



Andhra Loyola Institute of Engineering and Technology

Teacher/Instructor: S.P.V.N.D SUMALATHA, Assistant Professor of Mathematics

Subject : Mathematical Foundations of Computer Science

Term/Semester/Year: II B.Tech Sem - I Syllabus 2020-21

Day-Wise Lesson Plan

Main Objectives

- To introduce the students to the topics and techniques of discrete methods and combinatorial reasoning
- To introduce a wide variety of applications. The algorithmic approach to the solution of problems is fundamental in discrete mathematics, and this approach reinforces the close ties between this discipline and the area of computer science

Course Outcomes:

1	Demonstrate skills in solving mathematical problems
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2	Comprehend mathematical principles and logic
3	Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software
4	Manipulate and analyze data numerically and/or graphically using appropriate Software
5	Communicate effectively mathematical ideas/results verbally or in writing

TEXT BOOK:

1. Discrete Mathematical Structures with Applications to Computer Science, J.P. Tremblay, R. Manohar, McGraw Hill education (India) Private Limited.
2. Elements of Discrete Mathematics, C. L. Liu and D. P. Mohapatra, 4th edition, McGraw Hill education (India) Private Limited.

REFERENCES:

1. Discrete Mathematics and its Applications, Kenneth H. Rosen, 7th Edition, McGraw Hill education (India) Private Limited.
2. Discrete Mathematics for Computer Scientists & Mathematicians, Joe L. Mott,
3. Discrete Mathematical Structures Bernard kolman, Robert C,Busby and Sharon Cutler, Ross PHI

Unit no.	Topic Name	Sessions	Learning Outcomes	References
Unit -1	Introduction : Propositional Calculus	Day-1	Define mathematical logic	https://youtu.be/z1D8gefa0g
	Statements and Notations, Connectives	Day-2	Define statements	https://youtu.be/xlUFkMKS

				B3Y
	Well Formed Formulas, Truth Tables	Day-3	Understand Truth Table constructions	https://youtu.be/xlUFkMKS B3Y
	Tautologies, Equivalence of Formulas	Day-4	Solve problems	T1,T2
	Duality Law, Tautological Implications	Day-5	Solve problems	T1,T2
	Normal Forms	Day-6	Understand Normal Forms	https://youtu.be/rzxJ1nN_J4g
	Normal Forms	Day-7	Solve problems	https://youtu.be/rzxJ1nN_J4g
	Normal Forms	Day-8	Solve problems	https://youtu.be/rzxJ1nN_J4g
	Theory of Inference for Statement Calculus	Day-9	Understand theory of inference	PPT
	Consistency of Premises	Day-10	Solve problems	PPT
	Indirect Method of Proof	Day-11	Understand Method	T1,T2
	Predicate Calculus: Predicative Logic, Statement Functions	Day-12	Understand predicate	https://youtu.be/h5UTvdcgF Hw
	Variables and Quantifiers, Free and Bound Variables	Day-13	Define variables	https://youtu.be/h5UTvdcgF Hw
	Inference Theory for Predicate Calculus.	Day-14	Understand theory of inference	https://youtu.be/h5UTvdcgF Hw
	Tutorial -1(Truth tables, normal forms)			
	Assignment			
Unit - 2	Introduction: Operations on Binary Sets	Day-15	Understand basic concepts of sets	https://youtu.be/tyDKR4FG3 Yw
	Principle of Inclusion and Exclusion	Day-16	Solve problems	https://youtu.be/GS7dIWA6 Hpo
	Relations: Properties of Binary Relations	Day-17	Define Properties	T1,T2

	Relation Matrix and Digraph, Operations on Relations	Day-18	Solve problems	PPT
	Partition and Covering, Transitive Closure	Day-19	Define Partition	https://youtu.be/3y6kXA9YE_pA
	Equivalence Relations, Hasse Diagrams	Day-20	Understand Equivalence relation	https://youtu.be/Sy6dYKHDcnY
	Compatibility and Partial Ordering Relations	Day-21	Define POR	T1,T2
	Functions: Bijective Functions, Composition of Functions	Day-22	Define Functions	T1,T2
	Inverse Functions, Recursive Functions	Day-23	Solve problems	T1,T2
	Permutation Functions	Day-24	Solve problems	T1,T2
	Lattice and its Properties	Day-25	Understand Lattice	T1,T2
	Tutorial -1 (Properties of relations,Hasse diagrams)			
	Assignment			
	Introduction: Algebraic Structures	Day-26	Define Structures	https://youtu.be/4V_KYo6sMJs
	Algebraic Systems, Examples, General Properties	Day-27	Solve problems	https://youtu.be/4V_KYo6sMJs
	Semi Groups and Monoids, Homomorphism of Semi Groups and	Day-28	Define Groups	https://youtu.be/4V_KYo6sMJs
	Group, Subgroup, Abelian Group, Homomorphism, Isomorphism	Day-29	Define Properties	https://youtu.be/4V_KYo6sMJs
	Group, Subgroup, Abelian Group, Homomorphism, Isomorphism	Day-30	Solve problems	https://youtu.be/4V_KYo6sMJs
	Tutorial -1 (homomorphism and isomorphisms)			
	Assignment			
Unit - 3	Introduction: Combinatorics	Day-31		https://youtu.be/zG9Y8hnXZ

			Understand Combinatorics	Oc
	Basic of Counting, Permutations, Permutations with Repetitions	Day-32	Define various methods of counting	https://youtu.be/zG9Y8hnXZ Oc
	Circular Permutations, Restricted Permutations	Day-33	Solve problems	https://youtu.be/lscOTEPc5xg
	Combinations, Restricted Combinations	Day-34	Understand permutation and combination	https://youtu.be/lscOTEPc5xg
	Generating Functions of Permutations and Combinations	Day-35	Solve problems on combinations	https://youtu.be/lscOTEPc5xg
	Binomial and Multinomial Coefficients	Day-36	Understand permutations	PPT
	Binomial and Multinomial Theorems	Day-37	Solve problems on permutations	T1,T2
	The Principles of Inclusion–Exclusion	Day-38	Solve problems on combinations	https://youtu.be/lscOTEPc5xg
	Pigeonhole Principle and its Application	Day-39	Understand Principle	https://youtu.be/rfT_kX8Vq6I
	Tutorial -1 (Binomial and Multinomial Theorems)			
	Assignment			
	Number Theory :Properties of Integers, The Greatest Common	Day-40	Understand Number theory	https://youtu.be/SCvtxjpVQms
	Division Theorem , Least Common Multiple	Day-41	Solve problems	https://youtu.be/SCvtxjpVQms
	Euclidean Algorithm,Testing for Prime Numbers	Day-42	Understand Algorithm	https://youtu.be/SCvtxjpVQms
	The Fundamental Theorem of Arithmetic	Day-43	Understand Theorem	https://youtu.be/SCvtxjpVQms
	Modular Arithmetic (Fermat's Theorem and Euler's Theorem)	Day-44	Solve problems	https://youtu.be/SCvtxjpVQms

	Tutorial -1 (Euclidean Algorithm, Group, Subgroup, Abelian Group)			
	Assignment			
Unit - 4	Introduction	Day-45	Define Sequence	
	Generating Functions, Function of Sequences, Partial Fractions	Day-46	Define generating function	https://youtu.be/4d2XEn1j_q4
	Calculating Coefficient of Generating Functions	Day-47	Solve problems on coefficients	https://youtu.be/4d2XEn1j_q4
	Recurrence Relations, Formulation as Recurrence Relations	Day-48	Define recurrence relation	T1,T2
	Solving Recurrence Relations by Substitution and Generating	Day-49	Solve problems using substitution method	T1,T2
	Method of Characteristic Roots	Day-50	Solve problems	T1,T2
	Solving Inhomogeneous	Day-51	Solve problems using generating functions	https://youtu.be/4d2XEn1j_q4
	Solving Inhomogeneous	Day-52	Solve problems	https://youtu.be/4d2XEn1j_q4
	Tutorial -1 (Recurrence Relations)			
	Assignment			
Unit -5	Introduction	Day-53		https://youtu.be/jBsEKyx6Rj0
	Basic Concepts of Graphs, Sub graphs	Day-54	Define graph and various types of graphs	https://youtu.be/au1urh576YI
	Matrix Representation of Graphs	Day-55	Solve problems	https://youtu.be/au1urh576YI

	Adjacency Matrices, Incidence Matrices	Day-56	Define Matrices	https://youtu.be/au1urh576YI
	Isomorphic Graphs, Paths and Circuits	Day-57	Define paths and circuits	https://youtu.be/jBsEKyx6Rj0
	Eulerian and Hamiltonian Graphs	Day-58	Solve problems	https://youtu.be/jBsEKyx6Rj0
	Eulerian and Hamiltonian Graphs	Day-59	Solve problems	https://youtu.be/LV4VgNWiZTA
	Multigraphs, Planar Graphs	Day-60	Solve problems	https://youtu.be/LV4VgNWiZTA
	Euler's Formula, Graph Colouring and Covering	Day-61	Solve problems	https://youtu.be/LV4VgNWiZTA
	Chromatic Number	Day-62	Define chromatic number	https://youtu.be/LV4VgNWiZTA
	Spanning Trees	Day-63	Define Spanning trees	https://youtu.be/7WV7dsFdsbw
	Algorithms for Spanning Trees	Day-64	Solve problems	https://youtu.be/7WV7dsFdsbw
	Tutorial -1 (Isomorphic Graphs, Chromatic Number)			
	Assignment			
	Total No. of hours:	64		

