

<b>22MYB05 – DISCRETE MATHEMATICS</b> (Common to CSE,IT,AI&DS,IOT,CS(Cyber security))				
	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
<b>PRE-REQUISITE: NIL</b>				
<b>Course Objective:</b>	<ul style="list-style-type: none"> <li>To understand the basic concepts of logic, properties of set theory and their applications in Algorithms.</li> <li>To understand the ideas about Lattices and general counting methods involving permutations and combinations.</li> </ul>			
<b>Course Outcomes</b> The Student will be able to		<b>Cognitive Level</b>	<b>Weightage of COs in End Semester Examination</b>	
CO1	Apply the concept of logic to solve the problems in Artificial Intelligence.	Ap	20%	
CO2	Calculate the applications of predicate logic used in data science.	An	20%	
CO3	Solve different properties of injection, surjection, bijection, composition and inverse functions in software engineering.	Ap	20%	
CO4	Determine the concepts of lattices, Permutations, Combinations and Mathematical induction in the experience of network theory and analysis of algorithms.	An	40%	
CO5	Demonstrate the importance of lattice theory using the modern tools and solve the real time problems in various contexts.	Ap	Internal Assessment	

<b>UNIT I - PROPOSITIONAL CALCULUS</b>	<b>(9+3)</b>
Propositions-Logical connectives-Compound propositions-Conditional and biconditional propositions-Truth tables-Tautologies and Contradictions-Logical Equivalences and implications – De Morgan's Laws-Normal forms-Rules of inference-Arguments-Validity of arguments.	
<b>UNIT II - PREDICATE CALCULUS</b>	<b>(9+3)</b>
Predicates-Statement Function-Variables-free and bound variables-Quantifiers-Universe of discourse-Logical equivalences and implications for quantified statements-Theory of inference-The rules of universal specification and generalization-Validity of arguments.	
<b>UNIT III - SET THEORY AND FUNCTIONS</b>	<b>(9+3)</b>
Set Operations-Properties-Power set-Relations-Graph and matrix of a relation-Partial Ordering-Equivalence relation-Functions-Types of functions-Composition of relation and functions-Inverse functions.	
<b>UNIT IV COMBINATORICS</b>	<b>(9+3)</b>
Basics of counting - Counting arguments - Pigeonhole Principle - Permutations and Combinations- Recursion and recurrence relations - Generating Functions - Mathematical Induction – Inclusion and Exclusion.	
<b>UNIT V - LATTICES</b>	<b>(9+3)</b>
Posets-Lattices as posets-Properties of lattices-Lattices as Algebraic systems – Sub lattices - Direct product and Homomorphism.	
<b>TOTAL (L:45+L:15) : 60 PERIODS</b>	

**TEXT BOOKS:**

1. Tremblay J.P and Manohar R, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw-Hill, New Delhi, Reprint 2010.
2. Veerarajan.T, —Discrete Mathematics with Graph Theory and Combinatorics, 4<sup>th</sup> ed., Tata McGraw Hill, New Delhi, 2008.
3. Kenneth H.Rosen, —Discrete Mathematics and its Applications, 5<sup>th</sup> ed., Tata McGraw- Hill publications, New Delhi 2007.

**REFERENCES:**

1. Venkatraman M.K., Discrete Mathematics, the National Publishing Company, Chennai, 2007.
2. S.Santha, Discrete Mathematics with Combinatorics and Graph Theory, 2010 Cengag Learning India Pvt. Ltd.
3. Swapan Kumar Sarkar, A Text Book of Discrete Mathematics, S. Chand & Company Ltd., New Delhi.

**Mapping of COs with POs / PSOs**

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3												3	
2		2												
3	3													
4		2												
5	3				2				3			2	3	
CO (W.A)	3	2			2				3			2	3	

