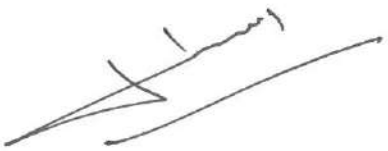
Scheme of B.Sc. Computer Science

Year	Course Code	Subject Name	Theory/ Practical	Total Credit	Total Marks	
					Max	Min
First	COMP-1T	Computer Fundamental and Operating System	Theory	4	50	17
	COMP-2T	Programming with C and C++	Theory	4	50	17
	COMP-1P	LAB 1: Programming with C and C++	Practical	2	50	17
Second	COMP-3T	Data Structure	Theory	4	50	17
	COMP-4T	Web technology and Java	Theory	4	50	17
	COMP-2P	LAB 2: Web technology and Java	Practical	2	50	17
Third	COMP-5T	Data Communication and Networking	Theory	4	50	17
	COMP-6T	Relational Database Management System	Theory	4	50	17
	COMP-3P	LAB 3: Relational Database Management System	Practical	2	50	17
Total				**30**	**450**	

Note: There shall be four extra credits in all the years of under graduation for internship/apprenticeship. The certificate of extra credits would be provided by the concern university and is not mandatory.



Part A: Introduction				
Program: **Certificate Course**		Class: **B.Sc.-CS I Year**	Year: **2022**	Session: **2022-2023**
1	Course Code	**COMP-1P**		
2	Course Title	**LAB 1 : Programming with C and C++**		
3	Course Type	**Practical**		
4	Pre-requisite (if any)	Theoretical knowledge of C and C++		
5	Course Learning Outcomes (CLO)	At the end of course, Students will be able to: • Understand the fundamental programming concepts and methodologies which are essential to create good C/C++ programs. • Code, test, and implement a well-structured, robust computer program using the C/C++ programming language. • Write reusable modules (collections of functions). • Understand design/implementation issues involved with variable allocation and binding, control flow, types, subroutines, parameter passing. • Develop an in-depth understanding of functional, logic, and object-oriented programming paradigms.		
6	**Credit Value**	**Practical: 2**		
7	**Total Marks**	**Max. Marks: 50**	**Min Passing Marks : 17**	

Part B: Content of the Course	
Total Periods: 30	
Tentative Practical List	**Note:** This is tentative list; the teachers concern can add more program as per requirement. 1. Write a program in C/C++ for addition of two numbers using float data type. 2. Write a program in C/C++ to find the biggest number between two numbers. 3. Write a program in C/C++ to find the factorial value of any entered number using do – while loop. 4. Write a program in C/C++ for various arithmetic operations using switch case statements. 5. Write a program in C/C++ for Multiplication of two 3X3 matrix. 6. Write a program in C/C++ to store five books information using structure. 7. Write a program in C/C++ to store six employee information using union. 8. Write a program in C/C++ to calculate simple interest using call by value and call by reference method. 9. Write a program in C/C++ for swapping of two numbers using pointer. 10. Write a program in C/C++ to make a text file using file handling. 11. Write a program to count word, space and lines in a text file. 12. Write a program to demonstrate work of calloc(). 13. Write a program to demonstrate work of malloc(), realloc() and free().

14. Write a program in C++ to find the sum and average of five numbers using class and objects.
15. Write a program in C++ to multiply two numbers using private and public member functions.
16. Write a program in C++ to print structure like this using scope resolution operator

    1

    1 2

    1 2 3

    1 2 3 4

    1 2 3 4 5
17. Write a program in C++ for constructor and Destructor.
18. Write a program in C++ for multiple inheritance.
19. Write a program in C++ for operator overloading.
20. Write a program in C++ for friend class and friend function.
21. Write a program in C++ for virtual function and virtual class.
22. Write a program in C++ for Exception Handling.
23. Write a program in C++ to open and close a file using file Handling.
24. Given two ordered arrays of integers, write a program to merge the two-arrays to get an ordered array.
25. WAP to display Fibonacci series (i) using recursion, (ii) using iteration
26. WAP to calculate Factorial of a number (i) using recursion, (ii) using iteration
27. WAP to calculate GCD of two numbers (i) with recursion (ii) without recursion.
28. Create Matrix class using templates. Write a menu-driven program to perform following Matrix Operations (2-D array implementation): a) Sum b) Difference c) Product d) Transpose 22. Create the Person class. Create some objects of this class (by taking information from the user). Inherit the class Person to create two classes Teacher and Student class. Maintain the respective information in the classes and create, display and delete objects of these two classes (Use Runtime Polymorphism).
29. Create a class Triangle. Include overloaded functions for calculating area. Overload assignment operator and equality operator.
30. Create a class Box containing length, breath and height. Include following methods in it: a) Calculate surface Area b) Calculate Volume c) Increment, Overload ++ operator (both prefix & postfix) d) Decrement, Overload -- operator (both prefix & postfix) e) Overload operator == (to check equality of two boxes), as a friend function f) Overload Assignment operator g) Check if it is a Cube or cuboid Write a program which takes input from the user for length, breath and height to test the above class.
31. Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.
32. Write a program to retrieve the student information from file created in previous question and print it in following format: Roll No. Name Marks

	33. Copy the contents of one text file to another file, after removing all whitespaces. 34. Write a function that reverses the elements of an array in place. The function must accept only one pointer value and return void. 35. Write a program for exception handling.

Part C - Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

1. Program Design, Peter Juliff, PHI Publications.
2. Let us C: Yashwant Kanetkar, BPB Publications.
3. Programming in ANSI C , E. Balaguruswamy, Tata McGraw Hill
4. Let us C++ ,Y. Kanetkar, B.P.B Publication.
5. Programming in C++, E. Balaguruswamy, Tata McGraw Hill.

E Resources:

1. Introduction from SWAYAM/NPTEL
   https://onlinecourses.nptel.ac.in/noc19_cs38/preview
   https://onlinecourses.nptel.ac.in/noc22_cs103/preview
   https://www.youtube.com/watch?v=KG4hjVDw-p8&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=2

2. Constant and Inline Function
   https://www.youtube.com/watch?v=pX6LufLso2M&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=10

3. Pointer and Reference
   https://www.youtube.com/watch?v=GtsBZ5e1-cE&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=12

4. Function Overloading
   https://www.youtube.com/watch?v=uJGmGAShHeU&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=13

5. Operator Overloading
   https://www.youtube.com/watch?v=0jpOwe4d-FE&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=17

6. Dynamic Memory Management
   https://www.youtube.com/watch?v=lkFK2X6qIc0&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=18

B4KrM9uOEdvPIVFUkU3jNc6D2&index=18

7. Class and Object
https://www.youtube.com/watch?v=wtuks_f3vP4&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=24

8. Access Specifiers
https://www.youtube.com/watch?v=6ki_W7cXdM0&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=22

9. Constructor and Destructor
https://www.youtube.com/watch?v=wtuks_f3vP4&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=24

- **C different topics from W3School**
https://www.w3schools.com/c/
- **C++ different topics from W3School**
https://www.w3schools.com/CPP/default.asp
- **C different topics from Javatpoint**
https://www.javatpoint.com/c-programming-language-tutorial
- **C++ different topics from Javatpoint**
https://www.javatpoint.com/cpp-tutorial

Part D: **Assessment and Evaluation**

Suggested Continuous Evaluation Methods:
Maximum Marks: 50
Continuous Comprehensive Evaluation (CCE): Not Applicable
University Exam(UE): 50 Marks

Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test/Assignment/Presentation	Not Applicable

Declaration

The syllabus of this subject is frame as per the TOR of department of higher education, Chhattisgarh.

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   Hemchand Yadav Vishwavidyalaya, Durg
10. Mr. Vishwnath Tamrakar - Member
    Asst. Prof. and Head, Sant Guru Ghasidas Govt. PG College, Kurud, Not Agreed because syllabus is lengthy
    Pt. Ravishankar Shukla University, Raipur
11. Ms. Anjeeta Kujur - Member
    Asst. Prof. and Head, Govt. R.B.R.N.E.S. PG College, Jashpur
    Sant Gahira Guru University Sarguja, Ambikapur
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13. Dr. Ugrasen Suman - Member (Present Online)
    Prof. and Head, Dept. of Computer Science
    Devi Ahila Vishwavidyalaya, Indore

Date: 03.06.2022

Part A: Introduction				
Program: **Certificate Course**		Class: **B.Sc.-CS I Year**	Year: **2022**	Session:**2022-2023**
1	Course Code	**COMP-1T**		
2	Course Title	**Computer Fundamental and Operating System**		
3	Course Type	**Theory**		
4	Pre-requisite (if any)	No		
5	Course Learning. Outcomes (CLO)	At the end of this course, the students will be able to: • Understand the history and types of computers and various input/output devices. • Understand the concept of memory and its types. • Understand the concept of operating system and process management with scheduling algorithms. • Understand the threads and their management with deadlock detection and prevention. • Understand the working principles of Operating System.		
6	**Credit Value**	**Theory: 4**		
7	**Total Marks**	**Max. Marks: 50**	**Min Passing Marks: 17**	

Part B: Content of the Course		
Total No. of Periods: 60		
Unit	**Topics**	**No. of Periods**
I	**Fundamental of Computer**: History of computer, Generation of computer, Types of Computers, Block diagram of CPU, Digital and Analogue computers and its evolution. Major components of digital computers, types of digital computers, Memory addressing capability of CPU, Word length and processing speed of computers, Microprocessors, Single chip Microcomputer, Large and small computers, Users interface, hardware, software and firmware, multiprogramming multiuser system, Dumb smart and intelligent terminals, Number system & Computer Codes.	12
II	**Peripheral devices:** I/O devices-Keyboard, Mouse, Monitor, Impact and Non-Impact Printers, Plotters, Scanner, other Input/output devices: Scan method of Display, Raster Scan, Vector Scan, Bit Mapped Scan, CRT Controller, I/O Port, Programmable and Non Programmable I/O port, Inbuilt I/O ports, Parallel and Serial ports, USB, IEEE 1394, AGP, Serial data transfer scheme, Microcontroller, Signal Processor, I/O processor, Arithmetic Processor.	12
III	**Memory:** Memory hierarchy, Primary and Secondary Memory, Cache memory, Virtual Memory, Direct Access storage devices (DASD) Destructive and Non-destructive Readout, Program and data memory, Memory Management Unit (MMU), PCMCIA cards and Slots.	12
IV	**Operating System Concepts:** Evolution of Operating Systems: Types of operating systems - Different views of the operating systems, Principles of Design and Implementation. The process concept, operating system services for process management. Process scheduling, Schedulers, Scheduling Algorithms.	12
V	**Process Management and Deadlock:** Structural overview, Concept of process and Process synchronization, Process Management and Scheduling, Hardware requirements: protection, context switching, privileged mode; Threads and their Management; Tools and Constructs for Concurrency, Detection and Prevention of Deadlocks, Mutual Exclusion: Algorithms, semaphores.	12

Keywords: Computer, Input /Output Devices, Memory, Operating System, Process Management, Scheduling Algorithms, Semaphores, Deadlock.

Part C - Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

1. Computer Fundamentals, P.K. Sinha, BPB Publication, Sixth Edition.
2. Fundamentals of Computers, V. Rajaraman, PHI Sixth Edition.
3. Computer Fundamentals Architecture and Organization, B. Ram, New Age International Publishers, Fifth Edition.
4. Fundamental of Computers, Raja Raman V., Prentice Hall of India, New Delhi.
5. Operating System Concepts – Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, 8th edition, Wiley-India, 2009.
6. Modern Operating Systems, Andrew S. Tanenbaum, 3rd Edition, PHI
7. Operating Systems: A Spiral Approach – Elmasri, Carrick, Levine, TMH Edition

E-learning Resources:

Introduction to Computer Fundamental:

1. https://www.w3schools.blog/computer-fundamentals-tutorial
2. https://vikaspedia.in/education/digital-litercy/it-literacy-courses-in-associating-with-msup/computer-fundamentals
3. https://www.tutorialspoint.com/computer_fundamentals/index.htm
4. https://vikaspedia.in/education/digital-litercy/it-literacy- courses-in-associating-with-msup/computer-fundamentals
5. https://nptel.ac.in/courses/106/103/106103068/

Introduction to Operating System:

6. https://www.w3schools.in/operating-system/tutorials/

Part D: Assessment and Evaluation

Maximum Marks: 50

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Date : 03.06.2022

Part A: Introduction				
Program: **Diploma Course**		Class: **B.Sc.-CS II Year**	Year: **2022**	Session: **2022-2023**
1	Course Code	**COMP-2P**		
2	Course Title	**LAB 2: Web Technology and JAVA**		
3	Course Type	**Practical**		
4	Pre-requisite (if any)	Theoretical knowledge of HTML, CSS, JavaScript and JAVA		
5	Course Learning Outcomes (CLO)	At the end of course, Students will be able to: • Develop web-based application. • Develop front end application using front end technologies. • Demonstrate the principles of object-oriented programming. • Create multi-threaded programs and event handling mechanisms • Develop simple GUI interfaces for a computer program to interact with users. • Use form validation on web page. • Develop server-based application using Servlet and JSP.		
6	**Credit Value**	**Practical: 2**		
7	**Total Marks**	**Max. Marks: 50**	**Min Passing Marks : 17**	

Part B: Content of the Course	
	Total Lecturer: 30
Tentative Practical List	**Note:** This is tentative list; the teachers concern can add more program as per requirement. Developing Web based application based on the concept of Web design technologies and Java programming. 1. Design a Login Page by using HTML and CSS. 2. Write a program to perform validation on web page. 3. Design a web page to demonstrate registration form of student. 4. Design a from by using HTML and CSS who will take input from the user through Java-script Function and check weather it is integer or not. 5. Design a device friendly web page which should be able to resize the display depending on the device by using bootstrap. 6. Write a java program to create an abstract class named shape that contains two integers and an empty method named print Area () Provide three classes named Rectangle. Triangle and Circle such that each one of the classes extends the class shape. Each one of the class contains only the method print Area () that print the area of the given shape. 7. Write a Java program that implements a multithreaded program that has three threads. First thread generates a random integer every 1 second and if the value

	is odd the third thread will print the value of the cube of the number. 8. Write a java program which creates a list containing ice cream flavours. On selection of any flavour price should be displayed in a text field. 9. Write a JDBC program to create a table product (id number, name varchar. Price varchar). And insert a record in the table. 10. Write a program to execute a select query using JDBC. 11. Write a program to execute an Update query using JDBC. 12. Write a server program to return the square root of a number to the client using Socket. 13. Write a server program to return Date and time to clients using socket programming. 14. Write a JSP program for basic arithmetic functions. 15. Write a advance java program to implement registration of student by using JSP. 16. Write a program to design a web page for login form and connect to the database while using JSP and JDBC. 17. Write a program to design a simple calculator using (a) JavaScript (b) Servlet and (c) JSP. 18. A web application that lists all cookies stored in the browser on clicking "List Cookies" button. Add cookies if necessary. 19. Write a java program that connects to a database using JDBC and does add, deletes, modify and retrieve operations. 20. Develop an applet that displays a simple message.

Part C: Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

1. The Complete Reference JAVA, Herbert Scheldt, Tata McGraw Hill publication, 5° Edition.
2. Advance JAVA, Gajendra Gupta, Firewall Media, 1" Edition, 2006.
3. JAVA network programming, Elliotte Rusty Harold, O'Reilly Publication, 3" Edition.
4. Core Java for Beginners, Rashmi Kanta Das, Vikas Publishing House Pvt. Ltd.
5. Internet and Internet Engineering, Daniel Minoli, TMH (Latest Edition)
6. Java Script, Gosslin, Vikas (Latest Edition)
7. HTML The Definite Guide, Chuck musiano& Bill Kenndy, O Reilly (Latest Edition).

E Resources:

1. Introduction to web-app
   https://www.youtube.com/watch?v=lZnp3tRRTzw&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=22

TBzKoa1Ov21lwDzJfM&index=22

- Building web-app
  https://www.youtube.com/watch?v=kIEn4LqAQlE&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=3
- Introduction to Java Script
  https://www.youtube.com/watch?v=fRbP92oScp0&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=10
- Introduction to Database
  https://www.youtube.com/watch?v=mtc0HHrUKpI&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=12
- Introduction to SQL
  https://www.youtube.com/watch?v=ar2naKy0aPw&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=16
- Introduction to Java
  https://www.youtube.com/watch?v=OjdT2l-EZJA&list=PLfn3cNtmZdPOe3R_wO_h540QNfMkCQ0ho&index=1

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:
Maximum Marks: 50
Continuous Comprehensive Evaluation (CCE): Not Applicable
University Exam(UE): 50 Marks

Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test/Assignment/Presentation	Not Applicable

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Date: 03.06.2022

Part A: Introduction				
Program: **Certificate Course**		Class: **B.Sc.-CS I Year**	Year: **2022**	Session:**2022-2023**
1.	Course Code	**COMP-2T**		
2.	Course Title	**Programming with C and C++**		
3.	Course Type	**Theory**		
4.	Pre-requisite (if any)	No		
5.	Course Learning. Outcomes (CLO)	At the end of this course, the students will be able to: • Develop programming skill and learn how to implement new software. • Develop programming and logical concepts which helps to build up source code of concern programming language. • Understand the concept of programming like Compilation, Debugging, Executing, Linking and Loading. • Familiar about the structure of C and C++ program. • Understand about the cursor movement and control structure of C and C++ program. • Write simple C and C++ programs using programming concepts. • Familiar about procedure oriented and object oriented concepts. • Understand the concept of inheritance and polymorphism which helps them to develop programs to solve real world problems. • Use file handling concepts in C and C++ to develop programs for real life projects. • Develop new applications with C and C++ which helps them to switch in Software Industry.		
6.	**Credit Value**	**Theory : 4**		
7.	**Total Marks**	**Max. Marks: 50**	**Min Passing Marks : 17**	

Part B: Content of the Course		
Total Periods: 60		
Unit	**Topics**	**No. of Periods**
I	**Introduction and Programming Concepts :** Definition of Program, Source file, Object file, Executable file, Header file, Language Translator- Assembler, Interpreter, Compiler, Testing, Debugging, Linker and Loader, Algorithms, Flow Charts, History of C language, Structure of C program , C Tokens : Identifiers, Keywords, Constants, Variables, Operators , Data Types , Control structure: Conditional and looping statements, Operator Precedence and Associativity, Array and it's types.	12
II	**Core Concepts of C Programming : Functions :** Standard Library and User defined functions, function prototype, Call by value and Call by reference, recursive functions, String functions, **Structure :** Declaration and Definition, Nested structure, array within structure. **Union:** Declaration and Definition, union variables, **Pointers:** Declaration and Definition, using & and * operators, pointer arithmetic, pointer to pointer, **Dynamic memory allocation functions:** malloc, calloc, realloc, free, **File Handling**: Basics, File Pointer, various file accessing functions.	12

III.	**Introduction to Object Oriented Programming:** Concepts, Features of C++, Bottom up Approach, Structure of C++ program, Data types, Class and Objects, Access Specifiers: Private, Public, Protected, I/O statements, Insertion and Extraction operator, Scope resolution operator, Array, this pointer, **Constructor:** Default constructor, Copy constructor, Parameterized constructor, Destructor.	12
IV.	**Inheritance:** Definition, Concept of base and derived class, Types of Inheritance: Single, Multilevel, Multiple, Hierarchical and Hybrid Inheritance. **Polymorphism:** Definition, Compile time polymorphism: Function overloading, Operator overloading, Run time polymorphism: Virtual Function, pure virtual function. Inline function, friend function, friend class.	12
V.	**Input-Output and File Handling :** I/O classes, File and Stream classes, Char I/O, String I/O, Object I/O, File Pointer, Opening and Closing file. **Exception Handling and Standard Template Library :** Definition, Exception basics, try, catch and throws keywords, Template, Components of STL.	12
Keywords: Token, Datatype, Operators, Functions, Class, Inheritance, Polymorphism.		

Part C - Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

1. Program Design, Peter Juliff, PHI Publications .
2. Let us C: Yashwant Kanetkar, BPB Publications .
3. Programming in ANSI C , E. Balaguruswamy, Tata McGraw Hill
4. Let us C++ ,Y. Kanetkar, B.P.B Publication .
5. Programming in C++, E. Balaguruswamy, Tata McGraw Hill.

E Resources:

1. Introduction to C and C++ from SWAYAM/NPTEL
   https://onlinecourses.nptel.ac.in/noc19_cs38/preview
   https://onlinecourses.nptel.ac.in/noc22_cs103/preview
   https://www.youtube.com/watch?v=KG4hjVDw-p8&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=2
2. Constant and Inline Function
   https://www.youtube.com/watch?v=pX6LufLso2M&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=10
3. Pointer and Reference
   https://www.youtube.com/watch?v=GtsBZ5e1-cE&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=12
4. Function Overloading
   https://www.youtube.com/watch?v=uJGmGAShHeU&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=13
5. Operator Overloading
   https://www.youtube.com/watch?v=0jpOwe4d-FE&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=17

6. Dynamic Memory Management
   https://www.youtube.com/watch?v=lkFK2X6qIc0&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=18

7. Class and Object
   https://www.youtube.com/watch?v=wtuks_f3vP4&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=24

8. Access Specifiers
   https://www.youtube.com/watch?v=6ki_W7cXdM0&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=22

9. Constructor and Destructor
   https://www.youtube.com/watch?v=wtuks_f3vP4&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=24

10. C different topics from W3School
    https://www.w3schools.com/c/

11. C++ different topics from W3School
    https://www.w3schools.com/CPP/default.asp

12. C different topics from Javatpoint
    https://www.javatpoint.com/c-programming-language-tutorial

13. C++ different topics from Javatpoint
    https://www.javatpoint.com/cpp-tutorial

Part D: Assessment and Evaluation

Maximum Marks: 50

Declaration

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03/06/22

03/06/22

Not agree because Syllabus is lengthy

03/06/22

03/06/22

Date: 03.06.2022

Part A: Introduction				
Program: **Degree Course**		Class: **B.Sc.-CS III Year**	Year: **2022**	Session:**2022-2023**
1	Course Code	**COMP-3P**		
2	Course Title	**LAB 3: Relational Database Management System**		
3	Course Type	**Practical**		
4	Pre-requisite (if any)	Basic Knowledge of SQL		
5	Course Learning. Outcomes (CLO)	At the end of course, Students will be able to: • Learn about Database Concepts, Architecture, various Users, Data Models and Data Management which helps them to interact with various Databases. • Develop various Tables and Databases which helps them to develop new Software. • Practice various SQL commands which helps them to generate new relationships among various Tables and Databases which are useful for Software Development. • Familiar about RDBMS Software like Oracle and SQL Server which are used as Backend for Software Development. • Develop new Databases for their Minor and Major Project Development which enhances their Data Storage, Data Accessibility and Data Management.		
6	**Credit Value**	**Practical: 2**		
7	**Total Marks**	**Max. Marks: 50**		**Min Passing Marks: 17**

Part B: Content of the Course	
Total Periods: 30	
Tentative Practical List	**Note:** This is tentative list; the teachers concern can add more program as per requirement. 1. Design an employee table in Oracle/SQL Server having eid(primary key) ename, edesignation, edoj, edob, eaddress, salary, econtact as fields and answer the following questions : a) Insert five records in above created table. b) Display all five records. c) Delete the fourth record. d) Update the third record of field ename as 'hari'. e) Add one new field in the table. 2. Design a salary table Oracle/SQL Server with one primary key and foreign key(employee table) having following fields :

Month, working days, deptid, gross, incentive, deduction and net salary.

a) Insert five records in above created table.
b) Display all five records.
c) Use foreign key relation and display records.
d) Update the second record of field deptid as 'Sales '.
e) Add one new field in the table.

3. Create a new user in Oracle/SQL Server.
4. Create a view in Oracle/SQL Server.
5. Create a new table in Oracle/SQL Server and practice for join operation.
6. Create a new user in Oracle/SQL Server and practice for commit and rollback command.
7. Create a new database in Oracle/SQL Server having atleast five tables for Hotel Management System.
8. Create a new database in Oracle/SQL Server having atleast four tables for Covid Vaccination Management System.
9. Create a new database in Oracle/SQL Server having atleast five tables for Library Management System.
10. Create a new table in Oracle/SQL Server and practice for Group by and Order by Clause.
11. Create a new table in Oracle/SQL Server and practice for max(), min(), avg() and count() functions.
12. Create a new table in Oracle/SQL Server and practice for lower(), substr(),trim() and upper() functions.
13. Create a new table in Oracle/SQL Server and practice for unique and check constraint.
14. Create a new table in Oracle/SQL Server and practice for any two date formats.
15. Create a new table in Oracle/SQL Server and practice for using clause.
16. Create a new table in Oracle/SQL Server and practice for having clause with sub queries.
17. Create a new table in Oracle/SQL Server and practice for alias in any table.
18. Create a new table in Oracle/SQL Server and practice for inner and outer join.
19. Create a new table in Oracle/SQL Server and practice for Drop command.
20. Write a PL/SQL program for addition of two numbers .
21. Write a PL/SQL program to find the factorial value of any entered number.
22. Write a PL/SQL program for swapping of two numbers.

	23) Write a PL/SQL program to print first ten Natural Numbers. 24) Write a PL/SQL program to generate even series upto five digits starting from 2 and sum all the terms. 25) Write a PL/SQL program to practice for implicit and explicit cursor.

Part C - Learning Resources
Text Books, Reference Books, Other Resources
Suggested Readings: 1. Database system concept , H. Korth and A. Silberschatz, TMH Publications . 2. Data Base Management System, Alexies & Mathews,Vikash publication. 3. Data Base Management System, C. J. Date ,Narosha Publication. 4. Data Base Management System by James Matin. 5. Principles of Database System by Ullman. 6. Program Design, Peter Juliff, PHI Publications. 7. The Complete Reference, Kevin Loney, Oracle Press. 8. SQL, PL/SQL The Programming Language of Oracle, Ivan Bayross , PustakKosh Publication. 9. Microsoft SQL Server Management and Administration, Ross, STM Publications. **E Resources:** 1. SWAYAM URL link for DBMS and RDBMS: https://youtu.be/f6LGtJutWyA 2. SWAYAM URL link for DBMS and RDBM: https://youtu.be/IoL9Ve2SRwQ 3. SWAYAM URL link for DBMS and RDBMS : https://**swayam**.gov.in/courses/4434-data-base-management-system

Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: 50 Continuous Comprehensive Evaluation (CCE): Not Applicable University Exam(UE): 50 Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test/Assignment/Presentation	Not Applicable

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    Devi Ahila Vishwavidyalaya, Indore

Date: 03.06.2022

Part A: Introduction				
Program: **Diploma Course**		Class: **B.Sc.-CS II Year**	Year: **2022**	Session:**2022-2023**
1.	Course Code	**COMP-3T**		
2.	Course Title	**Data Structure**		
3.	Course Type	**Theory**		
4.	Pre-requisite (if any)	No		
5.	Course Learning. Outcomes (CLO)	At the end of this course, the students will be able to: • Use different types of data structures, operations and algorithms. • Implement appropriate sorting/searching technique for any given problem. • Use stack, Queue, Lists, Trees and Graphs in problem solving. • Find suitable data structure during application development/ Problem Solving.		
6.	**Credit Value**	**Theory: 4**		
7.	**Total Marks**	**Max Marks: 50**	**Min Passing Marks: 17**	

Part B: Content of the Course		
Total Periods: 60		
Unit	**Topics**	**No. of Periods**
I	**Introduction and Basic Concepts of Data Structure:** Data types: primitive, non-primitive data types, ADT, Linear and nonlinear data structure. **Linear Data Structures**: Arrays: One dimensional, Multidimensional array, allocation methods, address calculations, sparse arrays. Linked List: Singly and Doubly Linear link lists, singly and doubly circular linked list: Definitions, operations (INSERT, DELETE, TRAVERSE) on these lists. (Insertion operation includes – insertion before a given element, insertion after a given element, insertion at given position, insertion in sorted linked list)	12
II	**Stack:** Stack: Definition, Operations PUSH, POP, TRAVERSE, implementations using array and linked list, Applications of stack: Infix, Prefix, Postfix representation and conversion using stack, Postfix expression evaluation using stack. **Queue:** Introduction, and Types of Queues: Priority Queue, Circular queue, Double Ended Queue, operations (INSERT, DELETE, TRAVERSE), implementation using array and linked list and applications	12
III	**Non-linear Data Structure:** Trees: Definition of trees and their types, Binary trees, Properties of Binary trees and Implementation operation (Insertion, deletion, searching and traversal algorithm: preorder, post order, in-order traversal), Binary Search Trees, Implementations, Threaded trees, AVL Trees.	12
IV.	**Graph:** Definition of Graph and their types, adjacency and incident (matrix & linked list) representation of graphs, Graph Traversal – Breadth first Traversal, Depth first Traversal, Connectivity of graphs; Weighted Graphs, Shortest path Algorithm, spanning tree, Minimum Spanning tree, Kruskal's and prim's algorithms. Static Hashing: Introduction, Hash table, Hash function.	12

V.	**Sorting Methods:** Types of sorting, Sequential Sort, Insertion Sort, Bubble Sort, Quick Sort, Merge Sort. **Searching**: Linear search, Binary search, Hashing, collision resolution methods, Comparison of Search trees.	12
Keywords: Linear Data Structure, Non-linear Data Structure, Searching, Sorting, Graph.		

Part C - Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

1. "Data Structures and Algorithms in C++", Michael T. Goodrich, Wiley, 2007
2. "Fundamentals of Data Structures", Horowitz and Sahani, Computer Science Press, 1978
3. "Data structures and Algorithms", Aefred V. Aho, Jhon E. Joperoft and J.E. Ullman.
4. "An Introduction to Data Structures with Applications", Jean Paul Trembley and Paul Sorenson, TMH, International Student Edition, 1985
5. "Data Structures and Program Design in C", R. Kurse, Leung &Tondo, 2nd Edition, PHI publication

E- Resources:

1. Introduction to Data Structure
   https://www.youtube.com/watch?v=zWg7U0OEAoE&list=PLBF3763AF2E1C572F&index=1
2. Stacks
   https://www.youtube.com/watch?v=g1USSZVWDsY&list=PLBF3763AF2E1C572F&index=2
3. Queues and linked list
   https://www.youtube.com/watch?v=PGWZUgzDMYI&list=PLBF3763AF2E1C572F&index=3
4. Trees
   https://www.youtube.com/watch?v=tORLeHHtazM&list=PLBF3763AF2E1C572F&index=6
5. Graphs
   https://www.youtube.com/watch?v=9zpSs845wf8&list=PLBF3763AF2E1C572F&index=24

Part D: Assessment and Evaluation

Maximum Marks: 50

Declaration

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Date: 03.06.2022

Part A: Introduction				
Program: **Diploma Course**		Class: **B.Sc.-CS II Year**	Year: **2022**	Session:**2022-2023**
1.	Course Code	**COMP-4T**		
2.	Course Title	**Web Technology and Java**		
3.	Course Type	**Theory**		
4.	Pre-requisite (if any)	Basic understanding of programming concepts and programming language		
5.	Course Learning. Outcomes (CLO)	At the end of this course, the students will be able to: • Create applications using HTML, CSS and Java Script. • Understand fundamental tools and technologies for web design. • Specify design rules in constructing web pages and sites. • Understand how web pages are designed and created. • Design console-based GUI based and web based application. • Front end designing using html, CSS, java script and bootstrap. • Develop server-side programs in the form of Servlet. • Designing web application by using JSP as a server-side programming. • Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's Create web pages using HTML and Cascading Styles sheets. • Analyze a web page and identify its elements and attributes Create dynamic web pages using JavaScript. • Build web applications using JSP and Servlet.		
6.	**Credit Value**	**Theory: 4**		
7.	**Total Marks**	**Max. Marks: 50**	**Min Passing Marks : 17**	

Part B: Content of the Course		
Total Periods: 60		
Unit	**Topics**	**No. of Periods**
I	**Introduction:** Overview of WWW, Web page, Web browsers, HTTP, URL, Hypertext, Web server, Tools for web site development, hosting options and domain name registration. **Markup language:** Introduction, DTD, Creating Web pages, Headings, Paragraphs, Lists, Hyperlinks, Tables, Web forms, Input Types, Input Attributes, Inserting images, Frames, Basics of DHTML, XML , XHTML.	12

II	**Web Development:** CSS- Introduction, Syntax, measurement units, colors, Backgrounds, Font, Text, position, Align, Images, Link, Table, List, Padding. **JavaScript:** Overview, syntax, Variables, Operators, Decision control statement, Looping statement, JavaScript functions, Java script Events, Cookies, Page Redirect, and Validation. **Bootstrap:** Introduction, Grid system, typography, tables, images, dropdowns, jumbotron, them, template and forms. **PHP:** Introduction, syntax, variables, operators, functions, include, get method, post method, cookies, session, PHP form validation, exception.	12
III	**JAVA:** Primitive Data Types, Variables, Array, operators, control statements, classes and objects, Abstract Classes, Polymorphism, Inheritance, Method Over-writing, method overriding, constructor, super keyword, this keyword, final static, package and interface, Multi-threading and Exception Handling, Collection Framework. Introduction to applet.	12
IV.	**Java Server Page (JSP):** Basics of Servlet, writing simple program in Servlet, Introduction to Java Server Page (JSP), Embedding Java Code into HTML, Implicit JSP Objects, Overview of the JSP Tags, Directives, Declarations, Expressions, Deploying Servlet and JSP, JSTL, JSP Action elements: jsp:forward, jsp:include, JSP Request, JSP Response, JSP Config, JSP Session, Cookies, JSP Exception Handling.	12
V.	**Database Using JDBC:** Concept, JDBC Driver Types, JDBC package, establishing a database connection and executing SQL Statements.	12
Keywords: Web Designing, Collection Framework, Servlet, JSP, Database Connectivity.		

Part C: Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

1. The Complete Reference JAVA, Herbert Scheldt, Tata McGraw Hill publication, 5° Edition.
2. Advance JAVA, Gajendra Gupta, Firewall Media, 1" Edition, 2006.
3. JAVA network programming, Elliotte Rusty Harold, O'Reilly Publication, 3" Edition.
4. Core Java for Beginners, Rashmi Kanta Das, Vikas Publishing House Pvt. Ltd.
5. Internet and Internet Engineering, Daniel Minoli, TMH (Latest Edition)
6. Java Script, Gosslin, Vikas (Latest Edition)
7. HTML The Definite Guide, Chuck musiano& Bill Kenndy, O Reilly (Latest Edition).

E Resources:

1. Introduction to web-app
   https://www.youtube.com/watch?v=lZnp3tRRTzw&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=22
2. Building web-app
   https://www.youtube.com/watch?v=kIEn4LqAQlE&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=3
3. Introduction to Java Script
   https://www.youtube.com/watch?v=fRbP92oScp0&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=10
4. Introduction to Database
   https://www.youtube.com/watch?v=mtc0HHrUKpI&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=12
5. Introduction to SQL
   https://www.youtube.com/watch?v=ar2naKy0aPw&list=PLJ5C_6qdAvBEJ6-TBzKoa1Ov21lwDzJfM&index=16
6. Introduction to Java
   https://www.youtube.com/watch?v=OjdT2l-EZJA&list=PLfn3cNtmZdPOe3R_wO_h540QNfMkCQ0ho&index=1

Part D: Assessment and Evaluation

Maximum Marks: 50

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    Prof. and Head, Dept. of Computer Science (Present Online)
    Devi Ahila Vishwavidyalaya, Indore

Date: 03.06.2022

Part A: Introduction				
Program: **Degree Course**		Class: **B.Sc.-CS III Year**	Year: **2022**	Session:**2022-2023**
1.	Course Code	**COMP-5T**		
2.	Course Title	**Data Communication and Networking**		
3.	Course Type	**Theory**		
4.	Pre-requisite (if any)	No		
5.	Course Learning. Outcomes (CLO)	At the end of this course, the students will be able to: • Understand the basic computer network technology • Understand and explain the data communication system and its components. • Identify the different types of network topologies and protocols. • Understand the layers of the OSI model and TCP/IP. • Expose wireless and wired LANs.		
6.	**Credit Value**	**Theory: 4**		
7.	**Total Marks**	**Max. Marks: 50**	**Min Passing Marks: 17**	

Part B: Content of the Course		
Total Periods: 60		
Unit	**Topics**	**No. of Periods**
I	**Overview of Data Communication and Networking:** Data Communications: components, data representation, direction of data flow (simplex , half duplex , full duplex; Networks : distributed processing, network criteria , physical structure (type of connection , topology), categories of network (LAN, MAN, WAN), Protocol and standards; Reference Models: OSI & TCP/IP reference model comparative study.	12
II	**Physical layer:** Analog and Digital Transmission: Transmission Impairments, Data Rates Limits, Digital to Digital Conversion, Digital to Analog conversion, Analog To Digital Conversion: Modulation, Transmission Modes, Parallel, Serials Asynchronous and Synchronous communication; Constellation Diagram, Analog to Analog conversion, Bandwidth Utilization, Transmission Media: Multiplexing: FDM, WDM AND TDM, Guided Media: Twisted Pair, Coaxial and Fiber Optic, Unguided Media : Wireless , Radio Waves, Microwaves and Infrared.	12
III	**Data Link Layer:** Flow control: Protocols: Stop & wait ARQ, Go-Back-N ARQ, Selective repeat ARQ, HDLC; Medium Access Sub-layer: Point to point protocol, LCP, NCP, FDDI, token bus, token ring; Multiple Access Protocols: Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, FDMA,TDMA,CDMA; Traditional Ethernet, Fast Ethernet.	12
IV.	**Network Layer:** Internetworking Devices: Repeaters , Hubs , Bridges, Switches, Router , Gateway; Addressing: Internet address, classful address, subnetting, classless address; Routing: Techniques, static vs dynamic routing, and routing table for classful address; Routing Algorithms: Shortest path algorithm, flooding , distance vector routing , link state routing; Protocols: ARP, RARP, IP, ICMP, IPV6; Unicast and multicast routing protocols;	12

V.	**Transport Layer and Application Layer:** UDP, TCP; Congestion control algorithm: Leaky bucket algorithm, Token bucket algorithm, choke packets; Quality of service: techniques to improve Qos; DNS,SMTP, SNMP,FTP, HTTP, Firewalls; Modern Topics: Wireless LAN: IEEE 802.11;Introduction to Bluetooth,VLAN's, Cellular telephony & Satellite network.	12
Keywords: Networking Model, Communication Protocol, Transmission Media, Internetworking Devices.		

Part C: Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

1. Data Communications and Networking, B.A. Forouzan, TMH, (Latest Edition)
2. Computer Networks, A.S. Tanenbaum, 4th Edition, Pearson Education/PHI
3. Data and Computer Communication, W. Stallings, 5th Edition, PHI/Pearson Education
4. Computer Networking – A top down approach featuring the internet, Kurose and Rose, Pearson Education.
5. Communication Networks, Walrand, TMH (Latest Edition)

E Resources:

1. NPTEL URL link for Data Communication:
   https://nptel.ac.in/courses/106105082
   Topics From SWAYAM Portal
2. Introduction to Data Communication
   https://www.youtube.com/watch?v=swtH_okidQc&list=PLUtfVcb-iqn8dG1-Cn7NTEdILR3hRVgcN&index=1
3. Layered Architecture
   https://www.youtube.com/watch?v=xHO6LjSHeo0&list=PLUtfVcb-iqn8dG1-Cn7NTEdILR3hRVgcN&index=2
4. Data and Signal
   https://www.youtube.com/watch?v=6ZGVZ7gUccE&list=PLUtfVcb-iqn8dG1-Cn7NTEdILR3hRVgcN&index=3
5. Guided Transmission Media
   https://www.youtube.com/watch?v=y7v3EAJsWXA&list=PLUtfVcb-iqn8dG1-Cn7NTEdILR3hRVgcN&index=5
6. Unguided Transmission Media
   https://www.youtube.com/watch?v=hKq1tYlVxdQ&list=PLUtfVcb-iqn8dG1-Cn7NTEdILR3hRVgcN&index=6
7. Computer Networking
   https://www.tutorialspoint.com/data_communication_computer_network/index.htm

Part D: Assessment and Evaluation

Maximum Marks: 50

Declaration

The syllabus of this subject is frame as per the TOR of department of higher education, Chhattisgarh.

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Date: 03.06.2022

Part A: Introduction				
Program: **Degree Course**		Class: **B.Sc.-CS III Year**	Year: **2022**	Session:**2022-2023**
1.	Course Code	**COMP-6T**		
2.	Course Title	**Relational Database Management System**		
3.	Course Type	**Theory**		
4.	Pre-requisite (if any)	No		
5.	Course Learning. Outcomes (CLO)	At the end of this course, the students will be able to: • Learn about Database Concepts, Architecture, various Users, Data Models and Data Management which helps them to interact with various Databases. • Develop various Tables and Databases which helps them to develop new Software. • Practice various SQL commands which help them to generate new relationships among various Tables and Databases which are useful for Software Development. • Familiar about RDBMS Software like Oracle and SQL Server which are used as Backend for Software Development. • Develop new Databases for their Minor and Major Project Development which enhances their Data Storage, Data Accessibility and Data Management.		
6.	**Credit Value**	**Theory : 4**		
7.	**Total Marks**	**Max Marks: 50**	**Min Passing Marks : 17**	

Part B: Content of the Course		
Total Periods: 60		
Unit	**Topics**	**No. of Periods**
I	**Overview of Database Management**: Data, Information and Knowledge, Data Processing versus Data Management, File Oriented Approach verses Database Oriented Approach, Data Independence, Database Administration Roles, Overview of Database, DBMS Architecture, Different kinds of DBMS users, Introduction to Data Dictionary. Data Models: Network Model, Relational Model, Hierarchical Model. Database Languages: DDL, DML, DCL, And TCL. Structured Query Language: Basic Data Types, Commands : Create, Insert, Select, Delete, Truncate , Drop, Alter, Grant ,Revoke, Commit, Rollback, Queries on Multiple Relation, Join Operation, String Operation, Set Operation, Grouping, Nested Subqueries.	12
II	**Concepts of Database Management System :** Definition of Tables, Cardinality relationships in a Database, Constraints in a Database, Entity, Attributes, Strong and weak entities, ER-Diagram, Symbols and Implementation, Concept of keys: Candidate key, Primary key, Alternate key, Foreign key, Case studies of ER modeling Generalization, Specialization and Aggregation. Converting an ER model into relational Schema. Extended ER features.	12
III	**Relational Database Design:** Normalization concept in logical model, Pitfalls in database design, Functional dependencies, Join dependencies, Natural Join, Normal forms (1NF, 2NF, 3NF). Boyce Codd Normal form, Decomposition, Multi-Valued Dependencies, 4NF, 5NF. Issues in physical design: Concepts of indexes, File organization for relational tables, De-normalization. Relational Database: Structure of Relational Database, Schema, Relational Operation:	12

	Database: Structure of Relational Database, Schema, Relational Operation: Selection, Projection, Cartesian Production, Union, Intersection and Minus operation. Relational Algebra: Select operation, Project operation, Union operation, Cartesian Product operation, Intersection operation, Join operation, Different types of joins (Inner join, Outer join, Self join).	
IV.	**SQL Server Basics:** Microsoft SQL Server 2019, Overview of SQL Server 2019, Versions of SQL Server, Installation of SQL Server 2019, SQL Server Management Studio(SSMS), Azure Data Studio(ADS), Features of SQL Server Express, SQL Server Support Life Cycle, Data Definition Language (DDL) Commands, Data Manipulation Language (DML) Commands, Data Control Language (DML) Commands, Transaction Control Language (TCL) Commands, Data Constraints, Stored Procedure, Function .	12
V.	**Oracle Basics:** Oracle Corporation, Versions of Oracle, Oracle Products, Oracle Installation, Oracle Client and Server Products, Online Transaction Processing, Hybrid cloud Installation, Data Definition Language (DDL) Commands, Data Manipulation Language (DML) Commands, Data Control Language (DML) Commands, Transaction Control Language (TCL) Commands, Data Constraints, Introduction to PL/SQL Programming, Data Types, Looping Statements, Cursors, Stored Procedure, Function .	12
Keywords: Data Models, Keys, SQL Commands, DBMS, RDBMS, Oracle, SQL Server.		

Part C - Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

1. Database system concept, H. Korth and A. Silberschatz, TMH Publications.
2. Data Base Management System, Alexies & Mathews,Vikash publication.
3. Data Base Management System, C. J. Date ,Narosha Publication.
4. Data Base Management System By James Matin.
5. Principles of Database System By Ullman.
6. Program Design, Peter Juliff, PHI Publications.
7. The Complete Reference, Kevin Loney, Oracle Press.
8. SQL, PL/SQL The Programming Language of Oracle, Ivan Bayross , PustakKosh Publication.
9. Microsoft SQL Server Management and Administration, Ross, STM Publications.

E Resources:

1. SWAYAM URL link for DBMS and RDBMS: https://youtu.be/f6LGtJutWyA
2. SWAYAM URL link for DBMS and RDBM: https://youtu.be/IoL9Ve2SRwQ
3. SWAYAM URL link for DBMS and RDBMS: https://**swayam**.gov.in/courses/4434-data-base-management-system.
4. Introduction of DBMS: https://onlinecourses.swayam2.ac.in/cec19_cs05/preview
5. Introduction of RDBMS: https://onlinecourses.nptel.ac.in/noc19_cs46/preview
6. DMBS Contents from W3SHOOL: https://www.w3schools.in/dbms/intro
7. Data independence from W3SHOOL: https://www.w3schools.in/dbms/data-independence
8. Generalization and Aggregation: https://www.w3schools.in/dbms/generalization-aggregation
9. DMBS Contents from Javatpoint: https://www.javatpoint.com/dbms-tutorial

Part D: Assessment and Evaluation
Maximum Marks: 50

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