University of Kerala

Discipline	Mathematics				
Course Code	UK3DSCMAT211				
Course Title	Discrete Mathematics				
Type of Course	DSC				
Semester	III				
Academic Level	200-299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours per week
	4	4	-	-	4
Pre-requisites	None				
Course Summary	This course enable the students to gain a thourough understanding of various set representations and proof techniques.				

Detailed Syllabus

Module	Unit	Contents	Hrs
I		**Mathematical Logic**	**12**
	1	Proposition and Connectives, Conditional and bi-conditional, Equivalence of proposition *(These topics can be found in Chapter 1 of Text [2])*	
	2	Tautology and Contradiction, Logical implications well-formed formula, Algebra of proposition *(These topics can be found in Chapter 1 of Text [2])*	
	3	De Morgan's law *(This topic can be found in Chapter 1 of Text [1])*	
II		**Proof Methods and Logic**	**12**
	4	Formal Proof, Propositional reasoning by contradiction *(These topics can be found in Chapter 1 of Text [2])*	

Module	Unit	Contents	Hrs
	5	Boolean expressions, Normal forms - Disjunctive normal form, Conjunctive normal form, Principal Conjunctive Normal forms and principal disjunctive normal forms using truth table only *(These topics can be found in Chapter 1 of Text [2])*	
III	**Algebraic Structures**		**12**
	6	Algebra, DeMorgan's Law, Group examples and simple properties (These topics can be found in Text [1])	
	7	Communication Model - coding theory *(These topics can be found in Text [1])*	
IV	**Predicate Logic**		**12**
	8	Quantifiers: Essential and Universal quantifier, Free and Bound Variables *(These topics can be found in Chapter 1 of Text [2])*	
	9	Rules of Specifications: Rule US, ES, UG, EG. Using these, convert a given statement into symbolic notation *(These topics can be found in Chapter 1 of Text [2])*	
V	**Suggestions for the Teacher designed Module**		**12**
	10	Duality theorem *(This topic can be found in Chapter 1 of Text [1])*	
	11	Indirect method of proof *(This topic can be found in Chapter 1 of Text [2])*	
	12	Subgroups examples and simple properties *(This topic can be found in Text [1])*	
	13	Error corrections and detection, Hamming Codes (Avoid computer programs) *(This topic can be found in Text [1])*	
	14	Derivation from Premises using truth table *(This topic can be found in Chapter 1 of Text [2])*	

Textbooks

1. Gary Haggard, John Schlipf and Sue Whitesides, *Discrete Mathematics for Computer Science*, Thomson Learning Academic Resource Center 1120 Birchmount Road 1-800-423-0563. ISBN 0-534-49501-X.

References

1. Kenneth H Rosen, *Discrete Mathematics and its Applications* (Eighth Edition). Tata McGraw- Hill Education (India) private limited, Special Indian Edition 2021.

2. R.P. Grimaldi, *Discrete Mathematics and Combinatorial Mathematics*, Pearson Edu. India.

3. L. Mohapatra, *Elements of Discrete Mathematics*, Tata McGraw Hill.

Course Outcomes

CO No.	Upon completion of the course the graduate will be able to	PO/PSO	Cognitive Level	Knowledge Category	Lecture(L) Tutorial (T)	Practical (P)
CO 1	Describe memberships of sets in- cluding the empty set, equality, finite, infinite sets, relation be- tween sets using proper notation.	PO 2, PSO 1, 2, 3	U, Ap	F, C	L	
CO 2	Analyse the techniques regard- ing membership, equality, sub- set, and proper subset and two sided implications.	PO 1, PSO 1, 2, 3	U, Ap	F, C	L	
CO 3	Analyse the techniques regard- ing membership, equality, sub- set, and proper subset and two sided implications.	PO 2, PSO 1, 2, 3	U, Ap	F, C	L	
CO 4	Apply appropriate properties of the mathematical logic to prove some principles, theo- rems, formulas on sets. Discuss power sets, products, lattice and Boolean algebra	PO 2, PSO 1, 2, 3	U, Ap	F, C	L	

(R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create)
(F-Factual, C-Conceptual, P-Procedural, M-Metacognitive)

Mapping of CO with PSOs and POs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	3	2	-	-	-	-	3	-	-	-	-	-	-
CO2	3	3	2	-	-	-	3	-	-	-	-	-	-	-
CO3	3	3	2	-	-	-	-	3	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	3	-	-	-	-	-	-

(- -Nill, 1-Slightly/Low, 2-Moderate/Medium, 3-Substantial/High)

Assessment Rubrics

- Quiz/Assignment/Discussion/Seminar
- Midterm Exam
- Final Exam

Mapping of COs to Assessment Rubrics

	Internal Examination	Assignment	Project Evaluation	End Semester Exam
CO1	✓	✓		✓
CO2	✓	✓		✓
CO3	✓	✓		✓
CO4	✓	✓		✓