SRM University *AP*, Andhra Pradesh
Neerukonda, Mangalagiri Mandal,
Guntur District, Mangalagiri, Andhra Pradesh – 522240.

Discrete Mathematics

Course Code	CSE 203	**Course Category**	CC	**L**	**T**	**P**	**C**
				3	0	0	3
Pre-Requisite Course(s)		**Co-Requisite Course(s)**		**Progressive Course(s)**			
Course Offering Department	Mathematics	**Professional / Licensing Standards**					

Course Objectives / Course Learning Rationales (CLRs)

1. The objective is to equip the students with mathematical definitions, proofs, and applicable methods.
2. Use mathematically correct terminology and notation. Constructs correct direct and indirect proofs.
3. Use foundational concepts in number theory and algorithms and developing problem-solving skills through the application of mathematical reasoning and induction principles.
4. Familiar about graphs and graph models, terminology, and special types is to understand the fundamental concepts and applications of graphs in various domains.

Course Outcomes / Course Learning Outcomes (CLOs)

	At the end of the course the learner will be able to	**Bloom's Level**	**Expected Proficiency Percentage**	**Expected Attainment Percentage**
Outcome 1	Express an argument using predicates, quantifiers and logic connectives and determine if the argument is valid.	2	80%	80%
Outcome 2	Apply the rules of inferences and methods of proofs including direct and indirect proofs, proof by contradiction and mathematical induction.	3	70%	60%
Outcome 3	Describe set properties, set operations, set identities, and representing relationship between the sets.	2	80%	70%
Outcome 4	Discover whether a given function is one-one, onto and invertible.	4	70%	60%
Outcome 5	Define the concept of divisibility, congruence, greatest common divisor, prime numbers, and prime factorization of numbers.	1	80%	80%
Outcome 6	Apply counting principles to determine probabilities and solving problems using recurrence relations.	3	70%	60%
Outcome 7	Explain graphs, their representations and determine the Euler circuits, Hamilton circuits, Euler paths and Hamilton paths in a graph.	3	80%	80%

Course Articulation Matrix (CLO) to Program Learning Outcomes (PLO)

CLOs	**Program Learning Outcomes (PLO)**														
	Engineering Knowledge	Problem Analysis	Design and Development	Analysis, Design and Research	Modern Tool and CT Usage	Society and Multicultural Skills	Environment and Sustainability	Moral, and Ethical Awareness	Individual and Teamwork Skills	Communication Skills	Project Management and Finance	Self-Directed and Lifelong Learning	PSO 1	PSO 2	PSO 3
Outcome 1	**2**	**3**	**2**	-	-	-	-	-	-	-	-				
Outcome 2	**2**	3	2	**-**	**-**	-	-	-	-	-	-				
Outcome 3	2	3	2			-	-	-	-	-	-				
Outcome 4	3	**2**	3			-	-	-	-	-	-				
Outcome 5	2	3	2			-	-	-	-	-	-				
Outcome 6	3	3	3			-	-	-	-	-	-				
Outcome 7	3	3	3			-	-	-	-	-	-				
Average	**3**	**3**	**2**												

Course Unitization Plan

Unit No.	Description of Topic	Contact hours	CLo's Addressed	Reference
Unit 1	**The Foundations: Logic and Proofs**	**10**		
	Propositional Logic, Applications of Propositional Logic,	1	**CO 1**	1
	Propositional Equivalences	1	**CO 1**	1
	Predicates and Quantifiers	2	**CO 1**	1
	Nested Quantifiers, Rules of Inference	2	**CO 2**	1
	Introduction to Proofs	2	**CO 2**	1
	Proof Methods and Strategy.	2	**CO 2**	1
Unit 2	**Set Theory**	**8**		
	Laws of set theory	1	**CO 3**	1
	Set Operations	1	**CO 3**	1
	Functions	2	**CO 4**	1
	Sequences and Summations	2	**CO 4**	1
	Matrices	2	**CO 4**	1
Unit 3	**Elementary number theory, Induction and Recursion**	**9**		
	Divisibility and Modular Arithmetic	2	**CO 5**	1
	nteger Representations and Algorithms	2	**CO 5**	1
	Primes and Greatest Common Divisors, Solving Congruence	2	**CO 5**	1
	Mathematical Induction, Strong Induction and Well-Ordering	2	**CO 2**	1
	Recursive Definitions and Structural Induction.	1	**CO 5**	1
Unit 4	**Counting principles**	**9**		
	The Basics of Counting, The Pigeonhole Principle, Permutations and Combinations	2	**CO 6**	1
	Binomial Coefficients and Identities	2	**CO 6**	1
	Applications of Recurrence Relations, Solving Linear Recurrence Relations	2	**CO 6**	1
	Divide-and-Conquer Algorithms	2	**CO 6**	1
	Recurrence Relations	1	**CO 6**	1
Unit 5	**Introduction to Graph Theory**	**9**		
	Graphs and Graph Models, Graph Terminology and Special Types of Graphs	3	**CO 7**	1
	Trees, Spanning trees, Minimal spanning trees	2	**CO 7**	1
	Representing Graphs and Graph Isomorphism	2	**CO 7**	1
	Connectivity, Euler and Hamilton Paths	1	**CO 7**	1
	Shortest-Path Problems	1	**CO 7**	1
	Total contact Hours	45		

Learning Assessment

Bloom's Level of Cognitive Task		Continuous Learning Assessments (60%)				End Semester Assessments (40%)
		CLA-1 (15%)	Mid-1 (25%)	CLA-2 (10%)	CLA-3 (10%)	
Level 1	Remember	50%	50%	40%	40%	50%
	Understand					
Level 2	Apply	50%	50%	60%	60%	50%
	Analyse					
Level 3	Evaluate					
	Create					
Total		**100%**	**100%**	**100%**	**100%**	**100%**

Recommended Resources

1. Kenneth, H. R. (2012). Discrete Mathematics and Applications, Seventh edition, Tata McGraw-Hill.

Other Resources

Course Designers

1. Dr. Ranjana Mehta, Dr. Fouzul Atik, Prof. Kannan