Criterion – 2

2.6.1 Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY)

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CYCLE 1 - NAAC ACCREDITATION 2023

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY)

HUT 101 LIFE SKILLS (2019 scheme)

Semester : 1

Course Title: **LIFE SKILLS**
Course Code: HUN 101

Course Outcomes (CO)

After the successful completion of this course, students will able to

No.	Course outcomes	Knowledge Level
HUN101.1	Define and Identify different life skills required in personal and professional life	**K_3**
HUN101.2	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.	**K_3**
HUN101.3	Explain the basic mechanics of effective communication and demonstrate these through presentations	**K_2**
HUN101.4	Take part in group discussions	**K_5**
HUN101.5	Use appropriate thinking and problem-solving techniques to solve new problems	**K_3**
HUN101.6	Understand the basics of teamwork and leadership	**K_6**

CO – PO Matrix

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
HUN101.1	-	-	-	-	-	-	-	1	-	3	-	2	-	-
HUN101.2	-	-	-	-	-	-	-	-	-	1	-	3	-	-
HUN101.3	-	-	1	-	-	1	-	-	1	3	-	-	-	-
HUN101.4	-	-	-	-	-	-	-	-	-	3	-	1	1	-
HUN101.5	-	-	1	-	-	-	-	-	2	3	-	-	-	-
HUN101.6	1	-	-	-	-	1	-	-	1	3	-	-	1	-
	1	-	1	-	-	1	-	1	1	3	-	2	1	-

JUSTIFICATIONS FOR CO-PO MAPPING

Mapping	Mapping Level (3/2/1)	Justifications
CO6 – PO1	1	Graduate will be able to understand the significance of teamwork in bringing solutions to complex engineering problems
CO3 – PO3	1	Graduate will be able to comprehend the need for effective communication and its significance in understanding the specified needs in designing a system with needed consideration
CO5 – PO3	1	Graduate will be able to apply the appropriate approach in developing novel solution to engineering problems considering the cultural, societal and environmental considerations.
CO3 – PO6	1	Graduate will be able to develop effective presentation based on the reasoning applied on information obtained from contextual knowledge
CO6- PO6	1	Graduates will be able to understand the implications of teamwork and effective leadership to help in reaching plausible conclusions taking appropriate considerations
CO1-PO8	1	Graduates will be able to the right moral and ethical values that are close to their core values to help develop themselves as better professionals
CO3 – PO9	1	Graduates will understand the need for effective communication to work effectively in a team.
CO5- PO9	2	Graduate will able to apply the techniques required as an individual or as a team member to create effective presentation
CO6-PO9	1	Graduate will understand the need for teamwork and leadership skills to effectively work in a team or as an individual
CO1-PO10	3	Graduate will be able to identify the right skill that needs to be developed in communicating effectively in complex engineering problems
CO2-PO10	1	Graduate will be able to develop the skills needed to understand the way in communicating and comprehending to the other member in his/her team
CO3-PO10	3	Graduate will be able to communicative effectively in engineering activites by developing the needed understanding to set up an effective presentation
CO4-PO10	3	Graduate will be able to display healthy participation in group discussions in developing effective solution
CO5-PO10	3	Graduate will be able to apply appropriate thinking technique to develop design documentation and reports

CO6-PO10	3	Graduate able to understand the basic function of team/group and how effective communications plays a part in it

CO1-PO12	2	Graduates will be able to recognize the need for developing life skills in their life that would culminate to importance of life-long learning for their professional life
CO2-PO12	3	Graduates will be able to understand the methods of self-awareness and managing of stress to help him/her better equip for independent and life – long learning
CO4-PO12	1	Graduate will be able to discuss his/her ideas related to technology and its advancement effectively that would channel towards the right direction for research
CO4-PSO1	1	Graduate will understand the significance of effective group discussion to help in design of complex electronic systems
CO6-PSO1	1	Graduate will understand the need for teamwork and leadership in design of complex electronic systems

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY)

COURSE OUTCOME: EST102 COMPUTER PROGRAMMING

The students will be able to

CO	Course outcome	Knowledge level
EST102.1	Analyze a computational problem and develop an algorithm/flowchart to find its solution	K3
EST102.2	Develop readable C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators.	K3
EST102.3	Write readable C programs with arrays, structure or union for storing the data to be processed	K3
EST102.4	Divide a given computational problem into a number of modules and develop a readable multi-function C program by using recursion if required, to find the solution to the computational problem	K3
EST102.5	Write readable C programs which use pointers for array processing and parameter passing	K3
EST102.6	Develop readable C programs with files for reading input and storing output	K3

CO-PO MAPPING

PO / CO	Programme outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	-	2	-	-	-	3	3	3	3	-	2
CO2	3	3	3	2	2	-	-	-	-	2	-	3	3	-	-
CO3	3	3	3	1	2	-	-	-	-	2	-	3	3	2	-
CO4	3	3	3	1	2	-	-	-	-	2	3	3	3	2	-
CO5	3	3	-	-	2	-	-	-	-	1	-	3	3	1	-
CO6	3	3	-	-	2	-	-	-	-	1	-	3	3	1	-
AVG	3	3	3	1.5	2	2	-	-	-	1.83	3	3	3	1.5	2

Mapping	Low/Medium/ High	Justification
CO1-PO1	H	Students will be able to use Engineering knowledge by Analyzing a computational problem and develop an algorithm/flowchart.
CO1-PO2	H	With analyzing a computational problem and develop an algorithm/flowchart, the students are able to analyze complex engineering problems.
CO1-PO3	H	By analyzing a computational problem and develop an algorithm/flowchart, the students are able to design solutions for complex engineering problems.
CO1-PO4	M	Through analyzing a computational problem and develop an algorithm/flowchart, the students are able to conduct investigations of complex problems.
CO1-PO6	M	Students will be able to apply knowledge to assess social issues and responsibilities relevant to the professional engineering practice through analyzing a computational problem and developing solutions for that.
CO1-PO10	H	With analyzing a computational problem and develop an algorithm/flowchart, the students are able to communicate effectively on complex engineering activities with the engineering community.
CO1-PO11	H	The students will be able to demonstrate knowledge and understanding of the engineering principles and apply them in multi-disciplinary environments with the knowledge of analyzing a computational problem and developing an algorithm/flowchart.
CO1-PO12	H	By analyzing a computational problem and develop an algorithm/flowchart, the students are able to recognize the need for and to engage in independent and life-long learning in the broadest context of technological change.
CO1-PSO1	H	Through analyzing a computational problem and develop an algorithm/flowchart, the students are able to analyze, design and develop computing solutions.
CO1-PSO3	M	Students will be able to adapt to emerging technologies by providing innovative ideas and solutions to novel problems with the knowledge of analyzing a computational problem and developing Solutions.
CO2-PO1	H	With the knowledge of different Arithmetic, Logical, Relational or Bitwise operators, the students will be able to use Engineering knowledge.
CO2-PO2	H	With developing programs using branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators, the students are able to analyze complex engineering problems.

CO2-PO3	H	With the knowledge of branching and looping statements and operators and by developing programs using them, the students are able to design solutions for complex engineering problems.
CO2-PO4	M	The students are able to conduct investigations of complex problems with the knowledge of programming using branching and looping statements and operators.
CO2-PO5	M	With the knowledge of programming using branching and looping statements and operators, students will be able to select and apply appropriate techniques and IT tools like prediction and modelling to complex problems.
CO2-PO10	M	The students are able to communicate effectively on complex engineering activities with the engineering community with the knowledge of programming using branching and looping statements.
CO2-PO12	H	With the knowledge of different programming using branching and looping statements, the students are able to recognize the need for and to engage in independent and life-long learning in the broadest context of technological change.
CO2-PSO1	H	Students will be able to analyze, design and develop computing solutions with the knowledge of programming using branching and looping statements.
CO3-PO1	H	By examining how arrays, structure or union are used for storing data to be processed, the students will be able to apply knowledge in fundamentals of engineering and mathematics.
CO3-PO2	H	Students will be able to perform analysis of complex engineering problems by examining how arrays, structure or union are used for storing data to be processed
CO3-PO3	H	With the knowledge of how arrays, structure or union are used for storing data to be processed, the students will be able to design solutions for complex engineering problems.
CO3-PO4	L	With the knowledge of how arrays, structure or union are used for storing data to be processed, the students will be able to conduct investigations of complex problems.
CO3-PO5	M	With the knowledge of how arrays, structure or union are used for storing data to be processed, students will be able to select and apply appropriate techniques and IT tools like prediction and modelling to complex problems.
CO3-PO10	M	Students will be able to communicate effectively on complex engineering activities with the engineering community with the knowledge of how arrays, structure or union are used for storing data to be processed.
CO3-PO12	H	With the knowledge of how arrays, structure or union are used for storing data to be processed, the students will be able to recognize

		the need for and to engage in independent and life-long learning in the broadest context of technological change
CO3-PSO1	H	Students will be able to analyze, design and develop computing solutions with the knowledge of how arrays, structure or union are used for storing data to be processed.
CO3-PSO2	M	Students will be able to apply software engineering principles and practices for developing quality software with the gained knowledge of how arrays, structure or union are used for storing data to be processed.
CO4-PO1	H	Students will be able to use Engineering knowledge with developing readable multi-function C programs to find the solution to the computational problem.
CO4-PO2	H	Students will be able to perform analysis of complex engineering problems with developing readable multi-function C programs to find the solution to the computational problem.
CO4-PO3	H	Students will be able to design solutions for complex engineering problems by dividing a problem into modules and developing readable multi-function C programs to find the solution to the computational problem
CO4-PO4	L	With the knowledge of sub modules and by developing readable multi-function C programs to find the solution to the computational problem, the students will be able to conduct investigations of complex problems.
CO4-PO5	M	With the knowledge of Identifying Subtasks and developing readable multi-function C programs to find the solution to the computational problem, students will be able to select and apply appropriate techniques and IT tools like prediction and modelling to complex problems.
CO4-PO10	M	Students will be able to communicate effectively on complex engineering activities with the engineering community with the knowledge of Identifying Subtasks and developing readable multi-function C programs to find the solution to the computational problem.
CO4-PO11	H	The students will be able to demonstrate knowledge and understanding of the engineering principles and apply them in multi-disciplinary environments with the knowledge of Identifying Subtasks and developing readable multi-function C programs to find the solution to the computational problem
CO4-PO12	H	With the knowledge of Identifying Subtasks and developing readable multi-function C programs to find the solution to the computational problem, the students will be able to recognize the need for and to engage in independent and life-long learning in the broadest context of technological change

CO4-PSO1	H	Students will be able to analyze, design and develop computing solutions with the knowledge of Identifying Subtasks and developing readable multi-function C programs to find the solution to the computational problem.
CO4-PSO2	M	Students will be able to apply software engineering principles and practices for developing quality software with the gained knowledge of Identifying Subtasks developing readable multi- function C programs to find the solution to the computational problem.
CO5-PO1	H	Students will be able to use fundamental Engineering knowledge by writing readable C programs which use pointers for array processing and parameter passing.
CO5-PO2	H	Students will be able to perform analysis of complex engineering problems with the knowledge of C programs which use pointers for array processing and parameter passing.
CO5-PO5	M	By writing readable C programs which use pointers for array processing and parameter passing, students will be able to select and apply appropriate techniques and IT tools like prediction and modelling to complex problems.
CO5-PO10	L	With writing C programs which use pointers for array processing and parameter passing, the students will be able to communicate effectively on complex engineering activities with the engineering community
CO5-PO12	H	With the knowledge of programs which use pointers for array processing and parameter passing., the students will be able to recognize the need for and to engage in independent and life-long learning in the broadest context of technological change
CO5-PSO1	H	Students will be able to analyze, design and develop computing solutions by writing readable C programs which use pointers for array processing and parameter passing.
CO5-PSO2	L	Students will be able to apply software engineering principles and practices for developing quality software with the gained knowledge of writing C programs which use pointers for array processing and parameter passing.
CO6-PO1	H	Students will be able to use Engineering knowledge with developing readable C programs with files for reading input and storing output.
CO6-PO2	H	Students will be able to perform analysis of complex engineering problems with the knowledge of developing C programs with files for reading input and storing output.
CO6-PO5	M	With developing readable C programs with files for reading input and storing output, the students will be able to conduct investigations of complex problems.

CO6-PO10	L	Through developing readable C programs with files for reading input and storing output, the students will be able to communicate effectively on complex engineering activities with the engineering community.
CO6-PO12	H	With the knowledge of the concept of File system for handling data storage and developing readable C programs with files, the students will be able to recognize the need for and to engage in independent and life-long learning in the broadest context of technological change.
CO6-PSO1	H	Students will be able to analyze, design and develop computing solutions with the knowledge of the concept of File system for handling data storage and developing readable C programs with files.
CO6-PSO2	L	Students will be able to apply software engineering principles and practices for developing quality software with the gained knowledge of File system for handling data storage and developing readable C programs with files.

SEMESTER 3

Programme : Bachelor of Technology
Course Code: CST203
Course Name: LOGIC SYSTEM DESIGN
Semester: 3

COURSE OUTCOMES

The students will be able to:

CO	Course outcome	Knowledge level
CST203.CO 1	Illustrate decimal, binary, octal, hexadecimal and BCD number systems, perform conversions among them and do the operations - complementation, addition, subtraction, multiplication and division on binary numbers (Cognitive Knowledge level: Understand)	K2
CST203.CO 2	Simplify a given Boolean Function and design a combinational circuit to implement the simplified function using Digital Logic Gates (Cognitive Knowledge level: Apply)	K3
CST203.CO 3	Design combinational circuits - Adders, Code Convertors, Decoders, Magnitude Comparators, Parity Generator/Checker and design the Programmable Logic Devices - ROM and PLA. (Cognitive Knowledge level: Apply)	K3
CST203.CO 4	Design sequential circuits - Registers, Counters and Shift Registers. (Cognitive Knowledge level: Apply)	K3
CST203.CO 5	Use algorithms to perform addition and subtraction on binary, BCD and floating-point numbers (Cognitive Knowledge level: Understand)	K2

CO - PO - PSO MAPPING

PO / CO	Programme outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CST203.CO 1	2	2	-	-	-	-	-	-	-	-	-	3	2	-	2
CST203.CO 2	3	3	3	3	-	3	-	-	-	-	-	3	3	-	3
CST203.CO 3	3	3	3	3	-	3	-	-	-	-	-	3	3	-	3
CST203.CO 4	3	3	3	3	-	3	-	-	-	-	-	3	3	-	3
CST203.CO 5	3	3	3	-	-	-	-	-	-	-	-	3	3	-	3

AVG	2.8	2.8	3	3	-	3	-	-	-	-	-	3	2.8	-	2.8

Correlation : 1-Low, 2-moderate, 3-high, No Correlation '-'

JUSTIFICATION

CO-PO	LEVEL (Low/ Moderate/ High)	JUSTIFICATION
CST203.CO1-PO1	Moderate	The knowledge of number system conversions and the arithmetic operations helps the students to understand the solution of simple engineering problems
CST203.CO2-PO1	High	By designing a combinational circuit to implement simplified Boolean functions, the students will be able to solve complex engineering problems.
CST203.CO3-PO1	High	By designing a combinational circuit and PLD the students will be able to solve complex engineering problems.
CST203.CO4-PO1	High	By designing a sequential circuit, the students will be able to solve complex engineering problems
CST203.CO5-PO1	High	By using the algorithms for arithmetic operations on different number systems, help the students to understand complex engineering problems.
CST203.CO1-PO2	Moderate	The knowledge of number system conversions and the arithmetic operations helps the students to understand the formulation of simple engineering problems
CST203.CO2-PO2	High	By designing a combinational circuit to implement simplified Boolean functions, the students will be able to identify and formulate complex engineering problems.
CST203.CO3-PO2	High	By designing a combinational circuit and PLD the students will be able to identify and formulate complex engineering problems.
CST203.CO4-PO2	High	By designing a sequential circuit, the students will be able to identify and formulate complex engineering problems
CST203.CO5-PO2	High	By using the algorithms for arithmetic operations on different number systems, help the students to identify and formulate of complex engineering problems.

CST203.CO2-PO 3	High	By designing a combinational circuit to implement simplified Boolean functions, the students will be able to design solutions for complex engineering problems.

CST203.CO3-PO 3	High	By designing a combinational circuit and PLD the students will be able to design solutions for complex engineering problems.
CST203.CO4-PO 3	High	By designing a sequential circuit, the students will be able to design solutions for complex engineering problems
CST203.CO5-PO 3	High	By using the algorithms for arithmetic operations on different number systems, help the students to design solutions for of complex engineering problems.
CST203.CO2-PO 4	High	By designing a combinational circuit to implement simplified Boolean functions, the students will be able to use research-based knowledge for the analysis and synthesis of data
CST203.CO3-PO 4	High	By designing a combinational circuit and PLD the students will be able to use research-based knowledge for the analysis and synthesis of data
CST203.CO4-PO 4	High	By designing a sequential circuit, the students will be able to use research-based knowledge for the analysis and synthesis of data
CST203.CO2-PO 6	High	By designing a combinational circuit to implement simplified Boolean functions, the students will be able to apply reasoning to assess the issues in different areas of society and address the responsibilities related to professional engineering practice.
CST203.CO3-PO 6	High	By designing a combinational circuit and PLD the students will be able to assess the issues in different areas of society and address the responsibilities related to professional engineering practice.
CST203.CO4-PO 6	High	By designing a sequential circuit, the students will be able to assess the issues in different areas of society and address the responsibilities related to professional engineering practice.
CST203.CO 1- PO12	High	The knowledge of number system conversions and the arithmetic operations helps the students can engage in continuous learning
CST203.CO 2- PO12	High	By designing a combinational circuit to implement simplified Boolean functions, the students can engage in continuous learning

CST203.CO 3- PO12	High	By designing a combinational circuit and PLD the students can engage in continuous learning
CST203.CO 4- PO12	High	By designing a sequential circuit, the students can engage in continuous learning

CST203.CO 5- PO12	High	By using the algorithms for arithmetic operations on different number systems, the students can engage in continuous learning
CST203.CO 1- PSO1	Moderate	The knowledge of number system conversions and the arithmetic operations helps the students to analyze, design and develop simple computing solutions
CST203.CO 2- PSO1	High	By designing a combinational circuit to implement simplified Boolean functions, the students will be able to analyze, design and develop computing solutions
CST203.CO 3- PSO1	High	By designing a combinational circuit and PLD the students will be able to analyze, design and develop computing solutions
CST203.CO 4- PSO1	High	By designing a sequential circuit, the students will be able to analyze, design and develop computing solutions
CST203.CO 5- PSO1	High	By using the algorithms for arithmetic operations on different number systems, help the students to analyze, design and develop computing solutions
CST203.CO 1- PSO3	Moderate	The knowledge of number system conversions and the arithmetic operations helps the students to adapt to emerging information and communication technologies
CST203.CO 2- PSO3	High	By designing a combinational circuit to implement simplified Boolean functions, the students will be able to adapt to emerging information and communication technologies
CST203.CO 3- PSO3	High	By designing a combinational circuit and PLD the students will be able to adapt to emerging information and communication technologies adapt to emerging information and communication technologies
CST203.CO 4- PSO3	High	By designing a sequential circuit, the students will be able to adapt to emerging information and communication technologies
CST203.CO 5- PSO3	High	By using the algorithms for arithmetic operations on different number systems, help the students to adapt to emerging information and communication technologies

Programme : Bachelor of Technology
Course Code: CST201
Course Name: Data Structures
Semester: 3

COURSE OUTCOMES

The students will be able to:

CO	Course outcome	Knowledge level
CST201.CO1	Design an algorithm for a computational task and calculate the time/space complexities of that algorithm (Cognitive Knowledge Level: Apply)	K3
CST201.CO2	Identify the suitable data structure (array or linked list) to represent a data item required to be processed to solve a given computational problem and write an algorithm to find the solution of the computational problem (Cognitive Knowledge Level: Apply)	K3
CST201.CO3	Write an algorithm to find the solution of a computational problem by selecting an appropriate data structure (binary tree/graph) to represent a data item to be processed (Cognitive Knowledge Level: Apply)	K3
CST201.CO4	Store a given dataset using an appropriate Hash Function to enable efficient access of data in the given set (Cognitive Knowledge Level: Apply)	K3
CST201.CO5	Select appropriate sorting algorithms to be used in specific circumstances (Cognitive Knowledge Level: Analyze)	K4
CST201.CO6	Design and implement Data Structures for solving real world problems efficiently (Cognitive Knowledge Level: Apply)	K3

CO - PO - PSO MAPPING

PO / CO	Programme outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CS352.CO1	3	2	1	1	-	1	-	-	-	-	-	3	3	-	1
CS352.CO2	3	3	3	2	-	1	-	-	-	-	-	3	3	-	3
CS352.CO3	3	3	3	2	-	1	-	-	-	-	-	3	3	-	3
CS352.CO4	3	3	3	1	-	1	-	-	-	-	-	3	3	-	3

CS352.CO 5	2	2	2	1	-	1	-	-	-	-	-	3	3	-	3
CS352.CO 6	3	3	3	2	-	1	-	-	-	-	-	3	3	-	3
AVG	2.83	2.67	2.5	1.5	-	1	-	-	-	-	-	3	3	-	2.67

Correlation : 1-Low, 2-moderate, 3-high, No Correlation '-'

JUSTIFICATION

CO-PO	LEVEL (Low/ Moderate/ High)	JUSTIFICATION
CST 201 CO1-PO1	H	Learning to design an algorithm for a computational task and calculate the time/space complexities of that algorithm helps the students in the solutions for complex engineering problems.
CST 201 CO1-PO2	**M**	Learning to design an algorithm for a computational task and calculate the time/space complexities of that algorithm helps the students to identify and formulate solutions of complex engineering problem.
CST 201 CO1-PO3	**L**	Learning to design an algorithm for a computational task and calculate the time/space complexities of that algorithm helps the students to design solution to an engineering problem.
CST 201 CO1-PO4	**L**	Learning to design an algorithm for a computational task and calculate the time/space complexities of that algorithm, helps the students to investigate and analyze complex problems.
CST 201 CO1-PO6	L	Learning to design an algorithm for a computational task and calculate the time/space complexities of that algorithm, helps the students to solve health, safety and legal servicing problems efficiently.
CST 201 CO1-PO12	H	Learning to design an algorithm for a computational task and calculate the time/space complexities of that algorithm, helps to learn many other topics of engineering and help for a lifelong learning.
CST 201 CO1-PSO1	H	Learning to design an algorithm for a computational task and calculate the time/space complexities of that algorithm, helps the students to analyze, design and develop computing solutions.
CS 201 CO1-PSO3	L	Learning to design an algorithm for a computational task and calculate the time/space complexities of that algorithm help the students to adapt to modern information and communication technologies
CST 201 CO2-PO1	H	By identifying the suitable data structure like array or linked list to represent a data item required to be processed to solve a given computational problem and write an algorithm to find the solution of the

		computational problem, the students will be able to solve complex engineering problems.
CST 201 CO2-PO2	**H**	By identifying the suitable data structure like array or linked list to represent a data item required to be processed to solve a given computational problem and write an algorithm to find the solution of the computational problem, the students will be able to identify and formulate complex engineering problems.
CST 201 CO2-PO3	**H**	By identifying the suitable data structure like array or linked list to represent a data item required to be processed to solve a given computational problem and write an algorithm to find the solution of the computational problem, the students will be able to design of solutions to complex engineering problems.
CST 201 CO2-PO4	**M**	By identifying the suitable data structure like array or linked list to represent a data item required to be processed to solve a given computational problem and write an algorithm to find the solution of the computational problem, helps the students to investigate and analyze complex problems.
CST 201 CO2-PO6	**L**	By identifying the suitable data structure like array or linked list to represent a data item required to be processed to solve a given computational problem and write an algorithm to find the solution of the computational problem, helps the students to solve health, safety and legal servicing problems efficiently.
CST 201 CO2-PO12	H	By identifying the suitable data structure like array or linked list to represent a data item required to be processed to solve a given computational problem and write an algorithm to find the solution of the computational problem, helps the students to learn many other topics of engineering and help for a lifelong learning.
CST 201 CO2-PSO1	H	By identifying the suitable data structure like array or linked list to represent a data item required to be processed to solve a given computational problem and write an algorithm to find the solution of the computational problem, helps the students to analyze, design and develop computing solutions.

CST 201 CO2-PSO3	H	By identifying the suitable data structure like array or linked list to represent a data item required to be processed to solve a given computational problem and write an algorithm to find the solution of the

		computational problem, helps the students to adapt to modern information and communication technologies
CST 201 CO3-PO1	H	By learning to write an algorithm to find the solution of a computational problem by selecting an appropriate non-linear data structure to represent a data item to be processed, helps the students to solve complex engineering problems
CST 201 CO3-PO2	**H**	By learning to write an algorithm to find the solution of a computational problem by selecting an appropriate non-linear data structure to represent a data item to be processed, helps the students to identify and formulate complex engineering problems
CST 201 CO3-PO3	H	By learning to write an algorithm to find the solution of a computational problem by selecting an appropriate non-linear data structure to represent a data item to be processed, helps the students to design solutions to complex engineering problems
CST 201 CO3-PO4	**M**	By learning to write an algorithm to find the solution of a computational problem by selecting an appropriate non-linear data structure to represent a data item to be processed, helps the students to solve complex engineering problems.
CST 201 CO3-PO6	L	By learning to write an algorithm to find the solution of a computational problem by selecting an appropriate non-linear data structure to represent a data item to be processed, helps the students to solve safety and legal servicing problems efficiently
CST 201 CO3-PO12	H	By learning to write an algorithm to find the solution of a computational problem by selecting an appropriate non-linear data structure to represent a data item to be processed, helps the students to learn many other topics of engineering and help for a lifelong learning.
CST 201 CO3-PSO1	H	By learning to write an algorithm to find the solution of a computational problem by selecting an appropriate non-linear data structure to represent a data item to be processed, helps the students to analyze, design and develop computing solutions.

CST 201 CO3-PSO3	H	By learning to write an algorithm to find the solution of a computational problem by selecting an appropriate non-linear data structure to represent a data item to be processed, helps the students to adapt to modern information and communication technologies

CST 201 CO4-PO1	H	By learning to store a given dataset using an appropriate Hash Function to enable efficient access of data in the given set, help the students to solve complex engineering problems
CST 201 CO4-PO2	**H**	By learning to store a given dataset using an appropriate Hash Function to enable efficient access of data in the given set, helps the students to identify and formulate complex engineering problems
CST 201 CO4-PO3	H	By learning to store a given dataset using an appropriate Hash Function to enable efficient access of data in the given set, helps the students to design solutions to complex engineering problems
CST 201 CO4-PO4	L	By learning to store a given dataset using an appropriate Hash Function to enable efficient access of data in the given set, helps the students to analyze and interpret data.
CST 201 CO4-PO6	**L**	By learning to store a given dataset using an appropriate Hash Function to enable efficient access of data in the given set, help to solve health, safety and legal servicing problems efficiently
CS 205 CO4-PO12	H	By learning to store a given dataset using an appropriate Hash Function to enable efficient access of data in the given set helps to learn many other topics of engineering and help for a lifelong learning.
CST 201 CO4-PSO1	H	By learning to store a given dataset using an appropriate Hash Function to enable efficient access of data in the given set , helps the students to analyze, design and develop solutions to different computing problems.
CST 201 CO4-PSO3	H	By learning to store a given dataset using an appropriate Hash Function to enable efficient access of data in the given set can be used to help to adapt to modern information and communication technologies
CST 201 CO5-PO1	**M**	By learning to select appropriate sorting algorithms to be used in specific circumstances, students will be able to solve complex engineering problems
CST 201 CO5-PO2	M	By learning to select appropriate sorting algorithms to be used in specific circumstances, students will be able to identify and formulate complex engineering problems

CST 201 CO5-PO3	**M**	By learning to select appropriate sorting algorithms to be used in specific circumstances, students will be able to design solutions to complex engineering problems

CST 201 CO5-PO4	L	By learning to select appropriate sorting algorithms to be used in specific circumstances, the students will be able to conduct investigation on large set of data to analyze the performance on different set of data
CST 201 CO5-PO6	**L**	By learning to select appropriate sorting algorithms to be used in specific circumstances helps to solve health, safety and legal servicing problems efficiently
CST 201 CO5-PO12	H	By learning to select appropriate sorting algorithms to be used in specific circumstances helps to learn many other topics of engineering and help for a lifelong learning.
CST 201 CO5-PSO1	H	By learning to select appropriate sorting algorithms to be used in specific circumstances, the students will be able to analyze, design and develop solutions to complex engineering problems.
CST 201 CO5-PSO3	H	By learning to select appropriate sorting algorithms to be used in specific circumstances, the students will be able to use modern information and communication technologies
CST 201 CO6-PO1	**H**	Learning to design and implement Data Structures for solving real world problems efficiently, helps to find solutions for various complex engineering problems.
CST 201 CO6-PO2	**H**	Learning to design and implement Data Structures for solving real world problems efficiently, helps to find identify and formulate solutions for various complex engineering problems.
CST 201 CO6-PO3	**H**	Learning to design and implement Data Structures for solving real world problems efficiently, helps to design solutions for various complex engineering problems.
CST 201 CO6-PO4	**M**	Learning to design and implement Data Structures for solving real world problems efficiently, helps to conduct investigation on large set of data to analyze the performance on different set of data
CST 201 CO6-PO6	**L**	Learning to design and implement Data Structures for solving real world problems efficiently help to solve health, safety and legal servicing problems efficiently

CS 205 CO6-PO12	H	Learning to design and implement Data Structures for solving real world problems efficiently helps to learn many other topics of engineering and help for a lifelong learning.

CS 205 CO6-PSO1	H	Learning to design and implement Data Structures for solving real world problems efficiently help in designing solutions to complex multidisciplinary engineering problems.
CS 205 CO6-PSO3	H	Learning to design and implement Data Structures for solving real world problems efficiently help to adapt to modern information and communication technologies

Programme : Bachelor of Technology
Course Code: HUN 102
Course Name: Professional Communication
Semester: 3

Course Outcomes

CO1	Develop vocabulary and language skills relevant to engineering as a profession	K3
CO2	Analyze, interpret and effectively summarize a variety of textual content	K3
CO3	Create effective technical presentations	K2
CO4	Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus	K5
CO5	Identify drawbacks in listening patterns and apply listening techniques for specific needs	K3
CO6	Create professional and technical documents that are clear and adhering to all the necessary conventions	K6

CO-PO-PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	2	-	-	2	2	1	3	-	-	1
CO2	1	1	-	-	-	-	-	-	3	-	-	3	-	-	1
CO3	-	-	-	-	-	1	-	-	1	3	1	-	-	-	1
CO4	1	2	-	-	-	-	-	-	-	2	1	1	-	-	1
CO5	-	3	2	1	-	-	-	-	-	1	-	1	-	-`	1
CO6	-	-	-	-	-	1	-	-	2	3	-	1	1	1	-
Average	1	2	2	1	-	1	-	-	2	2	1	2	1	1	1

CO – PO – PSO Mapping Justification

CO	PO	MAP	JUSTIFICATION

		PING	
CO1	PO6	2	Graduate should be able to understand the textual content given to assess societal, health and legal issues
	PO9	2	Graduate need to effectively communicate as a member or leader of a team to constructively work towards providing solution for engineering problems
	PO10	2	Graduate need to effectively communicate using language effectively to comprehend and write effective report
	PO11	1	Graduate needs to communicate effectively knowledge and understanding of engineering principles in order to manage projects
	PO12	3	Graduate need to develop vocabulary and language skills relevant to engineering as a professional to engage in lifelong learning
	PS03	1	Graduate need to develop vocabulary and language skills relevant to engineering as a professional to engage in life long learning
CO2	PO1	1	Graduate will be able to apply different reading styles to analyze, interpret & effectively summarize a variety of textual content
	PO2	1	Graduate need to develop reading skills in order to develop sustained conclusions to complex engineering problems
	PO9	3	Graduate need to effectively summarize, analyses and interpret the textual content in order to function effectively in a team
	PO12	3	Graduate need to analyze, interpret & effectively summarize a variety of textual content to effectively engage in lifelong learning
	PS03	1	Graduate need to analyze, interpret & effectively summarize a variety of textual content to effectively engage in lifelong learning
CO3	PO6	1	Graduate should be able to create technical presentation based on contextual knowledge to convey societal, health and legal issues
	PO9	1	Graduate need to effectively create technical presentation to convey ideas and solutions in a team
	PO10	3	Graduate need to effectively create technical presentation to convey ideas
	PO11	1	Graduate need to effectively create technical presentation to demonstrate their acquired knowledge through effective presentation
	PS03	1	graduates need to create effective presentations to pursue lifelong learning
CO4	PO1	1	Graduate need to effectively conduct healthy group discussion to analyses, understand and learn various methodologies towards efficient electrical system design
	PO2	2	Graduate need to actively involved in group discussions to able to arrive at optimal conclusion towards development of electrical system
	PO10	2	Graduate need to discuss technical solution related to complex engineering topics in a group setting and arrive at generalization /consensus
	PO11	1	Graduates need to be able to communicate in a group for effective project management
	PO12	1	Graduate need to discuss technical solution related to complex engineering

			problems to advance in research and development
	PS03	1	Graduates need to have good communication skill in a group setting to pursue lifelong learning
CO5	PO2	3	Graduate need to apply proper listening skills and analyze them to constructively contribute to sustained conclusions to complex engineering problems
	PO3	2	Graduate need to implement appropriate listening skills to understand the specified needs to find solution for complex engineering problems
	PO4	1	Graduate need to apply listening skills for synthesis of information to provide valid conclusion
	PO10	1	Graduates need to listen effectively to arrive at proper reports on activities being conducted
	PO12	1	Graduates need to listen effectively to pursue lifelong learning
	PS03	1	Graduates need to have good listening skills to pursue lifelong learning
CO6	PO6	1	Graduate need to create technical document that convey the textual knowledge associated to an engineering system
	PO9	2	Graduates need to create professional & technical document that will help the team or individual work effectively
	PO10	3	Graduates need to create professional & technical document to communicate ideas and projects effectively
	PO12	1	Graduates need to create professional documents to pursue lifelong learning
	PSO1	1	Graduates need to be able to create effective technical reports to
	PSO2	1	Graduates need to be able to create effective technical reports to derive sustainable solutions to complex electrical systems

Programme : Bachelor of Technology
Course Name: DATA STRUCTURES LAB

Course Code: CSL201
Semester: 6

COURSE OUTCOMES

The students will be able to:

CO	Course outcome	Knowledge level
CSL201.CO 1	Write a time/space efficient program using arrays/linked lists/trees/graphs to provide necessary functionalities meeting a given set of user requirements (Cognitive Knowledge Level: Analyse)	K4
CSL201.CO 2	Write a time/space efficient program to sort a list of records based on a given key in the record (Cognitive Knowledge Level: Apply)	K3
CSL201.CO 3	Examine a given Data Structure to determine its space complexity and time complexities of operations on it (Cognitive Knowledge Level: Apply)	K3
CSL201.CO 4	Design and implement an efficient data structure to represent given data (Cognitive Knowledge Level: Apply)	K3
CSL201.CO 5	Write a time/space efficient program to convert an arithmetic expression from one notation to another (Cognitive Knowledge Level: Apply)	K3
CSL201.CO 6	Write a program using linked lists to simulate Memory Allocation and Garbage Collection (Cognitive Knowledge Level: Apply)	K3

CO - PO - PSO MAPPING

PO / CO	Programme outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSL201.CO 1	3	3	3	2	-	1	-	2	-	2	-	3	3	-	3
CSL201.CO 2	3	3	3	2	-	-	-	2	-	2	-	3	3	-	3
CSL201.CO 3	3	3	3	2	-	-	-	2	-	2	-	3	3	-	3
CSL201.CO 4	3	3	3	2	-	-	-	2	-	2	-	3	3	-	3
CSL201.CO	3	3	3	-	-	-	-	2	-	2	-	3	3	-	-

5															
CSL201.CO 6	3	3	3	-	-	-	-	2	-	2	-	3	3	-	-
AVG	3	3	3	2	-	1	-	2	-	2	-	3	3	-	3

Correlation : 1-Low, 2-moderate, 3-high, No Correlation '-'

JUSTIFICATION

CO-PO	LEVEL (Low/ Moderate/ High)	JUSTIFICATION
CSL201.CO1 – PO1	**HIGH**	By learning to write a time/space efficient program using arrays/linked lists/trees/graphs to provide necessary functionalities meeting a given set of user requirements, the students will be able to solve complex engineering problems.
CSL201.CO2– PO1	**HIGH**	By learning to write a time/space efficient program to sort a list of records based on a given key in the record, the students will be able to solve complex engineering problems.
CSL201.CO3– PO1	**HIGH**	By examining a given Data Structure to determine its space complexity and time complexities of operations on it, the students will be able to solve complex engineering problems.
CSL201.CO4– PO1	**HIGH**	By designing and implement an efficient data structure to represent given data, the students will be able to solve complex engineering problems.
CSL201.CO5– PO1	**HIGH**	By writing a time/space efficient program to convert an arithmetic expression from one notation to another, the students will be able to solve complex engineering problems.
CSL201.CO6– PO1	**HIGH**	By writing a program using linked lists to simulate Memory Allocation and Garbage Collection, the students will be able to solve complex engineering problems.
CSL201.CO1 – PO2	**HIGH**	By learning to write a time/space efficient program using arrays/linked lists/trees/graphs to provide necessary functionalities meeting a given set of user requirements, the students will be able to identify and formulate complex engineering problems.

CSL201.CO2–PO2	**HIGH**	By learning to write a time/space efficient program to sort a list of records based on a given key in the record, the students will be able to identify and formulate complex engineering problems.

CSL201.CO3–PO2	**HIGH**	By examining a given Data Structure to determine its space complexity and time complexities of operations on it the students will be able to identify and formulate complex engineering problems.
CSL201.CO4–PO2	**HIGH**	By designing and implement an efficient data structure to represent given data, the students will be able to identify and formulate complex engineering problems.
CSL201.CO5–PO2	**HIGH**	By writing a time/space efficient program to convert an arithmetic expression from one notation to another, the students will be able to the students will be able to identify and formulate complex engineering problems.
CSL201.CO6–PO2	**HIGH**	By writing a program using linked lists to simulate Memory Allocation and Garbage Collection, the students will be able to identify and formulate complex engineering problems.
CSL201.CO1 –PO3	**HIGH**	By learning to write a time/space efficient program using arrays/linked lists/trees/graphs to provide necessary functionalities meeting a given set of user requirements, the students will be able to design solutions for complex engineering problems.
CSL201.CO2–PO3	**HIGH**	By learning to write a time/space efficient program to sort a list of records based on a given key in the record, the students will be able to the students will be able to design solutions for complex engineering problems.
CSL201.CO3–PO3	**HIGH**	By examining a given Data Structure to determine its space complexity and time complexities of operations on it, the students will be able to the students will be able design solutions for complex engineering problems.
CSL201.CO4–PO3	**HIGH**	By designing and implement an efficient data structure to represent given data, the students will be able to design solutions for complex engineering problems.
CSL201.CO5–PO3	**HIGH**	By writing a time/space efficient program to convert an arithmetic expression from one notation to another, the students will be able to design solutions for complex engineering problems.

CSL201.CO6–PO3	**HIGH**	By writing a program using linked lists to simulate Memory Allocation and Garbage Collection, to the students will be able to design solutions for complex engineering problems.

CSL201.CO1 – PO4	**MODERATE**	By learning to write a time/space efficient program using arrays/linked lists/trees/graphs to provide necessary functionalities meeting a given set of user requirements, the students will be able to use research-based knowledge to provide valid conclusions.
CSL201.CO2– PO4	**MODERATE**	By learning to write a time/space efficient program to sort a list of records based on a given key in the record, the students will be able to use research-based knowledge to provide valid conclusions.
CSL201.CO3– PO4	**MODERATE**	By examining a given Data Structure to determine its space complexity and time complexities of operations on it the students will be able to use research-based knowledge to provide valid conclusions.
CSL201.CO4– PO4	**MODERATE**	By designing and implement an efficient data structure to represent given data, the students will be able to use research-based knowledge to provide valid conclusions.
CSL201.CO1 – PO6	**LOW**	By learning to write a time/space efficient program using arrays/linked lists/trees/graphs to provide necessary functionalities meeting a given set of user requirements, the students will be able to apply reasoning to assess issues in different areas of life.
CSL201.CO1 – PO8	**MODERATE**	By learning to write a time/space efficient program using arrays/linked lists/trees/graphs to provide necessary functionalities meeting a given set of user requirements, the students will be able to apply ethical principles while doing programs.
CSL201.CO2– PO8	**MODERATE**	By learning to write a time/space efficient program to sort a list of records based on a given key in the record, the students will be able to apply ethical principles while doing programs.
CSL201.CO3– PO8	**MODERATE**	By examining a given Data Structure to determine its space complexity and time complexities of operations on it the the students will be able to apply ethical principles while doing programs.
CSL201.CO4– PO8	**MODERATE**	By designing and implement an efficient data structure to represent given data, the students will be able to apply ethical principles while doing programs.

CSL201.CO5–PO8	**MODERATE**	By writing a time/space efficient program to convert an arithmetic expression from one notation to another, the students will be able to the students will be able to apply ethical principles while doing programs.

CSL201.CO6–PO8	**MODERATE**	By writing a program using linked lists to simulate Memory Allocation and Garbage Collection, the students will be able to apply ethical principles while doing programs.
CSL201.CO1 – PO10	**MODERATE**	By learning to write a time/space efficient program using arrays/linked lists/trees/graphs to provide necessary functionalities meeting a given set of user requirements, the students will be able to communicate effectively on complex engineering problems.
CSL201.CO2–PO10	**MODERATE**	By learning to write a time/space efficient program to sort a list of records based on a given key in the record, the students will be able to the students will be able to communicate effectively on complex engineering problems
CSL201.CO3–PO10	**MODERATE**	By examining a given Data Structure to determine its space complexity and time complexities of operations on it, the students will be able to communicate effectively on complex engineering problems
CSL201.CO4–PO10	**MODERATE**	By designing and implement an efficient data structure to represent given data, the students will be able to communicate effectively on complex engineering problems
CSL201.CO5–PO10	**MODERATE**	By writing a time/space efficient program to convert an arithmetic expression from one notation to another, the students will be able to communicate effectively on complex engineering problems
CSL201.CO6–PO10	**MODERATE**	By writing a program using linked lists to simulate Memory Allocation and Garbage Collection, the students will be able to communicate effectively on complex engineering problems
CSL201.CO1 – PO12	**HIGH**	By learning to write a time/space efficient program using arrays/linked lists/trees/graphs to provide necessary functionalities meeting a given set of user requirements, the students will be able to engage in continuous learning.
CSL201.CO2–PO12	**HIGH**	By learning to write a time/space efficient program to sort a list of records based on a given key in the record, the students will be able to engage in continuous learning.

CSL201.CO3–PO12	**HIGH**	By examining a given Data Structure to determine its space complexity and time complexities of operations on it the students will be able to engage in continuous learning.

CSL201.CO4–PO12	**HIGH**	By designing and implement an efficient data structure to represent given data, the students will be able to engage in continuous learning.
CSL201.CO5–PO12	**HIGH**	By writing a time/space efficient program to convert an arithmetic expression from one notation to another, the students will be able to engage in continuous learning.
CSL201.CO6–PO12	**HIGH**	By writing a program using linked lists to simulate Memory Allocation and Garbage Collection, the students will be able to engage in continuous learning.
CSL201.CO1 – PSO1	**HIGH**	By learning to write a time/space efficient program using arrays/linked lists/trees/graphs to provide necessary functionalities meeting a given set of user requirements, the students will be able to analyze, design and develop computing solutions by applying foundational concepts of computer science and engineering.
CSL201.CO2–PSO1	**HIGH**	By learning to write a time/space efficient program to sort a list of records based on a given key in the record, the students will be able to analyze, design and develop computing solutions by applying foundational concepts of computer science and engineering.
CSL201.CO3–PSO1	**HIGH**	By examining a given Data Structure to determine its space complexity and time complexities of operations on it the students will be able to analyze, design and develop computing solutions by applying foundational concepts of computer science and engineering.
CSL201.CO4–PSO1	**HIGH**	By designing and implement an efficient data structure to represent given data, the students will be able to analyze, design and develop computing solutions by applying foundational concepts of computer science and engineering.
CSL201.CO5–PSO1	**HIGH**	By writing a time/space efficient program to convert an arithmetic expression from one notation to another, the students will be able to analyze, design and develop computing solutions by applying foundational concepts of computer science and engineering.
CSL201.CO6–PSO1	**HIGH**	By writing a program using linked lists to simulate Memory Allocation and Garbage Collection, the students will be able to analyze, design and develop computing solutions by applying foundational concepts of computer science and engineering.

CSL201.CO1 – PSO3	**HIGH**	By learning to write a time/space efficient program using arrays/linked lists/trees/graphs to provide necessary functionalities meeting a given set of user requirements, the students will be able to adapt to emerging information and communication technologies.
CSL201.CO2– PSO3	**HIGH**	By learning to write a time/space efficient program to sort a list of records based on a given key in the record, the students will be able to adapt to emerging information and communication technologies.
CSL201.CO3– PSO3	**HIGH**	By examining a given Data Structure to determine its space complexity and time complexities of operations on it the students will be able to adapt to emerging information and communication technologies.
CSL201.CO4– PSO3	**HIGH**	By designing and implement an efficient data structure to represent given data, the students will be able to adapt to emerging information and communication technologies.

Programme: Bachelor of Technology

Course Code: CST205

Course Name: Object Oriented Programming using Java

Semester: 3

COURSE OUTCOMES

After the completion of the course the student will be able to

CO	Statement
CST205.1	Write Java programs using the object-oriented concepts - classes, objects, constructors, data hiding, inheritance and polymorphism (Cognitive Knowledge Level: Apply)
CST205.2	Utilize datatypes, operators, control statements, built in packages & interfaces, Input/ Output Streams and Files in Java to develop programs (Cognitive Knowledge Level: Apply)
CST205.3	Illustrate how robust programs can be written in Java using exception handling mechanism (Cognitive Knowledge Level: Understand)
CST205.4	Write application programs in Java using multithreading and database connectivity (Cognitive Knowledge Level: Apply)
CST205.5	Write Graphical User Interface based application programs by utilizing event handling features and Swing in Java (Cognitive Knowledge Level: Apply)
CST205.6	Apply the knowledge of software engineering methods, such as object-oriented analysis and design methods with a clear emphasis on UML. (Cognitive Knowledge Level: Apply)

CO - PO - PSO MAPPING

PO / CO	Programme outcomes												PSO		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CST205.1	1	2	2	1	-	-	-	-	-	-	-	3	3	-	-
CST205.2	1	2	2	1	-	-	-	-	-	-	-	3	3	-	-
CST205.3	1	1	2	1	-	-	-	-	-	1		3	1	-	-
CST205.	2	2	3	1	-	-	-	-	-	-	-	3	3	1	-

4															
CST205.5	2	2	3	1								3	3	3	
CST205.6	1	2	3	1								3	3	3	1
AVG	1.33	1.83	2.5	1						1		3	2.67	2.33	1

Correlation : 1-Low, 2-moderate, 3-high, No Correlation '-'

JUSTIFICATION

Mapping	Level (L/M/H)	Justification
CST205.1-PO1	L	By understanding the object oriented features of java, the students will be able to apply the knowledge in java to derive solutions to basic computing problems.
CST205.1-PO2	M	By gaining the ability to apply object oriented principles in software design process, the students will be able to analyze various engineering problems in the domain of software development with better effectiveness.
CST205.1-PO3	M	The students will get an insight into software design process and they would be able to apply standard practices in software project development to an extent
CST205.1-PO4	L	Java programming helps in finding solutions for complex engineering problems, but more training would be required to develop the ability
CST205.1-PO12	H	The knowledge of Object oriented concepts learned in this course will help the students during their career.
CO405.1-PSO1	H	Students will be able to apply the foundational concepts in objected oriented deign to develop computing solutions in the real world problems.
CST205.2 – PO1	L	By understanding lexical issues and basic programing constructs of java, the students will be able to derive solutions to computing problems

CST205.2-PO2	M	Students will be able to analyse basic problems and implement solutions using lexical issues and programing constructs of java.
CST205.2-PO3	M	By understanding lexical issues and programing constructs of java, the students will be able to design/develop solutions to basic problems
CST205.2-PO4	L	By understanding java features like inheritance, packages and interface, the students will be able to find solutions for complex
		engineering problems, but more training would be required to develop the ability
CST205.2-PO12	H	The knowledge of basic programing concepts learned in this course will help the students during their career.
CST205.2-PSO1	H	Students will be able to apply the foundational concepts in java to develop computing solutions in the real world problems.
CST205.3-PO1	L	Students will be able to apply the knowledge of exception handing to handle errors in the programs.
CST205.3-PO2	L	Students will be able to analyse the errors in the program by exception handling techniques.
CST205.3-PO3	M	Exception handling will help the students to design reliable and quality software solutions.
CST205.3-PO4	L	Students will investigate on the possibilities of the errors and find reliable solutions using exception handling techniques.
CST205.3-PO10	L	The reasons for the exceptions will be effectively communicated to the user.
CST205.3-PO12	H	Students will be able to develop Robust solutions in their career
CST205.3-PSO1	L	Students will be able to apply the exception handling techniques in java to develop error free computing solutions in the real world problems.

CST205.4-PO1	M	Students will be able to apply the knowledge of multi-threading and JDBC concepts to solve complex software problems, but require more training in advanced Java .
CST205.4-PO2	M	Students will be able to analyse complex problems to some extend and implement it by using the concepts of multi-threading and JDBC.
CST205.4-PO3	H	Students will be able to design and develop problems using multi-threading and JDBC concepts in Java.
CST205.4-PO4	L	Innovative products can be developed by conducting investigations on real world problems.

CST205.4-PO12	H	The knowledge of advanced concepts in this course will help the students in their lifelong learning.
CST205.4-PSO1	H	Multi-threading and JDBC techniques in java help the students to design, develop and analyse computing solutions in the real-world problems.
CST205.4-PSO2	H	During the development of solutions, the students can apply best software engineering practices.
CST205.6 – PO1	L	Students will be able to apply the knowledge of UML to design solutions to software problems.
CST205.6 – PO2	M	A software design document can be analysed by a student using the UML diagrams.
CST205.6 – PO3	H	Students will be able to develop solutions for problems by UML design concepts.
CST205.6 – PO4	L	Investigations on UML diagrams to analyse the underlying concepts in the problems presented.
CST205.6–PSO1	H	UML diagrams techniques in Object oriented programing helps the students to design, develop and analyse computing solutions in the real-world problems.
CST205.6–PSO2	H	During the designing of UML diagrams, the students can apply best software engineering practices.
CST205.6–PSO3	L	The students can use emerging technologies to design innovative UML diagrams.

Programme: Bachelor of Technology Course Code: CSL 203

Course Name: Object Oriented Programming Lab (in Java) Semester: 3

COURSE OUTCOMES

After the completion of the course the student will be able to

CO	Statement
CSL203.1	Implement the Object Oriented concepts - constructors, inheritance, method overloading & overriding and polymorphism in Java (Cognitive Knowledge Level: Apply)
CSL203.2	Implement programs in Java which use datatypes, operators, control statements, built in packages & interfaces, Input/Output streams and Files (Cognitive Knowledge Level: Apply)
CSL203.3	Implement robust application programs in Java using exception handling (Cognitive Knowledge Level: Apply)
CSL203.4	Implement application programs in Java using multithreading and database connectivity (Cognitive Knowledge Level: Apply)
CSL203.5	Implement Graphical User Interface based application programs by utilizing event handling features and Swing in Java (Cognitive Knowledge Level: Apply)

CO - PO - PSO MAPPING

PO / CO	Programme outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSL203.1	3	3	3	3	3	-	-	1	-	3	-	3	3	1	3
CSL203.2	3	3	3	3	3	-	-	1	-	3	-	3	3	1	3
CSL203.3	3	3	3	3	3	-	-	1	-	3	-	3	3	1	3
CSL203.4	3	3	3	3	3	-	-	1	-	3	-	3	3	2	3

CSL203.5	3	3	3	3	3	-	-	1	-	3	-	3	3	1	3
AVG	3	3	3	3	3	-	-	1	-	3	-	3	3	1.2	3

Correlation: 1-Low, 2-moderate, 3-high, No Correlation '-'

JUSTIFICATION

Mapping	Low/Medium/ High	Justification
CSL203.1-PO1	H	By Implementing the Object-Oriented concepts such as constructors, inheritance, method overloading & overriding and polymorphism in Java students are able to apply the knowledge gained for the solutions of complex engineering problems.
CSL203.1-PO2	H	With the knowledge of Object-Oriented concepts such as constructors, inheritance, method overloading & overriding and polymorphism in Java, students are able to identify and analyses the complex engineering problems.
CSL203.1-PO3	H	With the knowledge of Object-Oriented concepts such as constructors, inheritance, method overloading & overriding and polymorphism in Java, the students are able to design solutions for complex engineering problems that meet the specified needs.
CSL203.1-PO4	H	With the knowledge of Object-Oriented concepts such as constructors, inheritance, method overloading & overriding and polymorphism in Java, the students are able to conduct investigations of complex problems.
CSL203.1-PO5	H	With the knowledge of Object-Oriented concepts such as constructors, inheritance, method overloading & overriding and polymorphism in Java, the students are able to apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
CSL203.1-PO8	L	With the design of experiments the students are able to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
CSL203.1-PO10	H	With the knowledge of Object-Oriented concepts such as constructors, inheritance, method overloading & overriding and polymorphism in Java, the students are able to communicate effectively on complex engineering activities with engineering community, able to comprehend effectively give and receive clear instructions
CSL203.1-PO12	H	With the knowledge of Object-Oriented concepts such as constructors, inheritance, method overloading & overriding and polymorphism in Java, the students are able to communicate effectively on complex engineering activities with engineering community, able to recognize the need for, and life-long learning in the broadest context of technological change.
CSL203.1-	H	Students will be able to analyze, design and develop computing solutions with the knowledge of Object-Oriented concepts such as constructors, inheritance, method overloading & overriding and polymorphism in Java

PSO1		

CSL203.1-PSO2	L	Students will be able to apply software engineering principles and practices for developing quality software with the gained knowledge of Object-Oriented concepts such as constructors, inheritance, method overloading & overriding and polymorphism in Java
CSL203.1-PSO3	H	Students will be able to adapt to the emerging information and communication technologies by providing innovative ideas and ideas to novel problems with the gained knowledge of Object-Oriented concepts such as constructors, inheritance, method overloading & overriding and polymorphism in Java
CSL203.2-PO1	H	By Implementing the programs in Java which uses the datatypes, operators, control statements, built in packages & interfaces, Input/output streams and files students are able to apply the knowledge gained for the solutions of complex engineering problems.
CSL203.2-PO2	H	With the knowledge gained from the programs in Java which uses the datatypes, operators, control statements, built in packages & interfaces, Input/output streams and files, students are able to identify and analyze the complex engineering problems.
CSL203.2-PO3	H	With the knowledge of the programs in Java which uses the datatypes, operators, control statements, built in packages & interfaces, Input/output streams and files, the students are able to design solutions for complex engineering problems that meet the specified needs.
CSL203.2-PO4	H	With the knowledge of the programs in Java which uses the datatypes, operators, control statements, built in packages & interfaces, input/output streams and files, the students are able to conduct investigations of complex problems.
CSL203.2-PO5	H	With the knowledge of the programs in Java which uses the datatypes, operators, control statements, built in packages & interfaces, input/output streams and files, the students are able to apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
CSL203.2-PO8	L	With the design of programs the students are able to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice

CSL203. 2- PO10	H	With the knowledge of the programs in Java which uses the datatypes, operators, control statements, built in packages & interfaces, input/output streams and files, the students are able to communicate effectively on complex engineering activities with engineering community, able to comprehend effectively give and receive clear instructions

CSL203. 2- PO12	H	With the knowledge of the programs in Java which uses the datatypes, operators, control statements, built in packages & interfaces, input/output streams and files, the students are able to communicate effectively on complex engineering activities with engineering community, able to recognize the need for, and life-long learning in the broadest context of technological change.
CSL203. 2- PSO1	H	Students will be able to analyze, design and develop computing solutions with the knowledge of the programs in Java which uses the datatypes, operators, control statements, built in packages & interfaces, input/output streams and files.
CSL203. 2- PSO2	L	Students will be able to apply software engineering principles and practices for developing quality software with the gained knowledge of the programs in Java which uses the datatypes, operators, control statements, built in packages & interfaces, input/output streams and files.
CSL203. 2- PSO3	H	Students will be able to adapt to the emerging information and communication technologies by providing innovative ideas and ideas to novel problems with the gained knowledge of the programs in Java which uses the datatypes, operators, control statements, built in packages & interfaces, input/output streams and files
CSL203.3-PO 1	H	By Implementing the robust application programs in Java using exception handling, students are able to apply the knowledge gained for the solutions of complex engineering problems.
CSL203.3-PO 2	H	With the knowledge gained from the robust application programs in Java using exception handling, students are able to identify and analyze the complex engineering problems.
CSL203.3-PO 3	H	With the knowledge of the robust application programs in Java using exception handling, the students are able to design solutions for complex engineering problems that meet the specified needs.
CSL203.3-PO 4	H	With the knowledge of the robust application programs in Java using exception handling, the students are able to conduct investigations of complex problems.

CSL203.3-PO 5	H	With the knowledge of the robust application programs in Java using exception handling, the students are able to apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
CSL203.3-PO 8	H	With the design of robust application programs, the students are able to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
CSL203. 3- PO10	H	With the knowledge of the robust application programs in Java using exception handling, the students are able to communicate effectively on complex engineering activities with engineering community, able to comprehend effectively give and receive clear instructions

CSL203. 3- PO12	H	With the knowledge of the robust application programs in Java using exception handling, the students are able to communicate effectively on complex engineering activities with engineering community, able to recognize the need for, and life-long learning in the broadest context of technological change.
CSL203.3- PSO1	H	Students will be able to analyze, design and develop computing solutions with the robust application programs in Java using exception handling.
CSL203. 3- PSO2	L	Students will be able to apply software engineering principles and practices for developing quality software with the gained knowledge of the robust application programs in Java using exception handling.
CSL203. 3- PSO3	H	Students will be able to adapt to the emerging information and communication technologies by providing innovative ideas and ideas to novel problems with the gained knowledge of the robust application programs in Java using exception handling.
CSL203.4-PO 1	H	By Implementing the application programs in Java using multithreading and database connectivity, students are able to apply the knowledge gained for the solutions of complex engineering problems.
CSL203.4-PO 2	H	With the knowledge gained from the application programs in Java using multithreading and database connectivity, students are able to identify and analyze the complex engineering problems.
CSL203.4-PO 3	H	With the knowledge of the application programs in Java using multithreading and database connectivity, the students are able to design solutions for complex engineering problems that meet the specified needs.
CSL203.4-PO 4	H	With the knowledge of the application programs in Java using multithreading and database connectivity, the students are able to conduct investigations of complex problems.

CSL203.4-PO 5	H	With the knowledge of the application programs in Java using multithreading and database connectivity, the students are able to apply appropriate

		techniques, resources and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
CSL203.4-PO 8	L	With the design of application programs, the students are able to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
CSL203.4-PO10	H	With the knowledge of the application programs in Java using multithreading and database connectivity, the students are able to communicate effectively on complex engineering activities with engineering community, able to comprehend effectively give and receive clear instructions
CSL203. 4- PO12	H	With the knowledge of the application programs in Java using multithreading and database connectivity, the students are able to communicate effectively on complex engineering activities with engineering community, able to recognize the need for, and life-long learning in the broadest context of technological change.
CSL203. 4- PSO1	H	Students will be able to analyze, design and develop computing solutions with the knowledge of the application programs in Java using multithreading and database connectivity.
CSL203. 4- PSO2	M	Students will be able to apply software engineering principles and practices for developing quality software with the gained knowledge of the application programs in Java using multithreading and database connectivity.
CSL203. 4- PSO3	H	Students will be able to adapt to the emerging information and communication technologies by providing innovative ideas and ideas to novel problems with the gained knowledge of the application programs in Java using multithreading and database connectivity.
CSL203.5-PO 1	H	By Implementing the Graphical User Interface based application programs by utilizing event handling features and Swing in Java students are able to apply the knowledge gained for the solutions of complex engineering problems.
CSL203.5-PO 2	H	With the knowledge gained from the Graphical User Interface based application programs by utilizing event handling features and Swing in Java, students are able to identify and analyze the complex engineering problems.
CSL203.5-PO 3	H	With the knowledge of the Graphical User Interface based application programs by utilizing event handling features and Swing in Java, the students are able to design solutions for complex engineering problems that meet the specified needs.
CSL203.5-PO 4	H	With the knowledge of the Graphical User Interface based application programs by utilizing event handling features and Swing in Java, the students are able to conduct investigations of complex problems.

CSL203.5-PO 5	H	With the knowledge of the Graphical User Interface based application programs by utilizing event handling features and Swing in Java, the students

		are able to apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
CSL203.5-PO 8	H	With the design of Graphical user Interface based programs, the students are able to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
CSL203. 5- PO10	H	With the knowledge of the Graphical User Interface based application programs by utilizing event handling features and Swing in Java, the students are able to communicate effectively on complex engineering activities with engineering community, able to comprehend effectively give and receive clear instructions
CSL203. 5- PO12	H	With the knowledge of the Graphical User Interface based application programs by utilizing event handling features and Swing in Java, the students are able to communicate effectively on complex engineering activities with engineering community, able to recognize the need for, and life-long learning in the broadest context of technological change.

CSL203. 5- PSO1	H	Students will be able to analyse, design and develop computing solutions with the knowledge of the Graphical User Interface based application programs by utilizing event handling features and Swing in Java.
CSL203. 5- PSO2	L	Students will be able to apply software engineering principles and practices for developing quality software with the gained knowledge of the Graphical User Interface based application programs by utilizing event handling features and Swing in Java
CSL203. 5- PSO3	H	Students will be able to adapt to the emerging information and communication technologies by providing innovative ideas and ideas to novel problems with the gained knowledge of the Graphical User Interface based application programs by utilizing event handling features and Swing in Java

SEMESTER 4

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Programme: Bachelor of Technology Course Code: CST 202

Course Name: Computer Organization and Architecture Semester: 4

COURSE OUTCOMES

After the completion of the course the student will be able to

CO	Statement	K LEVEL
CO1	Recognize and express the relevance of basic components, I/O organization and pipelining schemes in a digital Computer (Cognitive Knowledge Level:Understand)	K2
CO2	Explain the types of memory systems and mapping functions used in memory systems. (Cognitive Knowledge Level:Understand)	K2
CO3	Demonstrate the control signalsrequire for the execution of a given instruction. (Cognitive Knowledge Level:Apply)	K3
CO4	Illustrate the design of a Arithmetic Logic Unitand explain the usage of registers in it. (Cognitive Knowledge Level:Apply)	K3
CO5	Explain the implementaion aspects of a arithmetic algorithms in a digital computer. (Cognitive Knowledge Level:Apply)	K3
CO6	Develop the control logic for a given arithmetic problem. (Cognitive Knowledge Level:Apply)	K3

CO-PO-PSO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	-	-	-	-	-	-	-	3	2	1	-
CO2	3	3	2	1	-	-	-	-	-	1	-	3	3	2	-
CO3	3	3	3	1	-	-	-	-	-	1	-	3	3	1	-
CO4	3	3	3	1	-	-	-	-	-	1	-	3	3	2	2
CO5	3	3	3	-	-	-	-	-	-	1	-	3	3	2	-
CO6	3	2	2	1	-	-	-	-	-	1	-	3	2	-	2
Average	3	3	3	1	-	-	-	-	-	1	-	3	3	2	2

Correlation High:3 Medium :2 Low:1 No correlation: -

JUSTIFICATION

MAPPING	LOW/MEDIUM /HIGH	JUSTIFICATION
CST202.CO1-PO1	H	Students have ability to apply the knowledge of engineering fundamentals to identify the basic structure and functional units of a digital computer and for the development of supporting software and applications.
CST202.CO1-PO2	M	Students are able to identify the basic structure and functional units of a digital computer and also, they can analyze the units of a digital computer.
CST202.CO1-PO3	M	Students are able to apply reasoning informed by the contextual knowledge to assess the functions and structure of functional units of a digital computer using engineering science.
CST202.CO1-PO4	M	Students can communicate effectively by presenting the functionalities of a digital computer.
CST202.CO1 - PO12	H	Students can recognize the need for the digital computer and gain the ability to engage in independent and lifelong learning in the functionalities of a digital computer.
CST202.CO 1- PSO1	M	Students can develop computing solutions in functionality of a digital computer by applying foundational concepts of Computer Science and Engineering.
CST202.CO 1- PSO2	L	Students are able to apply reasoning informed by the contextual knowledge to assess the functions and structure of functional units of a digital computer.
CST202.CO2-PO1	H	Students have ability to apply the knowledge of engineering fundamentals to relate the effect of addressing modes and identify the role of various functional units of a computer.
CST202.CO2-PO2	H	Students are able to formulate the effect of addressing modes and identify the role of various functional units of a computer using engineering science.
CST202.CO2-PO3	M	Students are able to find solutions to meet specific needs in the effect of addressing modes.

CST202.CO2-PO4	L	Students can experiment and analyze data to relate the effect of addressing modes and identify the role of various functional units of a computer.
CST202.CO 2- PO10	L	Students are able to apply reasoning informed by the contextual knowledge to relate the effect of addressing modes and identify the role of various functional units of a computer.
CST202.CO 2- PO12	H	Students can communicate effectively by presenting the effect of addressing modes and the role of various functional units of a computer.
CST202.CO 2- PSO1	H	Students can develop computing solutions to relate the effect of addressing modes by applying foundational concepts of Computer Science and Engineering.
CST202.CO 2- PSO2	M	Students can adapt to emerging information in functional units of a computer by providing innovative ideas and solutions to problems in functional units of a digital computer.
CST202.CO3-PO1	H	Students have ability to apply the knowledge of engineering fundamentals to design processing unit using the concepts of ALU and control logic design.
CST202.CO3-PO2	H	Students are able to formulate and design basic structure processing unit using the concepts of ALU and control logic design using engineering science
CST202.CO3-PO3	H	Students can adapt to emerging information in designing processing unit by providing innovative ideas and solutions to problems in ALU and control logic design.
CST202.CO3-PO4	L	Students can experiment and analyze data to relate the ALU and control logic
CST202.CO 3- PO10	L	Students are able to apply reasoning informed by the contextual knowledge to design the basic structure of processing unit using the concepts of ALU and control logic design.
CST202.CO 3- PO12	H	Students are able to apply ethical principles while designing the basic structure of processing unit using the concepts of ALU.
CST202.CO 3- PSO1	H	Students can communicate effectively while designing the basic structure of processing unit using the concepts of ALU.

CST202.CO 3- PS02	L	Students can recognize the need for designing processing unit using the concepts of ALU and control logic design via lifelong learning.
CST202.CO4-PO 1	H	Students have ability to apply the knowledge of engineering fundamentals to identify the features of various types of memory unit and identify pros and cons of different types of control logic design in processors.
CST202.CO4-PO 2	H	Students are able to identify the features of various types of memory unit and identify pros and cons of different types of control logic design in processors using engineering science.
CST202.CO4-PO 3	H	Students can adapt to emerging information in the identifying the features of various types of memory unit and identify pros and cons of different types of control logic design in processors using engineering science.
CST202.CO4-PO 4	L	Students can experiment and analyze the features of various types of memory unit and identify pros and cons of different types of control logic design in processors using engineering science and synthesis information.
CST202.CO 4- PO10	L	Students are able to identify the features of various types of memory unit and identify pros and cons of different types of control logic design in processors.
CS202.CO4-PO1 2	H	Students can communicate effectively while identifying the features of various types of memory unit and identifying pros and cons of different types of control logic design in processors.
CS202.CO4-PSO 1	H	Students can recognize the need of various types of memory unit and lifelong learning in the context of technological change.
CST202.CO 4- PSO2	M	Students can develop computing solutions in while identifying the features of various types of memory unit and identifying pros and cons of different types of control logic design in processors by applying foundational concepts of Computer Science and Engineering.
CS202.CO4-PSO 3	M	Students can apply software engineering principles while identifying the features of various types of memory unit and identifying pros and cons of different types of control logic design in processors
CST202.CO5-PO 1	H	Students have ability to apply the knowledge of engineering fundamentals to outline appropriate interfacing standards for I/O devices.

CST202.CO5-PO 2	H	Students are able to apply the knowledge of engineering fundamentals to outline appropriate interfacing standards for I/O devices using engineering science
CST202.CO5-PO 3	H	Students can adapt to apply the knowledge of engineering fundamentals to outline appropriate interfacing standards for I/O device
CST202.CO 5- PO10	L	Students can experiment and appropriate interfacing standards for I/O devices and synthesis information.
CST202.CO 5- PO12	H	Students are able to apply reasoning informed by the contextual knowledge to outline appropriate interfacing standards for I/O devices.
CST202.CO 5- PSO1	H	Students can communicate effectively while defining appropriate interfacing standards for I/O devices
CST202.CO 5- PSO2	M	Students can recognize appropriate interfacing standards for I/O devices and lifelong learning in the context of technological change.
CST202.CO6-PO 1	H	Students can adapt to emerging information in designing processing unit by providing innovative ideas and solutions to problems in ALU.
CST202.CO6-PO 2	M	Students are able to apply ethical principles while designing the basic structure of processing unit using the concepts of ALU
CST202.CO6-PO 3	M	Students can recognize the need for designing processing unit using the concepts of ALU and control logic design via lifelong learning.
CST202.CO6-PO 4	L	Students are able to apply principles while designing the basic structure of processing unit using the concepts of ALU
CST202.CO 6- PO10	L	Students can adapt to emerging information in functional units of a computer by providing innovative ideas and solutions to problems in functional units of a digital computer.
CST202.CO 6- PO12	H	Students can adapt to emerging information in designing processing unit by providing innovative ideas to problems in ALU.

CST202.CO 6- PSO1	M	Students can communicate effectively while designing the basic structure of processing unit using the concepts arithmetic circuits.
CST202.CO 6- PSO3	M	Students have ability to apply the knowledge of engineering fundamentals to design processing unit.

Course Outcome

CO	Description	Bloom's taxonomy level
CO1	Summarize and exemplify fundamental nature and characteristics of database systems	Understanding(U)
CO2	Model real word scenarios given as informal descriptions, using Entity Relationship diagrams.	Applying(P)
CO3	Model and design solutions for efficiently representing and querying data using relational model	Analyzing(A)
CO4	Demonstrate the features of indexing and hashing in database applications	Applying(P)
CO5	Discuss and compare the aspects of Concurrency Control and Recovery in Database systems	Applying(P)
CO6	Explain various types of NoSQL databases	Understanding(U)

CO - PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1									1	1		
CO2	2	3	3	2								3	3	3	3
CO3	2	3	3	2								3	3	3	3
CO4	2	3	3							1		3	3	3	3
CO5	2	3	3							1		3	3	3	3
CO6	1	1	1		2					1		3	1	3	1

Course : B.Tech Course Code : CST 204 Course Name : Database Management Systems Year & Semester : 2nd Year, 4

Mapping	LOW/MEDIUM/HIGH	Justification
CST 204.1-PO1	**L**	As students could just identify fundamental nature and characteristics of database system.
CST 204.1-PO2	**L**	Students could only analyze fundamental nature and characteristics of database system.
CST 204.1-PO3	**L**	Students could have only the basic knowledge of fundamental nature and characteristics of database system.
CST 204.1-PO12	**L**	The basics characteristics of database system will help the students to learn database further.
CST 204.1-PSO1	**L**	As students could just identify fundamental nature and characteristics of database system.
CST 204.2-P01	**M**	Students will be able to apply knowledge in DBMS to recognize ER diagram.
CST 204.2-PO2	**H**	Students will be able to analyze ER Diagram.
CST 204.2-PO3	**H**	Students will be able to design ER diagram from real world scenarios.
CST 204.2-PO4	**M**	Students will be able to conduct investigations on ER diagram and summaries the meaning from it.at a moderate level.
CST 204.2-PO12	**H**	The knowledge in ER diagram will help the students to design database applications in all future projects.
CST 204.2-PSO1	**H**	Students will be able to analyze and design ER diagram by applying the fundamental concepts.
CST 204.2-PSO2	**H**	Students will be able to apply software engineering principles in development of ER diagrams.

CST 204.2-PSO3	**H**	Students can solve the database design problems by using ER diagram.
CST 204.3-PO1	**M**	Knowledge in Relational algebra will help the student model and design solutions in DBMS.

Mapping	LOW/MEDIUM/HIGH	Justification
CST 204.3-PO2	**H**	Students will be able to analyze the real-world problems and will be able to write relational algebra and SQL for solving it.
CST 204.3-PO3	**H**	Students will be able to design and develop database applications by using SQL.
CST 204.3-PO4	**M**	Students will be able to conduct investigations on existing database and derive summary from it.
CST 204.3-PO12	**H**	The knowledge in relational algebra and SQL will help the students to design database applications in all future projects.
CST 204.3-PSO1	**L**	Students will be able to analyze and design database solutions by applying the foundational concepts of relational algebra and SQL.
CST 204.3-PSO2	**M**	Students will be able to apply software engineering principles in development of relational algebra and SQL queries.
CST 204.3-PSO3	**M**	Students can solve the database design problems by using relational algebra and SQL queries.
CST 204.4-PO1	**M**	The knowledge in Indexing and hashing will help the students to optimize the databases. Need more practice to create highly optimised databases.
CST 204.4-PO2	**H**	Students will be able to analyse the optimisation problems in database and improve the optimisation using Indexing and hashing.
CST 204.4-PO3	**H**	Students will be able to design and develop the optimised database applications.

Mapping	LOW/MEDIUM/HIGH	Justification
CST 204.4-PO10	L	The effective optimisation writing skills will help the students to develop stable databases
CST 204.4-PO12	**H**	The knowledge in optimisation will help the students to design efficient database applications in all future projects
CST 204.4-PSO1	**H**	Students will be able to analyse and design optimised database solutions by applying the foundational concepts of indexing and hashing.
CST 204.4-PSO2	**H**	Students will be able to apply software engineering principles in development optimised database applications.
CST 204.4-PSO3	**H**	Students can solve the database optimisation problems by using indexing and hashing.
CST 204.5-PO1	**M**	The knowledge in Concurrency control will help the students to avoid conflict in simultaneous database operations.
CST 204.5-PO2	**H**	Students will be able to analyse concurrency issues in databases.
CST 204.5-PO3	**H**	Students will be able to design and develop databases that supports the concurrent transactions.
CST 204.5-PO10	**L**	Students will be able to write concurrent database applications but more experience required to write it properly.
CST 204.5-PO12	**H**	The knowledge in concurrency control will help the students to design database applications that can handle simultaneous operations in all their future projects

CST 204.5-PSO1	**H**	Students will be able to analyse and design database solutions with concurrency control by applying the foundational concepts they learned.
CST 204.5-PSO2	H	Students will be able to apply software engineering principles in development of

Mapping	LOW/MEDIUM/HIGH	Justification
		database applications that can handle simultaneous operations.
CST 204.5-PSO3	H	Students can solve the database concurrency problems.
CST 204.6-PO1	L	Students will have a basic knowledge in NoSQL Databases
CST 204.6-PO2	L	Students will have basic analysing skills in NOSQL Databases
CST 204.6-PO3	L	Students will be able to develop basic NoSQL queries.
CST 204.6-PO5	M	Students will have a moderate knowledge in using the NoSQL software tools.
CST 204.6-PO10	L	Students will have a basic skill in writing NoSQL queries
CST 204.6-PO12	H	The knowledge in NoSQL will help the students to design unstructured database applications all their future projects
CST 204.6-PSO1	L	Students will have a basic analysis and design skills in solving computational problems using NoSQL
CST 204.6-PSO2	H	Students will be able to apply software engineering concepts in developing NoSQL Queries
CST 204.6-PSO3	L	Students will able to solve basic problems using NoSQL

COURSE OUTCOME: MAT266

Programme : Bachelor of Technology
Course Code: CST 206
Course Name: Operating Systems
Semester: 4

COURSE OUTCOMES

The students will be able to:

CO	Course outcome	Knowledge level
CST206.1	Explain the relevance, structure and functions of Operating Systems in computing devices.	K 2
CST206.2	Illustrate the concepts of process management and process scheduling mechanisms employed in Operating Systems.	K 2
CST206.3	Explain process synchronization in Operating Systems and illustrate process synchronization mechanisms using Mutex Locks, Semaphores and Monitors	K 2
CST206.4	Explain any one method for detection, prevention, avoidance and recovery for managing deadlocks in Operating Systems.	K 2
CST206.5	Explain the memory management algorithms in Operating Systems.	K 2
CST206.6	Explain the security aspects and algorithms for file and storage management in Operating Systems.	K 2

CO - PO - PSO MAPPING

PO / CO	Programme outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO2	PSO 3
CO1	2	2	2	-	-	-	-	-	-	1	-	2	1	-	-
CO2	2	2	2	2	-	-	-	-	-	1	-	2	2	-	-
CO3	2	2	2	2	-	-	-	-	-	1	-	2	2	-	-
CO4	2	2	2	2	-	-	-	-	-	1	-	2	2	-	-
CO5	2	2	2	1	-	-	-	-	-	1	-	2	2	-	-
CO6	2	1	1	1	-	-	-	-	-	1	-	2	1	-	-
AVG					-	-	-	-	-		-				-

Correlation : 1-Low, 2-Moderate, 3-High, No Correlation '-'

JUSTIFICATION

CO-PO-PSO	LEVEL (Low/Moderate/High)	JUSTIFICATION
CST206.1-PO1	M	Understanding the relevance, structure and functions of Operating Systems in computing devices, students are able to gain the knowledge various types operating systems used in different computing environments, different functions performed by operating systems includes process, memory, storage management and security it provides.
CST206.1-PO2	M	With the knowledge gained to explain the relevance, structure and functions of Operating Systems in computing devices, students are able to identify the functionalities and computing resources
CST206.1-PO3	L	Understanding the relevance, structure and functions of Operating Systems in computing devices, students are able to perform systematic evaluation of the degree to which several design concepts meet the criteria
CST206.1-PO10	L	With the knowledge gained to explain the relevance, structure and functions of Operating Systems in computing devices, the students are able to read, understand and interpret technical and non-technical information
CST206.1-PO12	M	With the knowledge gained to explain the relevance, structure and functions of Operating Systems in computing devices, the students are able to recognize the need and be able to clearly explain why it is vitally important to keep current regarding new developments in the field; recently regarding the launch of Windows 11.
CST206.2-PO1	M	With the understanding of SIC, SIC/XE machine architectures, their addressing modes and instruction

		set, students are able to apply the knowledge for the solution of engineering problems.
CST206.2-PO2	M	With the understanding of SIC, SIC/XE machine architectures, their addressing modes and instruction set, students are able to identify algorithms and parameter to solve a problem.
CST206.2-PO3	M	With the understanding of SIC, SIC/XE machine architectures, their addressing modes and instruction set, the students are able to refine architecture design into a detailed design within the existing constraints.
CST206.2-PO12	L	With the understanding of SIC, SIC/XE machine architectures, their addressing modes and instruction set, the students are able to identify changing trends in engineering knowledge and practice
CST206.2-PS01	L	Students will be able to analyse, design and develop computing solutions with the knowledge of SIC, SIC/XE machine architectures, their addressing modes and instruction set**.**
CST206.3-PO1	M	With the understanding of various machine dependent features of assembler, linker and loader including the program relocation, the students are able to apply the gained knowledge to demonstrate competence in specialized engineering knowledge to the program
CST206.3-PO2	M	With the understanding of various machine dependent features of assembler, linker and loader including the program relocation, the students are able to apply the gained knowledge to identify design constraints for required performance criteria.
CST206.3-PO3	L	With the understanding of various machine dependent features of assembler, linker and loader including the program relocation, the students are able to implement and integrate the modules.

CST206.3-PO12	M	With the understanding of various machine dependent features of assembler, linker and loader including the program relocation, the students are able to comprehend technical literature and other credible sources of information.
CST206.3-PS01	L	Students will be able to analyse, design and develop computing solutions with the understanding of various machine dependent features of assembler, linker and loader including the program relocation
CST206.4-PO1	M	With the understanding of various machine independent features of microprocessor, assembler, linker and loader including the use of literals, control sections, macro expansion, the students are able to comprehend technical literature and other credible sources of information.
CST206.4-PO2	M	With the understanding of various machine independent features of microprocessor, assembler, linker and loader including the use of literals, control sections, macro expansion, the students are able to identify, assemble and evaluate information and resources.
CST206.4-PO12	M	With the understanding of various machine independent features of microprocessor, assembler, linker and loader including the use of literals, control sections, macro expansion, the students are able to comprehend technical literature and other credible sources of information.
CST206.4-PS01	L	Students will be able to analyse, design and develop computing solutions with the understanding of machine independent features of microprocessor, assembler, linker and loader including the use of literals, control sections, macro expansion.
CST206.5-PO1	H	With the design of algorithms for macroprocessors, assemblers, linkers and loaders and analysing the data structures involved, the students are able to

		demonstrate competence in engineering fundamentals.
CST206.5-PO2	H	With the design of algorithms for macroprocessors, assemblers, linkers and loaders and analysing the data structures involved, the students are able to demonstrate an ability to formulate a solution plan and methodology for an engineering problem
CST206.5-PO3	M	With the design of algorithms for macroprocessors, assemblers, linkers and loaders and analysing the data structures involved, the students are able to demonstrate an ability to advance an engineering design to defined end state.
CST206.5-PO4	M	With the design of algorithms for macroprocessors, assemblers, linkers and loaders and analysing the data structures involved, the students are able to demonstrate an ability to conduct investigations of technical issues consistent with their level of knowledge and understanding.
CST206.5-PO12	M	With the design of algorithms for macroprocessors, assemblers, linkers and loaders and analysing the data structures involved, the students are able to comprehend technical literature.
CST206.5-PS01	M	Students will be able to analyse, design and develop computing solutions with the design of algorithms for macroprocessors, assemblers, linkers and loaders and analysing the data structures involved.
CST206.6-PO1	M	With the understanding of features of device drivers, text editors, debuggers, their functionalities and capabilities, students are able to demonstrate competence in engineering fundamentals.

CST206.6-PO2	L	With the understanding of features of device drivers, text editors, debuggers, their functionalities and capabilities, the students are able to demonstrate an ability to execute a solution process and analyze results.

CST206.6-PO5	M	With the understanding of features of device drivers, text editors, debuggers, their functionalities and capabilities, the students are able to demonstrate an ability to select and apply discipline specific tools, techniques and resources
CST206.6-PO12	M	With the understanding of features of device drivers, text editors, debuggers, their functionalities and capabilities, the students are able to demonstrate an ability to identify changing trends in engineering knowledge and practice
CST206.6-PS01	L	Students will be able to analyse, design and develop computing solutions with the understanding the features of device drivers, text editors, debuggers, their functionalities and capabilities.
CST206.6-PSO2	L	Students will be able to develop quality software with the understanding the features of device drivers, text editors, debuggers, their functionalities and capabilities.

Programme : Bachelor of Technology
Course Name: Operating Systems Lab

Course Code: CSL204
Semester: 4

COURSE OUTCOMES

At the end of the course, the student should be able to:

CO	Course outcome	Knowledge level
CSL204.CO 1	Illustrate the use of systems calls in Operating Systems. (Cognitive knowledge: Understand)	K 2
CSL204.CO 2	Implement Process Creation and Inter Process Communication in Operating Systems. (Cognitive knowledge: Apply)	K 3
CSL204.CO 3	Implement Fist Come First Served, Shortest Job First, Round Robin and Priority based CPU Scheduling Algorithms. (Cognitive knowledge: Apply)	K 3
CSL204.CO 4	Illustrate the performance of First in First Out, Least Recently Used and Least Frequently Used Page Replacement Algorithms. (Cognitive knowledge: Apply)	K 3
CSL204.CO 5	Implement modules for Deadlock Detection and Deadlock Avoidance in Operating Systems. (Cognitive knowledge: Apply)	K 3
CSL204.CO 6	Implement modules for Storage Management and Disk Scheduling in Operating Systems. (Cognitive knowledge: Apply)	K 3

CO - PO - PSO MAPPING

PO / CO	Programme outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CS352.CO 1	2	2	2	-	-	-	-	1	-	1	-	3	2	-	2
CS352.CO 2	3	3	3	-	-	-	-	1	-	1	-	3	3	-	2
CS352.CO 3	3	3	3	2	-	-	-	1	-	1	-	3	3	-	2
CS352.CO 4	3	3	3	2	-	-	-	1	-	1	-	3	3	-	2
CS352.CO 5	3	3	3	2	-	-	-	1	-	1	-	3	3	-	2
CS352.CO	3	3	3	2	-	-	-	1	-	1	-	3	3	-	2

6															
AVG	2.83	2.83	2.83	2	-	-	-	1	-	1	-	3	2.83	-	2

Correlation : 1-Low, 2-moderate, 3-high, No Correlation '-'

JUSTIFICATION

CO-PO	LEVEL (Low/Moderate/High)	JUSTIFICATION
CSL204.CO1-PO1	**MODERATE**	By illustrating the use of system calls, the students will be able to apply the knowledge in simple engineering problems.
CSL204.CO2-PO1	**HIGH**	By implementing Process Creation and Inter Process Communication in Operating Systems, the students will be able to apply the knowledge of IPC in complex engineering problems
CSL204.CO3-PO1	**HIGH**	By implement Fist Come First Served, Shortest Job First, Round Robin and Priority based CPU Scheduling Algorithms, the students will be able to apply the knowledge of scheduling in complex engineering problems
CSL204.CO4-PO1	**HIGH**	By illustrating the performance of First in First Out, Least Recently Used and Least Frequently Used Page Replacement Algorithms, the students will be able to apply the knowledge of page replacement algorithms in complex engineering problems
CSL204.CO5-PO1	**HIGH**	By implementing modules for Deadlock Detection and Deadlock Avoidance in Operating Systems, the students will be able to apply the knowledge of deadlock detection and avoidance in complex engineering problems
CSL204.CO6-PO1	**HIGH**	By implementing modules for Storage Management and Disk Scheduling in Operating Systems, the students will be able to apply the knowledge in complex engineering problems
CSL204.CO1-PO2	**MODERATE**	By illustrating the use of system calls, the students will be able to identify and formulate simple engineering problems.

CSL204.CO2-PO 2	**HIGH**	By implementing Process Creation and Inter Process Communication in Operating Systems, the students will be able to identify and formulate complex engineering problems.
CSL204.CO3-PO 2	**HIGH**	By implement Fist Come First Served, Shortest Job First, Round Robin and Priority based CPU Scheduling Algorithms, the students will be able to identify and formulate complex engineering problems.
CSL204.CO4-PO 2	**HIGH**	By illustrating the performance of First in First Out, Least Recently Used and Least Frequently Used Page Replacement Algorithms, the students will be able to identify and formulate complex engineering problems.
CSL204.CO5-PO 2	**HIGH**	By implementing modules for Deadlock Detection and Deadlock Avoidance in Operating Systems, the students will be able to identify and formulate complex engineering problems.
CSL204.CO6-PO 2	**HIGH**	By implementing modules for Storage Management and Disk Scheduling in Operating Systems, the students will be able to identify and formulate complex engineering problems.
CSL204.CO1-PO 3	**MODERATE**	By illustrating the use of system calls, the students will be able to design solutions for simple engineering problems.
CSL204.CO2-PO 3	**HIGH**	By implementing Process Creation and Inter Process Communication in Operating Systems, the students will be able to design solutions for complex engineering problems.
CSL204.CO3-PO 3	**HIGH**	By implement Fist Come First Served, Shortest Job First, Round Robin and Priority based CPU Scheduling Algorithms, the students will be able to design solutions for complex engineering problems.

CSL204.CO4-PO 3	**HIGH**	By illustrating the performance of First in First Out, Least Recently Used and Least Frequently Used

		Page Replacement Algorithms, the students will be able to design solutions for complex engineering problems
CSL204.CO5-PO 3	**HIGH**	By implementing modules for Deadlock Detection and Deadlock Avoidance in Operating Systems, the students will be able to design solutions for complex engineering problems.
CSL204.CO6-PO 3	**HIGH**	By implementing modules for Storage Management and Disk Scheduling in Operating Systems, the students will be able to use research-based knowledge and research methods.
CSL204.CO3-PO 4	**MODERATE**	By implement Fist Come First Served, Shortest Job First, Round Robin and Priority based CPU Scheduling Algorithms, the students will be able to use research-based knowledge and research methods.
CSL204.CO4-PO 4	**MODERATE**	By illustrating the performance of First in First Out, Least Recently Used and Least Frequently Used Page Replacement Algorithms, the students will be able to use research-based knowledge and research methods
CSL204.CO5-PO 4	**MODERATE**	By implementing modules for Deadlock Detection and Deadlock Avoidance in Operating Systems, the students will be able to use research-based knowledge and research methods.
CSL204.CO6-PO 4	**MODERATE**	By implementing modules for Storage Management and Disk Scheduling in Operating Systems, the students will be able to use research-based knowledge and research methods.
CSL204.CO1-PO 8	**LOW**	By illustrating the use of system calls, the students will be able to apply ethical principles and commit to professional engineering solutions.

CSL204.CO2-PO 8	**LOW**	By implementing Process Creation and Inter Process Communication in Operating Systems, the

		students will be able to apply ethical principles and commit to professional engineering solutions.
CSL204.CO3-PO 8	**LOW**	By implement Fist Come First Served, Shortest Job First, Round Robin and Priority based CPU Scheduling Algorithms, the students will be able to apply ethical principles and commit to professional engineering solutions.
CSL204.CO4-PO 8	**LOW**	By illustrating the performance of First in First Out, Least Recently Used and Least Frequently Used Page Replacement Algorithms, the students will be able to apply ethical principles and commit to professional engineering solutions.
CSL204.CO5-PO 8	**LOW**	By implementing modules for Deadlock Detection and Deadlock Avoidance in Operating Systems, the students will be able to apply ethical principles and commit to professional engineering solutions.
CSL204.CO6-PO 8	**LOW**	By implementing modules for Storage Management and Disk Scheduling in Operating Systems, the students will be able to apply ethical principles and commit to professional engineering solutions.
CSL204.CO1-PO 10	**LOW**	By illustrating the use of system calls, the students will be able to communicate effectively on complex engineering activities.
CSL204.CO2-PO 10	**LOW**	By implementing Process Creation and Inter Process Communication in Operating Systems, the students will be able to communicate effectively on complex engineering activities
CSL204.CO3-PO 10	**LOW**	By implement Fist Come First Served, Shortest Job First, Round Robin and Priority based CPU Scheduling Algorithms, the students will be able to communicate effectively on complex engineering activities

CSL204.CO4-PO 10	**LOW**	By illustrating the performance of First in First Out, Least Recently Used and Least Frequently Used Page Replacement Algorithms, the students will be

		able to communicate effectively on complex engineering activities
CSL204.CO5-PO 10	**LOW**	By implementing modules for Deadlock Detection and Deadlock Avoidance in Operating Systems, the students will be able to communicate effectively on complex engineering activities
CSL204.CO6-PO 10	**LOW**	By implementing modules for Storage Management and Disk Scheduling in Operating Systems, the students will be able to communicate effectively on complex engineering activities
CSL204.CO1-PO 12	**HIGH**	By illustrating the use of system calls, the students will be able to engage in continuous learning.
CSL204.CO2-PO 12	**HIGH**	By implementing Process Creation and Inter Process Communication in Operating Systems, the students will be able to engage in continuous learning.
CSL204.CO3-PO 12	**HIGH**	By implement Fist Come First Served, Shortest Job First, Round Robin and Priority based CPU Scheduling Algorithms, the students will be able to engage in continuous learning.
CSL204.CO4-PO 12	**HIGH**	By illustrating the performance of First in First Out, Least Recently Used and Least Frequently Used Page Replacement Algorithms, the students will be able to engage in continuous learning.
CSL204.CO5-PO 12	**HIGH**	By implementing modules for Deadlock Detection and Deadlock Avoidance in Operating Systems, the students will be able to engage in continuous learning.
CSL204.CO6-PO 12	**HIGH**	By implementing modules for Storage Management and Disk Scheduling in Operating Systems, the students will be able to engage in continuous learning.

CSL204.CO1-PSO1	**MODERATE**	By illustrating the use of system calls, the students will be able to analyze, design and develop computing solutions.
CSL204.CO2-PSO1	**HIGH**	By implementing Process Creation and Inter Process Communication in Operating Systems, the students will be able to analyze, design and develop computing solutions
CSL204.CO3-PSO1	**HIGH**	By implement Fist Come First Served, Shortest Job First, Round Robin and Priority based CPU Scheduling Algorithms, the students will be able to analyze, design and develop computing solutions.
CSL204.CO4-PSO1	**HIGH**	By illustrating the performance of First in First Out, Least Recently Used and Least Frequently Used Page Replacement Algorithms, the students will be able to analyze, design and develop computing solutions.
CSL204.CO5-PSO1	**HIGH**	By implementing modules for Deadlock Detection and Deadlock Avoidance in Operating Systems, the students will be able to analyze, design and develop computing solutions
CSL204.CO6-PSO1	**HIGH**	By implementing modules for Storage Management and Disk Scheduling in Operating Systems, the students will be able to analyze, design and develop computing solutions
CSL204.CO1-PSO3	**MODERATE**	By illustrating the use of system calls, the students will be able to adapt to emerging information and communication solutions.
CSL204.CO2-PSO3	**MODERATE**	By implementing Process Creation and Inter Process Communication in Operating Systems, the students will be able to emerging information and communication solutions

CSL204.CO3-PSO3	**MODERATE**	By implement Fist Come First Served, Shortest Job First, Round Robin and Priority based CPU Scheduling Algorithms, the students will be able to

		emerging information and communication solutions.
CSL204.CO4-PSO3	**MODERATE**	By illustrating the performance of First in First Out, Least Recently Used and Least Frequently Used Page Replacement Algorithms, the students will be able to emerging information and communication solutions.
CSL204.CO5-PSO3	**MODERATE**	By implementing modules for Deadlock Detection and Deadlock Avoidance in Operating Systems, the students will be able to emerging information and communication solutions
CSL204.CO6-PSO3	**MODERATE**	By implementing modules for Storage Management and Disk Scheduling in Operating Systems, the students will be able to emerging information and communication solutions

Programme : Bachelor of Technology
Course Code: CSL 333
Course Name: DBMS LAB
Semester: 5

COURSE OUTCOMES

The students will be able to:

CO	Course outcome	Knowledge level
CSL333.CO 1	Design database schema for a given real world problem-domain using standard design and modeling approaches. (Cognitive Knowledge Level: Apply).	K 3
CSL333.CO 2	Construct queries using SQL for database creation, interaction, modification, and updation. (Cognitive Knowledge Level: Apply)	K 3
CSL333.CO 3	Design and implement triggers and cursors. (Cognitive Knowledge Level: Apply)	K 3
CSL333.CO 4	Implement procedures, functions, and control structures using PL/SQL. (Cognitive Knowledge Level: Apply)	K 3
CSL333.CO 5	Perform CRUD operations in NoSQL Databases. (Cognitive Knowledge Level: Apply)	K 3
CSL333.CO 6	Develop database applications using front-end tools and back-end DBMS. (Cognitive Knowledge Level: Create)	K 6

CO - PO - PSO MAPPING

PO / CO	Programme outcomes												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSL333.CO 1	3	3	3		3			2		2		2	3	-	3
CSL333.CO 2	3	2	3		3			2		2		2	2	-	2
CSL333.CO 3	3	2	2	2	2			2		2		2	3	-	-
CSL333.CO 4	3	2	2	2	2			2		2		2	3	-	-
CSL333.CO 5	3	2	2		2			2		2		2	3	-	-
CSL333.CO	3	2	2	2	2	2		2	2	2	2	2	2	-	2

6															
AVG	3	2.16	2.33	2	2.16	2		2	2	2	2	2	2.66	1	2.33

Correlation : 1-Low, 2-moderate, 3-high, No Correlation '-'

JUSTIFICATION

CO-PO	LEVEL (Low/Moderate/High)	JUSTIFICATION
CSL333.CO1-PO 1	**H**	The students will be able design database schema for a given real world problem-domain using standard design and modeling approaches by which the students will be able to apply engineering knowledge in complex engineering problems.
CSL333.CO1-PO2	**H**	The students can able to design database schema for analyzing a given real world problem-domain using standard design and modeling approaches.
CSL333.CO1-PO 3	**H**	Students can able to develop the solutions of complex engineering problems using standard design and modeling approaches in database.
CSL333.CO1-PO 5	**H**	The students will be able design database schema for a given real world problem-domain using standard design and modeling approaches and modern tool usage.
CSL333.CO1-PO 8	**M**	Students can apply ethical principles and commit to professional ethics and responsibilities while designing database schema for a given real world problem
CSL333.CO1-PO 10	**M**	Students can effectively communicate on complex engineering activities while designing database schema for a given real world problem

CSL333.CO1-PO 12	**M**	Students can apply in the area of designing database schema for a given real world problem-domain using standard design and modeling approaches to engage in independent

		and life -long learning in the broadest context of technological change.
CSL333.CO1-PSO1	**H**	The students can analyse, design and develop the solutions applying the concepts of datamining and warehousing.
CSL333.CO1-PSO3	**H**	Students can able to apply adapt to emerging Information and Communication Technologies by providing innovative ideas and solutions to novel problems in the area of datamining and warehousing.
CSL333.CO2-PO1	**H**	Students can construct queries using SQL for database creation, interaction, modification, and updation by applying engineering knowledge
CSL333.CO2-PO2	**M**	Students can construct queries using SQL for database creation, interaction, modification, and updation for problem analysis.
CSL333.CO2-PO3	**H**	Students can construct queries using SQL for database creation, interaction, modification, and updation for designing solutions.
CSL333.CO2-PO5	**H**	Students can construct queries using SQL for database creation, interaction, modification, and updation using modern tool.
CSL333.CO2-PO8	**M**	Students can apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice while constructing queries using SQL for database creation, interaction, modification, and updation
CSL333.CO2-PO10	**M**	Students can communicate effectively on complex engineering activities while constructing queries using SQL for database

		creation, interaction, modification, and updation
CSL333.CO2-PO 12	**M**	Students can construct queries using SQL for database creation, interaction, modification, and updation to engage in independent and life -long learning in the broadest context of technological change.
CSL333.CO2-PS O1	**M**	Students can be able to analyze, design and develop solutions by applying queries using SQL.
CSL333.CO2-PS O3	**M**	Students can provide innovative ideas and solutions to novel problems using SQL queries.
CSL333.CO3-PO 1	**H**	Students can able to apply engineering knowledge in design and implement triggers and cursors.
CSL333.CO3-PO 2	**M**	Students can able to design and implement triggers and cursors in appropriate complex engineering problems.
CSL333.CO3-PO 3	**M**	Students can design solutions for complex engineering problems and applying triggers and cursors in appropriate domain.
CSL333.CO3-PO 4	**M**	Students can use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid applying triggers and cursor in appropriate domain.
CSL333.CO3-PO 5	**M**	Students can design and implement triggers and cursors in appropriate complex engineering problems using modern tools in appropriate domain.
CSL333.CO3-PO 8	**M**	Students can apply ethical principles while implementing triggers and cursors

CSL333.CO3-PO 10	**M**	Students can able to communicate effectively about various classification algorithms while implementing triggers and cursors
CSL333.CO3-PO 12	**M**	Students can design and implement triggers and cursors to engage in independent and life - long learning in the broadest context of technological change.
CSL333.CO3-PSO1	**M**	Students can analyze, design and develop the solutions by applying concepts triggers and cursors.
CSL333.CO4.PO 1	**H**	Students can apply the knowledge of mathematics, science, engineering fundamentals to implement procedures, functions, and control structures using PL/SQL
CSL333.CO4.PO 2	**M**	Students can implement procedures, functions, and control structures using PL/SQL for performance metrics and engineering sciences.
CSL333.CO4.PO 3	**M**	Students can design solutions for complex engineering problems by implementing procedures, functions, and control structures using PL/SQL
CSL333.CO4.PO 4	**M**	Students can analysis and interpret data, and synthesis of the information to provide valid conclusions while implementing procedures, functions, and control structures using PL/SQL
CSL333.CO4.PO 5	**M**	Students can implement procedures, functions, and control structures using PL/SQL using modern tools in appropriate domain.
CSL333.CO4.PO 8	**M**	Students can implement procedures, functions, and control structures using PL/SQL by considering the ethics.

CSL333.CO4.PO 10	**M**	Students can able to communicate effectively in implementing procedures, functions, and control structures using PL/SQL

CSL333.CO4.PO 12	**M**	Students can implement procedures, functions, and control structures using PL/SQL via lifelong learning.
CSL333.CO4.PS O1	**H**	Students can implement procedures, functions, and control structures using PL/SQL by applying foundational concepts of Computer Science and Engineering.
CSL333.CO5-PO 1	**H**	Students can apply the engineering knowledge to perform CRUD operations in NoSQL Databases.
CSL333.CO5-PO 2	**M**	The students can analyze the complex engineering problems and can perform CRUD operations in NoSQL Databases.
CSL333.CO5-PO 3	**M**	The students can design the solutions of complex problems by performing CRUD operations in NoSQL Databases.
CSL333.CO5-PO 5	**M**	Students can perform CRUD operations in NoSQL Databases by using modern tool.
CSL333.CO5-PO 8	**M**	Students can apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice to real world scenario while using CRUD operations in NoSQL Databases
CSL333.CO5-PO 10	**M**	Students can communicate effectively on complex engineering activities with the engineering community and with society at large, while performing CRUD operations in NoSQL Databases.
CSL333.CO5-PO 12	**M**	Students can able to perform lifelong learning while dealing with CRUD operations in NoSQL Databases.

CSL333.CO5-PSO1	**M**	Students can be able to analyze, design and develop computing solutions by applying foundational concepts of Computer Science

		and Engineering to real world while dealing with CRUD operations in NoSQL Databases
CSL333.CO6-PO1	**H**	Student can develop database applications using front-end tools and back-end DBMS using engineering knowledge.
CSL333.CO6-PO2	**M**	The students can analyze the complex engineering and can develop database applications using front-end tools and back-end DBMS.
CSL333.CO6-PO3	**M**	The students can develop the solutions for complex engineering problems by developing database applications using front-end tools and back-end DBMS.
CSL333.CO6-PO4	**M**	The students can use the research-based knowledge for develop the solutions for complex engineering problems while developing database applications using front-end tools and back-end DBMS.
CSL333.CO6-PO5	**M**	Students can make use of modern tools while developing database applications using front-end tools and back-end DBMS.
CSL333.CO6-PO6	**M**	Students can make use of engineer and society while developing database applications using front-end tools and back-end DBMS.
CSL333.CO6-PO8	**M**	Students can apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice while developing database applications using front-end tools and back-end DBMS

CSL333.CO6-PO9	**M**	Students have to work individually and team work is very important while developing database applications using front-end tools and back-end DBMS

CSL333.CO6-PO 10	**M**	Students can communicate effectively on complex engineering activities with the engineering community and with society at large, while developing database applications using front-end tools and back-end DBMS.
CSL333.CO6-PO 11	**M**	Students can manage the project and finance effectively while developing database applications using front-end tools and back-end DBMS
CSL333.CO6-PO 12	**H**	Students can recognize and engage the solutions for complex engineering problems while developing database applications using front-end tools and back-end DBMS.
CSL333.CO6-PS O1	**M**	Students can able to apply the knowledge of mathematics, science, engineering fundamentals, while developing database applications using front-end tools and back-end DBMS.
CSL333.CO6-PS O3	**M**	Students can develop database applications using front-end tools and back-end DBMS for providing innovative ideas and solutions to novel problems concept.