Year-1 Term-2

Sl.#	Course Code	Course Title	Credit	Credit Hours
1	CSTE 1201	Data Structures and Analysis	3	3
2	CSTE 1202	Data Structures and Analysis Lab	1.5	3
3	CSTE 1203	Numerical analysis	3	3
4	CSTE 1204	Numerical analysis Lab	1	2
5	CSTE 1205	Discrete Mathematics	3	3
6	CSTE 1207	Electronic Devices and Circuits	3	3
7	CSTE 1208	Electronic Devices and Circuits Lab	1	2
8	MATH 1203	Ordinary and Partial Differential equations	2	2
9	BMS 1201	History of the Emergence of Independent Bangladesh	3	3
10	CSTE 1226	Viva Voce	1	0
		Total	**21.5**	**24**

COURSE TITLE: DATA STRUCTURE AND ANALYSIS

Course Code: CSTE 1201 **Credit Hours:** 03 **Exam Hours:** 04	**Attendance:** 05 **CIE Marks:** 25 **SEE Marks:** 70

Course Objectives:
 - To introduce the basics of data structures array, linked list, stack, queue, tree, and graphs.
 - Develop programs that implement data structure.
 - Explain the complexity of some familiar searching and sorting algorithms.

Resources Used: Multimedia, Whiteboard, Marker, Handouts, pdf books, e-Tutorials.

Course Learning Outcomes (CLO)	CLOs	Description (At the end of the course, students will be able to)
	CLO1	understand the fundamentals of linear and nonlinear data structures such as an array, linked list, stack, queue, tree, and graph.
	CLO2	gain knowledge of various operations e.g. sorting, searching, inserting, deleting, traversing, merging.
	CLO3	select appropriate data structures for solving computing problems.

Mapping of CLO to PLO (Program Learning Outcome)		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
	CLO1	√											
	CLO2	√											
	CLO3		√										

Lesson Plan (as per week):

Week	Course Contents	CLOs	Teaching Learning Strategy (activities directed to achieve outcomes)	Assessment Strategy (How they are developed)
1	**Basic of data structure:**	CLO1	Lecture and discussion with detailed information about	Answer basic questions, quizzes.

	Concept and importance of data and data structure. Major operations of data structures. Notations, Asymptotic Notation for complexity of algorithms.		the course, including the objectives, course outcomes, examinations. Topic wise lecture delivery.	
2	**Arrays:** Maximization, ordered lists, sparse matrices, representation of arrays.	CLO2	Lecture and discussion on characteristics, memory allocation and different operations of array.	Answer basic questions, quizzes, Homework, exams.
3	**Stacks and Queues:** Different types of stacks and queues: Circular, dequeues, etc; evaluation of expressions, multiple stacks and queues;	CLO1, CLO2	Lecture and discussion on characteristics, and different operations of stack and queue.	Answer basic questions, quizzes, Homework, exams.
4	**Recursion:** Direct and indirect recursion, depth of recursion; Simulation of Recursion, Removal of recursion.	CLO2	Lecture and discussion with problems.	Exercise with problems.
5	**Linked Lists:** Singly linked lists, linked stacks and queues, the storage pool, polynomial addition, equivalence relations, sparse matrices, doubly linked lists and dynamic storage management, generalized lists, garbage collection, and compaction.	CLO1, CLO2	Lecture and discussion on characteristics, memory allocation and different operations of linked list.	**Class Test 1** (topics of the week's 1-4)
6	**Trees:** Basic terminology, binary trees, binary tree representations, binary tree traversal; Extended binary trees: 2trees, internal and external path lengths.	CLO1, CLO2	Lecture and discussion with problems.	Answer basic questions, quizzes, Homework, exams.
7	Huffman codes/algorithms; threaded binary trees, a binary tree representation of trees; Application of Trees: Set representation, decision trees, games trees: Counting binary trees.	CLO1, CLO2	Lecture and discussion with problems.	Answer basic questions, quizzes, Homework, exams.
8	**Graphs:** Introduction, definitions and terminology, graph representations, traversals, connected components and spanning trees, shortest path and transitive closure, activity networks, topological sort and critical paths, enumerating all paths.	CLO1, CLO2	Lecture and discussion with problems	Answer basic questions, quizzes, Homework, exams.
9	**Sorting:** Efficiency considerations, O notation, Bubble sort, Quick sort, Selection sort, Binary Tree sort heap, Heap sort, Heap as a priority queue, Insertion sort, Shell sort, Merge sort, Radix sort.	CLO2, CLO3	Lecture on steps on different sorting algorithms. Discussion with problems.	**Class Test 2** (topics of the week's 5-8)

10	**Searching:** Sequential searching, indexed sequential searching, Binary search, Interpolation search, Binary tree searching, Insertion and deletion,	CLO2, CLO3	Lecture on steps on different searching algorithms. Discussion with problems.	Answer basic questions, quizzes, Homework, exams.
11	Optimum search trees, Height balanced trees, Single and double rotations, Multi way, Search trees, B-trees, B+ trees, Hashing methods of resolving clashes, Methods of choosing Hash functions.	CLO2, CLO3	Lecture and discussion with problems.	Answer basic questions, quizzes, Homework, exams.
12	**Symbol Tables:** Static tree tables, dynamic tree tables;	CLO2	Lecture and discussion with problems	**Class Test 3** (topics of the week's 9-12)
13	**Hash Tables:** Hashing functions overflow handling, theoretical evaluation of overflow techniques.	CLO2, CLO3	Lecture and discussion on miscellaneous topics.	Exercise the answering methods in final exam.

Recommended Books:
1. Theory and Problems of Data Structures by S. Lipschutz, McGraw Hill
2. Data Structures and Algorithm analysis in C++ by M.A. Weiss, Addison Wesley
3. R Sedgewick, Algorithms in C, Parts 1-4 Fundamentals, Data Structures, Sorting, Searching, Addison Wesley
4. Algorithms + Data Structures = Programs by Niklaus Wirth, Prentice Hall
5. Fundamentals of Data Structures by E. Horowitz and S. Sahni, Galgotia

ASSESMENT PATTERN

Attendance- 05

CIE-Continuous Interval Evolution (25) (Average of best 2 out of 3 will be counted)				SEE-Semester End Examination (70 marks)	
Bloom's Category	**Test-1 (25)**	**Test-2 (25)**	**Test-3 (25)**	**Bloom's Category**	**Test**
Remember				**Remember**	
Understand	15	10	5	**Understand**	25
Apply	5	10	10	**Apply**	30
Analyze	5	5	10	**Analyze**	20
Evaluate				**Evaluate**	
Create				**Create**	

COURSE TITLE: DATA STRUCTURE AND ANALYSIS LAB

Course Code: CSTE 1202 **Credit Hours:** 1.5 **Exam Hours:** 03	**Attendance:** 10 **Viva:** 20 **SEE Marks:** 70

Course Objectives:
➢ To introduce the basics of data structures array, linked list, stack, queue, tree, and graphs.
➢ Develop programs that implement data structure.
➢ Measure the complexity of some familiar searching and sorting algorithms.

Resources Used: Multimedia, Whiteboard, Marker, Handouts, pdf books, e-Tutorials, Code Blocks IDE.

Course Learning Outcomes	**CLOs**	**Description (At the end of the course, students will be able to)**
	CLO1	implement different data structures in a programming language.

(CLO)	CLO2	analyze the performance of data structures and algorithms by measuring time and space complexities.
	CLO3	justify different data structures for solving problems in different scenarios.

Mapping of CLO to PLO (Program Learning Outcome)		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
	CLO1	√											
	CLO2		√										
	CLO3		√										

Lesson Plan (as per week):

Week	Course Contents	CLOs	Teaching Learning Strategy (activities directed to achieve outcomes)	Assessment Strategy (How they are developed)
1-3	**Arrays** A program which will store data in a linear array. Program to travers, insert, delete in a linear array. To find a given target number using linear search from the list of numbers. To find a given target number using Binary Search from the list of number. To find the maximum and minimum value in a given list of numbers. To sort the given data using selection sort. To sort the given data using Bubble sort. To sort the given data using Insertion sort. To sort the given data using Quick Sort. Implement basic matrix operations.	CLO1, CLO2, CLO3	Discussion and practice	Answer basic questions, quizzes, Homework, exams.
4-6	**Stacks and Queues** Implement stack, queue using array and linked list. To perform all stacks operation. To perform all the queue operations. Write a C code to implement queue and dequeue using array. To sort the given data using Merge sort. Write a program to create a Stack and different functionality related to it (i.e. Push( ), Pop( ), Peak( ), Traverse( )). Implement it using linked Structure.	CLO1, CLO2	Discussion and practice.	Answer basic questions, quizzes, Homework, exams. Quiz 1 (Topic of the 1-3 weeks)
7	**Recursion** Problems to solve using recursive technique.	CLO2	Lecture and discussion with problems.	Exercise with problems.
8-9	**Linked Lists** Program which will store data in linked list. Program which will implement linked list using linear array and pointer.	CLO2, CLO3	Discussion and practice	Answer basic questions, quizzes, Homework, exams.

Week	Topic	CLOs	Teaching-Learning Strategy	Assessment Strategy
	Program which will do some basic operations in a singly linked list like traverse, insertion, deletion, reverse, search and swapping.			
10-11	**Trees** Write a C code to implement binary search tree insertion, deletion, search, and traverse operations. Write program for Huffman algorithm.	CLO2, CLO3	Lecture, discussion with problems and practice.	Answer basic questions, quizzes, Homework, exams. Quiz 2 (Topic of the 4-9 weeks)
12	**Graphs** Implement BFS and DFS traversal methods. Implement minimum spanning tree algorithm.	CLO2, CLO3	Discussion and practice	Answer basic questions, quizzes, Homework, exams. Quiz 3 (Topic of the 10-13 weeks)
13	**Final Lab Exam (Lab and Viva)**			

ASSESMENT PATTERN
Attendance- 10 **Viva- 20**

SEE-Semester End Examination (70 marks)

Bloom's Category	Test
Remember	
Understand	20
Apply	30
Analyze	20
Evaluate	
Create	

COURSE TITLE: NUMERICAL ANALYSIS

Course Code: CSTE 1203 **Credit Hours:** 03 **Exam Hours:** 04	**Attendance:** 05 **CIE Marks:** 25 **SEE Marks:** 70

Course Objectives:
- ➢ To introduce the fundamental concept of the number system and error calculation.
- ➢ To explain different numerical methods in solving linear and non-linear equations, interpolation and extrapolation, differentiation, and integration.
- ➢ To discuss various methods for the solution of 1st order differential equation with initial value problems.
- ➢ To provide the basic concepts of number theory and recurrence relation.

Resources Used: Multimedia, Whiteboard, Marker, Handouts, pdf books, e-Tutorials, Question bank, Previous questions.

Course Learning Outcomes (CLO)	CLOs	Description (At the end of the course, students will be able to)
	CLO1	understand the number system, errors estimation and analysis, number theory, and recurrence solution of different problems.
	CLO2	use the appropriate method to determine approximate solutions of linear and non-linear equations.
	CLO3	solve interpolation and extrapolation problems using different techniques.

	CLO4	determine the solutions of complex integration and differentiation, differential equations with initial value problem using various formula.											
Mapping of CLO to PLO (Program Learning Outcome)		**PLO1**	**PLO2**	**PLO3**	**PLO4**	**PLO5**	**PLO6**	**PLO7**	**PLO8**	**PLO9**	**PLO10**	**PLO11**	**PLO12**
	CLO1	√											
	CLO2	√											
	CLO3	√											
	CLO4	√											

Lesson Plan (as per week):				
Week	**Course Contents**	**CLOs**	**Teaching Learning Strategy (activities directed to achieve outcomes)**	**Assessment Strategy (How they are developed)**
1	**Numerical analysis:** Computer Number Systems; Overflow and underflow; Approximation in numerical computation; Truncation and round off errors;	CLO1	Lecture and discussion with detailed information about the course, including the objectives, course outcomes, examinations. Topic wise lecture delivery.	Answer basic questions, quizzes, Homework, exams.
2	**Numerical analysis:** Propagation and control of round off errors; Chopping and rounding off errors; Pitfalls (hazards) in numerical computations (ill conditioned and well-conditioned problems).	CLO1	Lecture and discussion and analyze the accuracy.	Answer basic questions, quizzes, Homework, exams.
3	**Numerical Solution of System of Linear Equations**: Gauss elimination method; Matrix Inversion; Operations Count;	CLO2	Lecture and computation of linear equation solution methods.	Answer basic questions, quizzes, Homework.
4	**Numerical Solution of System of Linear Equations**: LU Factorization Method (Crout's Method); Gauss-Jordan Method; Gauss-Seidel Method; Sufficient Condition of Convergence.	CLO2	Lecture and decomposition of linear systems	Answer basic questions, quizzes, Homework, exams.
5	**Numerical Solution of Algebraic and Transcendental Equations:** Iteration Method; Bisection Method; Secant Method;	CLO2	Lecture and discussion on non-linear equations solution.	**Class Test 1** (topics of the week's 1-4)
6	**Numerical Solution of Algebraic and Transcendental Equations:** Regula-Falsi Method; Newton-Raphson Method.	CLO2	Lecture and discussion on non-linear equations solution.	Answer basic questions, quizzes, Homework, exams.
7	**Interpolation:** Lagrange's Interpolation, Newton's forward & backward Interpolation Formula.	CLO3	Lecture and problem solving on interpolation.	Answer basic questions, quizzes, Homework, exams.
8	**Interpolation:** Extrapolation; Newton's Divided Difference Formula; Error; Problems.	CLO3	Lecture and discussion on divided difference and problem solving.	Exercise with various mathematical problems.

9	**Curve fitting:** Fitting with linear equations, Least square method, non-linear curve fitting	CLO2	Lecture and analysis on numerical differentiation with problems.	**Class Test 2** (topics of the week's 5-8)
10	**Numerical Differentiation:** Use of Newton's forward and backward interpolation formula only.	CLO4	Lecture and discussion on numerical integration methods with problems.	Answer basic questions, quizzes, Homework, exams.
11	**Numerical Integration:** Trapezoidal formula (composite); Simson's 1/3rd formula (composite); Romberg Integration (statement only); Problems.	CLO4	Lecture and analysis of Differential equations.	Quizzes, Homework, exams.
12	**Numerical Solution of Initial Value Problems of First Order Ordinary Differential Equations:** Taylor's Series Method; Euler's Method; Runge-Kutta Method (4th order);	CLO4	Lecture and discussion on Differential equations.	**Class Test 3**(topics of the weeks9-11)
13	**Numerical Solution of Initial Value Problems of First Order Ordinary Differential Equations:** Modified Euler's Method and Adams-Moulton Method.	CLO4	Lecture and discussion on concrete mathematics.	Exercise the answering methods in the final exam.

Recommended Books:
1. Introductory Methods of Numerical Analysis by S. S. Sastry, Prentice-Hall.
2. Numerical Methods for Engineers by Steven C. Chapra, Raymond P. Canale, McGraw-Hill.
3. Numerical Methods by E. Balaguruswamy, Tata McGraw-Hill Education.

ASSESMENT PATTERN
Attendance- 05

CIE-Continuous Interval Evolution (25) (Average of best 2 out of 3 will be counted)				SEE-Semester End Examination (70 marks)	
Bloom's Category	Test-1 (25)	Test-2 (25)	Assignment (25)	**Bloom's Category**	**Test**
Remember				**Remember**	
Understand	5	5		**Understand**	15
Apply	20	20	25	**Apply**	55
Analyze				**Analyze**	
Evaluate				**Evaluate**	
Create				**Create**	

COURSE TITLE: NUMERICAL ANALYSIS LAB

Course Code: CSTE 1204 **Credit Hours:** 01 **Exam Hours:** 03	**Attendance:** 10 **Viva:** 20 **SEE Marks:** 70

Course Objectives:
➢ To introduce the fundamental concept of digital computing, including number representation and arithmetic operations.
➢ To provide the student with numerical methods of solving the non-linear equations, interpolation, differentiation, and integration.
➢ To apply numerical methods to obtain approximate solutions to mathematical problems.

> ➤ To provide the basic concepts of concrete mathematics.

Resources Used: Multimedia, Whiteboard, Marker, Handouts, pdf books, e-Tutorials, Question bank, Previous questions.

Course Learning Outcomes (CLO)	CLOs	Description (At the end of the course, students will be able to)
	CLO1	apply different numerical methods for solving problems and their error calculation using the programming language.
	CLO2	justify different methods to find numerical solutions of linear and non-linear equations.
	CLO3	implement different methods to find missing values using interpolation and extrapolation.

Mapping of CLO to PLO (Program Learning Outcome)		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
	CLO1	√											
	CLO2		√										
	CLO3	√											

Lesson Plan (as per week):

Week	Course Contents	CLOs	Teaching Learning Strategy (activities directed to achieve outcomes)	Assessment Strategy (How they are developed)
1-2	Write a program to compute $y = e^{-x^3/2}$ for $0.1 \leq x \leq 2$ in steps of 0.1 Write a program to compute $y = 5x^3 + e^{-2x}$ for $0.1 \leq x \leq 2$ in steps of 0.1 Write a program to compute the value of i) e^x ii) $\ln(1+x)$ iii) $\ln(1+x)$ from Maclaurin expansion truncated after the 6th term.	CLO1	Lecture and practice	-Home task -Quiz
3	Write a program to find a real root of a nonlinear equation using Bisection method, False position method, Newton-Raphson method. a) ex – 3x = 0 b) x3 - 6x + 4 = 0 c) x log10 x - 1.2 = 0	CLO1, CLO2	Lecture and practice	-Home task -Quiz
4	The matrix **A** is said to be of size $m \times n.$ Where **m** represents number of columns and **n** represents number of rows. If $m = n$, the matrix is said to be a square matrix of order **n.** Write a program to perform the following matrix operations i. Enter some numbers and represent these numbers as a matrix form according to given number of columns and rows.	CLO2	Lecture and practice of matrix.	Quiz 1 (Topic of the 1-3 weeks)

	ii. Represent the above matrix **A** as an upper-triangular. iii. Represent the above matrix **A** as a lower-triangular matrix iv. Represent the above matrix **A** as a diagonal matrix. Write a program to find (i) the determinant of a square matrix **A** and also find (ii) the transpose, adjoint and inverse matrix of a square matrix **A**.			
5-6	Write a program to solve a system of linear equations using Matrix Inversion method. Write a program to solve a system of linear equations using simple Gaussian elimination method. Write a program to solve a system of linear equations using simple Gaussian-Seidel method (iterative method).	CLO2	Discussion and practice on non-linear equations solution.	Homework
7-9	The following values of f (x) are given. x = 1 2 3 4 5 ; y = f(x) 1 8 27 64 125 Write a program to find the values of y when x = 1.7 by using Newton's forward interpolation formula and when x = 4.7 by using Newton's backward interpolation formula. Write a program to find numerical solution using Lagrange's equation and Newtons formula for unequal interval.	CLO3	Discussion and practice about interpolation.	Quiz 2 (Topic of the 4-6 weeks)
10-11	Write a program to solve the following Differential Equation by using Euler's method. dy / dx = x3 + y, y (0) = 1. Compute y (0.02) taking h = 0.01. Write a program to solve the following Differential Equation by using Runge – Kutta method. dy / dx = x + y, y (0) = 1. Compute y (0.1) and y (0.2) taking h = 0.1.	CLO3	Discussion and practice.	Homework.
12	Write a program to integrate a tabulated function using the trapezoidal rule. Write a program to integrate a tabulated function using the Simpson's 1/3 rule.	CLO3	Discussion and problem solving on numerical integration.	Answer basic questions, quizzes, Homework, exams.
13	**Final Lab Exam (Job, Quiz and Viva)**			

ASSESMENT PATTERN	
Attendance- 10	
Viva- 20	

SEE-Semester End Examination (70 marks)

Bloom's Category	Test
Remember	
Understand	10
Apply	30
Analyze	20
Evaluate	10
Create	

COURSE TITLE: DISCRETE MATHEMATICS

Course Code: CSTE 1205 **Credit Hours:** 03 **Exam Hours:** 04	**Attendance:** 05 **CIE Marks:** 25 **SEE Marks:** 70

Course Objectives:
- To introduce mathematical reasoning to read, comprehend and construct mathematical arguments.
- To explain about the count or enumerate objects.
- To provide ideas on how to implement discrete structures include sets, permutations, relations, graphs, trees, finite geometries, random variables, and stochastic processes.
- To emphasize how to analyze certain classes of problems by the specification of an algorithm.
- To provide concepts about the classification of different mathematical models.

Resources Used: Multimedia, Whiteboard, Marker, Handouts, pdf books, e-Tutorials, Device manual, Question bank, Previous questions.

Course Learning Outcomes (CLO)	CLOs	Description (At the end of the course, students will be able to)
	CLO1	understand the mathematical objects, reasoning, quantifications, structure, and arguments.
	CLO2	implement discrete structures include sets, permutations, relations, graphs, trees, finite geometries, random variables, and stochastic processes.
	CLO3	analyze certain classes of problems by the specification of an algorithm and to classify different mathematical models.

Mapping of CLO to PLO (Program Learning Outcome)		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
	CLO1	√											
	CLO2	√											
	CLO3		√										

Lesson Plan (as per week):				
Week	Course Contents	CLOs	Teaching Learning Strategy (activities directed to achieve outcomes)	Assessment Strategy (How they are developed)
1	**Set and set operations:** Introduction to sets, elements and notations; universal set, empty set and subsets; all set operations; Venn	CLO1	Overall discussion with the students about the course contents including the objectives, course	Answer basic questions, group discussion and homework.

	diagrams, set identities, classes of sets; computer representation of sets.		outcomes, examinations, physical environment. Lecture and discussion on the set theory and all sets operations and demonstrate problem-solving techniques.	
2	**Functions and function applications:** Definition of function, different types of functions. Graphs of functions, floor functions and celling functions. Inverse functions, Euler's function and compositions of functions. Function relations.	CLO1, CLO2	Lecture and discussion on several topics of functions. Displaying different graphs of functions, composition of functions and relations of functions and solving several examples in classroom.	Solving problems correctly in classroom. Submitted home works and assignments regularly.
3	**Recurrence relations & Generating functions:** Definition of recurrence relations, solving linear homogeneous recurrence relations with constant coefficients. Definition of generating functions, useful facts about power series and using generating functions to solve recurrence relations.	CLO1, CLO2	Lecture and discussion on several topics of recurrence relations & generating functions and showing various calculations and several problem-solving techniques to solve recurrence relations of functions, power series and recurrence relations using generating functions.	Answer basic questions, group discussion and assignments.
4	**Integer and Algorithms:** Representations of integers, binary expansions, hexadecimal expansions. Algorithms for integer operations, modular exponentiation. Euclidean algorithm.	CLO1, CLO3	Demonstrating various calculations to solve binary and hexadecimal expansions also discussion on algorithms to find out modular exponentiation and the greatest common divisor.	Exercise with various mathematical problems.
5	**Inclusion- Exclusion & Binomial coefficients:** Principle and applications of Inclusion-exclusion. Binomial theorem, examples, PASCAL'S IDENTITY and TRIANGLE.	CLO2, CLO3	Showing several problem-solving techniques to solve several problems on principle of inclusion-exclusion.in the classroom. Demonstrating the technique to draw PASCAL'S Triangle using PASCAL'S IDENTITY.	**Class Test 1** (topics of the week's 1-4)
6	**Permutations-Combinations:** Basic concept of permutation, examples, permutations with repetitions. Basic concept of combination, examples, combinations with repetitions.	CLO2	Lecture and discussion on basic concepts of permutation and combination principles and sample problems using permutation and combination principles.	Q & A session, group discussion, assignments.

7	**Graph terminologies:** Introduction of graphs, types of graphs, graph terminology, bipartite graphs, application of graph, representing graphs.	CLO2	Lecture and discussion on graph terminologies, bipartite graph, application of graph and representing graphs in different ways.	Answer basic questions, home works.
8	**Graph applications:** Graph isomorphism, connectivity, Euler path, shortest path algorithm, graph coloring.	CLO2, CLO3	Lecture and discussion on graph properties, different types of path and graph coloring.	Answer basic questions, group discussion, assignments.
9	**Tree terminologies:** Introduction to tree, rooted tree, binary tree, tree parameters, properties of tree, Tree traversal algorithms. The application of tree, representing trees.	CLO1, CLO2	Lecture and discussion on tree terminologies, different types of traversal algorithms to solve related exercises.	**Class Test 2** (topics of the week's 5-8)
10	**Binary and Spanning trees:** Infix, prefix and postfix notations and algorithms, binary tree representation, spanning tree, minimum spanning tree.	CLO3 .	Lecture and explanation on infix, prefix and postfix algorithms to design binary trees and Prim's and Kruskal's algorithms to design minimum spanning tree.	Solving problems correctly in classroom and submitted home works and assignments regularly.
11	**Finite Geometries:** Cryptology and coding theory, Finite fields and Latin Squares, Finite geometry and designs, Basic ideas of public key cryptology and the theory of error correcting codes, Hamming code.	CLO1, CLO2, CLO3 .	Lecture on design and applications of cryptology, finite fields and Latin squares, finite geometry designs, Hamming and other codes.	Q & A session, group discussion, assignments.
12	**Random Variables and Stochastic Processes:** Random variables, Functions of random variables, Sequences of random variables, Stochastic processes, Markov chains, Markov processes and queuing theory.	CLO1, CLO2	Lecture and explanation on the pros and cons of random Variables and stochastic processes.	**Class Test 3** (topics of the week's 9-12)
13	Review topics and Final exam preparation.	Learn about latest trends and the better answering methods in the final exam.	Lecture and discussion on miscellaneous topics.	Exercise the answering methods in final exam.

Recommended Books:
1. Discrete Mathematics and its application by Kenneth H. Rosen, McGraw-Hill.
2. Theory and Problems of Discrete Mathematics by Seymour Lipschutz, Schaum's Series, McGraw-Hill.
3. Discrete Mathematics structures with applications to Computer Science by J. P. Tremblay and R. Manohar, Mc-Graw Hill.
4. Elements of Discrete Mathematics by C.L. Liu, McGraw-Hill.

ASSESMENT PATTERN

Attendance- 05

<table>
<tr><td colspan="4">CIE-Continuous Interval Evolution (25)
(Average of best 2 out of 3 will be counted)</td><td colspan="2">SEE-Semester End Examination (70 marks)</td></tr>
<tr><td>Bloom's Category</td><td>Test-1 (25)</td><td>Test-2 (25)</td><td>Assignment (25)</td><td>Bloom's Category</td><td>Test</td></tr>
<tr><td>Remember</td><td></td><td></td><td></td><td>Remember</td><td></td></tr>
<tr><td>Understand</td><td>15</td><td>10</td><td></td><td>Understand</td><td>20</td></tr>
<tr><td>Apply</td><td>5</td><td>10</td><td>10</td><td>Apply</td><td>20</td></tr>
<tr><td>Analyze</td><td>5</td><td>5</td><td>15</td><td>Analyze</td><td>30</td></tr>
<tr><td>Evaluate</td><td></td><td></td><td></td><td>Evaluate</td><td></td></tr>
<tr><td>Create</td><td></td><td></td><td></td><td>Create</td><td></td></tr>
</table>

COURSE TITLE: ELECTRONIC DEVICES AND CIRCUITS

Course Code: CSTE 1207 **Credit Hours:** 03 **Exam Hours:** 04	**Attendance:** 05 **CIE Marks:** 25 **SEE Marks:** 70

Course Objectives:
- ➢ To introduce the behavior of insulators, semiconductors, and conductors based on band theory.
- ➢ To explain the working principle of different kinds of diodes and analyze their applications in rectifier, clipper, clamper, regulator, etc.
- ➢ To familiarize with the characteristics of BJT, JFET, MOSFET and perform their operation under different configurations.
- ➢ To give an idea of how to analyze various amplifier circuits using different models and use them.
- ➢ To provide the concept about positive and negative feedback in an electronic circuit, a practical feedback circuit, and oscillator circuits and determine the parameters due to feedback.
- ➢ To discuss the construction and working of industrial electronic devices, voltage regulator circuit, and Integrated circuit (IC).

Resources Used: Multimedia, Whiteboard, Marker, Handouts, pdf books, e-Tutorials, Device manual, Question bank, Previous questions.

<table>
<tr><td rowspan="4">Course Learning Outcomes (CLO)</td><td>CLOs</td><td>Description (At the end of the course, students will be able to)</td></tr>
<tr><td>CLO1</td><td>understand the structure, working, and characteristics of the diode, transistor, and industrial electronic devices such as SCR, TRIAC, UJT, a feedback circuit, oscillator circuit.</td></tr>
<tr><td>CLO2</td><td>use a diode, transistor, and other electronic devices in different cases of our real-life such as regulation, switch, amplifier, oscillator, etc.</td></tr>
<tr><td>CLO3</td><td>analyze the circuit using different laws and models.</td></tr>
</table>

<table>
<tr><td rowspan="4">Mapping of CLO to PLO (Program Learning Outcome)</td><td></td><td>PLO1</td><td>PLO2</td><td>PLO3</td><td>PLO4</td><td>PLO5</td><td>PLO6</td><td>PLO7</td><td>PLO8</td><td>PLO9</td><td>PLO10</td><td>PLO11</td><td>PLO12</td></tr>
<tr><td>CLO1</td><td>√</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CLO2</td><td>√</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CLO3</td><td></td><td>√</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

<table>
<tr><td colspan="5" align="center">Lesson Plan (as per week):</td></tr>
<tr><td>Week</td><td>Course Contents</td><td>CLOs</td><td>Teaching Learning Strategy (activities directed to achieve outcomes)</td><td>Assessment Strategy (How they are developed)</td></tr>
</table>

1	**Semiconductor and PN junction:** Electronic structure of the elements, Energy band diagram of insulators, semiconductors & metals. The p-n junction, Clipping and clamping circuits, different types of diodes	CLO1, CLO2	Lecture and discussion with detailed information about the course, including the objectives, course outcomes, examinations. Topic wise lecture delivery.	Answer basic questions, quizzes, Homework, exams
2	**Principle of bipolar transistor** Junction transistor, npn and pnp transistors, principle of transistor action, potential distribution through a transistor, transistor current components, emitter efficiency.	CLO1	Lecture and discussion with problems	Answer basic questions, quizzes, Homework, exams.
3	**Characteristics of transistor:** Transistor as an amplifier, transistor characteristics in CB, CE and CC configurations. Concept of load line. Dynamic transfer curves of Ge and Si transistor.	CLO1	Lecture and discussion with characteristics parameters of transistor families individually.	Answer basic questions, quizzes, Homework, exams.
4	**DC Biasing and Load line:** The operating point, capacitive coupling, the static and dynamic load lines, bias stability, thermal stability. Analyzing of different types biasing circuit.	CLO3	Lecture and discussion with problems.	Answer basic questions, quizzes, Homework, exams.
5	**Transistor as an amplifier:** Classification of amplifier, BJT small signal amplifier circuit analysis in three configurations using different biasing circuit. Push-pull amplifier.	CLO3	Lecture and discussion with problems.	Exercise with various mathematical problems.
6	**BJT AC analysis and Transistor model:** BJT transistor modeling, the r_e transistor model, the hybrid equivalent model	CLO3	Transistor modeling.	Class Test 1 (topics of the week's 1-4)
7	**Oscillator:** Feedback and circuit requirements for oscillation, Nyquest criterion. Sinusoidal oscillators, Barkhousen criterion, phase shift oscillators, resonant circuit oscillators, Colpitt's and Hartly's oscillator, Wein bridge oscillator, Crystal oscillator, frequency stability.	CLO1, CLO2	Lecture, discussion and design.	Answer basic questions, quizzes, Homework, exams.
8	**Operational amplifier:** Basic differential amplifier, differential amplifier circuits, differential amplifier with current mirror and active load. Basics of operational amplifier.	CLO1, CLO2	Lecture on design and applications of the circuits.	Answer basic questions, quizzes, Homework, exams.
9	The ideal OpAmp, Study of OpAmp parameters, OpAmp circuits, Active filters, Voltage regulation.	CLO1, CLO2	Lecture on design and applications of the circuits.	Class Test 2 (topics of the week's 5-8)

10	**Field effect transistor:** JFET: construction, operation, static characteristics, small signal model and parameters.	CLO2, CLO3	Lecture on design and applications of the circuits.	Answer basic questions, quizzes, Homework, exams.
11	**MOSFET:** MOSFET: different types, operation, characteristics curves, DC biasing of depletion type and enhancement type MOSFET.	CLO1, CLO2	Lecture on design and applications of the circuits.	Quizzes, Homework, exams.
12	**Industrial electronic devices:** Thyristors, SCR, TRIAC, UJT, PUT, DIAC, Shockley diode. LED, Liquid Crystal displays (LCD), Photodiodes, Phototransistors, Opto-isolators, Solar cells.	CLO1, CLO2	Lecture on design and applications of the circuits.	Class Test 3 (topics of the weeks9-11)
13	Unregulated power supply, regulated power supply, regulator ICs, regulator circuits. Introduction, Advantage, Drawback, Scale of integration, Classification by structure and function of integrated circuit, How ICs are made?	CLO1, CLO2	Lecture and discussion of power supply and integrated circuit.	Assessment Strategy (How they are developed)

Recommended Books:
1. **Electronic and Circuits.** by-Jacob Millmanand Christos C. Halkias, McGraw-Hill Inc.
2. **Electronic Principles.** by-Albert Paul Malvino, Career Education
3. **Electronic Devices and Circuit Theory.** by- Robert L. Boylestad, Prentice Hall.

ASSESMENT PATTERN

Attendance- 05

CIE-Continuous Interval Evolution (25)
(Average of best 2 out of 3 will be counted)

SEE-Semester End Examination (70 marks)

Bloom's Category	Test-1 (25)	Test-2 (25)	Assignment (25)	Bloom's Category	Test
Remember				Remember	
Understand	15	10		Understand	20
Apply	5	10	10	Apply	20
Analyze	5	5	15	Analyze	30
Evaluate				Evaluate	
Create				Create	

COURSE TITLE: ELECTRONIC DEVICES AND CIRCUITS LAB

Course Code: CSTE 1208	**Attendance:** 10
Credit Hours: 01	**CIE Marks:** 20
Exam Hours: 03	**SEE Marks:** 70

Course Objectives:
➢ Deliver hands-on experience to the students so that they can put theoretical concepts to practice.
➢ To focus on the working of different diodes, transistors, CRO probes, and measuring instruments. Identifying the procedure of experimenting.
➢ Expose the V-I characteristics of diode and Zener diode.
➢ To discuss half-wave, full-wave, clipper, and clamper circuits and to see output wave shape.

- To explain low pass and high pass filter with their characteristics curve.
- To discuss the frequency response of an RLC series and parallel circuit.
- To explain basic construction of generator, motor and different types of switchgear.
- Acquire teamwork skills for working effectively in groups.

Resources Used: Multimedia, Whiteboard, Marker, Handouts, pdf books, e-Tutorials, Device manual, Question bank, Previous questions.

Course Learning Outcomes (CLO)	CLOs	Description (At the end of the course, students will be able to)
	CLO1	gain significant experience with electrical instruments such as function generators, digital multimeters, oscilloscopes, and power supplies, etc.
	CLO2	sketch the characteristics of the diode, BJT, FET, and MOSFET and to construct rectifier circuit using a diode, clipper, and clamper circuit, inverting and non-inverting circuit using IC.
	CLO3	construct and analyze the filter circuit.
	CLO4	construct and analyze RLC series and parallel circuit
	CLO5	acquire teamwork skills for working effectively in groups.

Mapping of CLO to PLO (Program Learning Outcome)		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
	CLO1	√											
	CLO2	√											
	CLO3		√										
	CLO4		√										
	CLO5										√		

		Lesson Plan (as per week):		

Week	Course Contents	CLOs	Teaching Learning Strategy (activities directed to achieve outcomes)	Assessment Strategy (How they are developed)
1	To familiar with the operation of different electrical instruments.	CLO1	Lecture and discussion with detailed information about the lab course, including the objectives, course outcomes, lab examinations and evaluation method.	Answer basic questions about different types of instruments.
2-6	Determination of unknown signal frequency and voltage by using Oscilloscope. Study of lead identification and testing of diode, BJT, FET, and MOSFET. To study of V-I Characteristics curve of a General Diode and Zener diode. To study of Full-Wave Rectification circuit (Bridge & Center tap) and Half-wave circuit. To study of Clipper and Clamper circuit and draw the output wave shape.	CLO2, CLO5	Through lecture, laboratory, and out-of-class assignments.	Neatness, organization, completeness and individually written lab reports are due at the beginning of the lab period. Respected Teacher will be evaluated in lab period.
7	To design and construct of low pass and high pass filter and drawtheir characteristics curves.	CLO3, CLO5	Through lecture, laboratory, and out-of-class assignments.	

8-9	Study the frequency response of an RLC series and parallel circuit and find its resonant frequency.	CLO4, CLO5	Through lecture, laboratory, and out-of-class assignments.	
10-11	Study the basic construction of Generator, Motor, Transformer and different types of switchgear.	CLO1	Through lecture, laboratory, and out-of-class assignments.	
12	Submit a mini project in a group			
13	**Final Lab Exam (Job, Quiz and Viva)**			

<center>

ASSESMENT PATTERN

Attendance- 10
Viva- 20

SEE-Semester End Examination (70 marks)

</center>

Bloom's Category	Test
Remember	
Understand	20
Apply	20
Analyze	30
Evaluate	
Create	

<center>

COURSE TITLE: ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS

</center>

Course Code: MATH 1203 Credit Hours: 02 Exam Hours: 03	Attendance: 05 CIE Marks: 25 SEE Marks: 70

Course Objectives:
  ➢ Introduce different types of the differential equation.
  ➢ Discuss various techniques to solve first-order, second-order, and higher-order differential equations.
  ➢ Provide knowledge about Laplace transform and its application in the engineering field.

Resources Used: Multimedia, Whiteboard, Marker, Handouts, pdf books, e-Tutorials, Previous questions.

Course Learning Outcomes (CLO)	CLOs	Description (At the end of the course, students will be able to)
	CLO1	understand and solve various types of differential equations.
	CLO2	formulate and solve first-order, second-order, and higher-order differential equations in the field of engineering.
	CLO3	use differential equations for complex engineering problems.
	CLO4	apply and analyze Laplace transform in the engineering field.

Mapping of CLO to PLO (Program Learning Outcome)		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
	CLO1	√											
	CLO2	√											
	CLO3	√											
	CLO4		√										

<center>

Lesson Plan (as per week):

</center>

Week	Course Contents	CLOs	Teaching Learning Strategy (activities directed to achieve outcomes)	Assessment Strategy (How they are developed)
1-2	**Introduction** • Direction Fields • Solution of Some Differential Equations • Classification of Differential Equation	CLO1.	Lecture and discussion with detailed information about topic.	Answer basic questions and Homework.
3-4	**First Order Differential Equations** • Linear Equations with Variable Coefficient • Separable Equations • Modeling with First Order Equations • Differences between Linear and Nonlinear Equation. • Autonomous Equations and Population Dynamics • Exact Equation	CLO2, CLO3	Lecture and discussion with detailed information about topic.	Answer basic questions and Homework.
5-8	**Second Order Linear Differential Equations** • Homogenous Equations with Constant Coefficients. • Fundamental Solutions of Linear Homogeneous Equation. • Complex Roots of the Characteristic Equations Repeated Roots; • Reduction of Order Nonhomogeneous Equations.	CLO2, CLO3	Lecture and discussion with problems.	**Class Test 1** (topics of the week's 1-4)
9-11	**Higher Order Linear Equations** • General Theory of 11-th Order Linear Equations. • Heterogeneous Equations with Constant Coefficients.	CLO2	Lecture and discussion with detailed information about topic.	**Class Test 2** (topics of the week's 5-8)
12-13	**The Laplace Transform** • Definition of the Laplace transforms. • Solution of initial Value Problems • Step Functions. • Differential Equations with Discontinuous Forcing Functions. • Impulse Function.	CLO4	Lecture and discussion with detailed information about topic.	**Class Test 3** (topics of the week's 9-11)

Recommended Books:
1. Elementary differentiate equations and boundary value problems. 9th Ed. W.E. Boyce and RCDiprima, John Wiley and Sons Inc.

ASSESMENT PATTERN

Attendance- 05					
CIE-Continuous Interval Evolution (25) (Average of best 2 out of 3 will be counted)				**SEE-Semester End Examination (70 marks)**	
Bloom's Category	**Test-1 (25)**	**Test-2 (25)**	**Assignment (25)**	**Bloom's Category**	**Test**
Remember				**Remember**	
Understand	10	5		**Understand**	10
Apply	15	15	25	**Apply**	50
Analyze		5		**Analyze**	10
Evaluate				**Evaluate**	
Create				**Create**	

COURSE TITLE: HISTORY OF THE EMERGENCE OF INDEPENDENT BANGLADESH

Course Code: BMS 1201 **Credit Hours:** 03 **Exam Hours:** 04	**Attendance:** 05 **CIE Marks:** 25 **SEE Marks:** 70

Course Objectives:
- ➢ To make the student knowledgeable about the emergence of Bangladesh.
- ➢ To prepare them to face the question on Bangladesh Affairs in various job interviews.

Resources Used: Multimedia, Whiteboard, Marker, Handouts, pdf books, e-Tutorials, Question bank, Previous questions.

Course Learning Outcomes (CLO)	**CLOs**	**Description (At the end of the course, students will be able to)**
	CLO1	get the knowledge about the true history of Bangladesh.
	CLO2	acquire knowledge about the ethical compositions of a country.

Mapping of CLO to PLO (Program Learning Outcome)		**PLO1**	**PLO2**	**PLO3**	**PLO4**	**PLO5**	**PLO6**	**PLO7**	**PLO8**	**PLO9**	**PLO10**	**PLO11**	**PLO12**
	CLO1	√											
	CLO2	√											

Lesson Plan (as per week):				
Week	**Course Contents**	**CLOs**	**Teaching Learning Strategy (activities directed to achieve outcomes)**	**Assessment Strategy (How they are developed)**
1	**Introducing:** History of the Emergence of Independent Bangladesh and its Scope	CLO1	Delivering Lecture	Oral Test
2-3	**Description of the Country and its People** • Description of the Country and its People • Ethnical Composition • Language	CLO2	• Delivering Lecture • Power Point (PP) projection • Presenting through image, audio and video. Showing the evolution of Bangla fonts	• Written Test • Assignment
4-5	**Partition of the Sub-Continent 1947, Structure of Pakistan, Disparity, the**	CLO1	• Delivering Lecture	• Written Test • Oral test

			Showing reverent images and videos	• Assignment
	Language Movement and the Rule of Ayub-Yahia Khan (1958-1971) • Lahore Resolution,1940 • The creation of Pakistan 1947 • Central and Provincial Structure • Economic, Social and Cultural Disparity • Misrule of Pakistan and Struggle for Democratic Politics • The Language Movement : Context and Phases • Rise of Nationalism and the Movement for Self- Determination Fall of Ayub Khan and Yahia Khan's Rule, Abolition of One Unit, Universal Suffrage, LFO			
6-7	**Rise of Nationalism and the Movement for Self- Determination** • The Six Point Movement of Sheikh Mujibur Rahman • Reactions, Importance and Significance of the Six Point Movement • The Agartala Case, 1968 • Students' 11-Points Movement The Mass-Upsurge of 1969	CLO1	• Delivering lectures • Showing relevant image and video Group discussion	• Written Test • Presentation • Assignment
8-9	**Election of 1970, Non-cooperation Movement of March 1971 and the Declaration of Independence by Bangabandhu** • Election Result and Central's Refusal to Comply • The Non-cooperation Movement, the 7th March Address, Operation Searchlight • Declaration of Independence by Bangabandhu and His Arrest The Proclamation of Independence and the Formation of Bangladesh Government	CLO1	• Delivering lectures • Showing relevant image and video • Panel discussion	• Written Test • Short Question Assignment
10-11	**The War of Liberation and Formation of Independent Bangladesh** • The Spontaneous Early Resistance and Subsequent Organized Resistance (MuktiFouj, MuktiBahini, Guerillas and the Frontal Warfare • Genocide, Repression of Women, Refugees	CLO1	• Delivering lectures • Showing relevant images and videos • Role play	• Written Test • Assignment • Presentation • Debating

	• Publicity Campaign in the War for Liberation (*Swadhin Bangla Betar Kendra*, the Campaigns Abroad and Formation of Public Opinion) • The Anti-Liberation Activities of the Occupation Army, the Peace Committee, AL-Badar, Al-Shams, Rajakars, Pro-Pakistan Political Parties and Pakistani Collaborators, Killing of the Intellectuals • Trial of Bangabandhu in Pakistan and Reaction of the World Community • The Contribution of India in the Liberation War and the Role of International Communities Formation of Joint Command and the Victory			
12-13	**Reconstruction of Bangladesh after 1971** • Bangabandhu's returning to Bangladesh 10 January 1972 • Formation of the Constitution • Reconstruction of the War-Ravaged Country Conspiracy of the Anti-Liberation Activists and the Murder of Bangabandhu	CLO1	• Lecture • Demonstration Audio-video projection	• Written Test • Assignment Panel Discussion

Recommended Books:

1. Harun-or-Roshid, The Foreshadowing of Bangladesh: Bengal Muslim League and Muslim Politics, 1906-1947, The University Press Limited, Dhaka 2012.
2. Rounaq Jahan, Pakistan: Failure in National Integration, The University Press Limited, Dhaka 1977.
3. Talukder Maniruzzaman, Radical Politics and the Emergence of Bangladesh, Mowla, Brothers, Dhaka2003.
4. গালাহ্‌ উদ্দিন আহমেদ ও অন্যান্য (সম্পাদিত), বাংলাদেশের মুক্তি সংগ্রামের ইতিহাস ১৯৪৭-১৯৭১, আগামী প্রকাশনী, ঢাকা ২০০২।
5. সিরাজুল ইসলাম (সম্পাদিত), বাংলাদেশের ইতিহাস ১৭০৪-১৯৭১, ৩ খণ্ড, এশিয়াটিক সোসাইটি অব বাংলাদেশ।
6. শেখ মুজিবুর রহমান, অসমাপ্ত আত্মজীবনী, দি ইউনিভার্সিটি প্রেস লিমিটেড, ঢাকা ২০১২।
7. সিরাজ উদ্দিন আহমেদ,একাত্তরের মুক্তিযুদ্ধ: স্বাধীন বাংলাদেশের অভ্যুদয়, ইসলামিক ফাউন্ডেশন, ঢাকা ২০১১।
8. ড. হারুন-অর-রশিদ, বঙ্গবন্ধুর অসমাপ্ত আত্মজীবনী পুনর্পাঠ, দি ইউনিভার্সিটি প্রেস লিমিটেড, ঢাকা ২০১৩।
9. ড. আতফুল হাই শিবলী ও ড. মোঃ মাহবুবর রহমান, বাংলাদেশের সাংবিধানিক ইতিহাস ১৭৭৩-১৯৭২, সূবর্ণ প্রকাশনী।
10. ড. মোঃ মাহবুবর রহমান, বাংলাদেশের ইতিহাস ১৯৪৭-১৯৭১, সময় প্রকাশনী, ঢাকা ২০১২।
11. সৈয়দ আনোয়ার হোসেন, বাংলাদেশের স্বাধীনতাযুদ্ধে পরাশক্তির ভূমিকা, ডানা প্রকাশনী, ঢাকা ১৯৮২।
12. আবুল মাল আবদুল মুহিত, বাংলাদেশ: জাতি রাষ্ট্রের উদ্ভব, সাহিত্য প্রকাশ, ঢাকা ২০০০।
13. ড. হারুন-অর-রশিদ,বাংলাদেশ: রাজনীতি, সরকার ও শাসনতান্ত্রিক উন্নয়ন ১৭৫৭-২০০০, নিউ এজ পাবলিকেশন্স।
14. আতিউর রহমান, অসহযোগ আন্দোলনের দিনগুলি: মুক্তিযুদ্ধের প্রস্তুতিপর্ব, সাহিত্য প্রকাশ, ঢাকা ১৯৯৮

ASSESMENT PATTERN	
Attendance- 05	
CIE-Continuous Interval Evolution (25) (Average of best 2 out of 3 will be counted)	**SEE-Semester End Examination (70 marks)**

Bloom's Category	Test-1 (25)	Test-2 (25)	Assignment (25)	Bloom's Category	Test
Remember	10			Remember	30
Understand	15	15	15	Understand	30
Apply				Apply	
Analyze		10	15	Analyze	10
Evaluate				Evaluate	
Create				Create	

COURSE TITLE: VIVA VOCE

Course Code: CSTE 1226 Credit Hours: 01	Total Marks: 100

Course Objectives:
➢ Prepare the students to face interviews both in the academic and the industrial sector.

Course Learning Outcomes (CLO)	CLOs	Description (At the end of the course, students will be able to)
	CLO1	analyze the various application of Computer Science &Telecommunication Engineering in real-life problem solving
	CLO2	evaluate overall technical knowledge and industry readiness
	CLO3	go under a virtual environment of technical interviews.

Mapping of CLO to PLO (Program Learning Outcome)		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
	CLO1		√										
	CLO2		√										
	CLO3										√		

COURSE CONTENTS	OUTCOME (Student should be able to)
VIVA VOCE (Viva based on major/minor courses of Year-1)	CLO1, CLO2, CLO3

ASSESMENT PATTERN

Category	Marks (100)
Eye contact	10
Body gesture	10
Communication skill	20
English pronunciation skill	10
Remember	10
Understand	10
Analyzing	20
Evaluating	10