University of Kerala

Discipline	Mathematics
Course Code	UK3DSEMAT202
Course Title	Discrete Mathematics
Type of Course	DSE
Semester	III
Academic Level	200-299

Course Details	Credit	Lecture per week	Tutorial per week	Practical	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		**Sets**	**12**
	1	Sets - Introduction, Venn Diagrams, Subsets, Size of a Set, Power Sets, Cartesian product of Sets, (Chapter 2: Section 2.1 of Text [1])	
	2	Set Operations - Introduction, Set Identities, Generalized Unions and Intersections, (Computer Representation of Sets - avoided). (Chapter 2: Section 2.2 of Text [1])	
II		**Functions**	**12**
	3	Functions - Introduction, One-to-One and Onto Functions, Inverse Functions and Compositions of Functions, The Graphs of Func- tions, Some Important Functions, Partial Functions. (Chapter 2: Section 2.3 of Text [1])	
III		**Sequences and Summations**	**12**
	4	Sequences and Summations - Introduction, Sequences, Recurrence Relations, Special Integer Sequences, Summations. (Chapter 2: Section 2.4 of Text [1])	

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Module	Unit	Contents	Hrs
	5	Cardinality of Sets - Introduction, Countable Sets, An Uncount- able Set, SCHRODER-BERNSTEIN THEOREM (Statement), Computable Function. (Chapter 2: Section 2.5 of Text [1])	
IV		**Matrices**	12
	6	Matrices - Introduction, Matrix Arithmetic, Transposes and Pow- ers of Matrices, Zero–One Matrices. (Chapter 2: Section 2.6 of Text [1])	
V		**Suggestions for the Teacher designed Module**	12
	7	Divisibility and Modular Arithmetic - Introduction, Division, The Division Algorithm, Arithmetic Modulo m, (Chapter 4: Section 4.1 of Text [1])	
	8	Primes and Greatest Common Divisors - Introduction, Primes, THE FUNDAMENTAL THEOREM OF ARITHMETIC, Greatest Common Divisors and Least Common Multiples, The Euclidean Algorithm, gcds as Linear Combinations, BEZOUTS THEOREM (Chapter 4: Section 4.3 of Text [1])	

Textbook

1. Kenneth H. Rosen, *Discrete Mathematics and Its Applications*, (Seventh Edition), Published by McGraw-Hill.

References

1. Richard Johnsonbaugh, *Discrete mathematics*, (Seventh Edition), Pearson Prentice Hall.

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 membership of sets, subsets, power sets using proper notation; perform the operations of union, intersection, comple- ment, difference and product of sets, and be able to draw and in- terpret Venn diagrams of set rela- tions and operations.	PSO1, 2, 3, PO2	U, Ap	F, C	L	
CO 2	Classify functions into one-one, onto, many-one, into etc. and be able to graph them.	PSO1, 2, 3, PO1	U, Ap	F, C	L	
CO 3	Discuss sequences, summation, recurrence relation, countable and uncountable sets.	PSO1, 2, 3, PO2	U, Ap	F, C	L	
CO 4	Describe different matrices and matrix arithmetics..	PSO1, 2, 3, PO2	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

- Programming Assignments

- Final Exam

Mapping of COs to Assessment Rubrics

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

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