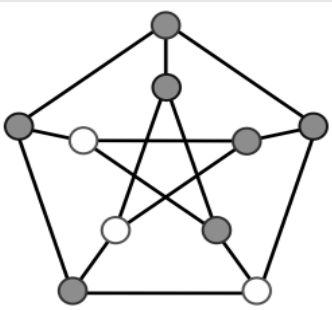
21IT121 DISCRETE MATHEMATICAL STRUCTURES



https://www.thenakedscientists.com

Hours Per Week :

L	T	P	C
3	-	-	3

Total Hours :

L	T	P
45	-	-

COURSE DESCRIPTION AND OBJECTIVES:

This course is aimed to improve the logical thinking and problem solving skills. This course enhances the students ability to reason and to present the argument. Throughout the course, students will be expected to demonstrate analytical and combinatorial methods such as propositional logic, set theory, relations, functions, recurrence relations and graph theory etc.

COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes
1	Apply propositional logic, predicate logic and Boolean functions to express the mathematical properties.
2	Analyze the basic mathematical objects such as sets and relations to verify the mathematical properties.
3	Identify the solutions for various problems using recurrence relations.
4	Design and Develop solutions for various combinatorial and Graph based problems.

SKILLS:

- ✓ *Design of logical gates using propositions.*
- ✓ *Prove the basic mathematical theorems through direct or indirect proofs.*
- ✓ *Solving various types of problems on sets & relations.*
- ✓ *Understand some basic Properties of trees, graphs and related discrete structures.*
- ✓ *Solving a problem in recursive manner and estimation of time complexity.*

UNIT– I **L- 9**

PROPOSITIONAL LOGIC: Propositional logic - applications of propositional logic, propositional equivalences; Predicates and quantifiers - nested quantifiers; Rules of inference - introduction to proofs, proof methods and strategy.

UNIT – II **L- 9**

SET THEORY: Sets - set operations, Functions - sequences and summations; Cardinality of sets, Counting - the basics of counting, the pigeonhole principle.

UNIT – III **L- 9**

RECURRENCE RELATIONS: Applications of recurrence relations - solving linear recurrence relations, Divide-and-conquer algorithms and recurrence relations; Generating functions; Inclusion–exclusion; Applications of inclusion–exclusion.

UNIT – IV **L- 9**

RELATIONS: Relations and their properties - n-ary relations and their applications, representing relations, closures of relations, equivalence relations; Partial orderings.

UNIT - V **L- 9**

GRAPHS: Graphs and graph models - graph terminology, special types of graph, representing, graphs and graph isomorphism, connectivity; Euler and hamilton paths; Shortest-path problems; Planar graphs; Graph coloring.

TEXT BOOK:

1. Kenneth H. Rosen, “Discrete Mathematics and Its Applications with Combinatorics and Graph Theory”, 7th edition, MGH, 2012.

REFERENCE BOOKS:

1. Thomas Koshy, “Discrete Mathematics with Applications”, 1st edition, Elsevier, 2003.
2. Tremblay J. P. and Manohar R., “Discrete Mathematical Structures”, MGH, 1997.
3. Bernand Kolman, Roberty C. Busby and Sharn Cutter Ross, “Discrete Mathematical Structures”, 2nd edition, Pearson Education/Prentice Hall India, 2013.
4. Garry Haggard, “Discrete Mathematics for Computer science”, 1st edition, Thomson, 2007.
5. J.L. Mott, A. Kandel and T.P. Baker, “Discrete Mathematics for Computer Scientists and Mathematicians”, 2nd edition, Prentice Hall India, 2009.
6. Grass Man and Trembley, “ Logic and Discrete Mathematics”, 2nd edition, Pearson Education/Prentice Hall India, 2013