

Course Code	Course Title	C	H	I	E	T
17U5MSA1	Skill Based Elective (CCM): Combinatorics	2	2	25	75	100

Learning Objectives

- To impart the knowledge of counting principles which is essential for the students to think critically and apply it in real-world problems.
- To acquire the knowledge of Lattices and its applications.

Learning Outcomes

After successful completion of this course, the students will be able to

- Solve counting problems by applying elementary counting techniques using the sum and product rules, permutations, combinations and pigeonhole principle.
- Apply the ideas of Permutations and Combinations, Combinatorial number theory in various real life situations.

Unit I Counting

Basic Counting Principles – Sum rule principle and product rule principle – Factorial notation – Binomial coefficient – Permutations – Problems.

Unit II Combinations

Combinations with repetitions – The Pigeonhole principle – Problems.

Unit III Ordered partitions

Ordered partitions and Unordered partitions – The inclusion – Exclusion principle – Generation of Permutations & Combinations – Tree diagrams – Problems.

Unit IV Ordered sets

Ordered sets – Hasse Diagrams of partially ordered sets – Consistent enumeration – Supremum and infimum – Isomorphic ordered sets – Well-ordered sets – Problems.

Unit V Lattices

Lattices – Bounded Lattices – Distributive Lattices – Complements and complemented Lattices – Problems.

Text Book:

Seymour Lipschutz and Marc Lars Lipson, Discrete Mathematics (Schaum's Outlines), 3rd Edition, 3rd Reprint 2010, Tata McGraw Hill.

Chapters: 6, 14.

Reference Books:

1. V.K. Balakrishnan, Combinatorics, Schaum's Outlines, 1995.
2. Dr. M. K. Venkataraman, Dr. N. Sridharan and N. Chandrasekaran, Discrete Mathematics, Reprint September 2007, The National Publishing Company.