operating system, Distributed operating system, Multi-processor, Multi-tasking.

Graphical OS: Fundamentals of windows, Types of windows, Anatomy of windows, Windows explorer, Customizing windows, Control panel, Taskbar setting, Open Network and sharing centre.

UNIT-2: Word Processor: (10 period)

Applications of word processor, Common packages, Creating and saving documents, Editing documents, Formatting text and paragraphs, Use of header footer, Insert table, Edit table, Mail merge, Macros

UNIT-3: Spread Sheet: (10 period)

Concept of worksheets and workbooks, Creating workbook, Editing a work sheet, Formatting data, Doing basic calculations using formulae, Using simple statistical functions, Inserting charts, Printing workbook.

UNIT-4: Power Point (10 period)

Templates, Views, Formatting slide, Slides with graphs, Animation, using special features, presenting slide shows

UNIT-5: Tutorial and Assignment (05 period)

References

1. R.K. Taxali: Introduction to Software Packages, Galgotia Publicaions.
2. MS–Office 2003, Compiled by SYBIX.
3. MS–Office 2003, BPB Publications.
4. Introduction to Computer, P.K. Sinha.
5. Fundamental of Computers – By V. Rajaraman B.P.B. Publications

Course Code: **CMP-313(B)**
Course Title: **HTML Programming**
Total Credits: 02
Contact Hours: 30 (Clock Hours)
Marks: 50
Periods: 45 (45 minutes each)

Objective:

The students would be able

1. To obtain in skill regarding the web development and its related applications.
2. To understand advanced features HTML.

UNIT-1: Introduction: (10 period)

Basic Concept , Internet, Internet Domains world wide web,
Protocols definition, Overview of TCP/IP, Telnet.
Web page, Web site , web browser , Web server ,web, Client, Communication between browser and web, server, Web site architecture.
Structure of HTML program HTML paired tags,Text formatting: paragraph, line break, headings , drawing lines.Text styles: Bold, italics,underline. Lists: types of lists viz. unordered, ordered, definition
lists

UNIT-2: Links and Image: (10 period)

Linking documents (Links) : External document references, internal document references.
Introduction to frames: frameset and frame tag. Putting an Image on a Page ,Using Images as Links ,Putting an Image in the Background

UNIT-3: Tables and Forms: (10 period)

Creating a Table , Table Headers ,Captions, Spanning
Multiple Columns ,Styling Table .
Introduction to forms, form design and form tag.

UNIT-4: Introduction to DHTML (10 period)

Overview of dynamic HTML. Cascading Style Sheets, font ,color ,background

UNIT-5: Tutorial and Assignment (05 period)

References

1. Web Enabled commercial Application Development Using HTML, DHTML, JavaScript by -Ivon Bayross.
2. Complete reference HTML, Narosa Publication
3. Cassidy Williams, Camryn Williams Introduction to HTML and CSS, O'Reilly, 2015

Curriculum for Semester IV

Course Code: **CMP-411**
Course Title: **DBMS with SQL**
Total Credits: 02
Contact Hours: 30 (Clock Hours)
Marks: 50
Periods: 45 (45 minutes each)

Objective: Students successfully completing this course should be able to:

1. To understand the different issues involved in the design and implementation of a database system.
2. To study the physical and logical database designs, database modeling, relational, hierarchical, and network models.
3. To understand and use data manipulation language to query, update, and manage a database.
4. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

UNIT-1: Introduction: (10 period)

General introduction to database systems; Database -DBMS distinction, approaches for building a database, data models, database management system, three-schema architecture of a database, challenges in building a DBMS, various components of a DBMS

UNIT-2: Data Models: (10 period)

E/R Model - Conceptual data modeling - motivation,entities, entity types, various types of attributes, relationships, relationship types, E/R diagram notation, examples

UNIT-3: Structured Query Language (SQL): (10 period)

Introduction, data definition in SQL, table, key and foreign key definitions, update behaviors. Querying in SQL - basic select-from-where block and its semantics, nested queries - correlated and uncorrelated, notion of aggregation, aggregation functions group by and having clauses, embedded SQL.

UNIT-4: Data Normalization (10 period)

Dependencies and Normal forms - Importance of a good schema design, problems encountered with bad schema designs, motivation for normal forms, definitions of 1NF, 2NF.

Data Storage, Indexes and Transactions: File organizations, primary, secondary index structures and various index structures.

UNIT-5: Tutorial and Assignment (05 period)

References

1. An Introduction to Database System By Bipin C Desai
2. H Garcia-Molina, JD Ullman and Widom, Database Systems: The Complete Book,2nd Ed., Prentice-Hall, 2008.
3. A Silberschatz, H Korth and S Sudarshan, Database System Concepts, 6th Ed., McGraw-Hill, 2010.
4. R Elmasri, S Navathe, Fundamentals of Database Systems, 6th edition, Addison-Wesley, 2010.
5. R Ramakrishnan, J Gehrke, Database Management Systems, 3rd Ed., McGraw-Hill,2002

Course Code: **CMP-412**
Course Title: **Object Oriented Programing using C++**
Total Credits: 02
Contact Hours: 30 (Clock Hours)
Marks: 50
Periods: 45 (45 minutes each)

Objective: Students successfully completing this course should be able to:

1. To expose students to concept of object oriented programming using C++.
2. Student will elaborate the algorithmic thinking and problem solving and impart moderate skills in programming using C++ Language in an industry-standard.
3. Introduce students to learn basic features of C++ language, design and execute the C++ program dynamically.

UNIT-1: Introduction of OOP: (10 period)

Procedural Vs Object Oriented Programming, Basic concepts of Object Oriented Programming, Class, Object, Data Abstraction, Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Message Passing.
Benefits and applications of OOP.

UNIT-2: Introduction to C++: (10 period)

History and overview of C++, C++ program structure. Reference variables, Scope resolution operator, Member de-referencing operators, new and delete, cin and cout,

UNIT-3: Functions in C++: (SQL): (10 period)

Function prototype, Call by reference (using reference variable), Return by reference, Inline function, Default arguments, Const arguments.
Function overloading Different numbers and different kinds of arguments.

UNIT-4: Objects and Classes (10 period)

Specifying a class, private and public, Defining member functions, Nesting of member function, Object as data types, Memory allocation for objects, static data members and member functions. Array of objects, Objects as function argument, returning objects, Friend function and its characteristics

Constructors and Destructors

Introduction, default and parameterized constructors, Multiple constructors in a class, Copy Constructor, Destructors

UNIT-5: Tutorial and Assignment (05 period)

References

1. Object Oriented Programming with C++ E. Balagurusamy, Tata McGraw-Hill Publishing
2. Object Oriented Programming In C + + Robert Lafore, Galgotia
3. Let us C++ Yeshwant Kanetkar; bpb publication

Course Code: **CMP-421**
Course Title: **Lab course 5 (based on CMP-411)**
Total Credits: 1.5
Contact Hours: 03 Hours (Week)
Marks: 50

1. Creating a single table without constraints and firing queries.
2. Queries containing aggregate, string and date functions fired on a single table.
3. Creating single table with constraints and executing queries.
4. Updating tables, altering table structure and deleting table Creating and altering a single table and executing queries.
5. Joining tables and processing queries.
6. For given scenario draw E-R diagram and convert entities and relationships to table. Write relational algebra queries and convert to SQL queries on these tables.
7. Creating, dropping and maintaining indexes.
8. Create and manage views and process queries on views.
9. Creating stored procedures, executing procedures, deleting procedures.
10. Creating with or without enforcing data integrity through triggers, nested triggers, viewing, modifying and deleting triggers

Minimum three practical on each unit

Course Code: **CMP-422**
Course Title: **Lab course 6 (based on CMP-412)**
Total Credits: 1.5
Contact Hours: 03 Hours (Week)
Marks: 50

1. Write programs that illustrates the simple C++ concepts without classes.
2. Write C++ programs to illustrate the concepts pointers, functions and function overloading.
3. Write C++ programs to illustrate the concepts: classes, friend functions.
4. Write C++ programs to illustrate the concepts:constructors, constructor overloading and destructors.
5. Write C++ programs to illustrate the concepts: operator overloading (both Unary and Binary).
6. Write C++ programs to illustrate the concepts: Simple,Multiple, Multilevel inheritance.
7. Write C++ programs to illustrate the concepts: Polymorphism (Virtual functions, Pure Virtual functions).
8. Write programs to illustrate the file handling in C++.
9. Write programs to illustrate the templates in C++.
10. Write programs to illustrate the exceptions in C++.

Minimum three practical on each unit

Course Code: **CMP-413(A)**
Course Title: **Digital Marketing**
Total Credits: 02
Contact Hours: 30 (Clock Hours)
Marks: 50
Periods: 45 (45 minutes each)

Objective:

1. To understand the fundamentals of digital marketing and its significance in today's business world.

2. To develop a comprehensive content marketing strategy that aligns with business goals.

3. To gain an in-depth understanding of search engine optimization techniques and how to optimize a website for search engines.

4. To learn how to create and execute effective social media marketing campaigns that reach and engage the target audience.

UNIT-1: Introduction to Digital Marketing: (10 period)

Definition and Overview of Digital Marketing
Types of Digital Marketing
Digital Marketing vs Traditional Marketing
The Importance of Digital Marketing in the Business World
Digital Marketing Channels
Digital Marketing Mix
The Digital Marketing Ecosystem
Understanding Target Audience

UNIT-2: Content Marketing: (10 period)

Definition and Overview of Content Marketing
Content Marketing Objectives
Types of Content Marketing
Creating a Content Marketing Plan
Content Marketing Process
Content Marketing Channels
Measuring Content Marketing Success
Content Marketing Best Practices

UNIT-3: Search Engine Optimization (SEO) (10 period)

Definition and Overview of SEO
The Importance of SEO in Digital Marketing
Keyword Research and Analysis
On-page and Off-page Optimization
Technical SEO
Link Building
Local SEO

Mobile Optimization
UNIT-4: Social Media Marketing (10 period) Definition and Overview of Social Media Marketing Types of Social Media Channels Creating a Social Media Marketing Plan Measuring Social Media Marketing Success Social Media Marketing Objectives Social Media Marketing Channels Social Media Advertising Social Media Best Practices
UNIT-5: Tutorial and Assignment (05 period)

References

1. Digital Marketing: An Hour a Day by Dave ChaffeyContent Marketing for Dummies by Stephanie Diamond
2. The Art of Social Media by Guy Kawasaki and Peg Fitzpatrick
3. The Science of Social Selling by Jill Konrath
4. The Art of SEO by Eric Enge, Jessie Stricchiola, and Rand Fishkin

Course Code: **CMP-413(B)**
Course Title: **PHP Programming** Total Credits: 02
Contact Hours: 30 (Clock Hours) Marks: 50
Periods: 45 (45 minutes each)

Objective:

- Upon successful completion of this course, student will understand the basic concept of PHP based web development.
- The student will elaborate their programming knowledge for web design and development.
- The PHP subject will support to student for designing and development of large scale websites for real time application.

UNIT-1: Introduction: (10 period)

PHP introduction, inventions and versions, important tools and software requirements (like Web Server, Database, Editors etc.) ,PHP with other technologies, scope of PHP ,Basic Syntax, PHP variables and constants ,Types of data in PHP , Expressions, scopes of a variable (local, global) ,PHP Operators : Arithmetic, Assignment, Relational , Logical operators, Bitwise , ternary and MOD operator, PHP operator Precedence and associatively .

UNIT-2: HTML Form with PHP: (10 period)

Capturing Form Data ,GET and POST form methods ,Dealing with multi value fields, Redirecting a form after submission

Conditional events and Loops:

PHP IF Else conditional statements (Nested IF and Else) Switch case, while ,For and Do While Loop, Goto , Break ,Continue and exit

UNIT-3: Functions : (10 period)

Function, Need of Function , declaration and calling of a function ,PHP Function with arguments, Default Arguments in Function ,Function argument with call by value, call by reference, Scope of Function Global and Local

UNIT-4: String Manipulation and Regular Expression (10 period)

Creating and accessing String , Searching & Replacing String ,Formatting, joining and splitting String , String Related Library functions

Use and advantage of regular expression over inbuilt function ,Use of preg_match(), preg_replace(), preg_split() functions in regular expression

UNIT-5: Tutorial and Assignment (05 period)

References

1. Steven Holzner, "PHP: The Complete Reference Paperback", McGraw Hill Education (India),2007.
2. Timothy Boronczyk, Martin E. Psinas, "PHP and MYSQL (Create-Modify-Reuse)", Wiley India Private Limited, 2008.
3. Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5", 3rd Edition Paperback, O'reilly,2014