FOUR YEAR UNDERGRADUATE PROGRAM (NEP–2020)

Program: Bachelor in Science (2024 -28)

DISCIPLINE – COMPUTER SCIENCE

SESSION – 2024 -25

DSC -01 to 08		DSE -01 to 12	
Code	**Title**	**Code**	**Title**
CSSC -01T	Computer Fundamental and Operating System	CSSE -01	Data Communication and Networking
CSSC -01P	**Lab 1**: Operating Systems (DOS, Windows, Linux)	CSSE -02	Computer System Architecture
CSSC -02T	Programming in C++	CSSE -03	Cyber Security and Cyber Law
CSSC -02P	**Lab 2**: Programming in C++	CSSE -04	Introduction to Artificial Intelligence
CSSC -03T	Data Structure	CSSE -05	Computer Graphics
CSSC -03P	**Lab 3**: Data Structure Using C++	CSSE -06T	Machine Learning
CSSC -04T	Relational Database Management System	CSSE -06P	**Lab 8:** Machine Learning
CSSC -04P	**Lab 4**: Relational Database Management System (Oracle/MySQL)	CSSE -07	Software Engineering
CSSC -05T	Programming in Java	CSSE -08	Theory of Computation
CSSC -05P	**Lab 5**: Programming in Java	CSSE -09	Soft Computing
CSSC -06T	Web Technology	CSSE -10	Advanced Operating Systems
CSSC -06P	**Lab 6**: Web Technology	CSSE -11	Cloud Computing
CSSC -07T	Programming in Python	CSSE -12	Major Project
CSSC -07P	**Lab 7**: Programming in Python		
CSSC -08T	Fundamental of IoT and Applications		
CSSC -08P	**Lab 9**: Fundamental of IoT and Applications		
DGE -01 & 02		**VAC**	
CSGE -01T	Computer Fundamental and Operating System	CSVAC-01	Artificial Intelligence
CSGE -01P	**Lab 1**: Operating System (DOS, Windows, Linux)	**SEC**	
CSGE -02T	Programming in C++	CSSEC-01	Multimedia and Animation
CSGE -02P	**Lab 2**: Programming in C++		

Program Outcomes (PO):

- Gain a complete exposure to the theories and practices of Computer science.
- Get transformed into a skilled learner and active programmer, enabling the students to focus on their

higher studies.

- Value computer professionals and programmers.
- Explore how the concepts and applications of Computer science lead to innovative thinking with a problem-solving attitude.

Program Specific Outcomes (PSO):

- Understand the basic Computer knowledge and practical application in operating system.
- Understanding the concept of programming and develop program in C++.
- Understanding the concept of data structure and implementation with C++.
- Understanding the concept of DBMS and implementation in MySQL /Oracle.
- Understanding the concept of OOPs and Java programming and develop program in Java.
- Understanding the concept of web technology and its implementation with HTML/CSS/DHTML/PHP.
- Understand the basic concept of internet of things (IOT).
- Understanding the basic concept of cyber security and cyber law.
- Understanding the basic concept of Artificial Intelligence.

Dr. H.S. Hota Chairman (Dr. K.B. Dubey) (Dr S K Sah) Dr. Dayal Kotangale (Dr. Anil Sharma) (Dr. Swati Jain)

(R. Khantley) (Sushil Kumar Sahu) 17/06/24 Dr. V.K. Gupta (Dr. Aramike Shukla Sharma)

(Suresh Thakur) Shailendra Arya

Jitendra Kumar

ANJEETA KUJUR

CURRICULUM STRUCTURE

SCHEME

PROGRAM: B.SC.

DISCIPLINE: COMPUTER SCIENCE

Semester	Course Type	Course Code	Course Title	Total Credit	Total Marks	
					Max	Min
1st Semester	DSC (Major/Core)	CSSC-01T	Computer Fundamental and Operating System	3	100	40
		CSSC-01P	**Lab 1**: Operating Systems (DOS, Windows and Linux)	1	50	20
2nd Semester	DSC (Major/Core)	CSSC-02T	Programming in C++	3	100	40
		CSSC-02P	**Lab 2**: Programming in C++	1	50	20
3rd Semester	DSC (Major/Core)	CSSC-03T	Data Structure	3	100	40
		CSSC-03P	**Lab 3**: Data Structure Using C++	1	50	20
	DSE	CSSE-01	Data Communication and Networking	4	100	40
4th Semester	DSC (Major/Core)	CSSC-04T	Relational Database Management System	3	100	40
		CSSC-04P	**Lab 4**: Relational Database Management System (Oracle/MySQL)	1	50	20
	DSE	CSSE-02	Computer System Architecture	4	100	40
5th Semester	DSC (Major/Core)	CSSC-05T	Programming in Java	3	100	40
		CSSC-05P	**Lab 5**: Programming in Java	1	50	20
	DSE	CSSE-03	Cyber Security and Cyber Law	4	100	40
6th Semester	DSC (Major/Core)	CSSC-06T	Web Technology	3	100	40
		CSSC-06P	**Lab 6**: Web Technology	1	50	20
	DSE	CSSE-04	Introduction to Artificial Intelligence	4	100	40
7th Semester	DSC (Major/Core)	CSSC-07T	Programming in Python	3	100	40
		CSSC-07P	**Lab 7**: Programming in Python	1	50	20

	DSE	CSSE-05	Computer Graphics	4	100	40
		CSSE-06T	Machine Learning	3	100	40
		CSSE-06P	**Lab 8**: Machine Learning	1	50	20
		CSSE-07	Software Engineering	4	100	40
		CSSE-08	Theory of Computation	4	100	40
8th Semester	DSC (Major/Core)	CSSC-08T	Fundamental of IoT and Applications	3	100	40
		CSSC-08P	**Lab 9:** Fundamental of IoT and Applications	1	50	20
	DSE	CSSE-09	Soft Computing	4	100	40
		CSSE-10	Advanced Operating Systems	4	100	40
		CSSE-11	Cloud Computing	4	100	40
		CSSE-12	Major Project	4	100	40

Dr. H.S. Hota
Chairman

(Dr. K.B. Dubey)

(Dr SK Sahu)

Durgesh Kotangle

(Dr. S. Jain)

(Dr. Aramita Shukla Sharma)

(Sushil Kumar Sahu)

(Suresh Thekur)

Sheikh Ana

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Jeetendra Khan

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction				
Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*			Semester - I	Session: 2024-2025
1	Course Code	**CSSC-01T**		
2	Course Title	**Computer Fundamental and Operating System**		
3	Course Type	**DSC (Discipline Specific Course)**		
4	Prerequisite	*As per program*		
5	Course Learning Outcomes (CLO)	After Completing this course, students will be able to: • Study and use of basic concepts and terminology of information technology. • Organize files and documents on storage devices. • Acquire knowledge of ICT and Internet applications. • Develop information technology solutions by evaluating user requirements in advance trends of IT. • Acquire knowledge of MS-Excel, MS-PowerPoint and MS-Access.		
6	Credit Value	**3 Credits**	*Credit = 15 Hours - Learning & Observation*	
7	Total Marks	**Max. Marks: 100**	**Min Passing Marks: 40**	

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Indian knowledge System and Computer Science :** Number System in India-Historical evidence, Salient aspect of Indian Mathematics, Bhuta-Samkhya system, Katapayadi system, pingala and the binary system, Sulbha Sutra as modern arithmetic and numerical mathematics. **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, Microprocessors, Single chip Microcomputer, Users interface, hardware, software and firmware, Number system & Computer Codes.	13
II	**Peripheral devices:** I/O Devices-Keyboard, Mouse, Monitor, Impact and Non-Impact Printers, Plotters, Scanner, other Input/output devices 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.	11
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).	10
IV	**Operating System Concepts:** Evolution of Operating Systems: Types of operating systems. Introduction to DOS, History Booting process of DOS, Internal and External commands of DOS, File Structure of DOS. Windows Operating System: History, Version of Windows, Basics of Windows, Windows Explorer, Windows Accessories, Control Panel. Introduction to Linux Operating System, Structure of Linux, Linux command cd, md, rm, mv, cp, ls, cat, find, grep, head, tail.	11
Keywords	*Computer, Input /Output Devices, Memory, Operating System, DOS, Linux.*	

Name and Signature of Convener & Members of CBoS:

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Chairman

ANJECTA KUJUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- P.K. Sinha,Computer Fundamentals, BPB Publication, Sixth Edition.
- V. Rajaraman, Fundamentals of Computers, PHI Sixth Edition.
- B. Ram, Computer Fundamentals Architecture and Organization, New Age International Publishers, Fifth Edition.
- Raja Raman V. Fundamental of Computers, Prentice Hall of India, New Delhi.
- Peter Baer Galvin, Greg Gagne,Operating System Concepts – Abraham Silberschatz, 8th edition, Wiley-India, 2009.

Reference Books Recommended:

- Chetan Shrivastava, Fundamentals of Information Technology, Kalyan Publishers.
- Dr. Santosh Kumar Miri, Computer Fundamentals and Office Automation, Iterative International Publisher IIP.
- Alexis Leon and Mathews Leon, Fundamentals of Information Technology, Vikash Publication.
- Leon and Leon, Fundamental of IT, Leon Tec world.
- Aksoy and Denardis, Introduction to Information Technology, Cengage learning.
- Suresh K. Basandra, Computers Today, Galgotia Publications.
- Dennis P.Curtin, Kim Foley, Kunai Sen and Cathleen Morin, Information Technology – The breaking wave, TMH.
- Kogent Solution Inc., OFFICE 2013 in Simple Steps, DremTech Press.
- Kogent Learning Solutions Inc., Access 2010 in Simple Steps
- Andrew S. Tanenbaum, Modern Operating Systems, 3rd Edition, PHI
- Elmasri, Carrick, Levine, Operating Systems: A Spiral Approach – TMH Edition
- Akshay Singh , Operating System, RGCSM Publications

Online Resources:

- Indian Knowledge System and computer Science from Swayam portal
  https://onlinecourses.swayam2.ac.in/imb23_mg53/preview
- Fundamentals of Computer :
  https://www.w3schools.blog/computer-fundamentals-tutorial
- Fundamentals of Computer, Memory:
  https://www.tutorialspoint.com/computer_fundamentals/index.htm
- Fundamentals of Computer , Windows Operating System :
  https://vikaspedia.in/education/digital-litercy/it-literacy-courses-in-associating-with-msup/computer-fundamentals
- Fundamentals of Computer:
  https://nptel.ac.in/courses/106/103/106103068/
- Introduction to Operating System:
  https://www.w3schools.in/operating-system/tutorials/
- Introduction to Operating System:
  https://www.javatpoint.com/windows.
- Peripheral Devices
  https://www.tutorialspoint.com/what-are-peripheral-devices
- Windows :
  https://www.javatpoint.com/windows
- Linux:
  https://www.javatpoint.com/what-is-linux

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
Continuous Internal Assessment (CIA):	30 Marks
End Semester Exam (ESE):	70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **20 & 20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts.,**1 out of 2** from each unit-4x10=40 Marks	

Name and Signature of Convener & Members of CBoS:

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ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree)*	Semester - I	Session: 2024-2025

1	Course Code	CSSC-01P	
2	Course Title	Lab 1: Operating Systems (DOS, Windows, Linux)	
3	Course Type	Practical	
4	Prerequisite	*As per program*	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Understand the fundamental concepts of DOS, Windows and Linux Operating System. • Understand basics of DOS commands and its types. • Understand features of Windows Operating system. • Understand comparative features of DOS and Windows Operating systems. • Explore functionality of Linux.	
6	Credit Value	1 Credits	*Credit =30 Hours Laboratory or Field Learning/Training*
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
List of Practical Experiment	1. Demonstrate different Directory naming listing structure with all options. 2. Create one file and rename file using DOS command 3. Demonstrate all Internal DOS Commands with Output. 4. Demonstrate all external DOS Commands with output. 5. Introduction to Windows and Familiarity with its controls. 6. Study and use of Desktop, my computer, recycle bin, Task bar. 7. Working with Files and Folder. 8. Use of various window applications: Calculator, notepad and MS-Paint. 9. Explaining control panel options. 10. Working with printers. 11. Create a file using Linux command. 12. Write a Linux command which lists all files and directories. 13. Demonstrate use of grep command. 14. Create Directory using Linux command and create 3 different files in this directory. 15. Delete above created files and directory using Linux command. 16. Explaining various flavors of Linux. **Note:** Concerned teacher can add additional practical exercises as per requirement.	30
Keywords	*DOS, Windows, Linux.*	

Name and Signature of Convener & Members of CBoS:

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PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Rusell A Stultz, MS DOS 6.22 BPB Publications
- Brain Underdahl,Teach yourself Windows 2000, Wiley Publications.

Reference Books Recommended:

- Peter Norton, Maximizing Windows, Teachmedia.
- Ray Duncan, Advances MS-DOS Programming, BPB
- Akshay Singh, Operating System, RGCSM Publications
- Ray Yao, Shell Scripting in 8 Hours

Online Resources:

- DOS: https://www.javatpoint.com/ms-dos-operating-system
- Windows: https://www.javatpoint.com/windows
- Linux: https://www.javatpoint.com/what-is-linux
- Fundamentals of Computer, Windows Operating System: https://vikaspedia.in/education/digital-litercy/it-literacy-courses-in-associating-with-msup/computer-fundamentals
- DOS: https://www.geeksforgeeks.org/ms-dos-operating-system/

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: **50 Marks**

Continuous Internal Assessment (CIA): **15 Marks**

End Semester Exam (ESE): **35 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar +Attendance - **05** Total Marks - **15**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance: On spot Assessment** **A. Performed the Task based on lab. work - 20 Marks** **B. Spotting based on tools & technology (written) – 10 Marks** **C. Viva-voce (Based on principle/technology) - 05 Marks**	Managed by Course teacher as per lab. status

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FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF INFORMATION SCIENCE
COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*		Semester - II	Session: 2024-2025
1	Course Code	**CSSC-02T**	
2	Course Title	**Programming in C++**	
3	Course Type	**DSC (Discipline Specific Course)**	
4	Prerequisite	*As per program*	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Understand the fundamentals of object oriented programming. • Write programs related to concept of object oriented program • Define functions, class and to create own Libraries. • Write programs for file handling. • Develop small programs to solve real world problems.	
6	Credit Value	**3 Credits**	***Credit = 15 Hours - Learning & Observation***
7	Total Marks	**Max. Marks: 100**	**Min Passing Marks: 40**

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
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 its types, Pointer, Functions : Standard Library and User defined functions, function prototype, Call by value and Call by reference, recursive functions, String functions.	12
II	**Introduction to Object Oriented Programming:** Concept of object oriented programming, Features of C++, Structure of C++ program, Data types, structure, class and objects, Access Specifiers: Private, Public, Protected, inline functions, static data and static functions. **Constructor:** Default constructor, Copy constructor, Parameterized constructor, Destructor.	11
III	**Inheritance and Polymorphism**: 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, constructor overloading, Runtime polymorphism: Virtual Function, pure virtual function. Inline function, friend function, friend class.	11
IV	**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.	11
Keywords	*Token, Identifier, Keyword, Array, Function, Class, Object, Polymorphism, Inheritance, Constructor, Template.*	

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Sheikh Arif

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PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Peter Juliff, Program Design, PHI Publications.
- Yashwant Kanetkar, Let us C: BPB Publications.
- E. Balaguruswamy, Programming in ANSI C, Tata McGraw Hill

Reference Books Recommended:

- Y. Kanetkar, Let us C++, B.P.B Publication .
- E. Balaguruswamy, Programming in C++, Tata McGraw Hill.
- R. Kumar, Object Oriented Programming with C++, Prakhar Publication(Hindi)
- Dhupiya, Lakhyani , C++ Programming Alka Publications, Ajmer (Paperback, Dhupiya, Lakhyani)(Hindi)

Online Resources:

- Introduction to C and C++ from SWAYAM/NPTEL
  https://onlinecourses.nptel.ac.in/noc22_cs103/preview
  https://www.youtube.com/watch?v=KG4hjVDw-p8&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=2
- Constant and Inline Function through NPTEL:
  https://www.youtube.com/watch?v=pX6LufLso2M&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=10
- Pointer and Reference NPTEL
  https://www.youtube.com/watch?v=GtsBZ5e1-cE&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=12
- Function Overloading NPTEL
  https://www.youtube.com/watch?v=uJGmGAShHeU&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=13
- Operator Overloading NPTEL
  https://www.youtube.com/watch?v=0jpOwe4d-FE&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=17
- Dynamic Memory Management NPTEL
  https://www.youtube.com/watch?v=lkFK2X6qIc0&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=18
- Class and Object NPTEL
  https://www.youtube.com/watch?v=wtuks_f3vP4&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=24
- Access Specifiers NPTEL
  https://www.youtube.com/watch?v=6ki_W7cXdM0&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=22
- Constructor and Destructor NPTEL
  https://www.youtube.com/watch?v=wtuks_f3vP4&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=24
- C++ different topics from W3School
  https://www.w3schools.com/CPP/default.asp
- C++ different topics from Javatpoint
  https://www.javatpoint.com/cpp-tutorial

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
Continuous Internal Assessment (CIA):	30 Marks
End Semester Exam (ESE):	70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 20 +20 Assignment / Seminar - 10 Total Marks - 30	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1**. Objective – **10** x1= **10** Mark; **Q2**. Short answer type- 5x4 =**20** Marks Section B: Descriptive answer type qts.,**1 out of 2** from each unit-**4x10**=**40 Marks**	

Name and Signature of Convener & Members of CBoS:

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Chairman

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF INFORMATION SCIENCE
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree)*	Semester - II	Session: 2024-2025

1	Course Code	CSSC-02P
2	Course Title	Lab 2: Programming in C++
3	Course Type	DSC
4	Prerequisite	*As per program*
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Understand the fundamental programming concepts and methodologies which are essential to create good C++ programs. • Code, test, and implement a well-structured, robust computer program using the 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	**1 Credits** *Credit =30 Hours Laboratory or Field Learning/Training*
7	Total Marks	**Max. Marks: 50** **Min Passing Marks: 20**

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
List of Practical Experiments.	1. Write a program in C++ for addition of two numbers using float data type. 2. Write a program in C++ to find the biggest number between two numbers. 3. Write a program in C++ to find the factorial value of any entered number using do – while loop. 4. Write a program in C++ for various arithmetic operations using switch case statements. 5. Write a program in C++ for Multiplication of two 3X3 matrices. 6. Write a program in C++ to store five books of information using structure. 7. Write a program in C++ to store six employee information using union. 8. Write a program in C++ to calculate simple interest using call by value and call by reference method. 9. Write a program in C++ to find the sum and average of five numbers using class and objects. 10. Write a program in C++ to multiply two numbers using private and public member functions. 11. 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 12. Write a program in C++ for constructor and Destructor.	**30**

13. Write a program in C++ for multiple inheritance.
14. Write a program in C++ for operator overloading.
15. Write a program in C++ for friend class and friend function.
16. Write a program in C++ for virtual function and virtual class.
17. Write a program in C++ for Exception Handling.
18. Write a program in C++ to open and close a file using file Handling.
19. Given two ordered arrays of integers, write a program to merge the two-arrays to get an ordered array.
20. WAP to display Fibonacci series (i) using recursion, (ii) using iteration
21. WAP to calculate Factorial of a number (i) using recursion, (ii) using iteration
22. WAP to calculate GCD of two numbers (i) with recursion (ii) without recursion.
23. Create a 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).
24. Create a class Triangle. Include overloaded functions for calculating area. Overload assignment operator and equality operator.
25. Create a class Box containing length, breadth 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
26. Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.
27. Write a program to retrieve the student information from the file created in the previous question and print it in the following format: Roll No. Name Marks
28. Copy the contents of one text file to another file, after removing all whitespaces.
29. Write a program for exception handling.
30. Write a program to insert data into file and to display it.

Note: Concerned teacher can add additional practical exercises as per requirement.

Keywords	*Array, Function, Structure, union, matrix, constructor, destructor, inheritance.*

Name and Signature of Convener & Members of CBoS:

Dr. A.S. Hota
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ANJEETA KUMAR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Peter Juliff, Program Design, PHI Publications.
- Yashwant Kanetkar, Let us C: BPB Publications.
- E. Balaguruswamy, Programming in ANSI C, Tata McGraw Hill

Reference Books Recommended:

- Y. Kanetkar, Let us C++, B.P.B Publication .
- E. Balaguruswamy, Programming in C++, Tata McGraw Hill.
- R. Kumar, Object Oriented Programming with C++, Prakhar Publication(Hindi)
- Dhupiya, Lakhyani , C++ Programming Alka Publications, Ajmer (Paperback, Dhupiya, Lakhyani)(Hindi)

Online Resources:

- Introduction to C and C++ from SWAYAM/NPTEL
  https://onlinecourses.nptel.ac.in/noc22_cs103/preview
  https://www.youtube.com/watch?v=KG4hjVDw-p8&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=2
- Constant and Inline Function through NPTEL:
  https://www.youtube.com/watch?v=pX6LufLso2M&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=10
- Pointer and Reference NPTEL
  https://www.youtube.com/watch?v=GtsBZ5c1-cE&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=12
- Function Overloading NPTEL
  https://www.youtube.com/watch?v=uJGmGAShHeU&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=13
- Operator Overloading NPTEL
  https://www.youtube.com/watch?v=0jpOwe4d-FE&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=17
- Dynamic Memory Management NPTEL
  https://www.youtube.com/watch?v=lkFK2X6qIc0&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=18
- Class and Object NPTEL
  https://www.youtube.com/watch?v=wtuks_f3vP4&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=24
- Access Specifiers NPTEL
  https://www.youtube.com/watch?v=6ki_W7cXdM0&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=22
- Constructor and Destructor NPTEL
  https://www.youtube.com/watch?v=wtuks_f3vP4&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=24
- C++ different topics from W3School
  https://www.w3schools.com/CPP/default.asp
- C++ different topics from Javatpoint
  https://www.javatpoint.com/cpp-tutorial

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:		
Maximum Marks:	50 Marks	
Continuous Internal Assessment (CIA):	15 Marks	
End Semester Exam (ESE):	35 Marks	
Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar +Attendance - 05 Total Marks - 15	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):	Laboratory / Field Skill Performance: On spot Assessment A. Performed the Task based on lab. work - 20 Marks B. Spotting based on tools & technology (written) – 10 Marks C. Viva-voce (based on principle/technology) - 05 Marks	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members:

1. Dr. H.S. Hota
2. Dr. Swati Jain
3. Dr. Surendra Patel
4. Dr. S. K. Sahu
5. Mr. Prakash Kumar Tripathi
6. Dr. Anil Kumar Sahu
7. Mr. L.K. Gavel

ANJEETA KUJUK

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*	Semester – III	Session: 2024-2025

1	Course Code	CSSC -03T	
2	Course Title	Data Structure	
3	Course Type	DSC (Discipline Specific Course)	
4	Prerequisite (if, any)	*As per program*	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Understand the fundamentals and applications of data structure. • Utilize various algorithms for real world problem solving. • Understanding about data management in computer memory. • Apply stack, Queue, Lists, Trees and Graphs for real world application. • Understand how various data structures can be used to implement through any programming language.	
6	Credit Value	3 Credits	*Credit = 15 Hours - Learning & Observation*
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Introduction and Basic Concepts:** Introduction, Fundamentals of Algorithms, Data types: Primitive, Non-Primitive Absent Data Type (ADT), Classification of Data Structure: Linear and Nonlinear Data Structure. **Array:** Arrays and its types, Memory allocation and address calculations of Array, Sparse Array. **Linked List:** Types of Linked List and various Operations Like INSERT, DELETE, TRAVERSE. Introduction and Application of Stack and Queue.	12
II	**Stack:** Definition, Operations PUSH, POP, Implementations using Array and Linked list, Applications of Stack: Infix, Prefix, Postfix representation and conversion using Stack, Postfix expression evaluation using Stack, Recursion using Stack. **Queue:** Definition, Types of Queues: Priority Queue, Circular queue, Double Ended Queue, operations of Queue INSERT, DELETE, TRAVERSE, Implementation Queue using Array and Linked list, Applications of Queue.	11
III	**Tree:** Definition of Trees and their types, Binary trees, Properties of Binary trees and operations Insertion, deletion, searching and traversal algorithm: preorder, post order, in-order traversal, Binary Search Trees, Implementations, AVL Trees. **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.	11
IV	**Sorting Methods:** Types of Sorting Selection Sort, Insertion Sort, Bubble Sort, Quick Sort, Merge Sort, Radix Sort. **Searching**: Linear search, Binary search.	11
Keywords	*Data, ADT, Array, Linked List, Stack, Queue, Tree, Graph, Searching, Sorting.*	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Michael T. Goodrich, Data Structures and Algorithms in C++, Wiley
- Horowitz and Sahani, Fundamentals of Data Structures, Computer Science Press

Reference Books ***Recommended:***

- Alfred V. Aho, Data structures and Algorithms, Jhon E. Hopcroft and J.E. Ullman.
- Jean Paul Trembley and Paul Sorenson, An Introduction to Data Structures with Applications, TMH, International Student Edition
- R. Kruse, Leung &Tondo, Data Structures and Program Design in C, PHI publication, 2nd Edition

Online Resources:

- NPTEL YouTube Channel: Data Structure Complete course
- https://youtube.com/playlist?list=PLc2MoXNv7E4mtsPlnn9BnTOENXsGyoDgR&si=aAYaVZ-vWfeuhFEO
- NPTEL YouTube Channel: Introduction to Data Structure
- https://www.youtube.com/watch?v=zWg7U0OEAoE&list=PLBF3763AF2E1C572F&index=1
- NPTEL YouTube Channel: Stacks
- https://www.youtube.com/watch?v=g1USSZVWDsY&list=PLBF3763AF2E1C572F&index=2
- NPTEL YouTube Channel: Queues and linked list
- https://www.youtube.com/watch?v=PGWZUgzDMYI&list=PLBF3763AF2E1C572F&index=3
- NPTEL YouTube Channel: Trees
- https://www.youtube.com/watch?v=tORLeHHtazM&list=PLBF3763AF2E1C572F&index=6
- NPTEL YouTube Channel: Graphs
- https://www.youtube.com/watch?v=9zpSs845wf8&list=PLBF3763AF2E1C572F&index=24
- W3schools Data Structure Reference: DSA Tutorial (w3schools.com)

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**100 Marks**
Continuous Internal Assessment (CIA):	**30 Marks**
End Semester Exam (ESE):	**70 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **20 & 20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: Q1. Objective – **10 x1= 10** Mark; Q2. Short answer type- **5x4 =20 Marks** Section B: Descriptive answer type qts., **1out of 2** from each unit-**4x10=40 Marks**	

Name and Signature of Convener & Members of CBoS:

Chairman

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction				
Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree)*			Semester – III	Session: 2025-2026
1	Course Code	**CSSC-03P**		
2	Course Title	**Lab 3: Data Structure Using C++**		
3	Course Type	**DSC**		
4	Prerequisite	*As per program*		
5	Course Learning. Outcomes (CLO)	At the end of this course, the students will be able to: • Understand how the concept of data structure can be implemented programmatically. • Implement the fundamentals data structure through C and C++ • Understand the functioning of Array and linked list programmatically. • Understand the applications of array, linked list stack, queue, tree and graph programmatic. • Write programs for various data structures for real world application.		
6	Credit Value	**1 Credits**	*Credit =30 Hours Laboratory or Field Learning/Training*	
7	Total Marks	**Max. Marks: 50**	**Min Passing Marks: 20**	

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
Lab./Field Training/ Experiment	1. Write a program to create a square matrix, fill the data inside and print the diagonal elements. 2. Write a program to perform addition and subtraction on two matrices. 3. Write a program to perform multiplication on two matrices. 4. Write a program to perform insertion, deletion of nodes from the end in singly linked list. 5. Write a program to perform insertion and deletion of nodes from the end in singly linked list. 6. Write a program to perform insertion and deletion of nodes from the end in circular doubly linked list. 7. Write a program to perform push and pop operations in stack, where stack should be created using array. 8. Write a program to perform push and pop operation in stack, where stack should be created linked list. 9. Write a program to calculate factorial of given number using stack. 10. Write a program to perform insertion and deletion of data items in queue, queue should be implemented by using a linked list. 11. Write a program to perform insertion and deletion of data items in queue, queue should be implemented by using arrays. 12. Write a program to demonstrate functioning of a double ended queue. 13. Write a program to read the postfix arithmetic expression and evaluate its value using the stack. 14. Write a program to show how to handle the overflow and underflow situation in stack. 15. Write a program to convert infix notation-based expression into the postfix notation-based expression using the stack. 16. Write a program to implement the concept of priority-based element	**30**

traversing using priority queue.

17. Write a program to implement the concept of priority-based element traversing using priority queue.
18. Write a program to create binary search tree using the concept of linked list and array, suppose data set will be given at the run time.
19. Write a program to create a binary tree with any data set and traverse the data items in pre-order, in-order and post-order manner using recursion.
20. Write a program to perform deletion of any data item from the binary search tree.
21. Write a program to find the height of any tree.
22. Write a program to create any given undirected graph using the adjacency matrix, and print each node/element with list of its adjacent elements.
23. Write a program to find the height of any given tree.
24. Write a program to traverse the element of given graph according BFS and DFS.
25. Write a program to find the minimum spanning tree of any given graph.
26. Write a program to search any run time given element from the array of 10 elements in the array are unsorted.
27. Write a program to demonstrate the binary search.
28. Write a program to find the smallest and largest element in any array.
29. Write a program to arrange the data items of any array in ascending order.
30. Write a program to arrange the data items of any array in descending order using quick sort.

Note: Concerned teacher can add additional practical exercises as per requirement.

Keywords	*Array, Linked List, Stack, Queue, Traversing, Tree, Graph, Searching, Sorting, Hashing.*

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

ANJEETA KUJUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Michael T. Goodrich, Data Structures and Algorithms in C++, Wiley
- Horowitz and Sahani, Fundamentals of Data Structures, Computer Science Press

Reference Books ***Recommended:***

- Alfred V. Aho, Data structures and Algorithms, Jhon E. Hopcroft and J.E. Ullman.
- Jean Paul Trembley and Paul Sorenson, An Introduction to Data Structures with Applications, TMH, International Student Edition
- R. Kruse, Leung &Tondo, Data Structures and Program Design in C, PHI publication, 2nd Edition

Online Resources:

- NPTEL YouTube Channel: Data Structure Complete course https://youtube.com/playlist?list=PLc2MoXNv7E4mtsPlnn9BnTOENXsGyoDgR&si=aAYaVZ-vWfeuhFEO
- NPTEL YouTube Channel: Introduction to Data Structure https://www.youtube.com/watch?v=zWg7U0OEAoE&list=PLBF3763AF2E1C572F&index=1
- NPTEL YouTube Channel: Stacks

https://www.youtube.com/watch?v=g1USSZVWDsY&list=PLBF3763AF2E1C572F&index=2

- NPTEL YouTube Channel: Queues and linked list
  https://www.youtube.com/watch?v=PGWZUgzDMYI&list=PLBF3763AF2E1C572F&index=3
- NPTEL YouTube Channel: Trees
  https://www.youtube.com/watch?v=tORLeHHtazM&list=PLBF3763AF2E1C572F&index=6
- NPTEL YouTube Channel: Graphs
  https://www.youtube.com/watch?v=9zpSs845wf8&list=PLBF3763AF2E1C572F&index=24
- W3schools Data Structure Reference: DSA Tutorial (w3schools.com)

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	50 Marks
Continuous Internal Assessment (CIA):	15 Marks
End Semester Exam (ESE):	35 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar +Attendance - 05 Total Marks - 15	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance:** On spot Assessment A. Performed the Task based on lab. work - 20 Marks B. Spotting based on tools & technology (written) – 10 Marks C. Viva-voce (based on principle/technology) - 05 Marks	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members of CBoS:

Dr. H. S. Hota
Chairman

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF COMPUTER SCIENCE

COURSE CURRICULUM

PART- A: Introduction				
Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*			Semester - IV	Session: 2024-2025
1	Course Code	CSSC-04T		
2	Course Title	**Relational Database Management System**		
3	Course Type	**DSC (Discipline Specific Course)**		
4	Prerequisite (if, any)	*As per program*		
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. • Familiar with RDBMS Software like Oracle and MySql. • Create various Tables and Databases. • Explore various SQL commands. • Create Database on the basis of E-R diagrams for Minor and Major Project.		
6	Credit Value	**3 Credits**	***Credit = 15 Hours - Learning & Observation***	
7	Total Marks	**Max. Marks: 100**		**Min Passing Marks: 40**

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Overview of Database Management**: Introduction, Data Processing versus Data Management, Data Models: Network Model, Relational Model, Hierarchical Model, Instance and schema, View of Database system, File Oriented Approach vs Database Oriented Approach, Data Independence, DBMS Architecture, Database Administration Roles, Database languages: DDL, DML, DCL, TCL, Different kinds of DBMS users, Introduction to Data Dictionary.	12
II	**Database Design and E-R Model:** Introduction, Entity, Strong and weak entities, Relationship, Cardinality, Attributes, Concept of keys: Super key, Candidate key, Primary key, Alternate key, Foreign key, ER Diagram, Constraints in Database, Codd's Rules, Extended ER features: Generalization, Specialization and Aggregation, Participation, Converting an E-R model into relational Schema.	11
III	**Relational Database Design and Operations:** Introduction, Dependencies: Functional dependencies, Multivalued Dependencies, Join dependencies, Database anomalies, Decomposition, Normalization: Normal forms 1NF, 2NF, 3NF, BCNF, 4NF, 5NF, De-normalization. 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).	11
IV	**Transaction:** Introduction, Desirable properties of transaction (ACID), Concurrency control techniques, Serializability.	11
Keywords	*Data Models, Data Dictionary, E-R Model, E-R Diagram, Keys, Functional Dependency, Anomalies, Normalization, Relational Algebra, Concurrency, Serializability.*	

Name and Signature of Convener & Members of CBoS:

Dr. H. S. Hota
chairman

ANJEETA KUJUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Database system concept, H. Korth and A. Silberschatz, TMH Publications.
- Data Base Management System, Alexies & Mathews,Vikash publication.
- Data Base Management System, C. J. Date ,Narosha Publication.
- Data Base Management System By James Matin.

Reference Books Recommended:

- Principles of Database System By Ullman.
- Program Design, Peter Juliff, PHI Publications.
- The Complete Reference, Kevin Loney, Oracle Press.
- SQL, PL/SQL The Programming Language of Oracle, Ivan Bayross , PustakKosh Publication.
- Microsoft SQL Server Management and Administration, Ross, STM Publications.

Online Resources:

- SWAYAM URL link for DBMS and RDBMS: https://youtu.be/f6LGtJutWyA
- SWAYAM URL link for DBMS and RDBMS: https://youtu.be/IoL9Ve2SRwQ
- SWAYAM URL link for DBMS and RDBMS: https://**swayam**.gov.in/courses/4434-data-base-management-system.
- Introduction of DBMS from SWAYAM: https://onlinecourses.swayam2.ac.in/cec19_cs05/preview
- Introduction of RDBMS from SWAYAM : https://onlinecourses.nptel.ac.in/noc19_cs46/preview
- Introduction to DMBS: https://www.w3schools.in/dbms/intro
- Data independence: https://www.w3schools.in/dbms/data-independence
- Generalization and Aggregation: https://www.w3schools.in/dbms/generalization-aggregation
- Introduction to DMBS: https://www.javatpoint.com/dbms-tutorial

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**100 Marks**
Continuous Internal Assessment (CIA):	**30 Marks**
End Semester Exam (ESE):	**70 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **20 +20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1**. Objective – **10 x1= 10** Mark: **Q2**. Short answer type- **5x4 =20 Marks** Section B: Descriptive answer type qts..**1 out of 2** from each unit-**4x10=40 Marks**	

Name and Signature of Convener & Members of CBoS:

Dr. H.S Hota
Chairman

(Dhiresh Thakur)

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction				
Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree)*			Semester - IV	Session: 2024-2025
1	Course Code	**CSSC-04P**		
2	Course Title	**Lab 4: Relational Database Management System (Oracle/MySQL)**		
3	Course Type	**Practical**		
4	Prerequisite	*As per program*		
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 helps them to generate new relationships among various Tables and Databases which are useful for Software Development. • Familiar with 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	**1 Credits**	*Credit =30 Hours Laboratory or Field Learning/Training*	
7	Total Marks	**Max. Marks: 50**		**Min Passing Marks: 20**

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
List of Practical Experiments	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 the 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 the above created table. b) Display all five records. c) Use foreign key relations 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 the commit and rollback command.	**30**

7. Create a new database in Oracle/SQL Server having at least five tables for the Hotel Management System.
8. Create a new database in Oracle/SQL Server having at least four tables for Covid Vaccination Management System.
9. Create a new database in Oracle/SQL Server having at least five tables for the 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 constraints.
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 using clauses.
16. Create a new table in Oracle/SQL Server and practice for having clauses with sub queries.
17. Create a new table in Oracle/SQL Server and practice for aliases 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 the 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 cursors.

Note: Concerned teacher can add additional practical exercises as per requirement.

Keywords	*TABLE, SQL, PL/SQL.*

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

Suresh Thakur

ANJEETA RUJUR

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Database system concept, H. Korth and A. Silberschatz, TMH Publications.
- Data Base Management System, Alexies & Mathews,Vikash publication.
- Data Base Management System, C. J. Date ,Narosha Publication.
- Data Base Management System By James Matin.

Reference Books Recommended:

- Principles of Database System by Ullman.
- Program Design, Peter Juliff, PHI Publications.
- The Complete Reference, Kevin Loney, Oracle Press.

- SQL, PL/SQL The Programming Language of Oracle, Ivan Bayross, PustakKosh Publication.
- Microsoft SQL Server Management and Administration, Ross, STM Publications.

Online Resources:

- SWAYAM URL link for DBMS and RDBMS: https://youtu.be/f6LGtJutWyA
- SWAYAM URL link for DBMS and RDBMS: https://youtu.be/IoL9Ve2SRwQ
- 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 Marks**
Continuous Internal Assessment (CIA):	**15 Marks**
End Semester Exam (ESE):	**35 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar +Attendance - **05** Total Marks - **15**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance:** On spot Assessment **A. Performed the Task based on lab. work - 20 Marks** **B. Spotting based on tools & technology (written) – 10 Marks** **C. Viva-voce (based on principle/technology) - 05 Marks**	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*		Semester - V	Session: 2024-2025
1	Course Code	CSSC-05T	
2	Course Title	**Programming in Java**	
3	Course Type	**DSC (Discipline Specific Course)**	
4	Prerequisite (if, any)	*As per program*	
5	Course Learning. Outcomes (CLO)	At the end of this course, the students will be able to: • Understand fundamentals of java programming environment • Understand the importance of features of Java programming. • Create user defined Classes/interfaces and Packages which help them to develop new Application Software and Utility Software. • Develop new Online Software and Internet Games with the help of Applet and AWT Packages. • Familiar about Applet, Thread and Servlet Life Cycle which helps them to develop important applications for Internet Users.	
6	Credit Value	**3 Credits**	***Credit = 15 Hours - learning & Observation***
7	Total Marks	**Max. Marks: 100**	**Min Passing Marks: 40**

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Overview of JAVA:** The genesis of java, history of java, java virtual machine (JVM), java development kit (JDK), source files, jar files, compiling and running of files, byte code, platform independency, data types, literals, variables, constants, array and its types, operators, conditional and looping statements, various packages, introduction of class, objects and methods, nested and inner class, string handling, constructor and its types.	12
II	**Inheritance:** concept of super and sub class, types of inheritance, Polymorphism: method overloading, method overriding; abstract class, constructor in multilevel inheritance, using final with inheritance. **interface:** defining and implementing interface, extending interface, nested interface, importance of interface in java. **Package:** defining package, rules for creating a new package, concept of class-path, access protection, importing package.	11
III	**Exception Handling and Multithreading:** using try and catch, multiple catch classes, nested try statements, throw, throws and finally, types of exception: built in exception, checked/unchecked exception, creating own exception class. **Java Thread Model:** main thread, creating own thread, life cycle of thread, thread priorities, synchronization, inter thread communication, suspending, resuming and stopping thread.	11
IV	**Java Packages: I/O classes:** Byte Stream and Character Stream, Predefined Stream, reading console input, writing console output. **Applet:** Applet Life Cycle, creating an applet, Using image and sound in applet. **Lang:** Various classes, Importance class Definition, **Util:** Framework, Event Model, Scanner Class **AWT:** Exploring AWT, Event handling – The delegation-event model, Event classes, Source of event, Event listener interfaces, handling mouse and keyboard event, Adapter class.	11

Keywords: *Java Virtual Machine (JVM), Java Development Kit (JDK), Interface, Package, Threads, Applet, AWT.*

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

ANJEETA KUJUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Naughton P and Schildt H., Osborne, The complete reference, McGraw-Hill, Berkeley Publication.
- James R. Laverick, An Introduction to JAVA programming, Firewall Media publication.

Reference Books Recommended:

- E. Balgurusamy, Java Programming, McGraw-Hill Publication.
- Rashmi Kanta Das ,Core JAVA for beginners, Vikas Publication.

Online Resources:

- SWAYAM URL Link for Java
  https://onlinecourses.swayam2.ac.in/aic20_sp13/preview
  https://onlinecourses.nptel.ac.in/noc19_cs84/preview
  https://www.dqindia.com/iit-bombay-offers-free-online-course-java-swayam-platform/
  https://www.classcentral.com/course/swayam-programming-in-java-12930
- W3schools Java Tutorial.
  Java Tutorial (w3schools.com)
- Online Platforms to Exercise and Execute the Java Programs
  Online Java Compiler (programiz.com)
  Solve Java | HackerRank
  Online Java Compiler - Online Java Editor - Java Code Online (jdoodle.com)
- NPTEL Channel: Programming in Java
  Programming In Java - Course (nptel.ac.in)

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**100 Marks**
Continuous Internal Assessment (CIA):	**30 Marks**
End Semester Exam (ESE):	**70 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 20 +20 Assignment / Seminar - 10 Total Marks - 30	Better marks out of the two Test / Quiz obtained marks in Assignment shall be considered against 30 Marks
End Semester Exam (ESE):	Two section – A & B Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts..1 out of 2 from each unit-4x10=40 Marks	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
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ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree)*	Semester – V	Session: 2026-2027

1	Course Code	**CSSC-05P**
2	Course Title	**Lab 5: Programming in Java**
3	Course Type	**DSC**
4	Prerequisite (if, any)	*As per program*
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Execute the program in java • Implement the concept of multi-threading • Develop new Packages which help them to develop new application software and Utility Software. • Develop new Online Software and Internet Games with the help of Applet and AWT Packages. • Familiar about Applet, Thread and Servlet Life Cycle which helps them to develop value added services for Internet Users.
6	Credit Value	**1 Credits** *Credit =30 Hours Laboratory or Field learning/Training*
7	Total Marks	**Max. Marks: 50** **Min Passing Marks: 20**

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
Lab./Field Training/ Experiment Contents of Course	1. Write a program to check palindrome number. 2. Write a program to check Armstrong number. 3. Write a program to check the prime number. 4. Write a program to calculate simple interest using the GUI Form. 5. Write a program to demonstrate the thread life cycle. 6. Write a program to show the use of applet. 7. Write a program to demonstrate the concept of arrays. 8. Write a program to find the second largest and second smallest number in array. 9. Write a program to perform multiplication of two matrices. 10. Write a program to demonstrate the concept of method overloading. 11. Write a program to demonstrate the concept of constructor overloading. 12. Write a program to demonstrate the concept of inner classes. 13. Write a program to demonstrate the concept of inheritance. 14. Write a program to demonstrate the concept of access specifiers in java. 15. Write a program to implement the concept of interface. 16. Write a program to show the creation of package in java. 17. Write a program to design the user registration form with basic registration details. 18. Write a program to show the exception handling process in java. 19. Write a program to show the significance of multithreading. 20. Write a program to read the data from the console device and store it in any file in secondary storage. 21. Write a program to copy the content of any file into another file. 22. Write a program to demonstrate the advantages of event delegation model. 23. Write a program in java for command line value passing. 24. Write a program to implement the concept of event delegation model.	**30**

	Note: Concerned teacher can add additional practical exercises as per requirement.	
Keywords	*Class, Object, interface, Inheritance, package, exception handling, threads, applet, AWT.*	

Name and Signature of Convener & Members of CBoS:

Dr. H. S. Hota
Chairman

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Naughton P and Schildt H., Osborne, The complete reference, McGraw-Hill, Berkeley Publication.
- James R. Laverick, An Introduction to JAVA programming, Firewall Media publication.

Reference Books Recommended:

- E. Balgurusamy, Java Programming, McGraw-Hill Publication.
- Rashmi Kanta Das ,Core JAVA for beginners, Vikas Publication.

Online Resources:

- SWAYAM URL Link for Java
  https://onlinecourses.swayam2.ac.in/aic20_sp13/preview
  https://onlinecourses.nptel.ac.in/noc19_cs84/preview
  https://www.dqindia.com/iit-bombay-offers-free-online-course-java-swayam-platform/
  https://www.classcentral.com/course/swayam-programming-in-java-12930
- W3schools Java Tutorial.
  Java Tutorial (w3schools.com)
- Online Platforms to Exercise and Execute the Java Programs
  Online Java Compiler (programiz.com)
  Solve Java | HackerRank
  Online Java Compiler - Online Java Editor - Java Code Online (jdoodle.com)
- NPTEL Channel: Programming in Java
  Programming In Java - Course (nptel.ac.in)

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**50 Marks**
Continuous Internal Assessment (CIA):	**15 Marks**
End Semester Exam (ESE):	**35 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar +Attendance - **05** Total Marks - **15**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance:** **On spot Assessment** **A. Performed the Task based on lab. work - 20 Marks** **B. Spotting based on tools & technology (written) – 10 Marks** **Viva-voce (based on principle/technology) - 05 Marks**	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members of CBoS:

Dr. H. S. Hota
Chairman

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction				
Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*			Semester - VI	Session: 2024-2025
1	Course Code	**CSSC-06T**		
2	Course Title	**Web Technology**		
3	Course Type	**DSC (Discipline Specific Course)**		
4	Prerequisite (if, any)	*As per program*		
5	Course Learning. Outcomes (CLO)	At the end of this course, the students will be able to: • Analyze a web page and identify its elements and attributes. • Create web pages using HTML, CSS, JAVASCRIPT, XHTML • Build dynamic web pages using JavaScript (Client-side programming). • Create XML documents and Schemas. • Build interactive web applications using PHP, AJAX. • Handling MySQL Database using PHP.		
6	Credit Value	**3 Credits**	*Credit = 15 Hours - Learning & Observation*	
7	Total Marks	**Max. Marks: 100**	**Min Passing Marks: 40**	

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Introduction:** Fundamentals of web technology: Webpages, website, browser, client, web servers, Basics of HTML CSS, Scripting Languages, MySQL, PHP etc., protocols governing the web, Web applications. Web Publishing: Introduction, Domain Name Registration, choosing a web host and signing up for an Account, web hosting. IDE for web development.	12
II	**HTML:** Introduction, Basic formatting tags: heading, paragraph, line break, bold, italic, underline, superscript, subscript, font and image. Different attributes like align, color, bgcolor, font face, border, size, Navigation Links using anchor tag: internal, external, mail and image links, Link to different web pages and sections. Lists: ordered, unordered and definition, Table tag, image tag, iframe tag. HTML Form controls: form, text, password, text area, button, checkbox, radio button, select box, hidden controls, Frameset and frames. Basics of DHTML, introduction of XML and its uses. Introduction of AJAX.	11
III	**CSS and Scripting Languages:** Introduction and features of CSS, CSS syntax, Creating Style sheets, CSS selectors (simple selector, combinator selectors, pseudo-class-selectors, pseudo-element-selectors, attribute selector), different ways to insert the CSS, different styling attributes and their settings like color, background, font, text, margin, position, border etc. **JavaScript:** introduction and features of java script, Syntax & Conventions, Variables, Expression, Branching & Looping, Function, Array, Objects, Events and Document Object model, Alerts, prompts and conforms.	11
IV	**PHP:** Introduction and features of PHP, data types, operators, control statements and looping, functions, array, string and string functions, object oriented, programming features of PHP: class-objects, abstraction, encapsulation, constructor, destructor, inheritance, polymorphism etc., Exception Handling. Handling HTML forms with PHP, Working with files and directories, session and cookies, PHP functions for Database Connectivity and basic operation with MySQL.	11

Keywords: *Webpage, Website, HTML, AJAX, CSS, JavaScript, PHP, MySQL.*

Name and Signature of Convener & Members of CBoS:

Dr. H.S Hota Chairman

ANJEETA KUJUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Xavier, C, Web Technology and Design, New Age International.
- Ivan Bayross, HTML, DHTML, Java Script, Perl & CGI, BPB Publication.
- Ramesh Bangia, Internet and Web Design, New Age International.
- Ullman, PHP for the Web: Visual QuickStart Guide, Pearson Education.

Reference Books Recommended:

- Jim Converse & Joyce Park, PHP & MySQL Bible, Wiley India Publication
- Chuck Musiano & Bill Kenndy, O Reilly, HTML The Definitive Guide
- Joseph Schmuller, Dynamic HTML, BPB, 2000.
- Deitel, Deitel, Goldberg, Internet & World Wide Web How to Program,Pearson Education,
- Raj Kamal, Internet and Web Technologies, Tata McGraw-Hill.

Online Resources:

- Swayam Portal : Web technology:
  Web Technology - Course (swayam2.ac.in)
- W3schools: Web development Programming and Scripting Languages:
  https://www.w3schools.com
- Fundamentals of PHP:
  PHP Tutorial (tutorialspoint.com)
- IIT Kharagpur YouTube Link: Database and SQL
  https://youtube.com/playlist?list=PLIwC9bZ0rmjSkm1VRJROX4vP2YMlf4Ebh&si=Z5JJIgtFMUWTfNtg
- NPTEL: SQL
  https://youtube.com/playlist?list=PLLQPIumE5cEgzU5hChH1V3H93x4UOlHR&si=2dxqvodFZcnQUudR

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
Continuous Internal Assessment (CIA):	30 Marks
End Semester Exam (ESE):	70 Marks

Continuous Internal Assessment (CIA): **(By Course Teacher)**	Internal Test / Quiz-(2): **20** +**20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: Q1. Objective – **10** x1= **10** Mark; Q2. Short answer type- **5**x4 =**20** Marks Section B: Descriptive answer type qts.,**1 out of 2** from each unit-4x10=**40** Marks	

Name and Signature of Convener & Members of CBoS:

Dr H.S. Hota
Chairman

(Suresh Thakur)

Shailendra Arya

Jitendra Kumar

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree)*	Semester – VI	Session: 2024-2025

1	Course Code	CSSC-06P	
2	Course Title	Lab 6: Web Technology	
3	Course Type	Practical	
4	Prerequisite	*As per program*	
5	Course Learning. Outcomes (CLO)	At the end of this course, the students will be able to: • Analyze a web page and identify its elements and attributes. • Create web pages using HTML, CSS, JAVASCRIPT, XHTML • Build dynamic web pages using JavaScript (Client-side programming). • Create XML documents and Schemas. • Build interactive web applications using PHP, AJAX. • Handling MySQL Database using PHP.	
6	Credit Value	1 Credits	*Credit =30 Hours Laboratory or Field Learning/Training*
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
Lab./Field Training/ Experiment	**HTML** 1. Write HTML code to create the following table:	30

Class	Subject 1	Subject 2	Subject 3
BCA-I	Visual Basic	PC Software	Electronics
BCA-II	C++	DBMS	English
BCA-III	Java	Multimedia	CSA

2. Write HTML code to create the following lists:
   - C
   - C++
   - Fortran
   - COBOL
3. Write HTML code to create the following lists:
   1. Java
   2. Visual Basic
   3. Basic
   4. COBOL
4. Write HTML code to demonstrate hyper linking between two web pages.
5. Create a marquee & also insert an image.
6. Write HTML code to create a frame in HTML with 3 columns (width= 30%, 30%, 40%) and put hyperlinked pictures inside each.
7. Write HTML code to create a webpage with a blue background and print the following text with white background.
   "Hello Word "
8. Write HTML code to create the following table:

Course	OC	BC	MB	SC/ST	Total

Computer Science	**9**	**18**	**5**	**5**	**37**
Commerce	**14**	**25**	**6**	**5**	**50**
Grand Total					**87**

9. Write HTML code to create the following table:

Maruti		**Tata**		**Ford**	
Model	**Price**	**Model**	**Price**	**Model**	**Price**
Maruti 800	2 Lac	Sumo	2 Lac	Icon	5 Lac
Omni	3 Lac	Scorpio	3 Lac	Gen	2 Lac

10. Write HTML code to create the following table:

Pandit Ravishankar Shukla University		
Name	**Roll No.**	**Class**
Rahul	40	BCA-I
Preeti	85	BCA-I
Priya	74	BCA-I
Richa	95	BCA-I

11. Write HTML code to create the following table:

Students Record

Name	**Subject**	**Marks**
Arun	Java	70
	C	80
Ashish	Java	75
	C	69

12. Write HTML code to create the following table and also insert an image in the webpage.

Subject	**Max**	**Min**	**Obtain**
Java	100	33	75
Multimedia	100	33	70
Operating System	100	33	68
C++	100	33	73

13. Write HTML code to create the following table:

Name		Rahul	
Roll No.		101	
Subject	**Max**	**Min**	**Obtain**
Java	100	33	75
Multimedia	100	33	70

14. Write HTML code to create a form as the following:

Enter Name :

Enter Roll No. :

Enter Age :

Enter DOB :

15. Write HTML code to create the following form:

User Name :

Password :

When user types characters in a password field. The browser displays asterisks or bullets instead of character.

Submit

16. Write HTML code to create Student Registration Form
17. Write HTML code to create Contact Form
18. Write HTML code to insert Audio & Video in HTML
19. Write HTML code for the following equations:

$C_2H_5OH+PCL_5=C_2H_5CL+POCL_3+HCL$

$4H_3PO_3=3H_3PO_4+PH_3$

$PCL_3+CL_2=PCL_5$

20. Write the HTML code to display the following list:
    - Actors
        - Bruce Wills
        - Gerand Butler
        - Vin Diesel
        - Bradd Pitt
        - Paul Walker
        - Jason Statham
    - Actress
        - Julia Roberts
        - Angelina Jolie
        - Kate Wins let
        - Cameron Diaz
21. Write the HTML code to display the following list:
    1. Cricket Players
        A. Batsman
            i. Sachin Tendulkar
            ii. Rahul Dravid
            iii. Virendra Sehwag
        B. Bowlers
            i. Kumble
            ii. Zaheer Khan
            iii. Balaji
        C. Spinner
            i. Harbhajan
            ii. Ravindra Jadeja
            iii. Kartik

****

JavaScript

1. Write a java script, to print prime numbers from 1 and 50.
2. Write a script to get the largest value in an array.
3. Write a function to calculate the factorial of a number (a non-negative integer).
4. Write a script to demonstrate data validation.
5. Write a program to print dates using JavaScript.
6. Write a program to Sum and Multiply two numbers using JavaScript.

****

DHTML

1. Create a web page which shows the changes of header dynamically.

2. Create a webpage which explains the use of relative positioning.
3. Display an alert box to alert the x and y coordinates of the cursor.

****

PHP

1. write script using for loop to print all integer between -10 to 10
2. write script to construct the following pattern, using nested for loop

```
1
1 2
1 2 3
1 2 3 4 5
```

3. Write a PHP script to get the largest key in an array.
4. Write a function to calculate the factorial of a number (a non-negative integer).
5. Write a PHP script to check string for palindrome.
6. Write a PHP script to collect the data from the registration form designed in HTML, and submit it to the database.
7. Write a PHP script to read the data from the database and display it into the web page in tabular form.

****

MySQL

Task - I

Create the following table in MySQL:

College (cname, city, caddress, cphone)
Staffjoins (sid, cname, dept, doj, post, salary)
Staffs (sid, sname, saddress , scontacts)
Teaching (sid, class, paprid, fsession, tsession)
Subject (paperid, subject, paper, papername)

Write the queries to perform the following operations.

1. List the name and post of a teacher teaching a computer subject.
2. List the name and city of all staff working in your college.
3. List the name and city of all staff working in your college who earn more than 15000.
4. Find the staff whose date of joining is 2005.
5. Find the staff whose names start with 'M' or 'R' and 'A' and/or 7 characters long.
6. Modify the database so that staffN1 now works in C2 college.
7. List maximum, average, minimum salary of each college.
8. Acquire details of staff by name in a college or each college.
9. List names of staff in ascending order according to salary who are working in all colleges.
10. Find the staff that earn a higher salary who earn greater than the average salary of their college.

Task - II

Create the following table MySQL:
Enrollment (enrollno, name, gender, DOB, address, phone)
Admission (adno, enrollno, course, yearsem, date, cname)
Feestucture (course_yearsem, fee)
Payment (billno, admno, amount, pdate,purpose)

Write the queries to perform the following operations.

1. Get full detail of all students who took admission this year class wise.
2. Get details of students who took admission in sai colleges.
3. Calculate the total amount of fees collected in this session.
4. List the students who have not paid full fees in your colleges.
5. List the number of admission in your college every year.
6. List the students in colleges in your city and also live in your city.

Task - III

Create the following table MySQL:
Subject (paperid, subject, paper, papername)
test(paperid,tdate,max,min)
score(rollno,paperid,marks,attendance)
students(admno,rollno,class,yearsem)

Write the queries to perform the following operations.

1. List roll no of students who were present in a paper of a subject.
2. List all roll numbers who have passed in first division.
3. List all students in BCA-II who have scored higher than average in your college.

Note: Concerned teacher can add additional practical exercises as per requirement.

Keywords	*HTML, Hyperlinks, Form, List, Table, CSS, JavaScript, MySQL, PHP.*

Name and Signature of Convener & Members of CBoS:

Dr H.S Hota
Chairman

(Sureel Thakur)

ANJEETA KUJUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Xavier, C, Web Technology and Design, New Age International.
- Ivan Bayross, HTML, DHTML, Java Script, Perl & CGI, BPB Publication.
- Ramesh Bangia, Internet and Web Design, New Age International.
- Ullman, PHP for the Web: Visual QuickStart Guide, Pearson Education.

Reference Books Recommended:

- Jim Converse & Joyce Park, PHP & MySQL Bible, Wiley India Publication
- Chuck Musiano & Bill Kenndy, O Reilly, HTML The Definitive Guide
- Joseph Schmuller, Dynamic HTML, BPB, 2000.
- Deitel, Deitel, Goldberg, Internet & World Wide Web How to Program,Pearson Education,
- Raj Kamal, Internet and Web Technologies, Tata McGraw-Hill.

Online Resources:

- Swayam Portal : Web technology: Web Technology - Course (swayam2.ac.in)

- W3schools: Web development Programming and Scripting Languages
  https://www.w3schools.com
- Fundamentals of PHP: PHP Tutorial (tutorialspoint.com)
- IIT Kharagpur YouTube Link: Database and SQL
  https://youtube.com/playlist?list=PLIwC9bZ0rmjSkm1VRJROX4vP2YMIf4Ebh&si=Z5JJIgtFMUWTfNtg
- NPTEL: SQL
  https://youtube.com/playlist?list=PLLQPIumE5cEgzU5hChH1V3H93x4UOIHR&si=2dxqvodFZcnQUudR

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**50 Marks**
Continuous Internal Assessment (CIA):	**15 Marks**
End Semester Exam (ESE):	**35 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar +Attendance - **05** Total Marks - **15**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance:** **On spot Assessment** A. Performed the Task based on lab. work - 20 Marks B. Spotting based on tools & technology (written) – 10 Marks Viva-voce (based on principle/technology) - 05 Marks	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
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Shailendra Arya

ANJEETA KUMAR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction				
Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*			Semester - VII	Session: 2024-2025
1	Course Code	**CSSC-07T**		
2	Course Title	**Programming in Python**		
3	Course Type	**DSC (Discipline Specific Course)**		
4	Prerequisite	***As per Program***		
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Define the structure and components of a Python program. • Demonstrate proficiency in handling of loops and creation of functions. Identify the methods to create and manipulate lists, tuples and dictionaries. • Discover the commonly used operations involving regular expressions and file system. • Use libraries to write python program. • Use various data structure of python. • Interpret the concepts of Object-Oriented Programming as used in Python.		
6	Credit Value	**3 Credits**	***Credit = 15 Hours - Learning & Observation***	
7	Total Marks	**Max. Marks: 100**	**Min Passing Marks: 40**	

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Introduction to Python Programming**: What is a Program, Formal and Natural Languages, Why use Python, Uses of python, Strengths & Drawbacks, The Python Interpreter, Running Python, The IDLE User Interface, The Interactive Prompt, Script Mode, Dynamic Typing , Debugging. **Types, Operators, Expressions & Statements**: Values and Types, Assignment Statement, Variable Names, Expressions & Statements, Order of Operations, String Operations, Comments.	10
II	**Conditionals**: Boolean Expressions, Logical operators, Conditional & Alternative Execution, Chained and Nested Conditions. **Iterations**: Reassignment, Updating Variables, The "for" and "while" statements, break. **Strings**: String is a sequence, len, Traversal with a for loop, String Slices, Searching, Looping and Counting, String Methods, the "in" operator, String Comparison.	10
III	**Lists, Tuples, and Dictionaries;** Basic list Operators, replacing, inserting, removing an element, searching and sorting lists, Accessing tuples, Operations, Working, Functions and Methods, dictionary literals, adding and removing keys, accessing and replacing values, Traversing Dictionaries.	10
IV	**Function, Files and Graphics:** Defining a function, calling a function, Types of functions, Function Arguments, Anonymous functions, Global and local variables, **Files**: Files & Persistence, Reading and Writing, Filenames and Paths.**Graphics programming**: Drawing with turtle graphics, using turtle module, moving the turtle with any direction, moving turtle to any location, the color, bgcolor, circle and speed method of turtle, drawing with colors, drawing basic shapes using iterations. **Python Libraries:** Exploring python libraries like Panda, Numpy, TensorFlow, Scikit-Learn, Keras, PyTorch, SciPy etc.	15
Keywords	*List, Tuple, Dictionary, Panda, Numpy, TensorFlow, Scikit-Learn, Keras, PyTorch, SciPy.*	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- T. Budd, Exploring Python, TMH, 1st Ed, 2011
- Allen Downey, Jeffrey Elkner, Chris Meyers, How to think like a computer scientist: Learning with Pyth,Freelyavailableonline.2012

Reference Books Recommended:

- Luca Massaron John Paul Mueller, Python for Data Science For Dummies, Wiley, 2ed, 2019
- Allen B. Downey, Think Python: How to Think Like a Computer Scientist, 2nd edition by O'Reilly, 2015
- Zed A. Shaw, Learn Python 3 the Hard Way (Addison-Wesley, 2016)

Online Resources:

- NPTEL URL link for Python Programming: https://www.youtube.com/watch?v=coPsX7MKfc8&list=PLIdgECt554OVFKXRpo_kul0XpUQKk0ycO
- Complete NPTEL link for Basic Python Programming: https://www.youtube.com/watch?v=Y3Ri2GdYfYg&list=PLqftY2uRk7oXvERQEgATSr-KzAh8WLW_D
- File Handling: https://www.w3schools.com/python/python_file_handling.asp
- NumPy: https://www.w3schools.com/python/numpy/default.asp
- Pandas: https://www.w3schools.com/python/pandas/default.asp
- SciPy: https://www.w3schools.com/python/scipy/index.php
- Django: https://www.w3schools.com/django/index.php
- Matplotlib: https://www.w3schools.com/python/matplotlib_intro.asp
- Machine Learning: https://www.w3schools.com/python/python_ml_getting_started.asp
- Python MySQL: https://www.w3schools.com/python/python_mysql_getstarted.asp
- Topics related Python from SWAYAM/NPTEL
  - https://www.youtube.com/channel/UCxu1cR5XRauYn37yg-Fh6rA
  - https://www.youtube.com/channel/UCJAgw1niUkaShdmA5aAZdQw
- Topics related Python from Tutorials
  - https://www.javatpoint.com/python-tutorial
  - http://docs.python.org/3/tutorial/index.html
  - http://interactivepython.org/courselib/static/pythonds
  - http://www.ibiblio.org/g2swap/byteofpython/read/
- Python for Beginners:
  - https://www.w3schools.com/python/python_intro.asp
  - https://www.python.org/about/gettingstarted/
  - https://www.javatpoint.com/python-tutorial
  - https://www.geeksforgeeks.org/python-programming-language/

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**100 Marks**
Continuous Internal Assessment (CIA):	**30 Marks**
End Semester Exam (ESE):	**70 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **20** +**20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: Q1. Objective – 10 x1= **10** Mark; Q2. Short answer type- 5x4 =**20** Marks Section B: Descriptive answer type qts., **1 out of 2** from each unit-4x10=**40** Marks	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

(Sheron Thekkan)

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction				
Program: Bachelor in Science (CS) *Certificate / Diploma / Degree)*			Semester - VII	Session: 2024-2025
1	Course Code	**CSSC-07P**		
2	Course Title	**Lab 7: Programming in Python**		
3	Course Type	**DSC**		
4	Prerequisite	*As per program*		
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Define the structure and components of a Python program. • Demonstrate proficiency in handling of loops and creation of functions. Identify the methods to create and manipulate lists, tuples and dictionaries. • Discover the commonly used operations involving regular expressions and file system. • Determine the need for scraping websites and working with CSV, JSON and other file formats. • Interpret the concepts of Object-Oriented Programming as used in Python.		
6	Credit Value	**1 Credits**	*Credit =30 Hours Laboratory or Field Learning/Training*	
7	Total Marks	**Max. Marks: 50**		**Min Passing Marks: 20**

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
List of Practical Experiments	**Note:** This is tentative list; the teachers concern can add more program as per requirement. 1. Python program to find the union of two lists. 2. Python program to find the intersection of two lists. 3. Using for loop, print a table of Celsius/Fahrenheit equivalences. Let c be the Celsius temperatures ranging from 0 to 100, for each value of c, print the corresponding Fahrenheit temperature. 4. Using while loop, produce a table of sins, cosines and tangents. Make a variable x in range from 0 to 10 in steps of 0.2. For each value of x, print the value of sin(x), cos(x) and tan(x). 5. Write a program that reads an integer value and prints —leap yearl or —not a leap yearll. 6. Write a program that takes a positive integer n and then produces n lines of output shown as follows. For example, enter a size: 5 * ** *** **** ***** 7. Write a function that takes an integer _n'as input and calculates the value of 1 + 1/1! + 1/2! + 1/3! + … + 1/n	**30**

	8. Write a function that takes an integer input and calculates the factorial of that number. 9. Write a function that takes a string input and checks if it's a palindrome or not. 10. Write a list function to convert a string into a list, as in list (_abc') gives [a, b, c]. 11. Write a program to generate Fibonacci series. 12. Write a program to check whether the input number is even or odd. 13. Write a program to compare three numbers and print the largest one. 14. Write a program to print factors of a given number. 15. Write a method to calculate GCD of two numbers. 16. Write a program to create Stack Class and implement all its methods. (Use Lists). 17. Write a program to create Queue Class and implement all its methods. (Use Lists) 18. Write a program to implement linear and binary search on lists. 19. Write a program to sort a list using insertion sort and bubble sort. 20. Python program to remove the "i" th occurrence of the given word in a list where words repeat. 21. Python program to count the occurrences of each word in a given string sentence. 22. Python program to check if a substring is present in a given string. 23. Python program to map two lists into a dictionary. 24. Python program to count the frequency of words appearing in a string using a dictionary. 25. Python program to create a dictionary with key as first character and value as words starting with that character. 26. Python program to find the length of a list using recursion. 27. Python program to read a file and capitalize the first letter of every word in the file. 28. Python program to read the contents of a file in reverse order. 29. Python program to create a class in which one method accepts a string from the user and another prints it. 30. Study and Implementation of Database, Structured Query Language and database connectivity.	
Keywords	*List, Tuple, Dictionary, Panda, Numpy, TensorFlow, Scikit-Learn, Keras, PyTorch, SciPy.*	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

ANJEETA KUJUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- T. Budd, Exploring Python, TMH, 1st Ed, 2011
- Allen Downey, Jeffrey Elkner, Chris Meyers, How to think like a computer scientist: Learning with Pyth,Freelyavailableonline.2012

Reference Books Recommended:

- Luca Massaron John Paul Mueller, Python for Data Science For Dummies, Wiley, 2ed, 2019
- Allen B. Downey, Think Python: How to Think Like a Computer Scientist, 2nd edition by O'Reilly, 2015
- Zed A. Shaw, Learn Python 3 the Hard Way (Addison-Wesley, 2016)

Online Resources:

- NPTEL URL link for Python Programming: https://www.youtube.com/watch?v=eoPsX7MKfe8&list=PLIdgECt554OVFKXRpo_kul0XpUQKk0ycO
- Complete NPTEL link for Basic Python Programming: https://www.youtube.com/watch?v=Y3Ri2GdYfYg&list=PLqftY2uRk7oXvERQEgATSr-KzAh8WLW_D
- File Handling: https://www.w3schools.com/python/python_file_handling.asp
- NumPy: https://www.w3schools.com/python/numpy/default.asp
- Pandas: https://www.w3schools.com/python/pandas/default.asp
- SciPy: https://www.w3schools.com/python/scipy/index.php
- Django: https://www.w3schools.com/django/index.php
- Matplotlib: https://www.w3schools.com/python/matplotlib_intro.asp
- Machine Learning: https://www.w3schools.com/python/python_ml_getting_started.asp
- Python MySQL: https://www.w3schools.com/python/python_mysql_getstarted.asp
- Topics related Python from SWAYAM/NPTEL
  https://www.youtube.com/channel/UCxu1cR5XRauYn37yg-Fh6rA
  https://www.youtube.com/channel/UCJAgw1niUkaShdmA5aAZdQw
- Topics related Python from Tutorials
  https://www.javatpoint.com/python-tutorial
  http://docs.python.org/3/tutorial/index.html
  http://interactivepython.org/courselib/static/pythonds
  http://www.ibiblio.org/g2swap/byteofpython/read/

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**50 Marks**
Continuous Internal Assessment (CIA):	**15 Marks**
End Semester Exam (ESE):	**35 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar +Attendance - **05** Total Marks - **15**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance:** On spot Assessment A. Performed the Task based on lab. work - 20 Marks B. Spotting based on tools & technology (written) – 10 Marks Viva-voce (based on principle/technology) - 05 Marks	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members:

Dr. H. S Hota
Chairman

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*	Semester - VIII	Session: 2024-2025

1	Course Code	CSSC-08T
2	Course Title	**Fundamentals of IoT and Applications**
3	Course Type	**DSC (Discipline Specific Course)**
4	Prerequisite	*As per program*
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Understand IoT value chain structure (device, data cloud), application areas and technologies involved. • Understand IoT sensors and technological challenges faced by IoT devices, with a focus on wireless, energy, power, and sensing modules • Explore and learn about Internet of Things with the help of preparing projects designed for Raspberry Pi and Arduino.
6	Credit Value	**3 Credits** — *Credit = 15 Hours - Learning & Observation*
7	Total Marks	**Max. Marks: 100** — **Min Passing Marks: 40**

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Introduction to Internet of Things**- Definition and Characteristics of IoT, Sensors, Actuators, Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Embedded Systems, IoT Levels and Templates, Domain Specific IoTs – Home, City, Environment, Energy, Agriculture and Industry.	13
II	**IoT Physical Devices** - Introduction to Arduino and Raspberry Pi- Installation, Interfaces (serial, SPI, I2C). **Controlling Hardware**- Connecting LED, Buzzer, Switching High Power devices with transistors, Controlling AC Power devices with Relays, Controlling servo motor, speed control of DC Motor, unipolar and bipolar Stepper motors.	11
III	**Sensors-** Light sensor, temperature sensor with thermistor, voltage sensor, ADC and DAC, Temperature and Humidity Sensor DHT11, Motion Detection Sensors, Wireless Bluetooth Sensors, Level Sensors, USB Sensors, Embedded Sensors, Distance Measurement with ultrasound sensor.	10
IV	**Applications of IoT:** Home Automation, Smart Cities, Energy, Retail Management, Logistics, Agriculture, Health and Lifestyle, Industrial IoT, Legal challenges, IoT design Ethics, IoT in Environmental Protection.	11

Keywords	*Internet of Things, IOT Sensors, IOT Actuators, Arduino, Raspberry Pi.*

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
- Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759
- Raspberry Pi Cookbook, Software and Hardware Problems and solutions, Simon Monk, O'Reilly (SPD), 2016, ISBN 7989352133895

Reference Books ***Recommended:***

- Peter Waher, 'Learning Internet of Things', Packt Publishing, 2015 3. Editors Ovidiu Vermesan
- Peter Friess,'Internet of Things – From Research and Innovation to Market Deployment', River Publishers, 2014
- N. Ida, Sensors, Actuators and Their Interfaces, SciTech Publishers, 2014.

Online Resources:

- Swayam/NPTEL: https://www.youtube.com/channel/UC6ZY_csXZc7YZZm2W8HcQ6A
- Javatpoint: https://www.javatpoint.com/iot-internet-of-things
- Tutorialspoint: https://www.tutorialspoint.com/internet_of_things/index.htm
- Topics Related to IOT from data-flair: https://data-flair.training/blogs/iot-tutorial/
- Topics Related to IOT from edureka: https://www.edureka.co/blog/iot-tutorial/
- https://www.lnmiit.ac.in/Department/ECE/uploaded_files/Internet_of_Things_Lab_manual.pdf
- https://www.iare.ac.in/sites/default/files/lab1/IARE_IOT%20LAB%20_MANUAL.pdf
- https://www.amirajcollege.in/wp-content/uploads/2020/06/2180709-iot_manual.pdf
- https://peer.asee.org/internet-of-things-iot-laboratory.pdf
- https://www.teachmint.com/tfile/studymaterial/class-7th/internetofthingsiot/iotlabmanualpdf/d85015cf-722b-4b50-86e4-0f456f91bfa0
- https://www.slideshare.net/RadheyShyam18/iot-lab-manual-new
- https://www.psgrkcw.ac.in/wp-content/uploads/2021/08/IoT-Applications-Lab-Manual-IT.pdf
- https://www.coursehero.com/file/37028140/IoT-Lab-Manualpdf/
- https://www.scribd.com/document/408744059/IoT-Lab-Manual
- https://mrcet.com/CSE_downloads.html
- http://iotmumbai.bharatividyapeeth.edu/index.php/lab-manuals#computer-technology

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**100 Marks**
Continuous Internal Assessment (CIA):	**30 Marks**
End Semester Exam (ESE):	**70 Marks**

Continuous Internal Assessment (CIA): **(By Course Teacher)**	Internal Test / Quiz-(2): **20** +**20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1**. Objective – **10 x1= 10** Mark; **Q2**. Short answer type- **5x4 =20** Marks Section B: Descriptive answer type qts.,**1 out of 2** from each unit-4x10=**40 Marks**	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

ANJEETA KUTUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction				
Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree)*			Semester - VIII	Session: 2024-2025
1	Course Code	CSSC-08P		
2	Course Title	**Lab 8: Fundamental of IoT and Applications**		
3	Course Type	**DSC**		
4	Prerequisite	*As per program*		
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Handle various real world project. • Understand work of IoT. • Handle various IoT sensors. • Understand application of IoT in real world scenario. • Configure Arduino and Raspberry Pi for various real world project.		
6	Credit Value	**1 Credits**	*Credit =30 Hours Laboratory or Field Learning/Training*	
7	Total Marks	**Max. Marks: 50**	**Min Passing Marks: 20**	

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
List of Practical Experiment	1. Data acquisition using Multimeter and oscillographic recorder 2. Connect an LED to GPIO pin 25 and control it through the command line. 3. Connect an LED to GPIO pin 24 and a Switch to GPIO 25 and control the LED with the switch. 4. The state of LED should toggle with every press of the switch Use DHT11 temperature sensor and print the temperature and humidity of the room with an interval of 15 seconds 5. Use joystick and display the direction on the screen 6. Use Light Dependent Resistor (LDR) and control an LED that should switch-on/off depending on the light. 7. Create a traffic light signal with three colored lights (Red, Orange and Green) with a duty cycle of 5-2-10 seconds. 8. Switch on and switch of a DC motor based on the position of a switch. 9. Convert an analog voltage to digital value and show it on the screen. 10. Create a door lock application using a reed switch and magnet and give a beep when the door is opened. 11. Control a 230V device (Bulb) with Raspberry Pi using a relay. 12. Control a 230V device using a threshold temperature, using a temperature sensor. 13. Create an application that has three LEDs (Red, Green and white). The LEDs should follow the cycle (All Off, Red On, Green On, White On) for each clap (use sound sensor). 14. Create a web application for the above applications wherever possible with suitable modifications to get input and to send output. **Note:** Concerned teacher can add additional experiment as per requirement.	**30**
Keywords	*Internet of Things, IOT Sensors, IOT Actuators, Arduino, Raspberry Pi.*	

Name and Signature of Convener & Members of CBoS:

Dr H.S Mishra Chairman

(Shivani Thakur)

Shashikanta Arya

ANUPAMA KUTUM

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
- Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759
- Raspberry Pi Cookbook, Software and Hardware Problems and solutions, Simon Monk, O'Reilly (SPD), 2016, ISBN 7989352133895

*Reference Books **Recommended:***

- Peter Waher, 'Learning Internet of Things', Packt Publishing, 2015 3. Editors Ovidiu Vermesan
- Peter Friess,'Internet of Things – From Research and Innovation to Market Deployment', River Publishers, 2014
- N. Ida, Sensors, Actuators and Their Interfaces, SciTech Publishers, 2014.

Online Resources:

- Swayam/NPTEL: https://www.youtube.com/channel/UC6ZY_csXZc7YZZm2W8HcQ6A
- Javatpoint: https://www.javatpoint.com/iot-internet-of-things
- Tutorialspoint: https://www.tutorialspoint.com/internet_of_things/index.htm
- Topics Related to IOT from data-flair: https://data-flair.training/blogs/iot-tutorial/
- Topics Related to IOT from edureka: https://www.edureka.co/blog/iot-tutorial/
- Lab manuals:
  - https://www.lnmiit.ac.in/Department/ECE/uploaded_files/Internet_of_Things_Lab_manual.pdf
  - https://www.iare.ac.in/sites/default/files/lab1/IARE_IOT%20LAB%20_MANUAL.pdf
  - https://www.amirajcollege.in/wp-content/uploads/2020/06/2180709-iot_manual.pdf
  - https://peer.asee.org/internet-of-things-iot-laboratory.pdf
  - https://www.teachmint.com/tfile/studymaterial/class-7th/internetofthingsiot/iotlabmanualpdf/d85015cf-722b-4b50-86e4-0f456f91bfa0
  - https://www.slideshare.net/RadheyShyam18/iot-lab-manual-new
  - https://www.psgrkcw.ac.in/wp-content/uploads/2021/08/IoT-Applications-Lab-Manual-IT.pdf
  - https://www.coursehero.com/file/37028140/IoT-Lab-Manualpdf/
  - https://www.scribd.com/document/408744059/IoT-Lab-Manual
  - https://mrcet.com/CSE_downloads.html
  - http://iotmumbai.bharatividyapeeth.edu/index.php/lab-manuals#computer-technology

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**50 Marks**
Continuous Internal Assessment (CIA):	**15 Marks**
End Semester Exam (ESE):	**35 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar +Attendance - **05** Total Marks - **15**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance:** On spot Assessment A. **Performed the Task based on lab. work - 20 Marks** B. **Spotting based on tools & technology** (written) – **10 Marks**	Managed by Course

	C. Viva-voce (based on principle/technology) - 05 Marks	teacher as per lab. status

Name and Signature of Convener & Members of CBoS:

Chairman

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF COMPUTER SCIENCE

COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*		Semester - I	Session: 2024-2025
1	Course Code	CSGE-01T	
2	Course Title	**Computer Fundamental and Operating System**	
3	Course Type	**DGE (Discipline Generic Elective)**	
4	Prerequisite	*As per program*	
5	Course Learning Outcomes (CLO)	After Completing this course, students will be able to: • Study and use of basic concepts and terminology of information technology. • Organize files and documents on storage devices. • Acquire knowledge of ICT and Internet applications. • Develop information technology solutions by evaluating user requirements in advance trends of IT. • Acquire knowledge of MS-Excel, MS-PowerPoint and MS-Access.	
6	Credit Value	**3 Credits**	***Credit = 15 Hours - Learning & Observation***
7	Total Marks	**Max. Marks: 100**	**Min Passing Marks: 40**

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Indian knowledge System and Computer Science :** Number System in India-Historical evidence, Salient aspect of Indian Mathematics, Bhuta-Samkhya system, Katapayadi system, pingala and the binary system, Sulbha Sutra as modern arithmetic and numerical mathematics. **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, Microprocessors, Single chip Microcomputer, Users interface, hardware, software and firmware, Number system & Computer Codes.	13
II	**Peripheral devices:** I/O Devices-Keyboard, Mouse, Monitor, Impact and Non-Impact Printers, Plotters, Scanner, other Input/output devices 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.	11
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).	10
IV	**Operating System Concepts:** Evolution of Operating Systems: Types of operating systems. Introduction to DOS, History Booting process of DOS, Internal and External commands of DOS, File Structure of DOS. Windows Operating System: History, Version of Windows, Basics of Windows, Windows Explorer, Windows Accessories, Control Panel. Introduction to Linux Operating System, Structure of Linux, Linux command cd, md, rm, mv, cp, ls, cat, find, grep, head, tail.	11

Keywords *Computer, Input /Output Devices, Memory, Operating System, DOS, Linux.*

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
chairman

ANJEETA KUTUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- P.K. Sinha,Computer Fundamentals, BPB Publication, Sixth Edition.
- V. Rajaraman, Fundamentals of Computers, PHI Sixth Edition.
- B. Ram, Computer Fundamentals Architecture and Organization, New Age International Publishers, Fifth Edition.
- Raja Raman V. Fundamental of Computers, Prentice Hall of India, New Delhi.
- Peter Baer Galvin, Greg Gagne,Operating System Concepts – Abraham Silberschatz, 8th edition, Wiley-India, 2009.

Reference Books Recommended:

- Chetan Shrivastava, Fundamentals of Information Technology, Kalyan Publishers.
- Dr. Santosh Kumar Miri, Computer Fundamentals and Office Automation, Iterative International Publisher IIP.
- Alexis Leon and Mathews Leon, Fundamentals of Information Technology, Vikash Publication.
- Leon and Leon, Fundamental of IT, Leon Tec world.
- Aksoy and Denardis, Introduction to Information Technology, Cengage learning.
- Suresh K. Basandra, Computers Today, Galgotia Publications.
- Dennis P.Curtin, Kim Foley, Kunai Sen and Cathleen Morin, Information Technology – The breaking wave, TMH.
- Kogent Solution Inc., OFFICE 2013 in Simple Steps, DremTech Press.
- Kogent Learning Solutions Inc., Access 2010 in Simple Steps
- Andrew S. Tanenbaum, Modern Operating Systems, 3rd Edition, PHI
- Elmasri, Carrick, Levine, Operating Systems: A Spiral Approach – TMH Edition
- Akshay Singh , Operating System, RGCSM Publications

Online Resources:

- Indian Knowledge System and computer Science from Swayam portal
  https://onlinecourses.swayam2.ac.in/imb23_mg53/preview
- Fundamentals of Computer :
  https://www.w3schools.blog/computer-fundamentals-tutorial
- Fundamentals of Computer, Memory:
  https://www.tutorialspoint.com/computer_fundamentals/index.htm
- Fundamentals of Computer , Windows Operating System :
  https://vikaspedia.in/education/digital-litercy/it-literacy-courses-in-associating-with-msup/computer-fundamentals
- Fundamentals of Computer:
  https://nptel.ac.in/courses/106/103/106103068/
- Introduction to Operating System:
  https://www.w3schools.in/operating-system/tutorials/
- Introduction to Operating System:
  https://www.javatpoint.com/windows.
- Peripheral Devices
  https://www.tutorialspoint.com/what-are-peripheral-devices
- Windows :
  https://www.javatpoint.com/windows
- Linux:
  https://www.javatpoint.com/what-is-linux

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 20 & 20 Assignment / Seminar - 10 Total Marks - 30	Better marks out of the two Test / Quiz obtained marks in Assignment shall be considered against 30 Marks
End Semester Exam (ESE):	Two section – A & B Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts.,1 out of 2 from each unit-4x10=40 Marks	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

Sunil,

Suresh Thakur

Shailendra Arya

Jeetendra Kumar

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF COMPUTER SCIENCE

COURSE CURRICULUM

PART- A: Introduction				
Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree)*			**Semester - I**	Session: 2024-2025
1	**Course Code**	**CSGE-01P**		
2	**Course Title**	**Lab 1: Operating System (DOS, Windows, Linux)**		
3	**Course Type**	**Practical**		
4	**Prerequisite**	*As per program*		
5	**Course Learning Outcomes (CLO)**	At the end of this course, the students will be able to: • Understand the fundamental concepts of DOS, Windows and Linux Operating System. • Understand basics of DOS commands and its types. • Understand features of Windows Operating system. • Understand comparative features of DOS and Windows Operating systems. • Explore functionality of Linux.		
6	**Credit Value**	**1 Credits**	*Credit =30 Hours Laboratory or Field Learning/Training*	
7	**Total Marks**	**Max. Marks: 50**	**Min Passing Marks: 20**	

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
List of Practical Experiment	1. Demonstrate different Directory naming listing structure with all options. 2. Create one file and rename file using DOS command 3. Demonstrate all Internal DOS Commands with Output. 4. Demonstrate all external DOS Commands with output. 5. Introduction to Windows and Familiarity with its controls. 6. Study and use of Desktop, my computer, recycle bin, Task bar. 7. Working with Files and Folder. 8. Use of various window applications: Calculator, notepad and MS-Paint. 9. Explaining control panel options. 10. Working with printers. 11. Create a file using Linux command. 12. Write a Linux command which lists all files and directories. 13. Demonstrate use of grep command. 14. Create Directory using Linux command and create 3 different files in this directory. 15. Delete above created files and directory using Linux command. 16. Explaining various flavors of Linux. **Note:** Concerned teacher can add additional practical exercises as per requirement.	30
Keywords	*DOS, Windows, Linux.*	

Name and Signature of Convener & Members of CBoS:

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Chairman
(Suresh Thakur)
ANJEETA KUJUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Rusell A Stultz, MS DOS 6.22 BPB Publications
- Brain Underdahl,Teach yourself Windows 2000, Wiley Publications.

Reference Books Recommended:

- Peter Norton, Maximizing Windows, Teachmedia.
- Ray Duncan, Advances MS-DOS Programming, BPB
- Akshay Singh, Operating System, RGCSM Publications
- Ray Yao, Shell Scripting in 8 Hours

Online Resources:

- DOS: https://www.javatpoint.com/ms-dos-operating-system
- Windows: https://www.javatpoint.com/windows
- Linux: https://www.javatpoint.com/what-is-linux
- Fundamentals of Computer, Windows Operating System: https://vikaspedia.in/education/digital-literacy/it-literacy-courses-in-associating-with-msup/computer-fundamentals
- DOS: https://www.geeksforgeeks.org/ms-dos-operating-system/

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: **50 Marks**

Continuous Internal Assessment (CIA): **15 Marks**

End Semester Exam (ESE): **35 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar +Attendance - **05** Total Marks - **15**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance: On spot Assessment** **A. Performed the Task based on lab. work - 20 Marks** **B. Spotting based on tools & technology (written) – 10 Marks** **C. Viva-voce (based on principle/technology) - 05 Marks**	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF INFORMATION SCIENCE
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*	Semester - II	Session: 2024-2025

1	Course Code	CSGE-02T	
2	Course Title	**Programming in C++**	
3	Course Type	**DGE (Discipline Generic Elective)**	
4	Prerequisite	*As per program*	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Understand the fundamentals of object oriented programming. • Write programs related to concept of object oriented program • Define functions, class and to create own Libraries. • Write programs for file handling. • Develop small programs to solve real world problems.	
6	Credit Value	**3 Credits**	***Credit = 15 Hours - Learning & Observation***
7	Total Marks	**Max. Marks: 100**	**Min Passing Marks: 40**

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
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 its types, Pointer, Functions : Standard Library and User defined functions, function prototype, Call by value and Call by reference, recursive functions, String functions.	12
II	**Introduction to Object Oriented Programming:** Concept of object oriented programming, Features of C++, Structure of C++ program, Data types, structure, class and objects, Access Specifiers: Private, Public, Protected, inline functions, static data and static functions. **Constructor:** Default constructor, Copy constructor, Parameterized constructor, Destructor.	11
III	**Inheritance and Polymorphism**: 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, constructor overloading, Runtime polymorphism: Virtual Function, pure virtual function. Inline function, friend function, friend class.	11
IV	**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.	11
Keywords	*Token, Identifier, Keyword, Array, Function, Class, Object, Polymorphism, Inheritance, Constructor, Template.*	

Name and Signature of Convener & Members of CBoS:

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Peter Juliff, Program Design, PHI Publications.
- Yashwant Kanetkar, Let us C: BPB Publications.
- E. Balaguruswamy, Programming in ANSI C, Tata McGraw Hill

Reference Books Recommended:

- Y. Kanetkar, Let us C++, B.P.B Publication .
- E. Balaguruswamy, Programming in C++, Tata McGraw Hill.
- R. Kumar, Object Oriented Programming with C++, Prakhar Publication(Hindi)
- Dhupiya, Lakhyani , C++ Programming Alka Publications, Ajmer (Paperback, Dhupiya, Lakhyani)(Hindi)

Online Resources:

- Introduction to C and C++ from SWAYAM/NPTEL
  https://onlinecourses.nptel.ac.in/noc22_cs103/preview
  https://www.youtube.com/watch?v=KG4hjVDw-p8&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=2
- Constant and Inline Function through NPTEL:
  https://www.youtube.com/watch?v=pX6LufLso2M&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=10
- Pointer and Reference NPTEL
  https://www.youtube.com/watch?v=GtsBZ5e1-cE&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=12
- Function Overloading NPTEL
  https://www.youtube.com/watch?v=uJGmGAShHeU&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=13
- Operator Overloading NPTEL
  https://www.youtube.com/watch?v=0jpOwe4d-FE&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=17
- Dynamic Memory Management NPTEL
  https://www.youtube.com/watch?v=lkFK2X6qIc0&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=18
- Class and Object NPTEL
  https://www.youtube.com/watch?v=wtuks_f3vP4&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=24
- Access Specifiers NPTEL
  https://www.youtube.com/watch?v=6ki_W7cXdM0&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=22
- Constructor and Destructor NPTEL
  https://www.youtube.com/watch?v=wtuks_f3vP4&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=24
- C++ different topics from W3School
  https://www.w3schools.com/CPP/default.asp
- C++ different topics from Javatpoint
  https://www.javatpoint.com/cpp-tutorial

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
Continuous Internal Assessment (CIA):	30 Marks
End Semester Exam (ESE):	70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **20 +20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	Two section – A & B Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts.,**1 out of 2** from each unit-4x10=40 Marks	

Name and Signature of Convener & Members of CBoS:

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Suresh Thekkar

Sheikandra Ann

Sectandra Kumar

11/08/24
Dr. Vik-Lata

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FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF INFORMATION SCIENCE
COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree)*		Semester - II	Session: 2024-2025
1	Course Code	**CSGE-02P**	
2	Course Title	**Lab 2: Programming in C++**	
3	Course Type	**Practical**	
4	Prerequisite	*As per program*	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Understand the fundamental programming concepts and methodologies which are essential to create good C++ programs. • Code, test, and implement a well-structured, robust computer program using the 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	**1 Credits**	*Credit =30 Hours Laboratory or Field Learning/Training*
7	Total Marks	**Max. Marks: 50**	**Min Passing Marks: 20**

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
List of Practical Experiments.	1. Write a program in C++ for addition of two numbers using float data type. 2. Write a program in C++ to find the biggest number between two numbers. 3. Write a program in C++ to find the factorial value of any entered number using do – while loop. 4. Write a program in C++ for various arithmetic operations using switch case statements. 5. Write a program in C++ for Multiplication of two 3X3 matrices. 6. Write a program in C++ to store five books of information using structure. 7. Write a program in C++ to store six employee information using union. 8. Write a program in C++ to calculate simple interest using call by value and call by reference method. 9. Write a program in C++ to find the sum and average of five numbers using class and objects. 10. Write a program in C++ to multiply two numbers using private and public member functions. 11. 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 12. Write a program in C++ for constructor and Destructor.	**30**

13. Write a program in C++ for multiple inheritance.
14. Write a program in C++ for operator overloading.
15. Write a program in C++ for friend class and friend function.
16. Write a program in C++ for virtual function and virtual class.
17. Write a program in C++ for Exception Handling.
18. Write a program in C++ to open and close a file using file Handling.
19. Given two ordered arrays of integers, write a program to merge the two-arrays to get an ordered array.
20. WAP to display Fibonacci series (i) using recursion, (ii) using iteration
21. WAP to calculate Factorial of a number (i) using recursion, (ii) using iteration
22. WAP to calculate GCD of two numbers (i) with recursion (ii) without recursion.
23. Create a 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).
24. Create a class Triangle. Include overloaded functions for calculating area. Overload assignment operator and equality operator.
25. Create a class Box containing length, breadth 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
26. Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.
27. Write a program to retrieve the student information from the file created in the previous question and print it in the following format: Roll No. Name Marks
28. Copy the contents of one text file to another file, after removing all whitespaces.
29. Write a program for exception handling.
30. Write a program to insert data into file and to display it.

Note: Concerned teacher can add additional practical exercises as per requirement.

Keywords	*Array, Function, Structure, union, matrix, constructor, destructor, inheritance.*

Name and Signature of Convener & Members of CBoS:

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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Peter Juliff, Program Design, PHI Publications.
- Yashwant Kanetkar, Let us C: BPB Publications.
- E. Balaguruswamy, Programming in ANSI C, Tata McGraw Hill

Reference Books Recommended:

- Y. Kanetkar, Let us C++, B.P.B Publication .
- E. Balaguruswamy, Programming in C++, Tata McGraw Hill.
- R. Kumar, Object Oriented Programming with C++, Prakhar Publication(Hindi)
- Dhupiya, Lakhyani , C++ Programming Alka Publications, Ajmer (Paperback, Dhupiya, Lakhyani)(Hindi)

Online Resources:

- Introduction to C and C++ from SWAYAM/NPTEL
  https://onlinecourses.nptel.ac.in/noc22_cs103/preview
  https://www.youtube.com/watch?v=KG4hjVDw-p8&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=2
- Constant and Inline Function through NPTEL:
  https://www.youtube.com/watch?v=pX6LufLso2M&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=10
- Pointer and Reference NPTEL
  https://www.youtube.com/watch?v=GtsBZ5c1-cE&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=12
- Function Overloading NPTEL
  https://www.youtube.com/watch?v=uJGmGAShHeU&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=13
- Operator Overloading NPTEL
  https://www.youtube.com/watch?v=0jpOwe4d-FE&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=17
- Dynamic Memory Management NPTEL
  https://www.youtube.com/watch?v=lkFK2X6qIc0&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=18
- Class and Object NPTEL
  https://www.youtube.com/watch?v=wtuks_f3vP4&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=24
- Access Specifiers NPTEL
  https://www.youtube.com/watch?v=6ki_W7cXdM0&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=22
- Constructor and Destructor NPTEL
  https://www.youtube.com/watch?v=wtuks_f3vP4&list=PLmp4ylk-B4KrM9uOEdvPIVFUkU3jNc6D2&index=24
- C++ different topics from W3School
  https://www.w3schools.com/CPP/default.asp
- C++ different topics from Javatpoint
  https://www.javatpoint.com/cpp-tutorial

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**50 Marks**
Continuous Internal Assessment (CIA):	**15 Marks**
End Semester Exam (ESE):	**35 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar +Attendance - **05** Total Marks - 15	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance:** On spot Assessment **A. Performed the Task based on lab. work - 20 Marks** **B. Spotting based on tools & technology (written) – 10 Marks** **C. Viva-voce (based on principle/technology) - 05 Marks**	**Managed by Course teacher as per lab. status**

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
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Sunil

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Sheikh Arya

Sachin Kumar

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*		Semester - III	Session: 2024-2025
1	Course Code	**CSSE-01**	
2	Course Title	**Data Communication and Networking**	
3	Course Type	**DSE (Discipline Specific Elective)**	
4	Prerequisite	*As per program*	
5	Course Learning. Outcomes (CLO)	At the end of this course, the students will be able to: • Understand the fundamentals and functionalities of computer network technology. • Understand and explain the Data Communications System and its components. • Analyze the different types of network topologies and protocols. • Analyze various layers of OSI and TCP/IP models. • Explore wireless and wired LANs.	
6	Credit Value	**4 Credits**	***Credit = 15 Hours - learning & Observation***
7	Total Marks	**Max. Marks: 100**	**Min Passing Marks: 40**

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) – 60 Periods (60 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Introduction to Computer Network and Physical Layer:** Fundamentals of Computer network, types of computer networks: LAN, MAN, WAN, Network topologies, Transmission modes, ISO-OSI reference model, TCP/IP model, Concept of Analog and Digital Signals, Bandwidth, Multiplexing: TDM, FDM, WDM, CDMA, Transmission Media -Guided, Unguided, switching techniques: Circuit Switching, Message Switching, Packet Switching. **Common Network Architecture:** Wireless LANs 802.11 standards, Overview of VSAT and VPN.	15
II	**Data Link Layer:** Functions of Data Link Layer, Framing, Error detection and correction codes: checksum, CRC, hamming code, Flow Control: Stop & Wait and Sliding Window Protocols, Error Control: Stop & wait ARQ, Go-back-n, Selective Repeat ARQ, Data link protocols: HDLC and PPP, Medium Access Sublayer: LLC Protocol, IEEE Project 802 series of network standard and CSMA/CD.	15
III	**Network Layer and Transport Layer:** Functions of Network Layer, Routing Protocols & Algorithms, IPv4, IPv6, X.25, Networking & Internetworking devices, Functions of Transport Layer, Flow Control & Buffering, Transport Layer Protocols: TCP, UDP & SCTP, Network and Principles of Congestion Control.	15
IV	**Session Layer:** Overview, functioning and protocols. **Presentation Layer:** functioning and protocols. **Application Layer:** BOOTP, DHCP, DNS, TELNET, World Wide Web (WWW), File Transfer Protocol (FTP), Hypertext Transfer Protocol (HTTP), Email Protocols: MIME & SMTP, POP, IMAP, Proxy Server.	15
Keywords	*Protocol, Topology, Transmission Media, LAN, WAN, MAN, Wi-Fi.*	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Batra
Chairman

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PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Andrew S. Tanenbaum, Computer Networks, PHI / Pearson Education Inc.
- Behrouz A. Forouzan, Data Communication and Networking, Tata McGraw-Hill.

Reference Books Recommended:

- William Stallings, Data and Computer Communication, Pearson Education.
- Nader F. Mir, Computer and Communication Networks, Pearson Education, 2007.
- Black, Data & Computer Communication, PHI

Online Resources:

- NPTEL link for Data Communication: https://nptel.ac.in/courses/106105082
- Introduction to Data Communication from SWAYAM Portal https://www.youtube.com/watch?v=swtH_okidQc&list=PLUtfVcb-iqn8dG1-Cn7NTEdILR3hRVgcN&index=1
- Layered Architecture https://www.youtube.com/watch?v=xHO6LjSHco0&list=PLUtfVcb-iqn8dG1-Cn7NTEdILR3hRVgcN&index=2
- Data and Signal https://www.youtube.com/watch?v=6ZGVZ7gUccE&list=PLUtfVcb-iqn8dG1-Cn7NTEdILR3hRVgcN&index=3
- Guided Transmission Media https://www.youtube.com/watch?v=y7v3EAJsWXA&list=PLUtfVcb-iqn8dG1-Cn7NTEdILR3hRVgcN&index=5
- Unguided Transmission Media https://www.youtube.com/watch?v=hKq1tYlVxdQ&list=PLUtfVcb-iqn8dG1-Cn7NTEdILR3hRVgcN&index=6

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
Continuous Internal Assessment (CIA):	30 Marks
End Semester Exam (ESE):	70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **20** ÷ **20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1.** Objective – 10 x 1= **10** Mark; **Q2.** Short answer type- **5x4 =20 Marks** Section B: Descriptive answer type qts.,**1out of 2** from each unit-**4x10=40 Marks**	

Name and Signature of Convener & Members of CBoS:

Dr. H.S ~~Hora~~
Chairman

ANJEETA KUSH

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction				
Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*			Semester - IV	Session: 2024-2025
1	Course Code	**CSSE-02**		
2	Course Title	**Computer System Architecture**		
3	Course Type	**DSE (Discipline Specific Elective)**		
4	Prerequisite	*As per Program*		
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Understand the architecture and functioning of computer systems at the hardware level. • Analyze the Instruction Set Architecture (ISA) • Understand design, Implementation and Analysis of data path for instruction execution. • Understand the functioning of the CPU. • Understand the concept of parallel processing with their applications. • Understand the communication between the peripheral devices and CPU. • Explore the concepts of Memory Organization. • Understand the concept of multiprocessing. • Design the basic computer system Architecture.		
6	Credit Value	**4 Credits**	*Credit = 15 Hours - learning & Observation*	
7	Total Marks	**Max. Marks: 100**	**Min Passing Marks: 40**	

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) – 60 Periods (60 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Fundamentals Of Basic Computer Organization And Design:** Introduction of digital components, register and its types(DR,AR,AC,IR,PC,TR,INPR,OUTR), register transfer and register transfer language, microoperations and its types, common bus system for register and memory organization, computer instruction, basic format of instruction, types of instruction according addressing field (zero, one, two, three addressing), types of instruction (MRI,NMRI), addressing modes, instruction cycle and its flowchart, types of control unit(hardwired and microprogrammed control unit), design of control unit in basic computer.	15
II	**Central Processing Unit and Parallel Processing Techniques:** Introduction to CPU, general register organization, stack organization (register stack, memory stack), application of stack organizations, CPU instructions (data transfer instruction, data manipulation instruction, program control instructions), RISC and CISC instructions, interrupts and its types, interrupt cycle. Flynn's classification of computers, Parallel processing techniques (pipeline processing, vector processing, array processing), pipeline processing concept, types of pipelines and its application, speedup ratio of a pipeline, vector processing concept and its applications, concept of array processing and its applications.	15
III	**Input – Output Organization:** Introduction to peripheral devices, input-output interface and its designing, Modes of data transfer (synchronous and asynchronous data transfer), controls in asynchronous data transfer (strobe control and handshaking control), modes of data transfer (programmed i/o, interrupt-initiated i/o and direct memory access), input-output processor.	15
IV	**Memory Organization and Multiprocessor Architecture:** Memory hierarchy, main memory and its organization (RAM and ROM Chips, memory address map, memory connections to CPU), auxiliary memory, associative memory, concept of cache memory, cache memory mapping techniques (associative mapping, direct mapping, set-associative mapping), cache coherence problem and its solution, introduction to multiprocessors, interconnection structures of multiprocessor-based systems, inter-processor communication and synchronization.	15

Keywords	*Registers, micro-operation, instruction, control unit, instruction cycle, interrupt cycle, CPU, stack, parallel processing, pipeline processing, vector processing, array processing, asynchronous data transfer, DMA, RAM, ROM, cache memory, IOP, multiprocessor.*

Name and Signature of Convener & Members of CBoS:

Dr. H.S Hota
chairman

ANJEETA KUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- M. Morris Mano, Computer System Architecture, 3e, Pearson Education.
- B. Ram Sanjay Kumar, Computer Fundamentals Architecture and Organization , 5e, New Age International Publishers.

Reference Books Recommended:

- William Stalling, Computer Organization & Architecture, 11e, Pearson.
- Jyotsna Sengupta, Fundamentals of Computer Organization and Architecture, Deep & Deep Publications.
- Amit Kumar Mishra, A Textbook of Computer Architecture, Katson Books.

Online Resources:

- NPTEL YouTube Channel: Online Lecture Series on Computer Architecture
  - https://youtube.com/playlist?list=PL59E5B57A04EAE09C&si=WUP8O10Y6Zrleu-i
  - https://youtube.com/playlist?list=PL1A5A6AE8AFC187B7&si=JmlOO3rT9NGSMkmN
  - https://youtube.com/playlist?list=PLgHucKw979AvcnTpPNZMZyORdL5HvTr9m&si=PqOMY-sh6tCuzPXA
- NPTEL Portal : Online Lecture Computer Architecture and Organization

  NPTEL :: Computer Science and Engineering – NOC :Computer architecture and organization

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**100 Marks**
Continuous Internal Assessment (CIA):	**30 Marks**
End Semester Exam (ESE):	**70 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **20** +20 Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1**. Objective – **10** x**1**= **10** Mark; Q2. Short answer type- 5x4 =**20** Marks Section B: Descriptive answer type qts.,**1** out of 2 from each unit-4x10=40 Marks	

Name and Signature of Convener & Members of CBoS:

Dr. H.S Hota
chairman

ANJEETA KUR

Dr. V.K. Panchal

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART-A: Introduction

Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*	Semester – V	Session: 2024-2025

1	Course Code	CSSE-03	
2	Course Title	**Cyber Security and Cyber Law**	
3	Course Type	**DSE (Discipline Specific Elective)**	
4	Prerequisite	***As per Program***	
5	Course Learning Outcomes(CLO)	At the end of this course, students will be able to: • Understand the fundamental concepts in cyber security and distinguish among the attacks, threats and vulnerabilities. • Identify, differentiate and explain different cyber crimes and frauds. • Understand the concept of Cyber security issues and challenges associated with it. • Understand the cyber crimes, their nature, legal remedies and how to report the crimes through available platforms and procedures. • Understand the basic concepts related to E-Commerce and digital payments.	
6	Credit Value	**4 Credits**	***Credit = 15 Hours -Learning & Observation***
7	Total Marks	**Max. Marks: 100**	**Min Passing Marks: 40**

PART – B: Content of the Course

Total No. of Teaching– Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No .of Period
I	**Introduction:** Defining Cyberspace, Architecture of cyberspace, Internet, World wide web, Internet society, Regulation of cyberspace, Concept of cyber security, Issues and challenges of cyber security, Cyber Physical System Security, Classification of cyber crimes, Common cyber crimes- cyber crime targeting computers and mobiles, cyber crime against women and children, financial frauds, social engineering attacks, malware and ransomware attacks, zero day and zero click attacks, Cybercriminals modus-operandi, Reporting of cyber crimes, Remedial and mitigation measures.	15
II	**Authentication:** Vulnerability and vulnerability assessment, Intrusion Detection and Intrusion Prevention System, Introduction of Authentication, User Authentication Methods, Biometric Authentication Methods.	15
III	**Different Securities:** Window Security, Smartphone Security, Browser Security, Web Security, Email Security, Wi-Fi Security, and Social Media Security: Challenges, opportunities and pitfalls in online social network, Best practices for the use of Social media, Introduction to digital payments, Components of digital payment and stakeholders, Digital payments related common frauds and preventive measures. RBI guidelines on digital payments and customer protection in unauthorized banking transactions.	15
IV	**Cyber Law Basics:** Information Technology Act 2000-Amendments; Laws regarding posting of inappropriate content, Relevant provisions of Payment Settlement Act 2007, Cybercrimes and offenses dealt with IPC, RBI Act, IPR in India.	15
Keywords	*Cyberspace, Cybercrime, Cyber security, Physical System security, Ransomware, Modus-operandi, Authentication, Vulnerability, Intrusion Detection and Prevention, Cyber Law.*	

Signatures of Convener & Members of CBoS:

Dr. H.S Hota
Chairman

ANJEETA KUJUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Cyber criminology: Exploring Internet Crimes and Criminal Behavior by K. Jaishankar, CRC press.
- Data communication and Networking by B. Forouzan, TMH.
- An unofficial guide to ethical hacking by Ankit Fadia, trinity publisher.
- An ethical guide to hacking mobile phones by Ankit Fadia, trinity publisher.
- Computer Network Security and Cyber Ethics by Siva Ram Murthy,B.S. Manoj , McFarland and Company , INC

Reference Books Recommended:

- Cyber Crime Impact in the New Millennium, by R. C Mishra , Auther Press. Edition 2010.
- Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
- Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson , 13th November, 2001)
- Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd.
- Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.
- Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.
- Fundamentals of Network Security by E. Maiwald, McGraw Hill.

Online Resources:

- Cyber Security from SWAYAM: https://onlinecourses.swayam2.ac.in/cec21_cs09/preview
- Introduction to Cyber Security from SWAYAM: https://onlinecourses.swayam2.ac.in/nou20_cs01/preview
- Cyber Security for Beginners: https://heimdalsecurity.com/pdf/cyber_security_for_beginners_ebook.pdf
- Cyber Criminology by K. Jaishankar: https://larose.staff.ub.ac.id/files/2011/12/Cyber-Criminology-Exploring-Internet-Crimes-and-Criminal-Behavior.pdf
- Fundamental of Cyber Security by Dr. Jitendra Pandey: http://www.uou.ac.in/sites/default/files/slm/FCS.pdf
- Information Technology Act 2000: https://www.meity.gov.in/content/information-technology-act-2000
- Information Technology Act: https://www.meity.gov.in/content/information-technology-act
- Cyber Crime Law and Practice: https://www.icsi.edu/media/webmodules/publications/Cyber_Crime_Law_and_Practice.pdf

PART-D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**100 Marks**
Continuous Internal Assessment(CIA):	**30 Marks**
End Semester Exam(ESE):	**70 Marks**

Continuous Internal Assessment(CIA): (By Course Teacher)	Internal Test / Quiz- (2): 20 & 20 Assignment/Seminar- 10 Total Marks - 30	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks

End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1**. Objective – **10 x1= 10** Mark; **Q2**. Short answer type- **5x4 =20 Marks** Section B: Descriptive answer type qts., **1 out of 2** from each unit-**4x10=40 Marks**

Name and Signature of Convener & Members of CBoS:

Dr. H. S. Hota
Chairman

Sunil

Sharadra Arya

Jitendra Kumar

Dr. V. M. Gupta

ANJEETA KUJ

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART-A: Introduction

Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*	Semester – VI	Session: 2024-2025

1	Course Code	**CSSE-04**	
2	Course Title	**Introduction to Artificial Intelligence**	
3	Course Type	**DSE (Discipline Specific Elective)**	
4	Prerequisite	*As per program*	
5	Course Learning. Outcomes(CLO)	At the end of the course, students will be able to: • Understand the various searching techniques, constraint satisfaction problems and example problems- game playing techniques. • Apply techniques to solve the AI problems. • Provide a strong foundation of fundamental concepts in Artificial Intelligence. • Provide a basic exposition to the goals and methods of Artificial Intelligence. • Understand real world applications of AI.	
6	Credit Value	**4 Credits**	*Credit = 15 Hours - Learning & Observation*
7	Total Marks	**Max. Marks: 100**	**Min Passing Marks: 40**

PART – B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) - 60 Periods (60 Hours)

Unit	Topics (Course contents)	No .of Period
I	**Introduction:** Overview of Artificial Intelligence (AI), Foundations of AI, Areas and Applications of AI in various domains, AI Agents: Meaning, Types, Environments, and examples.	15
II	**Problem Solving:** Problem Solving as State Space Search, Production System, Some AI Classical Problems: Water-Jug Problem, Cannibal-Missionaries Problem, Tower of Hanoi, Tic-Tac-Toe, 8-Puzzle Problem, Search Techniques: Breadth First Search, Depth-First Search, Hill-Climbing, Best-First Search, A* Algorithms.	15
III	**AI Programming languages:** Introduction to LISP, Basic list manipulation functions, Input/output and local variables, Lists and Arrays, simple program in LISP, Introduction to PROLOG.	15
IV	**Knowledge Representation:** What is knowledge?, Approaches and issues, Knowledge representation techniques: Frame, Conceptual dependency, Semantic Net, Scripts etc., Propositional Logic, First order, Propositional Logic (FOPL), Conversion to clausal form, Inference rules, Resolution principal.	15
Keywords	*Artificial Intelligence (AI), AI Agent, State Space, Production System, LISP, PROLOG, Knowledge Representation, Semantic Net, Propositional Logic.*	

Name and Signature of Convener & Members of CBoS:

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Chairman

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PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

1. Introduction to Artificial Intelligence and Expert Systems, Dan W. Patterson, PHI Publication.
2. Artificial Intelligence, Elaine Rich and Kevin Knight TMH publication.

Reference Books Recommended:

3. Artificial Intelligence and machine learning, Vinod Chandra S.S., Anand Hareendrn S., PHI learning private Ltd.
4. Foundations of Artificial Intelligence and Expert Systems, Macmillan Series in Computer Science, V.S. Jankiraman, K. Sarukesi and P. Gopala Krishnan.

Online Resources:

- Introduction to Artificial Intelligence from SWAYAM: https://www.youtube.com/watch?v=pKeVMlkFpRc&list=PLwdnzlV3ogoXaceHrrFVZCJKbm_laSHcH&index=2
- Artificial Intelligence: Knowledge Representation And Reasoning from SWAYAM https://onlinecourses.nptel.ac.in/noc24_cs14/preview
- An introduction to Artificial Intelligence from SWAYAM: https://onlinecourses.nptel.ac.in/noc24_cs08/preview
- Introduction to Artificial Intelligence from Coursera: https://www.coursera.org/learn/introduction-to-ai
- Problem Solving as State Space Search from SWAYAM: https://www.youtube.com/watch?v=fLw8SfvaJWA&list=PLwdnzlV3ogoXaceHrrFVZCJKbm_laSHcH&index=3
- Heuristic Search from SWAYAM: https://www.youtube.com/watch?v=0awSpFyh2MY&list=PLwdnzlV3ogoXaceHrrFVZCJKbm_laSHcH&index=5
- Introduction to Artificial Intelligence: https://www.javatpoint.com/artificial-intelligence-ai
- How to Learn Artificial Intelligence from Coursera: https://www.coursera.org/articles/how-to-learn-artificial-intelligence
- What is knowledge representation: https://courses.csail.mit.edu/6.803/pdf/davis.pdf

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**100 Marks**
Continuous Internal Assessment (CIA):	**30 Marks**
End Semester Exam (ESE):	**70 Marks**

Continuous Internal Assessment (CIA): **(By Course Teacher)**	Internal Test / Quiz-(2): **20 & 20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1.** Objective – **10 x1= 10** Mark; **Q2.** Short answer type- **5x4 =20 Marks** Section B: Descriptive answer type qts.,**1 out of 2** from each unit-**4x10=40 Marks**	

Name and Signature of Convener & Members of CBoS:

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Chairman

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*	Semester - VII	Session: 2027-2028

1	Course Code	CSSE-05	
2	Course Title	Computer Graphics	
3	Course Type	DSE (Discipline Specific Elective)	
4	Pre-requisite	*As per program*	
5	Course Learning. Outcomes (CLO)	At the end of this course, the students will be able to: • Understand the basics of computer graphics, different graphics systems and applications of computer graphics. • Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis. • Use of geometric transformations on graphics objects and their application in composite form. • Extract scene with different clipping methods and its transformation to graphics display device. • Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.	
6	Credit Value	4 Credits	*Credit = 15 Hours - Learning & Observation*
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40

PART -B: Content of the Course

Total No. of Teaching–learning Periods(01 Hr. per period) – 60 Periods (60 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Basic elements of Computer Graphics**: Applications of Computer Graphics, Input Devices: Keyboard, Mouse, Trackball & Space ball, Joystick, Data Glove, Digitizers, Image Scanners, Touch panels, Light Pens systems. Output display devices: Refresh CRT, Raster-Scan display and Random-scan display technique, Color display techniques-Beam penetration method and Shadow-mask method, Direct view storage tubes, Emissive & Non-emissive flat-panel, Displays-Plasma panels, LED and LCD monitor.	15
II	**Fundamental Techniques in Graphics:** Line-drawing algorithms, DDA algorithm and Bresenham's Line drawing Algorithm, Midpoint Algorithm for Circle and Ellipse Generation, Curve generation. Attributes for output primitives: Area-filling Algorithms - Scan-line Polygon-fill.	15
III	**Geometrical Transformation:** 2D Transformation (translation, rotation, scaling, reflection and shearing), Homogeneous Coordinates and Matrix Representation of 2D Transformations, Successive and composite 2D Transformations, the Window-to-Viewport Transformations, Introduction to 3D Transformations Matrix.	15
IV	**Curves & Surfaces:** Polygon Surfaces and polygon meshes, Quadratic and super quadrics surfaces, Spline curve and representationDefinition of Bezier curve and its properties, Algorithms for Bezier curves and surfaces, Hermite curve.	15

Keywords: *CRT, LED, LCD, DDA, 2D, 3D.*

Name and Signature of Convener & Members:

Dr. M.S. Hota
Chairman

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Foley, Van Dam, Feiner, Hughes, Computer Graphics Principles& practice,2000.
- D.J. Gibbs & D.C. Tsichritzs: Multimedia programming Object Environment& Frame work, 2000.

Reference Books Recommended:

- Ralf Skinmeiz and Klana Naharstedt, Multimedia: computing, Communication and Applications, Pearson, 2001
- D. Haran & Baker. Computer Graphics Prentice Hall of India, 1986.

Online Resources:

- NPTEL: https://onlinecourses.nptel.ac.in/noc20_cs90
- https://mrcet.com/downloads/digital_notes/CSE/III%20Year/COMPUTER%20GRAPHICS%20NOTES.pdf
- http://www.aagasc.edu.in/cs/COMPUTER%20GRAPHICS%20NOTES.pdf
- https://archive.mu.ac.in/myweb_test/S.Y.B.Sc.(IT)%20(Sem%20%20III%20)%20Computer%20Graphics.pdf

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: **100 Marks**

Continuous Internal Assessment (CIA): **30 Marks**

End Semester Exam (ESE): **70 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **20** +**20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz **+** obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1**. Objective – **10 x1= 10** Mark; **Q2**. Short answer type- **5x4 =20 Marks** Section B: Descriptive answer type qts.,**1 out of 2** from each unit-**4x10=40 Marks**	

Name and Signature of Convener & Members:

Dr. H.S. Hota
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ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction				
Program: Bachelor of Computer Science *(Certificate / Diploma / Degree/Honors)*			Semester - VII	Session: 2027-2028
1	**Course Code**	**CSSE-06T**		
2	**Course Title**	**Machine Learning**		
3	**Course Type**	**DSE (Discipline Specific Elective)**		
4	**Prerequisite**	*As per program*		
5	**Course Learning Outcomes (CLO)**	At the end of this course, the students will be able to: • Gain a deep understanding of advanced AI and machine learning principles. • Acquire skills for conducting a thorough literature review and formulating research problems. • Learn to design and implement advanced AI and machine learning algorithms. • Can understand and design generative AI techniques. • Can apply AI and machine learning techniques to solve real-world problems.		
6	**Credit Value**	**3 Credits**	***Credit = 15 Hours - learning & Observation***	
7	**Total Marks**	**Max. Marks: 100**		**Min Passing Marks: 40**

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Introduction:** Concept of Machine Learning, Applications of Machine Learning, Key elements of Machine Learning, Supervised vs. Unsupervised Learning, Traditional programming Vs. Machine learning Statistical Learning: Bayesian Method, The Naïve Bayes Classifier.	13
II	**Linear Regression:** Prediction using Linear Regression, Gradient Descent, Linear Regression with one variable, Linear Regression with multiple variables, Polynomial Regression, Feature Selection and Feature Extraction. **Logistic Regression:** Classification using Logistic Regression, Logistic Regression vs. Linear Regression, Logistic Regression with one variable and with multiple variables.	11
III	**Regularization**: Regularization and its utility: The problem of Over fitting, Application of Regularization in Linear and Logistic Regression, Regularization and Bias/Variance. **Neural Networks:** Introduction, Model Representation, Gradient Descentvs. Perceptron Training, Stochastic Gradient Descent, Multilayer Perceptrons, Multiclass Representation, Back propagation Algorithms.	10
IV	**Deep Learning:** Introduction basics, various architectures of Deep learning: CNN, LSTM, Generative AI. **Machine learning tools:** Introduction of MATLAB, WEKA as machine learning tools, Using GUI of MATLAB and WEKA to develop Machine learning based models. Write programs to Implement machine learning models.	11
Keywords	*Artificial Intelligence (AI), Linear Regression, Logistic Regression, Artificial Neural Network (ANN).*	

Name and Signature of Convener & Members:

Dr. H S Hota
chairman

ANJEETA KUJUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Machine learning, Anuradha Srinivasaraghavan, Vincy Joseph, Wiley publication, India , 2019 edition.
- Introduction to Machine Learning with python A guide for data scientists, Andreas, C. Muller & Sarah Guido, O'Reilly.

Reference Books ***Recommended:***

- Understanding machine learning: From theory to algorithms, shai shalev-shwartez, shai ben-david, Cambridge University press.
- Machine learning with python, Abhishek Vijayvargia, BPB publication.
- Machine learning using python, U Dinesh Kumar, Manaranjan Pradhan, Wiley publication.
- Deep learning, Ian Goodfellow , Yoshua Bengio, Aoran Courville, Adaptive computation and machine learning series.
- Machine learning, Tom M. Mitchell, McGraw Hill, Indian Edition.

Online Resources:

- Overview of Machine Learning: https://www.youtube.com/watch?v=whSKA8aO6xQ&list=PLyqSpQzTE6M-SISTunGRBRiZk7opYBf_K&index=3
- Introduction to Artificial Intelligence: https://www.youtube.com/watch?v=pKeVMlkFpRc&list=PLwdnzlV3ogoXaceHrrFVZCJKbm_laSHcH&index=2
- Deep Learning specialization: https://www.coursera.org/specializations/deep-learning
- Learning Material for Deep Learning https://onlinecourses.nptel.ac.in/noc24_cs114/preview
- Learning Material for Artificial Intelligence and Machine Learning https://onlinecourses.nptel.ac.in/noc24_ce107/preview
- Learning Material for Machine Learning https://onlinecourses.swayam2.ac.in/imb24_mg126/preview
- learning Material for Artificial Intelligence https://swayam-plus.swayam2.ac.in/course_detail?course_code=P_SMARTBRIDGE_01
- Learning Material for Machine Learning using Python https://www.coursera.org/specializations/machine-learning-introduction
- Learning Material for Artificial Intelligence https://www.coursera.org/learn/ai-for-everyone
- Learning Material for Machine Learning https://coursera.org/specializations/machine-learning-introduction
- Learning Material for deep Learning https://coursera.org/specializations/deep-learning

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
Continuous Internal Assessment (CIA):	30 Marks
End Semester Exam (ESE):	70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **20 +20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1**. Objective – **10 x1= 10** Mark; **Q2**. Short answer type- **5x4 =20 Marks** Section B: Descriptive answer type qts.,**1 out of 2** from each unit-**4x10=40 Marks**	

Name and Signature of Convener & Members of CBoS:

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ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree)*	Semester - VII	Session: 2024-2025

1	Course Code	**CSSE-06P**
2	Course Title	**Lab 08: Machine Learning**
3	Course Type	**DSE (Discipline Specific Elective)**
4	Prerequisite	***As per program***
5	Course Learning Outcomes (CLO)	At the end of course, Students will be able to: • Understand complexity of Machine Learning algorithms and their limitations; • Applying common Machine Learning algorithms in practice and implementing their own. • Perform experiments in Machine Learning using real-world data. • Design and implement machine learning solutions to classification, regression, and clustering problems; and be able to evaluate and interpret the results of the algorithms. • Understand modern notions in data analysis oriented computing.
6	Credit Value	**1 Credits** — ***Credit =30 Hours Laboratory or Field Learning/Training***
7	Total Marks	**Max. Marks: 50** — **Min Passing Marks: 20**

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
List of Practical Experiments	1. Use command to compute the size of a matrix, size/length of a particular row/column, load data from a text file, store matrix data to a text file, finding out variables and their features in the current scope. 2. Perform basic operations on matrices (like addition, subtraction, multiplication) and 3. Display specific rows or columns of the matrix. 4. Perform other matrix operations like converting matrix data to absolute values, taking the negative of matrix values, adding/removing rows/columns from a matrix, finding the maximum or minimum values in a matrix or in a row/column, and finding the sum of some/all elements in a matrix. 5. Create various type of plots/charts like histograms, plot based on sine/cosine function based on data from a matrix. Further label different axes in a plot and data in a plot. 6. Generate different subplots from a given plot and color plot data. 7. Use conditional statements and different type of loops based on simple example/s. 8. Perform vectorized implementation of simple matrix operation like finding the transpose of a matrix, adding, subtracting or multiplying two matrices. 9. Implement Linear Regression problem. For example, based on a dataset comprising of existing set of prices and area/size of the houses, predict the estimated price of a given house. 10. Based on multiple features/variables perform Linear Regression. For example, based on a number of additional features like number of bedrooms, servant room,	**30**

	number of balconies, number of houses of years a house has been built – predict the price of a house. 11. Implement a classification/ logistic regression problem. For example based on different features of students data, classify, whether a student is suitable for a particular activity. Based on the available dataset, a student can also implement another classification problem like checking whether an email is spam or not. 12. Use some function for neural networks, like Stochastic Gradient Descent or back propagation - algorithm to predict the value of a variable based on the dataset of problem. **Note:** List of experiments may be changed by the concerned teacher.	
Keywords	*Artificial Intelligence (AI), Linear Regression, Logistic Regression, Artificial Neural Network (ANN).*	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
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PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Machine learning, Anuradha Srinivasaraghavan, Vincy Joseph, Wiley publication, India, 2019 edition.
- Introduction to Machine Learning with python A guide for data scientists, Andreas, C. Muller & Sarah Guido, O'Reilly.

Reference Books ***Recommended:***

- Understanding machine learning: From theory to algorithms, shai shalev-shwartez, shai ben-david, Cambridge University press.
- Machine learning with python, Abhishek Vijayvargia, BPB publication.
- Machine learning using python, U Dinesh Kumar, Manaranjan Pradhan, Wiley publication.
- Deep learning, Ian Goodfellow , Yoshua Bengio, Aoran Courville, Adaptive computation and machine learning series.
- Machine learning, Tom M. Mitchell, McGraw Hill, Indian Edition.

Online Resources:

- Overview of Machine Learning:
  - https://www.youtube.com/watch?v=whSKA8aO6xQ&list=PLyqSpQzTE6M-SISTunGRBRiZk7opYBf_K&index=3
  - http://www.jnit.org/wp-content/uploads/2020/04/Machine-Learning-Lab-Manual.pdf
  - https://nthu-datalab.github.io/ml/
  - https://www.deeplearning.ai/courses/
  - https://www.jnec.org/labmanuals/cse/tc/sem1/Machine%20Learning%20LAB%20MANUAL%20(1).pdf
  - https://deepakdvallur.weebly.com/machine-learning-laboratory.html
  - https://copyassignment.com/machine-learning-a-gentle-introduction/
- Introduction to Artificial Intelligence:

- https://www.youtube.com/watch?v=pKeVMlkFpRc&list=PLwdnzlV3ogoXaceHrrFVZCJKbm_laSHcH&index=2
- http://www.hpc.iitkgp.ac.in/pdfs/AI_HPC.pdf
- https://www.tensorflow.org/resources/learn-ml?gclid=CjwKCAjw_ISWBhBkEiwAdqxb9hljIi5hnqF0Cq2Fgy_JEWiD_uZbxtetr_BFUF_QztAELk8d2q3P_BoCodMQAvD_BwE
- https://www.edx.org/professional-certificate/deep-learning

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**50 Marks**
Continuous Internal Assessment (CIA):	**15 Marks**
End Semester Exam (ESE):	**35 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar +Attendance - 05 Total Marks - 15	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance:** On spot Assessment A. Performed the Task based on lab. work - 20 Marks B. Spotting based on tools & technology (written) – 10 Marks C. Viva-voce (based on principle/technology) - 05 Marks	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members of CBoS:

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Sureshthakur

Jeetendra Kumar

Dr. Vikas Kumar

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*	Semester -VII	Session: 2024-2025

1	Course Code	**CSSE-07**	
2	Course Title	**Software Engineering**	
3	Course Type	**DSE (Discipline Specific Elective)**	
4	Pre-requisite	***As per program***	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able: • Understand the fundamentals of software Engineering. • Identify and analyze the requirement of system. • Understand the design of existing System and Design the proposed System. • Understand the fundamentals of Software project management. • Create the test-cases and perform System testing. • Apply the concepts of software engineering for new system development.	
6	Credit Value	**4 Credits**	***Credit = 15 Hours - Learning & Observation***
7	Total Marks	**Max. Marks: 100**	**Min Passing Marks: 40**

PART -B: Content of the Course

Total No. of Teaching–learning Periods (01 Hr. per period) – 60 Periods (60 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Software Engineering & Models:** The evolving role of software, changing nature of software, Evolution of Software Engineering, Characteristics of software. SDLC Introduction, Software Process Models: Waterfall Model, V-model, Prototype model, RAD model, Incremental development model, Spiral Model, Evolutionary Model, RAD Model, Agile model.	15
II	**2 Requirements engineering process:** Requirement Gathering and Analysis, Feasibility studies, requirements validation, requirements management. Functional and Non-Functional Requirements, User requirements, System Requirements, SRS documents. **Design Engineering:** Software design concepts, design process, design methodology, Function-oriented software design, Structured analysis, Structured Chart, DFD, Concept of Modularity, Cohesion and Coupling, OOAD (Object oriented analysis and design) Concept, UML diagram, different view of software using UML diagrams, Class diagram, Object diagram, Activity diagram, Interaction diagram, State chart diagram.	15
III	**Software Project Management:** Need of Software project management, Software project managements complexities, Types of management in SPM, Project Planning, Software project scheduling, Project size estimation: LOC, Function Point. Project estimation techniques: Empirical, Analytical and Heuristic technique, COCOMO models.	15
IV	**Testing Strategies and Quality Management:** Testing Strategies for software, black-box and white-box testing, Verification and Validation, Unit-testing, Integration and system testing, Debugging approach. **Software Reliability & Quality Management:** Software Reliability, Quality concepts, software quality assurance, software reviews, formal technical reviews, software configuration management, software reliability, the ISO 9000 quality standards, Capability Maturity Model, Risk Management.	15

Keywords *Software, software Engineering, Models, Requirement engineering, Software Designing Tools, Testing.*

Signature of Convener & Members of CBoS:

Chairman

ANJEETA KUTUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Rajib Mall, Fundamentals of Software Engineering, 5th ed, PHI publication.
- Roger S. Pressman, Software Engineering, A practitioner's Approach, 6th edition, McGraw Hill International Edition.

Reference Books Recommended:

- Sommerville, Software Engineering, 7th edition, Pearson Education.
- James Rumbaugh, Ivar Jacobson, The unified modelling language user guide Grady Booch, Pearson Education.

Online Resources:

- NPTEL YouTube Channel: Software Engineering Lectures by Prof Rajib Mall, IIT Kharagpur https://youtube.com/playlist?list=PLbRMhDVUMngf8oZR3DpKMvYhZKga90JVt&si=tTBITZUdivHpNz1H
- NPTEL YouTube Channel: Software Engineering Lecture Series https://youtube.com/playlist?list=PL8751DA481F0F0D17&si=07IfYV7GP8_oc1xZ

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
Continuous Internal Assessment (CIA):	30 Marks
End Semester Exam (ESE):	70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **20** & **20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1**. Objective – 10 x1= **10** Mark; **Q2**. Short answer type- **5x4 =20 Marks** Section B: Descriptive answer type qts., **1out of 2** from each unit-**4x10=40 Marks**	

Name and Signature of Convener & Members of CBoS:

Dr. M.S. Hotti
Chairman

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction				
Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*			Semester -VII	Session: 2024-2025
1	Course Code	**CSSE-08**		
2	Course Title	**Theory of Computation**		
3	Course Type	**DSE (Discipline Specific Elective)**		
4	Prerequisite	*As per program*		
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Understanding of the core concepts in automata theory and formal languages. • Understanding and analyzing the fundamentals of compiler designing. • Design grammars and automata (recognizers) for different language classes. • Design the pushdown automata. • Design the Turing machine.		
6	Credit Value	**4 Credits**	***Credit = 15 Hours - Learning & Observation***	
7	Total Marks	**Max. Marks: 100**		**Min Passing Marks: 40**

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) – 60 Periods (60 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Introduction to automata**: Definition and types of automata: Finite Automata, Pushdown Automata, Turing Machine, introduction to Grammar and languages according to the types of automata. **Finite Automata:** Introduction to Finite State Automata (FSA): Formal definition, simpler notations (state transition diagram, transition table). Types of FSA: Deterministic Finite Automata (DFA), Nondeterministic Finite Automata (NFA), Finite Automata with Epsilon Transitions, Elimination of Epsilon transitions, Conversion of NFA to DFA, Equivalence of NFA and DFA. Applications of Finite Automata, Minimization of Deterministic Finite Automata. Mealy machine, Moore machine.	15
II	**REGULAR EXPRESSIONS (RE):** Introduction to RE, Identities of Regular Expressions, Finite Automata and Regular Expressions- Converting from DFA to Regular Expressions, Converting Regular Expressions to Automata, applications of Regular Expressions. **REGULAR GRAMMARS**: Definition, regular grammars and FA, FA for regular grammar, Regular grammar for FA. Proving languages to be non-regular -Pumping lemma, applications, Closure properties of regular languages.	15
III	**CONTEXT FREE GRAMMAR (CFG):** Introduction to CFG's, Properties of CFG's, Derivation Trees, Sentential Forms, Rightmost and Leftmost derivations of Strings. Ambiguity in CFG, Minimization of CFG, Chomsky Normal Form (CNF), Greibach Normal Form (GNF), Pumping Lemma for CFLs. **PUSHDOWN AUTOMATA:** Introduction of PDA and its model, types of PDA, Languages accepted by the PDA, Acceptance by Final State and Acceptance by Empty stack and its Equivalence, Equivalence of CFG and PDA.	15
IV	**TURING MACHINES (TM):** Formal definition and model of Turing Machine, Types of TMs, Languages of a TM, TM as acceptors, Properties of recursive and recursively enumerable languages, Universal Turing machine, The Halting problem, Undecidable problems about TMs. Context sensitive language and linear bounded automata (LBA).	15
Keywords	*Finite Automata, Regular Expression, Regular Grammar, Context Free Grammar, Turing Machine.*	

Name and Signature of Convener & Members of CBoS:

Dr H.S Hota
chairman

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PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman (2007), Introduction to Automata Theory Languages and Computation, 3rd edition, Pearson Education, India.
- K. L. P Mishra, N. Chandrasekaran (2003), Theory of Computer Science-Automata Languages and Computation, 2nd edition, Prentice Hall of India, India.

Reference Books Recommended:

- A.M. Padma Reddy, Finite Automata and Formal languages, Pearson Education India
- Michael Sipser, Third Edition, Introduction to the Theory of Computation, Cengage Learning.

Online Resources:

- NPTEL YouTube Channel: Lectures on Theory of Computation https://youtube.com/playlist?list=PLbMVogVj5nJSd25WnSU144ZyGmsqjuKr3&si=EvuSjnO_TT1oTHjn
- NPTEL YouTube Channel: Lectures on Theory of Automata, Formal Languages and Computation https://youtube.com/playlist?list=PL85CF9F4A047C7BF7&si=SBm-gIkmkjOBDscB
- NPTEL YouTube Channel: Lectures on Theory of Computation and Automata https://youtube.com/playlist?list=PL3-wYxbt4yCgBHUpwXDTLos3JSteeGIax&si=TbYH91hmlOrtUEnN
- SWAYAM YouTube Channel: Introduction to Automata, Languages and Computations https://youtube.com/playlist?list=PLbRMhDVUMngcwWkzVTm_kFH6JW4JCtAUM&si=RbTG3WZ0Jf6Zx_pu

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**100 Marks**
Continuous Internal Assessment (CIA):	**30 Marks**
End Semester Exam (ESE):	**70 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **20** +**20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1.** Objective – **10** x**1**= **10** Mark; **Q2.** Short answer type- **5**x**4** =**20 Marks** Section B: Descriptive answer type qts.,**1 out of 2** from each unit-**4**x**10**=**40 Marks**	

Name and Signature of Convener & Members of CBoS:

Chairman

ANJEETA KUTUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF COMPUTER SCIENCE

COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*		Semester – VIII	Session: 2024-2025
1	Course Code	CSSE-09	
2	Course Title	**Soft Computing**	
3	Course Type	**DSE (Discipline Specific Elective)**	
4	Prerequisite	*As per program*	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Analyze and appreciate the applications which can use fuzzy logic. • Understand the difference between learning and programming and explore practical applications of Neural Networks (NN). • Understand the efficiency of a hybrid system and how Neural Network and fuzzy logic can be hybridized to form a Neuro-fuzzy network and its various applications • Understand the importance of optimizations and its use in computer engineering fields and other domains. • Introduce the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience.	
6	Credit Value	**4 Credits**	*Credit = 15 Hours - Learning & Observation*
7	Total Marks	**Max. Marks: 100**	**Min Passing Marks: 40**

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) – 60 Periods (60 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Introduction:** Soft computing, Different tools of soft computing: Fuzzy logic, Artificial Neural Network, Genetic Algorithm), Area of application. **Fuzzy Logic:** Introduction to Classical Sets and Fuzzy Sets, Membership Function, properties and operations of classical set and Fuzzy set, a-cuts, Properties of a-cuts, Linguistic Variables, Membership function, Classical relation and Fuzzy Relation and its properties and operations, Defuzzification and its methods, Fuzzy rule base.	15
II	**Artificial Neural Network(ANN):** Architecture, Introduction, Evolution of Neural Network, Biological Neural Network Vs ANN, Basic Model of ANN, Different types of ANN, Single layer Perceptron, Solving XOR problem, Activation function, Linear severability, Supervised and unsupervised learning, perceptron learning, delta learning, Feed-forward and Feedback networks, Error Back Propagation Network (EBPN), Associative memories and its types, Hopefield Network, Kohenen self-organizing Map.	15
III	**Genetic Algorithm:** What is Optimization?, Introduction, Application, GA operators: selection, crossover and mutation, different techniques of selection, crossover and mutation, different types of chromosomes, Application of GA.	15
IV	**Hybrid soft commuting:** Design of Neuro-Fuzzy model like ANFIS, Neuro-Genetic, Fuzzy-Genetic Neuro-Fuzzy-Genetic model.	15
Keywords	*Soft Computing, Fuzzy Logic, ANN, Genetic Algorithm.*	

Name and Signature of Convener & Members of CBoS:

Dr H.S. Hota
Chairman

ANJEETA KUMAR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Principles of soft computing, S.N. Shivanandan and S.N. Deepa , Wiley publication, Wiley India Edition.
- Neural network and Learning Machines, Simon Haykin, Pearson Education, 2011.
- Artificial Neural Networks, Robert J. Scholkoff, McGraw Hill Education (India) Pvt. Limited, 1997.
- Fuzzy Sets, Uncertainty and Information, G. J. Klir and T.A. Folger, PHI learning private limited. Publisher– Pearson 3Edition 1999

Reference Books Recommended:

- Neural Networks and Fuzzy Systems, A dynamical Systems Approach to Machine Learning, Bart Kosko, PHI learning private limited.
- Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis and Applications, S. Rakasekaran, G.A. VijayalakshmiPai, PHI learning private limited, 14th Edition. 2003.
- Neural Networks and Fuzzy Logic, K. Vinoth Kumar, R. Saravana Kumar, S. K. Kataraia and Sons publication.
- Artificial Neural Networks, B.Yegnanarayana Prentice Halll of India (P) Limited.
- Introduction to Artificial Neural Systems, Jacek M. Zurada, Jaico Publication House.

Online Resources:

- Introduction to Soft computing: What is soft computing - Javatpoint
- Need for Soft Computing: Need for Soft Computing - GeeksforGeeks
- Introduction To Soft Computing: Introduction To Soft Computing - Course (nptel.ac.in)

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**100 Marks**
Continuous Internal Assessment (CIA):	**30 Marks**
End Semester Exam (ESE):	**70 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **20 & 20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1**. Objective – 10 x1= **10** Mark; **Q2**. Short answer type- **5x4 =20 Marks** Section B: Descriptive answer type qts.,**1 out of 2** from each unit-**4x10=40 Marks**	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
chairman

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*	Semester – VIII	Session: 2024-2025

1	Course Code	**CSSE-10**	
2	Course Title	**Advanced Operating Systems**	
3	Course Type	**DSE (Discipline Specific Elective)**	
4	Prerequisite	*As per program*	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Gain knowledge about advanced concepts of OS. • Understand the concept of distributed systems. • Understand process synchronisation and concurrency control. • Understand the architecture and functioning of mobile operating system. • Develop modules for mobile devices. • Understand the architecture of various advanced operating system.	
6	Credit Value	**4 Credits**	*Credit = 15 Hours - Learning & Observation*
7	Total Marks	**Max. Marks: 100**	**Min Passing Marks: 40**

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) – 60 Periods (60 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Multiprocessor Operating Systems:** System Architectures, Structures of OS, OS design issues, Process synchronization, Process Scheduling and Allocation, memory management.	15
II	**Distributed Operating Systems:** System Architectures, Design issues, Communication models, clock synchronization, mutual exclusion, election algorithms, Distributed Deadlock detection, Distributed scheduling, Distributed shared memory, Distributed File system, Multimedia file systems, File placement, Caching.	15
III	**Database Operating Systems:** Requirements of Database OS, Transaction process model, Synchronization primitives, Concurrency control algorithms.	15
IV	**Mobile Operating Systems:** ARM and Intel architectures, Power Management, Mobile OS Architectures, Underlying OS, Kernel structure and native level programming, Runtime issues, Approaches to power management.	15
Keywords	*Multiprocessor operating system, Distributed operating system, Database operating System, Mobile Operating system.*	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

(Suresh Thakur)

ANJEETA KUJUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Mukesh Singhal, Niranjan Shivaratri, "Advanced Concepts in Operating Systems", TMH,2001
- William Stallings, "Operating Systems – Operating System: Internals and Design Principles", Prentice Hall, 2005.

Reference Books Recommended:

- Andrew S. Tanenbaum, "Distributed Operating Systems", Pearson Education, 1995.
- Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, "Operating System Principles", John Wiley & Sons Inc., 2006.

Online Resources:

- Advanced Concepts in Operating Systems: https://books.google.co.in/books/about/Advanced_Concepts_in_Operating_Systems.html?id=ajx9NAEACAAJ&redir_esc=y
- Distributed Operating System: *https://www.javatpoint.com/distributed-operating-system*
- Mobile Operating System https://www.sciencedirect.com/topics/computer-science/mobile-operating-system https://baou.edu.in/assets/pdf/PGDMAD_101_slm.pdf
- Database operating System:
- https://www.redswitches.com/blog/database-operating-system/#:~:text=A%20Database%20Operating%20System%20(DBOS,storage%2C%20retrieval%2C%20and%20manipulation. https://www.ibm.com/docs/en/psfa/7.2.1?topic=logs-database-operating-system https://eecs.berkeley.edu/230426-2/

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
Continuous Internal Assessment (CIA):	30 Marks
End Semester Exam (ESE):	70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 20 +20 Assignment / Seminar - 10 Total Marks - 30	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
End Semester Exam (ESE):	Two section – A & B Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts., 1 out of 2 from each unit-4x10=40 Marks	

Name and Signature of Convener & Members of CBoS:

Dr. H. S. Hota
Chairman

ANJEETA KUMAR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*		Semester - VIII	Session: 2024-2025
1	Course Code	CASE-11	
2	Course Title	Cloud Computing	
3	Course Type	DSE (Discipline Specific Elective)	
4	Pre-requisite	*As per program*	
5	Course Learning Outcomes (CLO)	After Completing this course, students will be able to: • Understand the concepts, characteristics and benefits of cloud computing. • Understand the key security and compliance challenges of cloud computing. • Understand the concept of Cloud Security and governance. • Learn the Concept of Cloud Infrastructure Model. • Understand the cloud storage, Cloud Virtualization & Micro services.	
6	Credit Value	4 Credits	*Credit = 15 Hours - Learning & Observation*
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40

PART -B: Content of the Course

Total No. of Teaching–Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Fundamental Cloud Computing:** Concepts, Terminology, Technologies, Benefits, Challenges, SLAs and business cost metrics associated with cloud computing, SaaS, IaaS, PaaS delivery models, Common cloud deployment models and cloud characteristics, Various applications of cloud computing. **Cloud Architecture:** The technology architecture of cloud platforms and cloud-based solutions and services and their utilization via a set of cloud computing design patterns, Hybrid cloud deployment models, Compound design patterns and solution architectures that span cloud and on-premise environments.	15
II	**Cloud Security & Governance:** The cloud security mechanisms, cloud security architecture, A set of security design patterns, The definition of cloud governance precepts, Roles, Practices and processes, Common governance challenges and pitfalls specific to cloud computing.	15
III	**Cloud Storage:** The cloud storage devices, Structures and technologies, cloud storage mechanisms, Persistent storage, Redundant storage, Cloud-attached storage, Cloud-remote storage, Cloud storage gateways, Cloud storage brokers, Direct Attached Storage (DAS), Network Attached Storage (NAS), Storage Area Network (SAN), Various cloud storage-related design patterns.	15
IV	**Cloud Virtualization & Microservices:** Core topic areas pertaining to the fundamental virtualization mechanisms and types used within contemporary cloud computing platforms are explored along with various key performance indicators and related metrics, Microservices of Cloud Computing.	15

Keywords *Cloud Computing, Security, Governance, Storage, Virtualization.*

Name and Signature of Convener & Members of CBoS:

Dr. H. S. Hota
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Sunil

Suresh Thakur

Shailendra Arya

ANJEETA KUJUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Distributed Computing by Dollymore Cloud Computing (Wind) by Dr. Kumar Saurabh, 2nd Edison, Wiley India.

Reference Books ***Recommended:***

- Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wile, 2011 Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012.
- Handbook of Cloud Computing by Anand Nayyar, Publisher: BPB Publication.

Online Resources:

- Introduction to Cloud Computing from W3shool: https://www.w3schools.in/cloud-computing/tutorials/
- Introduction to Cloud Computing from Coursera: https://www.coursera.org/learn/introduction-to-cloud
- Cloud Computing Basics: https://www.coursera.org/learn/cloud-computing-basics
- Cloud Computing Concepts: https://www.coursera.org/learn/cloud-computing
- Cloud Computing Specialization from Coursera: https://www.coursera.org/specializations/cloud-computing
- Cloud Computing from SWAYAM/NPTEL: https://onlinecourses.nptel.ac.in/noc22_cs20/preview https://www.youtube.com/channel/UCK73enkjfQNDwdBqMyaMtRg
- Cloud Computing Basics: https://terrorgum.com/tfox/books/cloudcomputingbasics_aselfteachingintroduction.pdf
- CLOUD COMPUTING Principles and Paradigms : https://dhoto.lecturer.pens.ac.id/lecture_notes/internet_of_things/CLOUD%20COMPUTING%20Principles%20and%20Paradigms.pdf
- Cloud Computing Tutorial For Beginners: https://www.youtube.com/watch?v=fLV_t2qKYyU
- Introduction to Cloud Computing: https://www.youtube.com/watch?v=Dv0sjAYnVCY
- Cloud Computing Tutorials: https://www.youtube.com/watch?v=NyA9PB6j8bg

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
Continuous Internal Assessment (CIA):	30 Marks
End Semester Exam (ESE):	70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 20 +20 Assignment / Seminar - 10 Total Marks - 30	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
End Semester Exam (ESE):	Two section – A & B Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts.,1 out of 2 from each unit-4x10=40 Marks	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Mohan
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ANJEETA KUJUR

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Shailendra Arya

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction				
Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*			Semester - VIII	Session: 2024-2025
1	Course Code	**CSSE-12**		
2	Course Title	**Major Project**		
3	Course Type	**DSE (Discipline Specific Elective)**		
4	Prerequisite	*As per program*		
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to: • Enhance knowledge on latest techniques. • Make ready for IT industry. • Upgrade skill set as per IT industry. • Handle real word applications. • Debug Problem to make DFD of proposed system.		
6	Credit Value	**4 Credits**	*Credit = 15 Hours - Learning & Observation*	
7	Total Marks	**Max. Marks: 100**	**Min Passing Marks: 40**	

PART -B: Content of the Course

Total No. of Teaching–Learning hours - 60 Hours

	Important Guidelines for Project	No. of Period
	A project report has to be submitted as per the rules described below: 1. **Number of Copies:** The student should submit One hard bound copy of the Project Report with one CD/DVD. 2. **No of students:** Every student has to submit separate project. 3. **Acceptance / Rejection of Project Report:** The student must submit a project report to the Head of Department/Project Guide for approval. The Head of Department/Project Guide holds the right to accept the project or suggest modifications for resubmission. 4. **Format of the Project Report :**The student must adhere strictly to the following format for the submission of the Project Report I. **Paper:** The report shall be typed on white paper, A4 size or continuous computer stationary bond, for the final submission. The report to be submitted to the University must be original and subsequent copies may be photocopied on any paper. II. **Typing:** The typing shall be of standard letter size, double-spaced and on one side of the paper only, using black ribbons and black carbons. III. **Margins:** The typing must be done in the following margins Left ----- 35mm, Right ----- 20mm Top ----- 35mm, Bottom ----- 20mm IV. **Binding:** The Report shall be Rexene bound in black. Plastic, spiral bound Project Reports not be accepted. V. **Front Cover:** The front cover should contain the following details: **TOP:** The title in block capitals of 6mm to 15mm letters. **CENTER:** Full name in block capitals of 6mm to 10mm letters. **BOTTOM:** Name of the University, year of submission- all in block capitals of 6mm to 10mm letters on separate lines with proper spacing and centring.	60

VI. **Blank Sheets:** At the beginning and end of the report, two white black bound papers should be provided, one for the purpose of binding and other to be left blank.

5. **Abstract:** Every report should have an abstract following the Institute's Certificate. The abstract shall guide the reader by highlighting the important material contained in the individual chapters, section, subsection etc.
6. **Certificates etc:** The report should contain the following:
   I. Institute Certificate: Successful completion of project by competent authority.
   II. Acknowledgment
   III. List of Figures
   IV. Tables
   V. Nomenclature and Abbreviations
7. **Contents of the Project Report:** The project report must contain following in form of chapter, however student may include any other relevant chapter(s):
   I. **Introduction to the project:** This chapter shall highlight the purpose of project work, it will also define the chapters to be followed in the Project Report.
   II. **Scope of work:** Brief scope of the project work done
   III. **Existing System and Need for proposed System:** If there is some system already in use, then give brief detail of it in order to help to understand the enhancements carried out by the student in the existing system.
   IV. **Operating Environment**: Hardware and Software required and used.
   V. **Proposed System:** Which may contain following:
      a. **Objectives to be fulfilled**: clearly define the objective(s) of the system.
      b. **User Requirements**: State the requirements of the use in an unambiguous manner.
      c. **Requirements Determination Techniques and Systems Analysis Methods Employed:** Use the formal methods to describe the requirements of the use like Fact Finding Methods, Decision Analysis, and Data Flow Analysis etc.
      d. **Prototyping:** If the prototypes has been developed prior to the detailed design, then give details of the prototype.
      e. **System Feature**: Which includes as follows:
      - Module specifications
        - D.F.D. and ER
        - System flow charts
        - Data Dictionary
        - Structure charts
        - Database /File layouts
        - Design of Input Design of Output screens and reports
        - User Interfaces
        - Design of Control Procedures
8. **Testing procedures and Implementation phase**
9. **Problems encountered, Drawbacks and Limitations**
10. **Proposed Enhancements/ Future enhancement**
11. **Conclusions**
12. **Bibliography**
13. **Annexure**

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman
Sunil

ANJEETA KUJUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Database system concept, H. Korth and A. Silberschatz, TMH Publications.
- Data Base Management System, Alexies & Mathews,Vikash publication.
- Roger S. Pressman, Software Engineering, A practitioner's Approach, 6th edition, McGraw Hill International Edition.

Reference Books Recommended:

- The Complete Reference, Kevin Loney, Oracle Press.
- SQL, PL/SQL the Programming Language of Oracle, Ivan Bayross, PustakKosh Publication.
- Microsoft SQL Server Management and Administration, Ross, STM Publications.
- James Rumbaugh, Ivar Jacobson, The unified modelling language user guide Grady Booch, Pearson Education.

Online Resources:

- SWAYAM URL link for DBMS and RDBMS: https://youtu.be/f6LGtJutWyA
- SWAYAM URL link for DBMS and RDBMS: https://**swayam**.gov.in/courses/4434-data-base-management-system
- Introduction of RDBMS from SWAYAM : https://onlinecourses.nptel.ac.in/noc19_cs46/preview
- Introduction to DMBS: https://www.w3schools.in/dbms/intro
- NPTEL YouTube Channel: Software Engineering Lectures by Prof Rajib Mall, IIT Kharagpur https://youtube.com/playlist?list=PLbRMhDVUMngf8oZR3DpKMvYhZKga90JVt&si=tTBITZUdivHpNz1H
- NPTEL YouTube Channel: Software Engineering Lecture Series https://youtube.com/playlist?list=PL8751DA481F0F0D17&si=07IfYV7GP8_oc1xZ

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	100 Marks
End Semester Exam (ESE):	100 Marks

Name and Signature of Convener & Members of CBoS:

Dr H.S. Hota
chairman

(Sarvesh Thakur)

Sheikh Arif

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART-A: Introduction

Program: Bachelor in Science (CS) *(Certificate / Diploma / Degree/Honors)*	Semester – I/III/V	Session: 2024-2025

1	Course Code	**CSVAC–01**
2	Course Title	**Artificial Intelligence**
3	Course Type	**Value Addition Course (VAC)**
4	Prerequisite	*As per program*
5	Course Learning Outcomes(CLO)	At the end of this course, students will be able to: • Understand basics of AI. • Understand problem solving techniques of AI. • Aware about AI tools. • Explore application of AI in various domains. • Understand the current scenario of AI in India.
6	Credit Value	**2 Credits** *Credit = 15 Hours -Learning & Observation*
7	Total Marks	**Max. Marks: 50** **Min Passing Marks: 20**

PART – B: Content of the Course

Total No. of Teaching– Learning Periods (01 Hr. per period) - 30 Periods (30 Hours)

Unit	Topics (Course contents)	No .of Period
I	**Introduction:** Overview of Artificial Intelligence (AI), Foundations of AI, Areas and Applications of AI in various domains, AI in India, Impact and examples of AI, Future of AI.	8
II	**Advanced AI:** Basic Concept of Machine Learning, Deep Learning, Computer vision, Natural Language Processing (NLP), Speech recognition, Generative AI Applications.	8
III	**AI Tools:** Conversational AI: ALEXA, CORTANA, SIRI etc., AI tools for content generation, Image creation, Presentation, Video editing etc.	8
IV	**Application of AI:** Agriculture, Healthcare, Environment, Teaching-Learning, E-Commerce, Industry, Research etc.	6

Keywords *Artificial Intelligence (AI), Machine Learning (ML), Deep Learning, Computer Vision, Natural Language Processing (NLP), Conversational AI, Generative AI.*

Name and Signature of Convener & Members of CBoS:

Dr H.S. Hota chairman

Suresh Thakur

Shailendra Arya

Dr. V.K. Gupta

ANJEETA KUJU

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Introduction to Artificial Intelligence and Expert Systems, Dan W. Patterson, PHI Publication.
- Artificial Intelligence, Elaine Rich and Kevin Knight TMH publication.

Reference Books Recommended:

- Artificial Intelligence and machine learning, Vinod Chandra S.S., Anand Hareendrn S., PHI learning private Ltd.
- Foundations of Artificial Intelligence and Expert Systems, Macmillan Series in Computer Science, V.S. Jankiraman, K. Sarukesi and P. Gopala Krishnan.

Online Resources:

- Ministry of Electronics and Information Technology Portal for INDIAai:
  https://indiaai.gov.in/
  Introduction to Artificial Intelligence from SWAYAM:
  https://www.youtube.com/watch?v=pKcVMlkFpRc&list=PLwdnzlV3ogoXaceHrrFVZCJKbm_laSHcH&index=2
  An introduction to Artificial Intelligence from SWAYAM:
  https://onlinecourses.nptel.ac.in/noc24_cs08/preview
- Introduction to Artificial Intelligence from Coursera:
  https://www.coursera.org/learn/introduction-to-ai
- Introduction to Artificial Intelligence:
  https://www.javatpoint.com/artificial-intelligence-ai
- How to Learn Artificial Intelligence from Coursera:
  https://www.coursera.org/articles/how-to-learn-artificial-intelligence

PART-D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

MaximumMarks:	50 Marks
Continuous Internal Assessment(CIA):	15 Marks
End Semester Exam(ESE):	35 Marks

Continuous InternalAssessment(CIA): (By Course Teacher)	Internal Test / Quiz-(2): **10 + 10** Assignment/Seminar- **05** Total Marks - **15**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory/Field Skill Performance: On spot Assessment** **A. Performed the task based on learned skill - 20 Marks** **B. Spotting based on tools (Written) - 10 Marks** **C. Viva-voce (based on principle/technology)- 05 Marks**	**Managed by Coordinator as per skilling**

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

ANJEETA KUMAR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF COMPUTER SCIENCE
COURSE CURRICULUM

PART- A: Introduction

Program: Bachelor of Science (CS) *(Certificate / Diploma / Degree)*	Semester - II/IV/V/VI	Session: 2024-2025

1	Course Code	**CSSEC-01**	
2	Course Title	**Multimedia and Animation**	
3	Course Type	**Skill Enhance Course (SEC)**	
4	Prerequisite	***As Per Program***	
5	Course Learning. Outcomes (CLO)	After Completing this course, students will be able to: • Understand about Multimedia Framework. • Work with Adobe Flash. • Create games using Flash. • Film editing using VFX.	
6	Credit Value	**2 Credits (1C+1C)**	***Credit =15 Hours Theoretical Learning and = 30 Hours Laboratory or Field learning/Training***
7	Total Marks	**Max. Marks: 50**	**Min Passing Marks: 20**

PART -B: Content of the Course

Total No. of Teaching-learning periods:
Theory- 15 Periods (15 Hrs.) and Laboratory or Field learning/Training Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
Theory Content	1. Introduction to multimedia, multimedia hardware, multimedia software and frameworks. 2. Introduction to flash, creating games, making presentations, animation, visualizations. 3. Introduction to VFX, VFX compositing and editing, animation, motion, modelling artist, texture artist, painting, rigging.	15
Lab/Field Training Content	1. Create and Edit 2D animation using Flash. 2. Create and Edit 3D animation using Flash. 3. Making presentation using Flash. 4. Creating games using Flash. 5. Audio/video Editing using VFX. 6. Film editing using VFX. 7. Color grading using VFX. 8. Motion graphics designing using VFX.	30
Keywords	*Multimedia, Animation, Flash, VFX.*	

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

ANJEETA KUJUR

PART–C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Brian Underdahl, Macromedia Flash MX: The Complete Reference, McGraw-Hill
- Ibis Fernandez, Flash Animation and Cartooning: a creative guide
- Tony white, The animators to Adobe Flash.
- Ian failes, Masters of FX.

Reference Books ***Recommended:***

- Jan Marrelli , A Guide to Web Development Using Adobe Dreamweaver CS3 with Fireworks and Flash, Lawrenceville Press
- Codex Jeffrey A. Okun and Susan Zwerman, The VES handbook of Visual Effects: Indutry Standard VFX Practices and Procedures.

Online Resources:

- Introduction to Multimedia: https://www.javatpoint.com/multimedia-definition#:~:text=Multimedia%20combines%20several%20media%20formats,users%20engage%20with%20the%20information.
- Introduction to Multimedia: https://www.w3schools.com/html/html_media.asp
- Introduction to Flash: https://www.javatpoint.com/what-is-flash#:~:text=Adobe%20Flash%20is%20usually%20installed,of%20disabling%20the%20browser%20extension.
- Introduction-To-Macromedia-Flash-8: https://www.geeksforgeeks.org/introduction-to-macromedia-flash-8/

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**50 Marks**
Continuous Internal Assessment (CIA):	**15 Marks**
End Semester Exam (ESE):	**35 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar +Attendance - **05** Total Marks - **15**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory / Field Skill Performance:** On spot Assessment A. Performed the Task based on lab. work - 20 Marks B. Spotting based on tools & technology (written) – 10 Marks C. Viva-voce (based on principle/technology) - 05 Marks	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members of CBoS:

Dr. H.S. Hota
Chairman

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024-28)
Department of Library and Information Science
Course Curriculum for SEC

PART-A: Introduction				
Program: Undergraduate *(Certificate / Diploma / Degree / Honors)*			Semester - II/IV/V/V	Session: 2024-2025
1	Course Code	LISEC-01		
2	Course Title	Content Management and Web Development		
3	Course Type	SEC (Skill Enhancement Courses)		
4	Pre-requisite (if, any)	*As per Program*		
5	Course Learning. Outcomes (CLO)	*Understand the fundamental concepts of Content management and Web Page Designing.* *Able to understand popular platform for creating websites and Content Management System.* *Able to understand the Installation, Setup of Word Press, and JOOMLA, DRUPAL* *Able to Understanding the Dashboard Templates, Layouts, Extensions, Content Creation, Customization, Back up and Maintenance of Word Press, JOOMLA, DRUPAL.*		
6	Credit Value	2 Credits (1C+ 1C)	*Credit = 15 Hours – Theoretical learning and = 30 Hours Laboratory or Field learning/Training*	
7	Total Marks	Max. Marks: 50		Min Passing Marks: 20

PART-B: Content of the Course		
Module	Total No. of Teaching–learning Periods: Theory–15 Periods (15Hrs) and Lab. Or Field learning / Training 30 Periods (30 Hours)	No. of Period
Theory Contents	**Introduction and History** • Web Content Development and Management, Content types and Formats, Norms and Guidelines of Content Development • Word Press • JOOMLA • DRUPAL	15 (15 Hr)
Lab./Field Training Contents	**Practice** • **Word Press** Installation and Setup, Understanding the Dashboard, Themes, Plugins, Content Creation, Customization, Backup and Maintenance. • **JOOMLA** Installation and Setup, Understanding the Dash board, Templates and Layouts, Extensions, Content Creation, Customization, Backup and Maintenance. • **DRUPAL** Installation and Setup, Understanding the Dashboard, Content Types and Fields, Themes and Layouts, Modules, Views and Blocks, Taxonomy and Tagging, User Management, Multilingual Websites, Backup and Maintenance.	30 (30 Hr)
Keywords	.....	

Signature of Convener & Members, CBOS:

AINJEETA KUJUR

PART–C

Learning Resources: Text Books, Reference Books and Others

Text Books Recommended-

1. Michaud, T.(2013). *Foundations of Web Design: Introduction to HTML & CSS*. New Riders.
2. Casabona, J.(2020). HTML and CSS: Visual Quick Start Guide. Peachp it Press.
3. Rahmel, D. (2007). Professional Joomla. John Wiley & Sons.
4. Rahmel, D. (2008).Beginning Joomla: From novice to professional. Apress.
5. Kumar, R. (2018).MasteringDrupal8:Anadvancedguidetobuildingandmaintainingwebsites with Drupal 8. Packt Publishing.
6. Deshpande, V., & Shah, N.(2017).HTML5andCSS3:BuildingResponsiveWebsites.BPB Publications.
7. Duckett, J.(2014).HTML and CSS: Design and Build Websites. Wiley.
8. McFarland, D. (2018). HTML, CSS, and Java Script All in One. Wiley.
9. Morris, J. (2019).Learning WebDesign:ABeginner'sGuidetoHTML,CSS,JavaScript,andWeb Graphics. O'Reilly Media.
10. Smith,J.(2019).WordPressforBeginners:AStep-by-StepGuidetoBuildingYourOwn Website or Blog. Wiley.
11. Patel, R.(2020).Drupal9Explained:YourStep-by-StepGuidetoDrupal9. OS Training.
12. Gupta, S. (2018). Joomla3 Explained: Your Step-by-Step Guidet o Joomla3. OS Training.

Online Resources–

- https://egyankosh.ac.in/bitstream/123456789/35916/5/Unit-12.pdf
- JoomlaContentManagementSystem(CMS) -tryit!It's free!
- IntroductiontoContentManagementSystem(CMS) (w3schools.in)
- e-PGPathshala(inflibnet.ac.in)
- Drupal-OpenSourceCMS|Drupal.org
- https://wordpress.com/

Online Resources–

☐**e-Resources/e-books and e-learning portals**

Part-D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:
Maximum Marks: 50Marks
Continuous Internal Assessment (CIA): 15Marks
End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): **(By Course Coordinator)**	Internal Test/Quiz- (2): **10 & 10** Assignment/Seminar +Attendance - **05** Total Marks - **15**	Better marks out of the two Test/ Quiz +obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory/Field Skill Performance:** **On spot Assessment** **A. Performed the Task based on learned skill- 20 Marks** **B. Spotting based on tools (written) – 10 Marks** **C. Viva-voce (based on principle/technology)- 05 Marks**	**Managed by Coordinator as per skilling**

Signature of Convener & Members:

(Dr. S. Jain)

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024-28)
Department of Library and Information Science
Course Curriculum for SEC

PART-A: Introduction			
Program: Undergraduate *(Certificate / Diploma / Degree/Honors)*		Semester - II/IV/V/V	Session: 2024-2025
1	Course Code	LISEC-02	
2	Course Title	Literature Review and Reference Management	
3	Course Type	SEC (Skill Enhancement Courses)	
4	Pre-requisite (if, any)	*As per Program*	
5	Course Learning. Outcomes (CLO)	Students will be able ➢ To understand the Concept of Literature review ➢ To understand the Conduct the Literature review ➢ To understand the Understand the various reference style. ➢ To use the reference management tools ➢ To understand the various search strategies.	
6	Credit Value	2 Credits (1C+ 1C)	*Credit=15 Hours – Theoretical learning and = 30 Hours Laboratory or Field learning/Training*
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20

PART-B: Content of the Course

Module	Total No. of Teaching–learning Periods: Theory–15 Periods (15Hrs) and Lab. Or Field learning/Training 30 Periods (30 Hours)	No. of Period
Theory Contents	**Literature Review and Reference Management (Theory)** • LiteratureReview:Concept,Types,NeedandtheirImportance,Sourcesfor review of Literature. • Search Strategies in Literature review. • Writing effective literature review, Bibliographic elements • Basics of Citations and References, Measure to avoid plagiarism in research, Overview of Citation Analysis.	15(15Hr)
Lab./Field Training Contents	**Literature Review and Reference Management (Practice)** • Hands on practice on Citation and Reference management tool (Mendely, Zotero etc). • Practice of Referencing Style (APA and MLA, CHICAGO). • Hands on Practice on various Databases and Literature Review. • Practice of various search strategies in Literature Review.	30(30Hr)
Keywords	.....	

Signature of Convener & Members:

11/06/24

(Sushil Kr. Sahu) (Suresh Thakur) (Dr. S. Jain) (Dr. Aramita Shukla Sharma)

Shailendra Arya

ANJEETA KUJUR

PART–C

Learning Resources: Text Books, Reference Books and Others

Text Books Recommended-

1. Weyers, J., & McMillan, K.(Pearson Education).How to Cite, Reference &Avoid Plagiarism at University EBook. United Kingdom: Pearson Education.
2. Booth, A., Sutton, A., Papaioannou, D. (2016). Systematic Approaches to a Successful Literature Review. United Kingdom: SAGE Publications.
3. Galvan, J. L., Galvan, M. C. (2017). Writing Literature Reviews: A Guide for Students of the Social and Behavioral Sciences. United Kingdom: Taylor & Francis.
4. Hart,C.(2001).DoingaLiteratureSearch:AComprehensiveGuidefortheSocialSciences.United Kingdom: SAGE Publications.
5. McEvoy, B. T., Machi, L. A. (2012). The Literature Review: Six Steps to Success. United States: SAGE Publications.
6. Ridley,D.(2012).TheLiteratureReview:AStep-by-StepGuideforStudents.UnitedKingdom:SAGE Publications.
7. Muhammad, Rafiq.(2023).LiteratureReviewsimplified:ApracticalGuideforBeginners.ISBN-978- 9198900750.
8. Greetham,Bryan.(2021).HowtowriteyourliteratureReview.BloomsburyAcademic.ISBN-978- 1352011043.
9. Young,DonaJ.(2023).APAEssentials:Style,formattingandGrammar.7thEdition.
10. CognellaInc.ISBN978-1793581556.
11. MLAHandbook-9thedition(2021).ModernLanguageAssociation.ISBN-978-1603293518
12. Raibenheimer,Jacques.(2019)Mendeley:CrowdsourcedRofesenceandcitationmanagementinthe Information Era.True Insight Publishing.ISBN-978-0620594424.
13. Carter,S.,&Laurs,D.(2017).DevelopingResearchWriting:AHandbookforSupervisorsandAdvisors. New York: Routledge.
14. Parija,S.C.,&Kate,.(2017).WritingandPublishingaScientificResearchPaper.Singapore:Springer.

Online Resources–

- https://egyankosh.ac.in/bitstream/123456789/40653/1/Unit-3.pdf
- e-PGPathshala(inflibnet.ac.in)
- https://egyankosh.ac.in/bitstream/123456789/35677/1/Unit-3.pdf
- https://www.egyankosh.ac.in/bitstream/123456789/63508/2/Unit-15.pdf

Online Resources–

☐**e-Resources/e-books and e-learning portals**

Part-D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: **50Marks**

Continuous Internal Assessment (CIA): **15Marks**

End Semester Exam (ESE): **35 Marks**

Continuous Internal Assessment (CIA): (By Course Coordinator)	Internal Test/Quiz- (2): **10 & 10** Assignment/Seminar +Attendance - **05** Total Marks - **15**	Better marks out of the two Test/ Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory/Field Skill Performance:** **On spot Assessment** **A. Performed the Task based on learned skill- 20 Marks** **B. Spotting based on tools (written) – 10 Marks** **C. Viva-voce (based on principle/technology)- 05 Marks**	**Managed by Coordinator as per skilling**

Signature of Convener & Members:

(Dr. S. Jain)

(Suresh Thakur)

ANJEETA KUJUR

FOUR YEAR UNDERGRADUATE PROGRAM (2024 -2028)
DEPT. OF SPORTS: VALUE ADDITION COURSE
COURSE CURRICULUM (2024-25)

PART-A: Introduction			
Program: Undergraduate *(Certificate / Diploma / Degree/Honors)*		Semester - I/III/V	Session: 2024-2025
1	Course Code	LIVAC-01	
2	Course Title	Library & Information Resources	
3	Course Type	VAC(Value Added Courses)	
4	Pre-requisite (if, any)	*As per Program*	
5	Course Learning. Outcomes (CLO)	▯ Acquainted with library resources and their various types. ▯ Understood general and reference sources. ▯ Familiar with electronics and open resources. ▯ Able to evaluate library resources and locate answer to reference queries. ▯ Able to evaluate of Web-Based Resources.	
6	Credit Value	2 Credits	*Credit = 15 Hours - learning & Observation*
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20

PART -B: Content of the Course

Total No. of Teaching–learning Periods (01 Hr. per period) - 30 Periods (30 Hours)

Module	Topics (Course contents): Learning and Practices	No. of Periods
I	**Understanding Library Resources** • Concept, Definition, Scope • Types of Library and Information Sources • Documentary and Non-Documentary Sources • Primary, Secondary and Tertiary Sources	08 (08Hr)
II	**General and Reference Sources** • Meaning, Definition, Scope • General Resource Materials • Reference Sources-Nature and types • General Sources vs. Reference sources	07 (07Hr)
III	**Electronic and Open Access Resources** • E-resources-meaning, concept and definition • Types, nature and scope • Open access resources-nature and accessibility • Web based resources-nature and accessibility	08 (08Hr)
IV	**Evaluation of Library Resources** • Need and Purpose of Evaluation • Criteria for Evaluation • Evaluation of Documentary Resources • Evaluation of Web-Based Resources	07 (07Hr)
Keywords	.....	

Signature of Convener & Members, CBOS:

11/06/24

(Dr. S. Jain)

(Dr. Armika Shukla Sharma)

(Suresh Thakur)

Shailendra Arya

ANJEETA KUJUR

PART–C

Learning Resources: Text Books, Reference Books and Others

Text Books Recommended-

1. Bopp, R. C. & Smith, L.C. Reference & InformationServices,2nd Ed. US.LibrariesUnlimited,2011.
2. Cassell, K. A. & Hiremath,U.Reference&InformationServicesinthe21stCentury:AnIntroduction,2 nd Ed. US, American Library Association, 2011.
3. Kaushal,C.&Mahapatra,R.K.OpenAccessE-ResourcesinLibrary&InformationScience.NewDelhi, Ess Ess Publication, 2013.
4. Kumar, K. Library Manual, 4th Ed. New Delhi, S. Chand, 2018.
5. Kumar, PSG.InformationSourcesandServices-TheoryandPractice.Vol.6.NewDelhi:BR Publishing Corporation, 2004.
6. Ranganathan,SR.LibraryBookSelection.NewDelhi.EssEssPublications,2006
7. Ranganathan,SR.LibraryManual.NewDelhi.EssEssPublications,2008
8. Sharma,(J.S.)andGrover(DR).ReferenceServicesandSourcesofInformation.NewDelhi.EssEss Publications, 1987.
9. Singh, G. Information Sources,Services&Systems.NewDelhi,PrenticeHallIndiaLearning,2013.

Online Resources–

- LCh-009.pdf(nios.ac.in)
- LCh-001.pdf(nios.ac.in)
- https://ebooks.lpude.in/library_and_info_sciences/DLIS/Year_1/DLIS001_FOUNDATION_OF_LIBRARY_AND_INFORMATION_SCIENCE.pdf
- eGyanKosh:BLI-221Library,InformationandSociety
- MicrosoftWord-LG-Lesson1Lib(nios.ac.in)
- MicrosoftWord-BLIS-101.1 (uou.ac.in)
- http://14.139.237.190/other_pdf/BLIS_01_N.pdf(UPRTOU)
- http://14.139.237.190/other_pdf/BLIS-01.pdf(UPRTOU)
- eGyanKosh:बीएलआई221पुस्तकालयसूचनाएवंसमाज
- LCh-001H.pdf(nios.ac.in)
- LCh-002H.pdf(nios.ac.in)
- e-PGPathshala(inflibnet.ac.in)
- ref1-1(lpude.in)
- eGyanKosh:BLIS-05ReferenceandInformationSources
- pssou.ac.in/read_e_book?id=424c49425f3036
- http://14.139.237.190/other_pdf/BLIS_06.pdf(UPRTOU)
- LCh-008H.pdf(nios.ac.in)
- LCh-007H.pdf(nios.ac.in)
- LCh-006H.pdf(nios.ac.in)
- LCh-005H.pdf(nios.ac.in)
- e-PGPathshala(inflibnet.ac.in)
- unit7 (egyankosh.ac.in)Unit-3.pdf(egyankosh.ac.in)
- BLIS-106.pdf(uou.ac.in)
- BLIS6.pdf(vmou.ac.in)

Online Resources–

☐**e-Resources/e-books and e-learning portals**

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**50 Marks**
Continuous Internal Assessment (CIA):	**15 Marks**
End Semester Exam (ESE):	**35 Marks**

Continuous Internal Assessment (CIA): **(By Course Teacher)**	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar +Attendance - **05** Total Marks - **15**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Two section – A & B** Section **A**: **Q1**. Objective – **05 x1= 05** Mark; **Q2**. Short answer type- **5x2 =10 Marks** Section **B**: Descriptive answer type qts., **1out of 2** from each unit- **4x05 =20 Marks**	

Name and Signature of Convener & Members of CBOS:

(Dr. S. Jain)

FOUR YEAR UNDERGRADUATE PROGRAM (2024 -2028)
DEPT. OF SPORTS: VALUE ADDITION COURSE
COURSE CURRICULUM (2024-25)

PART-A: Introduction				
Program: Undergraduate *(Certificate / Diploma / Degree/Honors)*		**Semester - I/III/V**		Session: **2024-2025**
1	**Course Code**	**LIVAC-02**		
2	**Course Title**	**Open Access and Scholarly Communication**		
3	**Course Type**	**VAC (Value Added Courses)**		
4	**Pre-requisite (if, any)**	***As per Program***		
5	**Course Learning. Outcomes (CLO)**	▯ To get acquainted with the scholarly communication process and channels of communication necessary in the higher education scenario. ▯ To understand with the Copyright and Open Access policies associated with the publishing industry. ▯ To know and avoid malpractices in academic publishing. ▯ To Know about various academic Performance Indicators.		
6	**Credit Value**	**2 Credits**	***Credit = 15 Hours - learning & Observation***	
7	**Total Marks**	**Max. Marks: 50**	**Min Passing Marks: 20**	

PART -B: Content of the Course

Total No. of Teaching–learning Periods (01 Hr. per period) - 30 Periods (30 Hours)

Module	Topics (Course contents): Learning and Practices	No. of Periods
I	**Introduction to Scholarly Communication** • Genesis of Scholarly Communication • Academic Publishing: Process, Importance and Ethics • Channels of Academic Publishing • Academic Journals and Peer Review Process.	**08 (08Hr)**
II	**Academic Integrity** • Scientific Misconduct: Falsification, Fabrication and Plagiarism • UGC mandate son Plagiarism • Various Facets of Authorship • Identification of Publication Misconducts and its consequences; Predatory Journals.	**07 (07Hr)**
III	**Open Access Research** • Intellectual Property Rights • Open Access Policy • Open Access Publication Process • Open Knowledge Repositories on Various Subject; NDLI,SWAYAM-MOOCS, e-PG Pathshala, NPTEL, etc.	**08 (08Hr)**
IV	**Academic Performance Indicators** • Journal Indexing and Performance Indicators • Citation Indexing; ISSN and ISBN numbering • ElectronicDatabases(BibliographicDatabases,CitationDatabases,Full-text Databases, E-Journal Gateways) • UGC-CARE, Scopus, Web of Science, Google Scholar, ORCID, Research Gate, SJR ranking, etc.	**07 (07Hr)**
Keywords	.....	

Signature of Convener & Members:

(Dr. S. Jain)

PART–C

Learning Resources: Text Books, Reference Books and Others

Text Books Recommended-

1. Borgman, C.L(2010),ScholarshipintheDigitalAge:Information,infrastructure,andtheInternet, Cambridge, Massachusetts: The MIT Press.
2. Das,ArupKumar(2015),ScholarlyCommunication,Paris:UNESCO.Availableat: https://unesdoc.unesco.org/ark:/48223/pf0000231938
3. Bohannon,J.(2013).Who'sAfraidofPeerReview?Science,342(6154),60-65. DOI:10.1126/science.342.6154.60
4. Webster,P.J.(2008),Managing Electronic Resources: New and ChangingRolesforLibraries,Oxford: Chandos Publishing
5. Cargill,M.,& O'Connor, P.(2013),Writing Scientific Research Articles: Strategy and Steps, Hoboken: Wiley-Blackwell.

Online Resources–

- https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=9JW4FTxyrU+Wsr8xl8vgiw==
- https://egyankosh.ac.in/bitstream/123456789/8720/1/Unit-2.pdf
- https://egyankosh.ac.in/handle/123456789/8720?mode=full
- https://guides.lib.unc.edu/open-access-and-scholarly-communications
- https://ebooks.inflibnet.ac.in/lisp20/chapter/scholarly-communication-and-open-access-creating-knowledge-without-borders/
- eGyanKosh:Unit-21AdministrativeEthicsandIntegrityinCivilServices.
- eGyanKosh:BEGG-173AcademicWriting&Composition
- ResearchandPublicationEthics(RPE) -Course(swayam2.ac.in)
- eGyanKosh:MLIE-103AcademicLibrarySystem
- (PDF) Ethics inResearch Publications: Fabrication, Falsification,and Plagiarismin Science Chapter 3inBooktitled"AcademicIntegrityandResearchQuality"publishedbyUGC,Dec.2021(researchgate.net).

Online Resources–

□e-Resources/e-books and e-learning portals

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:	**50 Marks**
Continuous Internal Assessment (CIA):	**15 Marks**
End Semester Exam (ESE):	**35 Marks**

Continuous Internal Assessment (CIA): **(By Course Teacher)**	Internal Test / Quiz-(2): **10 & 10** Assignment/Seminar +Attendance - **05** Total Marks - **15**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Two section – A & B** Section **A**: **Q1**. Objective – **05 x1= 05** Mark; **Q2**. Short answer type- **5x2 =10 Marks** Section **B**: Descriptive answer type qts.,**1out of 2** from each unit- **4x05 =20 Marks**	

Name and Signature of Convener & Members of CBOS: