1. Course Profile

1.1 Course Summary

Course ID:	Course Title:	Credit Hours:	Year: 1st Term: 1st
CSE 1107	Discrete Mathematics	3.0	

1.2 Rationale

This course aims to develop the students' ability of logical thinking and its application to computer science and engineering. The course will help the students to acquire necessary skills, to recognize CSE problem scenarios where mathematical model/abstraction can be used, and to develop a new solution for new problems.

Course Contents

Set Theory: Properties of sets, Partitions of sets, Power sets and partial ordered sets. **Functions:** Functions defined on sets, Compositions of functions, Inverse functions, Generating functions, Growth of functions. **Relations:** Relations on sets, Equivalence relations, Partial order relations, Recurrence relations and recursive algorithms. **Mathematical Logic:** Propositional calculus and predicate calculus. **Mathematical Reasoning:** Induction, Contradictions, Recursion, Proof techniques. **Number Theory:** Elementary number theory, Modular arithmetic and their applications, Sequence, and summations. **Counting:** Permutations, Combinatorics, Principles of inclusion and exclusion. **Algebraic Structures:** Rings and groups. **Graph Theory:** Graphs, Paths and trees.

1.3 CLO to PLO mapping

On successful completion of this course, students will be able to

Course Learning Outcome (CLO) Matrix								
CLOs	CLO Description	Bloom's Learning Levels				PLO Assessed	CLO-PLO Correlation
		C	A	P	S		
CLO1	Comprehend the basic concept of set theory, functions, relations, logic, proofs, and number theory.	3				PLO1, PLO2	3, 2
CLO2	Demonstrate the fundamental concept of counting, graphs, trees, mathematical induction, algebraic structures, and growth functions.	3	2			PLO1, PLO2	3, 2
CLO3	Formulate mathematical models on various discrete problems.	3	3			PLO1, PLO3	3, 2
CLO4	Apply the knowledge learnt to solve mathematical problems in computer science and engineering.	3				PLO1, PLO2	3, 2

1.5 Lesson Planning with Mapping of CLO, Teaching and Assessment Strategies

	Week	Topic	Teaching-Learning Strategy	Assessment Strategy	Corresponding CLOs
CSE 1107 (T	1	**Set Theory:** Properties of sets, Partitions of sets, Power sets and partial ordered sets.	Lecture (3h)	Class Test-1, Class Test-2, Class Test-3	CLO1, CLO2, CLO3, CLO4
	2	**Functions:** Functions defined on sets, Compositions of functions, Inverse functions, Generating functions, Growth of functions.			
	3	**Relations:** Relations on sets, Equivalence relations, Partial order relations.			
	4	**Relations:** Recurrence relations and recursive algorithms.			

h e o r y)	5	**Mathematical Logic:** Propositional calculus and predicate calculus.			
	6	**Mathematical Reasoning:** Induction, Contradictions, Recursion, Proof techniques.			
	7	**Number Theory:** Elementary number theory, Modular arithmetic and their applications.			
	8	**Number Theory:** Sequence, and summations.			
	9	**Counting:** Permutations, Combinatorics.			
	10	**Counting:** Principles of inclusion and exclusion.			
	11	**Algebraic Structures:** Rings and groups.			
	12	**Graph Theory:** Graphs.			
	13	**Graph Theory:** Paths and trees.			

1.6 References

- Discrete mathematics and its applications by Kenneth H. Rosen.
- Discrete mathematics with applications by Susanna S. Epp.
- Discrete Mathematics: An Open Introduction by Oscar Levin.

1.7 Assessment and Evaluation

	Assessment Type	Assessment Tools	Allotted Marks	Assessment No	CLO Assessed	Blooms Category	Sub Total
CSE 1107 (Theory)	Continuous Assessment	Class Participation, Attendance, Assignments	10%				30%
		Class Test, Quizzes, Spot Test, etc.	20%	Class Test-1	CLO1, CLO2, CLO3	Comprehend, Demonstrate, Formulate	
				Class Test-2			
				Class Test-3			
	Summative Assessment	Term Final Examination	70%		CLO1 CLO2, CLO3, CLO4,	Comprehend, Demonstrate, Formulate, Apply	70%
Total							100%