MANGALORE UNIVERSITY

State Education Policy – 2024
[SEP-2024]

BLOWN UP SYLLABUS AND PRACTICAL LIST

FOR

I SEMESTER B.Sc.
COMPUTER SCIENCE

Semester I								
Sl. No	**Course Code**	**Title of the Course**	**Category of Courses**	**Teaching Hours per Week**	**SEE**	**IA**	**Total Marks**	**Credits**
1	**BSC-CSC-1.1**	Computer Fundamentals and Programming in C	**Core**	**4**	**80**	**20**	**100**	**3**
2	**BSC-CSC-1.2**	C Programming Lab	**Practical**	**4**	**40**	**10**	**50**	**2**

Program Name	**BSC-COMPUTER SCIENCE**	Semester	**I**
Course Title	**Computer Fundamentals and Programming in C (Theory)**		
Course Code:	**BSC-CSC-1.1**	No.of Credits	**03**
Contact hours	**4 Hours per week**	Duration of SEA/Exam	**3hours**
Formative Assessment Marks	**20**	Summative Assessment Marks	**80**

Topics	**Book**	**Chapter/Page No./ Section No.**
UNIT I		
Fundamentals of Computers: Introduction to Computers –Definition of a computer, Characteristics of computers Generations of computers, Classification of computers. Computer system, applications of computers.	Book 1	Chapter 1: All sections (sub sections included)
Computer Software – Categories of software. Computer Programming and Languages–Machine Level, Assembly level and High-level languages; Translator Programs – Assembler, Interpreter and Compiler. Developing a computer program, Program Development Cycle - Algorithm, Flowchart and Pseudocode with examples.	Book 1	Chapter 11: sections 11.1, 11.2, 11.3 Chapter 10: 10.1, 10.2, 10.3, 10.5 Chapter 1
Introduction to C Programming: Overview of C; History and Importance of C; Structure of a C Program with Examples; Creating and Executing a C Program; Compilation process in C.	Book 2	Chapter 2
C Programming Basic Concepts: C Character Set; C tokens - keywords, identifiers, constants, and variables;	Book 2	

Data types; Declaration and initialization of variables; Symbolic constants.		
UNIT II		
C Operators and Expressions: Arithmetic operators; Relational operators; Logical operators; Assignment operators; Increment & Decrement operators; Bitwise operators; Conditional operator; Special operators; Operator Precedence and Associatively. Evaluation of arithmetic expressions; Type conversion. **Input and output with C**: Formatted I/O functions - printf and scanf, control stings and escape sequences, output specifications with printf functions; Unformatted I/O functions to read and display single character and a string - getchar, putchar, gets and puts functions. **Control Structures:** Branching: if, if-else, nested if, else-if ladder, switch. **Looping**: while, do-while and for loop, nested loops, exit, break, jumps in loops.	Book 2	Chapter 3 Chapter 4 Chapter 5 Chapter 6
UNIT III		
Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays - Declaration, Initialization and Memory representation. **Handling of character Strings**: Declaring and Initializing string variables; String handling functions - strlen, strcmp, strcpy and strcat; Character handling functions - toascii, toupper, tolower, isalpha, isnumeric etc. **User-Defined Functions:** Need for user defined functions; Format of C user defined functions; Components of user defined functions - return type, name, parameter list, function body, return statement and function call; Categories of user defined functions - With and without parameters and return type. **Nesting**	Book 2	Chapter 7 Chapter 8 Chapter 9

of functions, Recursion, and functions with arrays, the scope, visibility & lifetime of variables (Storage classes).		
	UNIT IV	
Structures - Structure Definition, Advantages of Structure, declaring structure variables, accessing structure members, Structure members initialization, comparing structure variables, Array of Structures; Unions - Union definition; difference between Structures and Unions. **Pointers in C**: Understanding pointers - Declaring and initializing pointers, accessing address and value of variables using pointers; Pointers and Arrays; Pointer Arithmetic. **File Management in C:** Basic file operations, types of files. Creating text file. Modes of opening a file, formatted and unformatted i/o operations. **The Preprocessor:** Macro substitution and file inclusion.	Book 2	Chapter 10 Chapter 11 Chapter 12 Chapter 14

Text Books:

1. ITL Education Solution Limited, Introduction to Information Technology, Second Edition 2018, Pearson Education.
2. E. Balagurusamy: Programming in ANSI C (TMH),7th Edition.

Reference Books :

1. Kamthane: Programming with ANSI and TURBO C (Pearson Education)
2. V. Rajaraman: Programming in C (PHI – EEE)
3. S. Byron Gottfried: Programming with C (TMH)
4. Kernighan &Ritche: The C Programming Language (PHI)
5. Yashwant Kanitkar: Let us C
6. P.B. Kottur: Programming in C (Sapna Book House)
7. Pradeep K. Sinha and Priti Sinha: Computer Fundamentals (Sixth Edition), BPB Publication.

Program Name	**BSC-COMPUTER SCIENCE**	Semester	**I**
Course Title	**C Programming Lab**		
Course Code:	**BSC-CSC-1.2**	No.of Credits	**02**
Contact hours	**4 Hours per week**	Duration of SEA/Exam	**3 hours**
Formative Assessment Marks	**10**	Summative Assessment Marks	**40**

PART – A

1. Program to check for prime number.
2. Program to generate n Fibonacci numbers.
3. Program to read a multi – digit number find the sum of the digits, reverse the number and check it for palindrome.
4. Program to find the roots of quadratic equation (Demonstration of switch Statement).
5. Program to count occurrences of each character in a string.
6. Program to read ‘n’ integer values into a single dimension array and arrange them in ascending order using bubble sort method
7. Program to find the largest and smallest elements with their position in a one-dimensional array.
8. Program to multiply two matrices.

PART-B

1. Program to accept ‘n’ and find the sum of the series 1! + 3! + 5! …… + n!
2. Write user-defined functions to (a) find the length of a string (b) concatenate two strings. Call these functions in the main program
3. Program to find whether a given string is palindrome or not (Use a function to reverse a string using pointers)
4. Program to add two matrices using pointers.
5. Program to create a file NUMBER.txt, separates Odd and Even numbers and copy to file ODD.txt and EVEN.txt respectfully. Finally display all the three files.
6. Program to find the GCD of ‘n’ integers using a function to compute the GCD of two integers

7. Program to enter the information of n students (name, register number, marks in three subjects) into an array of structures. Compute and print the result of all students. For passing, student should get at least 35 in each subject, otherwise result is "FAIL". If the student passes and if percentage >= 70, result is DISTINCTION; If percentage is < 70 and >=60, result is FIRST CLASS; if percentage is < 60 and >=50, result is SECOND CLASS; otherwise result is PASS CLASS. Get the output of all students in a tabular form with proper column headings
8. Program to prepare the pay slip of 'n' employees using an array of structures. Input the employee name, employee number and basic pay. Calculate the DA,HRA, PF, PT, Gross Pay and Net Pay as follows:
   If Basic < 40000, DA = 50% of Basic, HRA = 12% of Basic, PF = 12% of Gross Pay,PT =250.
   Otherwise DA = 40% of Basic, HRA = 10% of Basic, PF = 13% of Gross, PT= 300.
   Gross Pay = Basic + DA + HRA and Net Pay = Gross Pay – PF – PT

Evaluation Scheme for Lab Examination:

Assessment Criteria		
Program-1	**PART-A** **Writing:7 Marks Execution:8Marks**	**15Marks**
Program-2	**PART-B** **Writing:10 Marks Execution:10 Marks**	**20 Marks**
Practical Record		**05 Marks**
Total		**40 Marks**

MANGALORE UNIVERSITY

State Education Policy – 2024
[SEP-2024]

BLOWNUP SYLLABUS AND PRACTICAL LIST

FOR

BSC-COMPUTER SCIENCE

CURRICULUM STRUCTURE FOR II SEMESTER BSc- COMPUTER SCIENCE

Semester II								
Sl. No	**Course Code**	**Title of the Course**	**Category of Courses**	**Teaching Hours per Week**	**SEE**	**IA**	**Total Marks**	**Credits**
1	**BSC-CSC-2.1**	Data Structures	**Core**	**4**	**80**	**20**	**100**	**3**
2	**BSC-CSC-2.2**	Data Structures Lab	**Practical**	**4**	**40**	**10**	**50**	**2**

Program Name	**BSC-COMPUTER SCIENCE**	Semester	**II**
Course Title	**Data Structures (Theory)**		
Course Code:	**BSC-CSC-2.1**	No.of Credits	**03**
Contact hours	**4 Hours per week**	Duration of SEA/Exam	**3 hours**
Formative Assessment Marks	**20**	Summative Assessment Marks	**80**

Topics	**Book**	**Chapter /Page No/Section**
UNIT 1[13 HOURS]		
Introduction to Data Structures: Definition, Need for Data Structures, Types of Data Structures. **Linear Data Structures:** Arrays - Definition, Declaration and storage of one-and two-dimensional arrays. Sparse matrices. **Recursion**: Definition; Types of recursion; Recursion Technique Examples – Fibonacci numbers, GCD, Binomial coefficient $^{n}C_{r}$, Comparison between iterative and recursive functions. **Sorting**: Sorting Selection sort, Bubble sort, Quicksort, Insertion sort; Comparison of Different sorting techniques.	BOOK-1	CHAPTER-1 1.1to 1.4 CHAPTER-4 4.1,4.2,4.4,4.5,4.6,4.10,4.17 CHAPTER-6 6.8(complexity excluded) 4.7,6.7,9.1,9.3,9.4(complexity excluded)
UNIT 2[13 HOURS]		
Searching: Introduction, Linear search, Binary Search, Comparison of different searching techniques. **Dynamic memory allocation:** Static	BOOK-1	CHAPTER-4 4.8(complexity excluded in both 4.8 & 4.9),4.9. CHAPTER-4

and Dynamic memory allocation; Memory allocation and deallocation functions-*malloc*, *calloc,realloc* and *free.* **Linked List**: Introduction, characteristics, types of linked lists, Representation of singly linked list in memory, Singly linked list – Operations, algorithms, Representation of polynomials using linked lists. Circular linked list–Operations, Doubly linked list-operations .Memory allocations.		4.13 CHAPTER-5 5.1,to 5.11,
UNIT 3[13 HOURS]		
Stacks: Array representation of stacks, Linked representation of stacks, operations, Applications of stacks Recursion, Implementation of recursive procedure by stack (Factorial function and Fibonacci sequence). **Arithmetic Expressions**: Prefix, infix and postfix notation, infix to postfix conversion, evaluation of postfix expression. **Queues**: Array representation of queue, Linked representation of queue, Types of queues-Simple queue, circular queue, double-ended queue, priority queue, operations on queues.	BOOK-1	CHAPTER-6 6.1,6.2,6.3,6.4,6.6,6.7,6.10 6.11,6.12,6.14,6.15,6.16(page number 6.79,6.80,6.87 Sonly),
UNIT 4[13 HOURS]		
Trees: Definition; Tree terminologies – node, root node, parent node, ancestors of anode, siblings, terminal and non-terminal nodes, degree of a node, level, edge, path, depth;	**Book 1**	CHAPTER-7 7.1,7.2,7.3,7.4,7.5,7.8,7.9

Binary tree: Types of binary trees-strict binary tree, complete binary tree, binary search tree. Array representation of binary tree. Traversal of binary tree; *preorder, inorder* and *postorder* traversal; Construction of a binary tree when inorder and pre/postorder traversals are given. **Graphs:** Terminologies, Matrix representation of graphs, Traversals: Breadth First Search and Depth first search.		CHAPTER-8 8.1,8.2,8.3,8.5,8.7

Text Books:

1. Seymour Lipschutz, Schaum's Outlines Series, Data Structures with C, TataMcGrawHill2011

Reference Books:

1. Sartaj Sahni: Fundamentals of Data Structures.
2. Yedidyah Langsam, MosheJ.Augenstein and Aaron M. Tenenbaum, Data Structures Using C and C++,2nd Edition, PHI Publication
3. Kamathane: Introduction to Data structures (Pearson Education)
4. Y.Kanitkar: Data Structures Using C(BPB)
5. Kottur: Data Structure Using C
6. Padma Reddy: Data Structure Using C
7. Sudipa Mukherjee: Data Structures using C 1000 Problems and Solutions (McGrawHillEducation,2007)

Program Name	**BSC-COMPUTER SCIENCE**	Semester	**II**
Course Title	**Data Structures Lab**		
Course Code:	**BSC-CSC-2.2**	No.of Credits	**02**
Contact hours	**4 Hours per week**	Duration of SEA/Exam	**3 hours**
Formative Assessment Marks	**10**	Summative Assessment Marks	**40**

PART-A

1. Program to compute power of a number using a recursive function.
2. Program to read the names of the cities and arrange them alphabetically.
3. Program to sort the given list using selection sort technique.
4. Program to sort the given list using bubble sort technique.
5. Program to sort the given list using quick sort technique.
6. Program to sort the given list using insertion sort technique.
7. Program to search an element using linear search technique.
8. Program to search an element using recursive binary search technique.

PART-B

1. Program to implement queue using arrays.
2. Program to implement stack using arrays.
3. Write a Program for converting an Infix Expression to Postfix Expression. Program should support both parenthesized and free parenthesized expressions with the following operators: +, -, *, /, % (Remainder), ^ (Power) and alphanumeric operands.
4. Program to implement all operations on a sorted singly linked list.
5. Program to implement queue using linked list.
6. Program to implement circular queue using array.
7. Write a menu driven program for the following operations on Binary Search Tree
   (BST) of integers

   (a) Create a BST of ‘n’ Integers.

(b) Traverse the BST in Inorder, Preorder and Postorder.

(c) Search the BST for a given element and report the appropriate message.

8. Program for the following operations on a graph (G) of cities:
   (a) Create a graph of N cities using Adjacency Matrix.
   (b) Print all the nodes reachable from a given starting node in a digraph using BFS method.

Evaluation Scheme for Lab Examination:

Assessment Criteria		
Program-1	**PART-A** **Writing:7 Marks Execution:8Marks**	**15Marks**
Program-2	**PART-B** **Writing:10 Marks Execution:10 Marks**	**20 Marks**
Practical Record		**05 Marks**
Total		**40 Marks**

MANGALORE UNIVERSITY

State Education Policy – 2024
[SEP-2024]

CURRICULUM STRUCTURE

FOR

BSC-COMPUTER SCIENCE

MANGALORE UNIVERSITY

Suggested programme structure for the Under Graduate Programmes

Bachelor of Science-B.Sc.

Semester	Course 1	Course 2	Course 3	Elective / Optional	Language	Compulsory	Total Credit	Total Working hours
I	5 (3T+2P)	5 (3T+2P)	5 (3T+2P)		3+3	2	23	4+4+4+4+4+4+4+4+2=34
II	5 (3T+2P)	5 (3T+2P)	5 (3T+2P)		3+3	2	23	4+4+4+4+4+4+4+4+2=34
III	5 (3T+2P)	5 (3T+2P)	5 (3T+2P)	2	3+3		23	4+4+4+4+4+4+4+4+2=34
IV	5 (3T+2P)	5 (3T+2P)	5 (3T+2P)	2	3+3	2	25	4+4+4+4+4+4+4+4+2+2=36
V	8[(2x3T)+2P]	8[(2x3T)+2P]	8[(2x3T)+2P]			2	26	3+3+4+3+3+4+3+3+4+2=32
VI	8[(2x3T)+2P]	8[(2x3T)+2P]	8[(2x3T)+2P]			2	26	3+3+4+3+3+4+3+3+4+2=32
							146	**202**

Note:

- **Course1, Course2 and Course3: I to IV Semester: Theory 3 credits = 4 contact hours & Practical 2 credit = 4 contact hours**
- **Course1, Course2 and Course3: V and VI Semester: 3 credits = 3 contact hours & Practical 2 credit = 4 contact hours**
- **Elective/Optional: 2 credits = 2 contact hours**
- **Languages: 3 credits = 4 contact hours**
- **Compulsory: 2 credits = 2 contact hours**

CURRICULUM STRUCTURE FOR I TO VI SEMETER BSC-COMPUTER SCIENCE

Semester I								
Sl No	**Course Code**	**Title of the Course**	**Category of Courses**	**Teaching Hours per Week**	**SEE**	**IA**	**Total Marks**	**Credits**
1	**BSC-CSC-1.1**	Computer Fundamentals and Programming in C	**Core**	**4**	**80**	**20**	**100**	**3**
2	**BSC-CSC-1.2**	C Programming-Lab	**Practical**	**4**	**40**	**10**	**50**	**2**

Semester II								
Sl No	**Course Code**	**Title of the Course**	**Category of Courses**	**Teaching Hours per Week**	**SEE**	**IA**	**Total Marks**	**Credits**
1	**BSC-CSC-2.1**	Data Structures	**Core**	**4**	**80**	**20**	**100**	**3**
2	**BSC-CSC-2.2**	Data Structures Lab	**Practical**	**4**	**40**	**10**	**50**	**2**

Semester III								
Sl No	**Course Code**	**Title of the Course**	**Category of Courses**	**Teaching Hours per Week**	**SEE**	**IA**	**Total Marks**	**Credits**
1	**BSCCSCS301**	Object Oriented Programming using Java	**Core**	**4**	**80**	**20**	**100**	**3**
2	**BSCCSPS301**	Object Oriented Programming Lab using Java	**Practical**	**4**	**40**	**10**	**50**	**2**
2	**BSCCSES301**	A. Digital Marketing B. Web Content Management C. Computer Organization	**Elective**	**2**	**40**	**10**	**50**	**2**

Semester IV								
Sl No	**Course Code**	**Title of the Course**	**Category of Courses**	**Teaching Hours per Week**	**SEE**	**IA**	**Total Marks**	**Credits**
1	**BSC-CSC-4.1**	Database Management System	**Core**	**4**	**80**	**20**	**100**	**3**
2	**BSC-CSC-4.2**	DBMS-Lab	**Practical**	**4**	**40**	**10**	**50**	**2**
3	**BSC-CSC-4.3**	A) Cloud Computing B) WEB design Basics C) Cyber Security	**Elective**	**2**	**40**	**10**	**50**	**2**
4	**BSC-CSC-4.4**	Data Analytics using Excel	**Compulsory**	**2**	**40**	**10**	**50**	**2**

Semester V								
Sl No	**Course Code**	**Title of the Cours*e***	**Category of Courses**	**Teaching Hours per Week**	**SEE**	**IA**	**Total Marks**	**Credits**
1	**BSC-CSC-5.1**	Programming in Python	**Core**	**3**	**80**	**20**	**100**	**3**
2	**BSC-CSC-5.2**	Operating Systems	**Core**	**3**	**80**	**20**	**100**	**3**
3	**BSC-CSC-5.3**	Python and Linux - Lab	**Practical**	**4**	**80**	**20**	**100**	**2**
4	**BSC-CSC-5.4**	Artificial Intelligence	**Compulsory**	**2**	**40**	**10**	**50**	**2**

Semester VI								
Sl No	**Course Code**	**Title of the Cours*e***	**Category of Courses**	**Teaching Hours per Week**	**SEE**	**IA**	**Total Marks**	**Credits**
1	**BSC-CSC-6.1**	Statistical Computing and R Programming	**Core**	**3**	**80**	**20**	**100**	**3**
2	**BSC-CSC-6.2**	Web Technologies	**Core**	**3**	**80**	**20**	**100**	**3**
3	**BSC-CSC-6.3**	R Programming and Web Technologies Lab	**Practical**	**4**	**80**	**20**	**100**	**2**
4	**BSC-CSC-6.4**	Computer Hardware and Maintenance	**Compulsory**	**2**	**40**	**10**	**50**	**2**

SEMESTER III

Program Name	**BSC-COMPUTER SCIENCE**	Semester	**III**
Course Title	**Object Oriented Programming using Java** (Theory)		
Course Code:	**BSCCSCS301**	No. of Credits	**03**
Contact hours	**4 Hours per week**	Duration of Exam/SEE	**3 hours**
Formative Assessment Marks	**20**	Summative Assessment Marks	**80**

Course Outcomes (COs):

After the successful completion of the course, the student will be able to:

- Understand the features of Java and the architecture of JVM
- Write, compile, and execute Java programs that may include basic data types and control flow constructs and how type casting is done
- Identify classes, objects, members of a class and relationships among them needed for a specific problem and demonstrate the concepts of polymorphism and inheritance
- Demonstrate programs based on interfaces and threads and explain the benefits of JAVA's Exceptional handling mechanism compared to other Programming Languages
- Write, compile, execute Java programs that include GUIs and event driven programming and also programs based on files

			Number of hours/Unit – 13
Unit	**Description**	Book	Chapter
1	**Introduction to Java:** Basics features of Java programming, Java program structure, Implementing Java program, Java virtual machine, Constants, variables, Data types, declaring and assigning value to thevariables, Operators, Control structures (including if, switch, and ternary operator), Looping.	Book - 1	Chapter 2- 2.1, 2.2[pg.10 –13] Chapter 3- 3.5, 3.9, 3.10 Chapter 4 – 4.2, 4.3, 4.4, 4.5, 4.6 Chapter 5- 5.1 to 5.14 Chapter 6, Chapter 7
2	**Objects and Classes:** Basics of objects and classes in java, Methods and objects, Constructors, methods Overloading, Finalised, Visibility modifiers, Arrays in java, Inbuilt classes like Math, String, Character, String Buffer and their methods, this reference. **Inheritance and Polymorphism:** Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism, Dynamic binding, Abstract methods and classes, Interface in Java, Package in Java, UTIL package.	Book - 1 Book - 2 Book - 1	Chapter 8 - 8.1 to 8.8, 8.15, 8.11, 8.12, 8.18, Chapter 9 - 9.1 to 9.4 Chapter 5- 5.15 Book 2- Chapter 15, Pg. 120 Book 1- Chapter 5- 5.13 8.11 to 8.12, 8.16-8.17 Chapter 10 - Complete Chapter 11- 11.1 to 11.9
3	**Event and GUI programming:** Event handling in Java, Event types, Mouse andkey events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, BorderLayout, Grid Layout, GUI components like Buttons, CheckBoxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Menus, Dialog Box, **Exception handling** with try catch-finally.	Book 2 Book 1	Chapter 22- Pg. 637 – 639, 645, 646 Chapter 23- 666-667 Chapter 24- Pg. 701 -729,737 - 746 Chapter 14- Complete Chapter 15- 15.11 Chapter 13- 13.1 to 13.3
4	**I/O programming:** Text and Binary I/O, Binary I/O classes, Object I/O, Random Access Files. **Multithreading in Java**: Thread life cycle and methods, Runnable interface, Thread synchronization. Applet and its life cycle, Introduction to	Book 1	Chapter 16 – 16.1 to 16.17 Chapter 12- 12.1 to 12.10 Chapter 13- 13.4 to 13.6 Chapter 17- complete

	swing. **Java Database Connectivity:** JDBC Driver Types, JDBC Packages, Overview of the JDBC process, Database Connection.		Chapter 20 Chapter 27- Pg. 837 – 840 Study Material for JDBC

Text Books:

1. Programming with Java, E Balagurusamy – A Primer, 4th Edition, McGraw Hill Publication.
2. Java - The Complete Reference, Herbert Schildt, 7th Edition, McGraw Hill Publication, 2017

References:

1. Core Java Volume I – Fundamentals, By Cay S. Horstmann, Prentice Hall.
2. Object Oriented Programming with Java: Somashekara M.T., Guru, D.S., Manjunatha K.S, 1st Edition, PHI Learning 2017.

Pedagogy: Lecture/ PPT/ Videos/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/Problem Solving/Trouble shooting.

Program Name	**BSC-COMPUTER SCIENCE**	Semester	**III**
Course Title	**Java Programming Lab**		
Course Code:	**BSCCSPS301**	No.of Credits	**02**
Contact hours	**52 Hours**	Duration of Exam/SEE	**3hours**
Formative Assessment Marks	**10**	Summative Assessment Marks	**40**

Java Programming Lab

List of programs

PART-A

1. Program to print all Fibonacci numbers between the range. (Use for loop)
2. Program which reads two numbers having same number of digits. The program should output the sum of product of corresponding digits. (Hint Input 327 and 539 output 3x5+2x3+7x9=84)
3. Program to find the biggest and smallest number in 3 x 3 array. The program should receive the 9 integers as command line arguments.
4. Define a class named Pay with data members String name, double salary, double da, double hra, double pf, double grossSal, double netSal and methods: Pay(String n, double s) - Parameterized constructor to initialize the data members, void calculate() - to calculate the following salary components, and void display() - to display the employee name, salary and all salary components.

   Dearness Allowance = 15% of salary
   House Rent Allowance = 10% of salary
   Provident Fund = 12% of salary
   Gross Salary = Salary + Dearness Allowance + House Rent Allowance
   Net Salary = Gross Salary - Provident Fund

   Write a main method to create object of the class and call the methods to compute and display the salary details. [class basics]

5. Given two strings, a and b, print a new string which is made of the following combination- first character of a, the first character of b, second character of a, second character of b and

so on. Any characters left, will go to the end of the result.

Example:

Input: Hello,World Output: :HWeolrllod

6. Write a Program to take care of Number Format Exception if user enters values othert than integer for calculating average marks of n students.
   The name of the students and marks in 3 subjects are taken from the user while executing the program.
   In the same Program write your own Exception classes to take care of Negative values and values out of range (i.e. other than in the range of 0-100)
7. Create a package to calculate volume of cube, and one more package to calculate the simple Interest. Implement both package in the Main () by accepting the required inputs for each application

PART-B

1. Create a school application with a class called Person. Create name and dateOfBirth as member variables.
   Create a class called Teacher that inherits from the Person class. The teacher will have additional properties like department, and the subject that the teacher teaches.
   Create a class called Salary that inherits from the Teacher class. The Salary will have additional properties like basic. And method to calculate the DA, HRA, PF, IT, GROSS and NETPAY using appropriate condition.
   If Basic <= 20000 D.A is 40% Basic H.R.A is 10% Basic.
   P.F 12% of Gross; PT is Rs .100
   If Basic.> 20000 D.A is 50% Basic. H.R.A 15% Basic.
   P.F 12% of Gross ; PT is Rs.150
   Gross = Basic.+D.A +HRA and Net = Gross -PT –PF
   Create a class called Student that inherits from Person class. This class will have a member variable called studentId.
   Create a class called College Student that inherits from Student class. This class will have collegeName, the year in which the student is studying (first/second/third/fourth)etc.
   Create objects of each of these classes, invoke and test the methods that are available in these classes.

2. Write a program that implements a multi-threaded program has three threads. First thread generates a random integer every second, and if the value is even, second thread computesthe square of the number and prints. If the value is odd the third thread will print the value of cube of the number. [Multithreading]

3. Write a program to separate odd and even numbers from the file NUMBER.txt and placed in two files OOD.txt and EVEN.txt. Write the numbers along with its corresponding count in an output file.

4. Write a Program to calculate marks of a student using multiple inheritance implemented through interface. Class Student with data membersrollNo, name, String cls and methods to set and put

data. Create another class test extended by class Student with data membersmark1, mark2, mark3 and methods to set and put data. Create interface sports with members sportsWt = 5 and putWt(). Now let the class results extends class test and implements interface sports. Write a Java program to read required data and display details in a neat format.

5. Create a package to convert temperature in centigrade into Fahrenheit, and one more package to calculate the simple Interest. Implement both package in the Main () by accepting the required inputs for each application.

6. Program that creates a user interface to perform basic integer operations.
The user enters two numbers in the TextFields - Num1 and Num2. The result of operations must be displayed in the Result TextField when the "=" button is clicked. Appropriate Exception handling message to be displayed in the Result TextFieldwhen Num1 or Num2 is not an integer or Num2 is Zero when division operation is applied.

7. Write a JDBC program to create a Bank database with fields Acc_no, Acc_name, Balance. Perform these operations
a) Insert the Account Holder information from the keyboard.
b) Amount Deposited
c) Amount Withdraw (Maintain minimum balance 500 Rs).
Display all information.(Use proper validation).

Evaluation Scheme for Lab Examination:

Assessment Criteria		
Program-1	**PART-A** **Writing: 7 Marks** **Execution: 8Marks**	**15 Marks**
Program-2	**PART-B** **Writing: 10 Marks** **Execution: 10 Marks**	**20 Marks**
Practical Record		**05 Marks**
Total		**40 Marks**

Program Name	**BSC-COMPUTER SCIENCE**	Semester	**III**
Course Title	**Digital Marketing (Elective)**		
Course Code:	**BSCCSES301**	No. of Credits	**02**
Contact hours	**26 Hours**	Duration of Exam/SEE	**2 Hours**
Formative Assessment Marks	**10**	Summative Assessment Marks	**40**

Course Outcomes (COs):

After the successful completion of the course, the student will be able to:

- Understand the fundamental concepts and principles of digital marketing.
- Develop practical skills to implement various digital marketing strategies and techniques
- Analyze and evaluate the effectiveness of digital marketing campaigns.
- Apply critical thinking and problem-solving skills to real-world digital marketing scenarios.
- Create comprehensive digital marketing plans and strategies

Unit	Description	Hours
1	**Introduction to Digital Marketing:** Overview of digital marketing, Evolution of digital marketing, Importance and benefits of digital marketing, Digital marketing channels and platforms Digital Marketing Strategy and Planning: Developing a digital marketing strategy, Setting goals and objectives, Budgeting and resource allocation. Campaign planning and execution, Monitoring and adjusting digital marketing campaigns	8

2	**Social Media Marketing:** Overview of social media marketing, social media platforms and their features, Creating and optimizing social media profiles, social media content strategy, social media advertising and analytics **Email Marketing**: Introduction to email marketing, building an email list, Creating effective email campaigns, Email automation and segmentation, Email marketing metrics and analytics	8
3	**Mobile Marketing:** Mobile marketing overview, Mobile advertising strategies, Mobile app marketing, Location-based marketing, Mobile marketing analytics **Analytics and Reporting:** Importance of analytics in digital marketing, setting up web analytics tools (e.g., Google Analytics), Tracking and measuring key performance indicators (KPIs), Conversion tracking and optimization, Reporting and data visualization	10

Text Books:

1. "Digital Marketing Strategy: An Integrated Approach to Online Marketing" by Simon Kingsnorth.

References

1. "Email Marketing Rules: How to Wear a White Hat, Shoot Straight, and Win Hearts" by Chad S. White
2. "Content Inc.: How Entrepreneurs Use Content to Build Massive Audiences and Create Radically Successful Businesses" by Joe Pulizzi
3. "Mobile Marketing: How Mobile Technology is Revolutionizing Marketing, Communications and Advertising" by Daniel Rowles
4. "Web Analytics 2.0: The Art of Online Accountability and Science of Customer Centricity" by Avinash Kaushik

Pedagogy: Lecture/ PPT/ Videos/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/Problem Solving/Trouble shooting.

Program Name	**BSC-COMPUTER SCIENCE**	Semester	**III**
Course Title	**Web Content Management. (Elective)**		
Course Code:	**BSCCSES302**	No. of Credits	**02**
Contact hours	**26 Hours**	Duration of Exam/SEE	**2 hours**
Formative Assessment Marks	**10**	Summative Assessment Marks	**40**

Course Outcomes (COs):

After the successful completion of the course, the student will be able to:

- Understand content development basics.
- Gain Knowledge of tools for multimedia content development for audio/ video, graphics, animations, presentations, screen casting.
- Host websites and develop content for social media platforms such as wiki and blog
- Understand e-publications and virtual reality
- Understand the e-learning platform Moodle and CMS applications Drupal and Joomla

Unit	Description	Hours
1	Web Content Development and Management, Content Types and Formats, Norms and Guidelines of Content Development, Creating Digital Graphics, Audio Production and Editing.	**8**
2	Web Hosting and Managing Multimedia Content, Creating and Maintaining a Wiki Site. Presentation Software Part , Screen casting Tools and Techniques, Multilingual Content Development.	**8**
3	Planning and Developing Dynamic Web Content Sites, Website Design Using CSS Creating and Maintaining a WIKI Site, Creating and Managing a Blog Site. Content Management System: Joomla, Content Management System: Drupal	**10**

Text Book:

1. Web Content Management: Systems, Features, and Best Practices 1st Edition by Deane Barker.

Reference Books:

1. Content Management Bible (2nd Edition) 2nd Edition by Bob Boiko.
2. Using Joomla!: Efficiently Build and Manage Custom Websites 2nd Edition by Ron Severdia

Pedagogy: Lecture/ PPT/ Videos/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/Problem Solving/Trouble shooting.

Program Name	**BSC-COMPUTER SCIENCE**	Semester	**III**
Course Title	**Computer Organization. (Elective)**		
Course Code:	**BSCCSES303**	No.of Credits	**02**
Contact hours	**26 Hours**	Duration of Exam/SEE	**2 hours**
Formative Assessment Marks	**10**	Summative Assessment Marks	**40**

Course Outcomes (COs):

After the successful completion of the course, the student will be able to:

- Boolean algebra concepts, various design Components of Computer System like logical gates and combinational circuits.
- Understand Digital computer and digital systems functioning

Unit	Description	Hours
1	**Digital Computers and Digital System**: Introduction to Number System, Decimal number, Binary number, Octal and Hexadecimal numbers, Number base conversion, Complements, Binary codes, Binary arithmetic, Addition, Subtraction in the 1's and 2's complements system, Subtraction in the 9's and 10's complement system.	**8**
2	**Boolean Algebra:** Basic definitions, Axiomatic definition of Boolean algebra, Basic theorems and properties of Boolean algebra, Venn diagram. **Digital logical gate:** Boolean functions, Canonical and Standard forms, Minterms, Maxterms, other logic operations, Digital logic gates, Universal gates.	**8**
3	**Simplification of Boolean function:** The map method, Two and three variable maps, four variable maps, Don't care conditions, Product of sum simplification. **Combinational Logic**: Introduction, Design Procedure, Half adder, Full adder, half Subtractor, Full Subtractor	**10**

Text Books:

1. M. Morris Mano, Digital Logic and Computer design, PHI, 2015

References

1. Thomas L Floyd, Digital Fundamentals, 10th Edition, Pearson, 2011.
2. Thomas. C. Bartee, Digital Computer Fundamentals, 6th edition, TMH

Pedagogy: Lecture/ PPT/ Videos/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/Problem Solving/Trouble shooting.

SEMESTER IV

Program Name	**BSC-COMPUTER SCIENCE**	Semester	**IV**
Course Title	**Database Management System (Theory)**		
Course Code:	BSCCSCS401	No. of Credits	**03**
Contact hours	**52 Hours**	Duration of Exam/SEE	**3hours**
Formative Assessment Marks	**20**	Summative Assessment Marks	**80**

Course Outcomes (COs):

At the end of the course, students will be able to:

- Understand the various database concepts and the need for database systems.
- Identify and define database objects, enforce integrity constraints on a database using DBMS.
- Demonstrate a Data model and Schemas in RDBMS.
- Identify entities and relationships and design ER diagrams for given real-world problems.
- Represent ER model to relational model and its implementation through SQL.
- Formulate queries in Relational Algebra, Structured Query Language (SQL) for database manipulation.
- Understand the transaction processing and concurrency control techniques.

Unit	Description	Hours
1	**Database Architecture**: Introduction to Database system applications. Characteristics, Data models, Database schema, Database architecture, Data independence, Database languages, GUIs, and Classification of DBMS. **E-R Model**: E-R Model Concepts: Entity, Entity types, Entity sets, Attributes, Types of attributes, key attribute, and domain of an attribute. Relationships between the entities. Relationship	**13**

	types, Roles and structural constraints, degree and cardinality ratio of a relationship. Weak entity types, E -R diagram.	
2	**Relational Data Model**: Relational model concepts. Characteristics of relations. Relational model constraints: Domain constrains, key constraints, primary & foreign key constraints, integrity constraints and null values. **Data Normalization**: Functional dependencies. Normalization. First normal form, second normal form, Third normal form. Boyce-Codd normal form.	**13**
3	**INTERACTIVE SQL**: Table fundaments, oracle data types, CREATE TABLE command, inserting data into table, Viewing Data in the table, sorting data in a table, creating a table from a table, inserting data into a table from another table, delete operations, Updating the contents of a table, Modifying the structure of tables, renaming tables, destroying tables, displaying table structure. **DATA CONSTRAINTS**: Types of data constraints, IO constraints-The PRIMARY KEY constraint, The FOREIGN KEY constraint, The UNIQUE KEY constraint, Business Rule Constraints- NULL value concepts, NOT NULL constraints, CHECK constraint, DEFAULT VALUE concepts. **COMPUTATIONS ON TABLE DATA**: Arithmetic Operators, Logical Operators, Range Searching, Pattern Matching, Oracle Table – DUAL, Oracle Function- Types, Aggregate Function, Date Conversion Function. GROUPING DATA FROM TABLES IN SQL, Group By clause, Having clause, subqueries, JOINS, Using the UNION, INTERSECTION, MINUS clause	**13**
4	**INTRODUCTION TO PL/SQL**: Advantages of PL/SQL, The Generic PL/SQL Block, PL/SQL The character set, Literals, PL/SQL datatypes, variables, Logical comparisons, Displaying User Messages on The VDU Screen, comments. Control Structure - Conditional Control, Iterative Control **PL/SQL Transactions**: Cursor-Types of Cursors, Cursor Attributes. Explicit cursor- Explicit cursor Management, cursor for loop. **PL/SQL Database Objects**: Procedures and Functions, Oracle Packages, Database Triggers, Error Handling in PL/SQL.	**13**

Text Book:

1. Fundamentals of Database Systems, Ramez Elamassri, Shankant B. Navathe, 7th Edition, Pearson, 2015

Reference Books:

1. An Introduction to Database Systems, Bipin Desai, Galgotia Publications, 2010.
2. Introduction to Database System, C J Date, Pearson, 1999.
3. Database Systems Concepts, Abraham Silberschatz, Henry Korth, S.Sudarshan, 6th Edition, McGraw Hill, 2010.
4. Database Management Systems, Raghu Rama Krishnan and Johannes Gehrke, 3rd Edition, McGraw Hill, 2002

Pedagogy: Lecture/ PPT/ Videos/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/Problem Solving/Trouble shooting.

Program Name	**BSC-COMPUTER SCIENCE**	Semester	**IV**
Course Title	**DBMS Lab**		
Course Code:	**BSCCSPS401**	No.of Credits	**02**
Contact hours	**52**	Duration of Exam/SEE	**3 hours**
Formative Assessment Marks	**10**	Summative Assessment Marks	**40**

DBMS Lab
List of Programs

PART-A

1.Create a table EMPLOYEE using SQL command to store details of employees such as EMPNO, NAME, DESIGNATION, DEPARTMENT, GENDER and SALARY. Specify Primary Key and NOT NULL constraints on the table.

Allow only 'M' or 'F' for the column GENDER.

DEPARTMENT can be SALES, ACCOUNTS, IT.

Choose DESIGNATION as CLERK, ANALYST, MANAGER, ACCOUNTANT and SUPERVISOR that depends on department

Write the following SQL queries:

a) Display *EMPNO, NAME* and *DESIGNATION* of all employees whose name ends with RAJ.
b) Display the details of all female employees who is earning salary within the range 20000 to 40000 in SALES or IT departments
c) List the different DEPARTMENTs with the DESIGNATIONs in that department.
d) Display the department name, total, average, maximum, minimum salary of the DEPARTMENT only if the total salary given in that department is more than 30000.
e) List the departments which have more than 2 employees.

2. Create a table CLIENT to store CLIENT_NO, NAME, ADDRESS, STATE, BAL_DUE. Client no must start with 'C'. Apply the suitable structure for the columns. Specify Primary Key and NOT NULL constraints on the table. Insert 10 records.

Write the following SQL queries:

a) From the table CLIENT, create a new table CLIENT1 that contains only CLIENT_NO and NAME , BAL_DUE from specified STATE. Accept the state during run time.
b) create a new table CLIENT2 that has the same structure as CLIENT but with no records. Display the structure and records.

c) Add a new column by name PENALTY number (10, 2) to the CLIENT

d) Assign Penalty as 10% of BAL_DUE for the clients C1002, C1005, C1009 and for others 8%. Display Records

e) Change the name of CLIENT1 as NEW_CLIENT

f) Delete the table CLIENT2

3. Create a table BOOK using SQL command to store Accession No, TITLE, AUTHOR, PUBLISHER, YEAR, PRICE. Apply the suitable structure for the columns. Specify Primary Key and NOT NULL constraints on the table. Insert 10 records.

Write the following SQL queries:

a) List the details of publishers having 'a' as the second character in their names.

b) Display Accession No., TITLE, PUBLISHER and YEAR of the books published by the specified author before 2010 in the descending order of YEAR. Accept author during run time

c) Modify the size of TITLE to increase the size 5 characters more.

d) Display the details of all books other than Microsoft press publishers.

e) Remove the records of the books published before 1990.

4. Create a table SALES with columns SNO, SNAME, MNO , JOIN_DATE, DATE_BIRTH, SALARY,SALES_AMOUNT and COMMISSION. Minimum age for joining the company must be 18 Yrs. Default value for Commission should be 0. Apply the suitable structure for the columns. Specify Primary Key and NOT NULL constraints on the table. Insert 10 records with data except commission. Manager of Manager can be NULL.

Write the following SQL queries:

a) Display the details of Sales Persons whose salary is more than Average salary in the company.

b) Update commission as 20% of Sales Amount.

c) Display SNO, SNAME, MNO, SALARY, COMMISSION, MANAGER_SALARY of the sales persons getting sum of salary and commission more than salary of manager. (Self-join)

d) Display the records of employees who finished the service of 10years

5. Create a table Sales_Details with the columns SNO, MONTH, TARGET and QTY_SOLD to store the Sales Details of one year. Specify the composite primary key to the columns SNO and MONTH. TARGET and SALES must be positive numbers.

Write the following SQL queries:

a) Display the total sales by each sales person considering only those months sales where target was reached

b) If a commission of RS.50 provided for each item after reaching target, calculate and display the total commission for each sales person.

c) Display the SNO of those who never reached the target.

d) Display the SNO, MONTH and QTY_SOLD of the sales persons with SNO S0001 or S0003

6. Create the following tables by identifying primary and foreign keys. Specify the not null property for mandatory keys. SUPPLIERS (SUPPLIER_NO, SNAME, SADDRESS, SCITY) COMPUTER_ITEMS (ITEM_NO, SUPPLIER_NO, ITEM_NAME, IQUANTITY) Consider three suppliers. A supplier can supply more than one type of items.
   Write the SQL queries for the following:
   a.)List ITEM and SUPPLIER details in alphabetical order of city name and in each city decreasing order of IQUANTITY.
   b)List the name , city and address of the suppliers who are supplying keyboard.
   c.) List the supplier name, items supplied by the suppliers 'Cats' and 'Electrotech'.
   d.)Find the items having quantity less than 5 and insert the details of supplier and item into another table NEWORDER

7. Create the following tables identifying Primary and Foreign keys. Specify the not null property for mandatory keys. EMPLOYEE_MASTER (EMP_ID, EMP_NAME, EMAIL_ID, EMP_ADDRS, PHONE) ATTENDANCE (EMP_ID, MONTH, WOM, MHRS, THRS, WHRS, TRHRS, FHRS, SHRS, SUHRS). (Valid values for WOM<=5, MONTH can be 1-12). Apply appropriate constraints. Consider 3 employees. And attendance records for at least two months. Write the SQL queries for the following:

a) Display EMP_ID,EMP_NAME and EMAIL_ID of all employees who are working on every Sunday of 2nd and 4th week in a month.

b) Display total hours worked by each employee in each month with EMP_ID.

c) Display the names of the employees who never attended the duty so far(Attendances not given so far).

d) Display the employee's name, month, week, total hours worked for employees who have total no. of hours more than 20 hrs a week.

PART-B

8. Write a PL/SQL program to accept the students rollno, name and their marks in 3 subjects from a base table Student (having RollNo, Sname, Marks in three subjects) and declare the result based on the following rules:
   i). If student has scored below 35 in any subject he/she is declared as FAIL.
   ii). If the Total >=180 then declare the result as I CLASS
   iii). If the Total >=150 but <180 then declare the result as II CLASS
   iv). If the Total <120 the declare the result as III CLASS.
   Assume the records of 5 students. Create an output which contains the roll number, name of the student, marks in 3 subjects, total mark and result in the following format.
   ==========

ROLLNO NAME MARK1 MARK2 MARK3 TOTAL RESULT

==========

9. Create a table Bank with the columns ACNO, ACT_NAME, ACT_TYPE and BAL. Specify the Primary Key. Initial BAL must be greater than 500.

   Write a PL/SQL program to perform debit operation by providing acct_no and amount required. The amount must be greater than 100 and less than 20000 for one transaction. If the account exist and BAL-amount>500 Bank table must be updated, otherwise "NO SUFFFICIENT BALANCE" message should be displayed. If account number is not present then display "NO SUCH ACCOUNT" message to the user.

10. Write a PL/SQL program to compute the selling price of books depending on the book code and category. Use Open, Fetch and Close. The Book_detail table contains columns: Book Code, Author, Title, Category and Price. Insert 10 records. The selling price=Price-Discount.

    The discount is calculated as follows:

Book Code	Category	Discount Percentage
A	Novels	10% of Price
	Technology	12.5% of Price
B	Commerce	18% of Price
	Science	19% of Price
C	Songs	25% of Price
	Sports	24% of Price
D	All	28% of Price

Print the result in tabular form with proper alignment

Book Code category title author price discount% discountamount sell price

11. Write a PL/SQL program to display employee pay bill (using Cursor For loop) Use a Procedure to receive basic pay and to compute DA, HRA, Tax, PF, Gross Pay and Net Pay(Use OUT). Base table contains the following columns empnum, empname, basic pay. Insert 3 records. Allowances are computed as follows.

Basic Pay	DA	HRA
<=20000	35% of Basic	8% of Basic
>20000 & <=30000	38%	9%
>30000 & <=40000	40%	10%
>40000	45%	10%

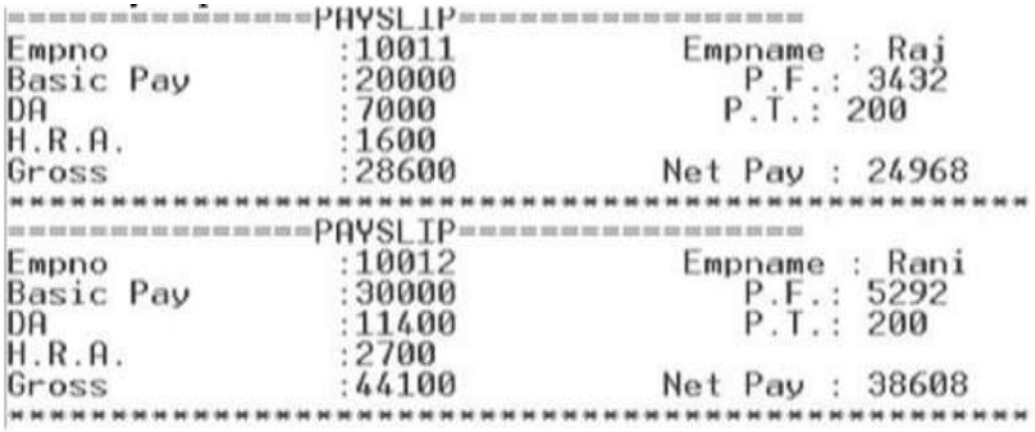
Gross=Basic+DA+HRA

PF=12% of Gross or Rs. 2000 whichever is minimum.

PT=Rs. 100 upto Gross is 25,000 else Rs. 200.

Net=Gross-(PF+PT)

Print Pay slip as follows



12. Given the following tables
    ITEM_MASTER (Item_No,Item_Name, Stock, Unit_Price)
    ITEM_TRANS (Item_No,Qty, Trans_Date)
    Write a function to check whether the item exists in ITEM_MASTER. Write a main program such that if the function returns a value 1, add a record to ITEM_TRANS with a given Item_No, Qty and today's date as Trans_Date, otherwise display an appropriate error message.

13. Create a trigger to update the MASTER table when a record is inserted into SALES table and create another trigger to update the MASTER table when a record is inserted or updated or deleted in NEWSTOCK table. Assume the suitable columns for all the tables.

14. Create a package which includes a function to compute the factorial of a number, a procedure to compute the value of nCr, and another procedure to compute nPr both uses the factorial function. Execute the package program for the required calculation.

Evaluation Scheme for Lab Examination:

Assessment Criteria		
Program-1	**PART-A** **Writing:7 Marks Execution: 8 Marks**	**15 Marks**
Program-2	**PART-B**	**20 Marks**

	Writing:10 Marks Execution:10 Marks	
Practical Record		**05 Marks**
Total		**40 Marks**

Program Name	**BSC-COMPUTER SCIENCE**	Semester	**IV**
Course Title	**WEB design Basics (ELECTIVE)**		
Course Code:	**BSCCSEC401**	No.of Credits	**02**
Contact hours	**26 Hours**	Duration of Exam/SEE	**2 hours**
Formative Assessment Marks	**10**	Summative Assessment Marks	**40**

Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

- Understand the fundamentals of HTML5 and its evolution from previous versions.
- Identify the structure and components of an HTML5 document.
- Utilize HTML5 semantic elements to create well-structured web pages.
- Implement multimedia elements such as audio and video using HTML5.
- Demonstrate the use of HTML5 forms and input types for user data collection.
- Apply best practices for web accessibility and SEO in HTML5 documents.

Unit	Description	Hours
1	Introduction to Computers and the Internet-Introduction, The Internet in Industry and Research, Evolution of the Internet and World Wide Web, Web Basics. Introduction to HTML5: Introduction, Editing HTML5, First HTML5 Example, W3C HTML5 Validation Service, Headings, Linking, Images, Special Characters and Horizontal Rules, Lists, Tables, Forms, Internal Linking, meta-Elements.	**8**

	New HTML5 Form input Types, input and data list Elements and autocomplete Attribute, Page-Structure Elements.	
2	Cascading Style Sheets-Introducing CSS, Add CSS Rules, CSS Properties-Controlling Fonts, Text Formatting, Text Pseudo-Classes, Selectors, Lengths, and Percentages.	**8**
3	More Cascading Style Sheets: Links, Backgrounds, Lists, Tables, Outlines, The: focus and: active Pseudo-Classes.	**10**

Text Books:

1.Deitel, Paul_Deitel, Harvey_Deitel, Abbey - Internet and World Wide Web How to Program-Pearson Education (US) (2011)

2.Jon Duckett -Beginning Web Programming with HTML, XHTML, and CSS (Wrox Beginning Guides)-Wrox (2004)

References:

1.The Complete Reference HTML and CSS, 5th Edition, Thomas A Powell, 2017.
2.Animation in HTML, CSS, and JavaScript, KirupaChinnathambi, 1st Edition, Createspace Independent Pub, 2013
3.Web Programming with HTML5, CSS, and JavaScript-John Dean

Pedagogy: Lecture/ PPT/ Videos/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/Problem Solving/Trouble shooting.

Program Name	**BSC-COMPUTER SCIENCE**	Semester	**IV**
Course Title	**Cyber Security (ELECTIVE)**		
Course Code:	**BSCCSES402**	No.of Credits	**02**
Contact hours	**26 Hours**	Duration of Exam/SEE	**2 hours**
Formative Assessment Marks	**10**	Summative Assessment Marks	**40**

Course Outcomes (COs):

After the successful completion of the course, the student will be able to:

- Understand the concept of Cyber security and issues and challenges associated with it.
- Understand the cybercrimes, their nature, legal remedies and as to how report the crimes through available platforms and procedures.
- Appreciate various privacy and security concerns on online Social media and understand the reporting procedure of inappropriate content, underlying legal aspects and best practices for the use of Social media platforms.
- On completion of this course, students should be able to appreciate various privacy and security concerns on online Social media and understand the reporting procedure of inappropriate content, underlying legal aspects and best practices for the use of Social media platforms.

Module	Description	Hours
1	**INTRODUCTION TO CYBERCRIME**: Cybercrime - Definition and Origins of the Word, Cybercrime and Information Security, Who are Cyber criminals? Classifications of Cyber Crimes, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens, Cyber Offences: How Criminals Plan Them, How Criminals Plan the Attacks, Social Engineering, Cyberstalking, Cyber cafe and Cybercrimes. Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing. Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices.	**8**

2	Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones. Mobile Devices: Security Implications for organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era. Tools and methods used in cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan-horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks. Phishing and Identity Theft: Introduction to Phishing, Identity Theft (ID Theft).	**10**
3	Social Media Overview and Security: Introduction to Social networks. Types of Social media, Social media platforms, Social media monitoring, Hashtag, Viral content, Social media marketing, Social media privacy, Challenges, opportunities and pitfalls in online social network, Security issues related to social media, Flagging and reporting of inappropriate content, Laws regarding posting of inappropriate content, Best practices for the use of Social media, Case studies.	**8**

Text Books:

1. SunitBelapure and Nina Godbole, "Cyber Security: Understanding Cyber Crimes,
2. ComputerForensicsAndLegalPerspectives",WileyIndiaPvtLtd,ISBN:978-81-265-21791, Publish Date 2013.
3. Dr. Surya Prakash Tripathi, Ritendra Goyal, Praveen Kumar Shukla, KLSI.
4. "Introduction to information security and cyber laws". DreamtechPress. ISBN: 9789351194736, 2015.
5. Thomas J. Mowbray, "Cybersecurity: Managing Systems, Conducting Testing, andInvestigatingIntrusions", Copyright © 2014 by John Wiley & Sons, Inc

References

1. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by SumitBelapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
2. Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson , 13th November, 2001
3. Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd
4. Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.
5. Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.

6. Fundamentals of Network Security by E. Maiwald, McGraw Hill.

Pedagogy: Lecture/ PPT/ Videos/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/Problem Solving/Trouble shooting.

Program Name	**BSC-COMPUTER SCIENCE**	Semester	**IV**
Course Title	**Cloud Computing (Elective)**		
Course Code:	**BSCCSES403**	No.of Credits	**02**
Contact hours	**26 Hours**	Duration of Exam/SEE	**2 hours**
Formative Assessment Marks	**10**	Summative Assessment Marks	**40**

Course Outcomes (COs): After the successful completion of the course, the student will be able to:

- Explain the core concepts of the cloud computing paradigm such as how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing.
- Apply the fundamental concepts in data centers to understand the trade-offs in power, efficiency and cost.
- Identify resource management fundamentals like resource abstraction, sharing and sandboxing and outline their role in managing infrastructure in cloud computing.
- Analyze various cloud programming models and apply them to solve problems on the cloud.

Unit	Description	Hours
1	**Introduction:** Different Computing Paradigms- Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing etc., Comparison of various Computing Technologies; Cloud Computing Basics- What is Cloud Computing? History, Characteristic Features, Advantages and Disadvantages, and Applications of Cloud Computing; Trends in Cloud Computing; Leading Cloud Platform Service Providers.	**8**
2	**Cloud Architecture:** Cloud Service Models- Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS), Comparison of different Service Models; Cloud Deployment Models- Public Cloud; Private Cloud, Hybrid Cloud, Community Cloud; Cloud Computing Architecture- Layered Architecture of Cloud. Virtualization- Definition, Features of Virtualization; Types of Virtualizations- Hardware Virtualization, Server Virtualization, Application Virtualization, Storage Virtualization, Operating System Virtualization; Virtualization and Cloud Computing, Pros and Cons of Virtualization.	**8**
3	**Cloud Application Programming and the Aneka Platform:** Aneka Cloud Application Platform- Framework Overview, Anatomy of the Aneka Container; Building Aneka Clouds (Infrastructure Organization, Logical Organization, Private Cloud Deployment Mode, Public Cloud Deployment Mode, Hybrid Cloud Deployment Mode); Cloud Programming and Management- Aneka SDK (Application Model and Service Model); Management Tools (Infrastructure, Platform and Application management).	**10**

Text Books:

1.Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi: "Mastering Cloud Computing- Foundations and Applications Programming", Elsevier, 2013

References Books:

1. Barrie Sosinsky: "Cloud Computing Bible", Wiley-India, 2010
2. K Chandrashekaran: "Essentials of Cloud Computing", CRC Press, 2015

4 Derrick Rountree, Ileana Castrillo: "The Basics of Cloud Computing", Elsevier, 2014

Pedagogy: Lecture/ PPT/ Videos/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/Problem Solving/Trouble shooting.

Program Name	**BSC-COMPUTER SCIENCE**	Semester	**IV**
Course Title	**Data Analytics using Excel (Compulsory)**		
Course Code:	**BSCCSES403**	No.of Credits	**02**
Contact hours	**26 Hours**	Duration of Exam/SEE	**2 hours**
Formative Assessment Marks	**10**	Summative Assessment Marks	**40**

Course Outcome:

After completing this course, a student will be able to:

- Demonstrate data manipulation, analysis, and visualization tasks.
- Create and apply basic and advanced formulas in Excel, including functions
- Develop skills in data analysis techniques such as sorting, filtering, and using PivotTables to summarize and analyze data effectively.
- Utilize Excel tools for tasks such as splitting screens, renaming spreadsheets, and copying and pasting data between spreadsheets.
- Create various types of charts in Excel, and format and customize these charts to effectively present data in real-world scenarios that require strong data analysis and presentation skills.

Unit	Description	Hours
1	**Introduction to Excel:** Spreadsheet window pane, Title Bar, Menu Bar, Standard Toolbar, Formatting Toolbar, Formula Bar, Workbook Window, Columns, Rows, Cells, and Formatting. Ranges, Using AutoFill Creating Formulas. **Basic functions** – Sum, Average, if, Count, max, min, Proper, Upper, Lower, Using AutoSum, Advance Formulas Concatenate, Vlookup, Hlookup, Match, Countif.	**8**
2	**Decision Making:** Introduction to IF, nested IF, Introduction to the Data filtering capabilities of Excel, Data Validation, **Data Analysis:** Sorting, Filter, Text to Column, PivotTables Creating PivotTables, manipulating a PivotTable, Using the PivotTable Toolbar, Changing Data Field, Properties, displaying a PivotChart, Setting PivotTable Options, Adding Subtotals to PivotTables Spreadsheet Tools.	**8**
3	**Charts:** Creating Charts, Formatting Chart Objects, Changing the Chart Type, Showing and Hiding the Legend, Showing and Hiding the Data Table **Charts in Excel:** Constructing various Line, Bar, Pie charts, Histograms and Scatter plots. **Multiple Spreadsheets:** Moving between Spreadsheets, Selecting Multiple Spreadsheets, Inserting and Deleting Spreadsheets Renaming Spreadsheets, Splitting the Screen, Freezing Panes, Copying and Pasting Data between Spreadsheets	**10**

Text Books:

1. "Data Analysis Using Microsoft Excel: Updated for Office 365" by Michael Alexander and Richard Kusleika.
2. "Data Analysis with Microsoft Excel: Updated for Office 2007" by Kenneth N. Berk and Patrick Carey.

References Books:

"Excel Data Analysis: Modeling and Simulation" by Hector Guerrero

Pedagogy: Lecture/ PPT/ Videos/ Demonstration/ Concept mapping/ Case Studies examples/ Tutorial/Problem Solving/Trouble shooting.

Questions Paper for Pattern Core Subjects

Duration:3 Hours Max.Marks:80

Note: Answer any ten Questions from Part-A. And one full Questions from each unit in Part-B

Part-A

1. 10*2=20

a.
b.
c.
d.
e.
f.
g.
h.
i.
j.
k.
l.

Part-B

UNIT-I, II, III,IV

Each unit contain main questions and it carry 15 Marks.
Each main questions contain 2 or more sub question.

4*15=60

UNIT-I

2.

a.
b.
c.

3.

a.
b.
c.

Questions Paper Pattern for Elective and Compulsory Subjects

Duration:2 Hours Max.Marks:40

Note: Answer any 5 Questions from Part-A. And one full Questions from each unit in Part-B

Part-A

1. 5*2=10

a.
b.
c.
d.
e.
f.
g.
h.

Part-B

UNIT-I, II, III

Each unit contain two main questions and it carry 10 Marks.
Each main questions contain 2 or more sub question.

3*10=30

UNIT-I

2.

a.
b.
c.

3.

a.
b.
c.