

## OUTCOMES

**Upon completion of the course, the students will be able to:**

- Identify the different types of polymers, polymerisation processes and some special properties and applications of polymers.
- Identify suitable adsorbents/ adsorption process and catalysts for pollution abatement and other industrial processes.
- Discuss the concepts involved in the absorption of radiation by materials and various photophysical processes, polymer chemistry, surface chemistry and catalysis.
- Point out the spectral techniques for qualitative and quantitative analysis & thermodynamics of various processes.
- Discuss the importance of the nano materials (and their superiority over conventional materials), feasibility of their preparation and uses
- Elaborate on various technologies for the fabrication of integrated circuits & specialty materials in the electronics/electrical industry

**TEXT BOOKS:**

1. Jain P.C and Monika Jain, "Engineering Chemistry", Dhanpet Rai Publishing Company (P) Ltd., New Delhi, 2013.
2. Wong M.N., "Polymer for electronics and photonic applications", John Wiley, New York, 2006.

## REFERENCES:

1. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2012
2. Vairam S., Kalyani P., Suba Ramesh., "Engineering Chemistry", Wiley India Pvt Ltd., New Delhi., 2011.
3. Khanna O.P., "Material Science" NIH Publications, 2007.

**EVALUATION METHOD TO BE USED:**

Continuous assessment	Mid term	End Semester
15(T) + 25 (P)	20	40

<b>MA6251</b>	<b>DISCRETE MATHEMATICS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>EL</b>	<b>CREDITS</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>5</b>
<b>MODULE I</b>	<b>LOGIC</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>EL</b>	
		<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>	
Propositional Logic – Propositional equivalences - Predicates and Quantifiers – Nested Quantifiers						
<b>SUGGESTED ACTIVITIES :</b>						
<ul style="list-style-type: none"> <li>• Problem Solving sessions</li> </ul>						
<b>SUGGESTED EVALUATION METHODS:</b>						
<ul style="list-style-type: none"> <li>• Tutorial problems</li> <li>• Assignment problems</li> </ul>						

<ul style="list-style-type: none"> <li>Quizzes</li> </ul>				
<b>MODULE II PROOFS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>EL</b>
	<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>
Rules of inference - Introduction to proofs – Proof methods and strategy.				
<b>SUGGESTED ACTIVITIES :</b> <ul style="list-style-type: none"> <li>Problem Solving sessions</li> <li>Applications in real life problems</li> </ul>				
<b>SUGGESTED EVALUATION METHODS:</b> <ul style="list-style-type: none"> <li>Tutorial problems</li> <li>Assignment problems</li> <li>Quizzes</li> </ul>				
<b>MODULE III COMBINATORICS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>EL</b>
	<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>
Mathematical induction – Strong induction and well ordering – The basics of counting - The pigeonhole principle- Permutations and Combinations				
<b>SUGGESTED ACTIVITIES :</b> <ul style="list-style-type: none"> <li>Problem Solving sessions</li> <li>Applications in real life problems</li> </ul>				
<b>SUGGESTED EVALUATION METHODS:</b> <ul style="list-style-type: none"> <li>Tutorial problems</li> <li>Assignment problems</li> <li>Quizzes</li> </ul>				
<b>MODULE IV RECURRENCES</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>EL</b>
	<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>
Recurrence relations -Solving linear recurrence relations using generating functions – Inclusion - Exclusion Principle and its applications.				
<b>SUGGESTED ACTIVITIES :</b> <ul style="list-style-type: none"> <li>Problem Solving sessions</li> <li>Applications in real life problems</li> </ul>				
<b>SUGGESTED EVALUATION METHODS:</b> <ul style="list-style-type: none"> <li>Tutorial problems</li> <li>Assignment problems</li> <li>Quizzes</li> </ul>				
<b>MODULE V GRAPH THEORY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>EL</b>
	<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>
Graphs and graph models – Graph terminology and special types of graphs – Matrix representation of graphs and graph isomorphism – Connectivity – Euler and Hamilton paths.				

**SUGGESTED ACTIVITIES :**

- Problem Solving sessions
- Flipped class room
- Applications in real life problems

**SUGGESTED EVALUATION METHODS:**

- Tutorial problems
- Assignment problems
- Quizzes

**MODULE VI ALGEBRAIC STRUCTURE 1**

L	T	P	EL
3	1	0	3

Algebraic systems – Semi groups and monoids – Groups - Subgroups - Homomorphisms

**SUGGESTED ACTIVITIES :**

- Problem Solving sessions
- Applications in real life problems

**SUGGESTED EVALUATION METHODS:**

- Tutorial problems
- Assignment problems
- Quizzes

**MODULE VII ALGEBRAIC STRUCTURE 2**

L	T	P	EL
3	1	0	3

Normal subgroup and coset - Lagrange's theorem – Definitions and examples of Rings and Fields

**SUGGESTED ACTIVITIES :**

- Problem Solving sessions
- Flipped Class room

**SUGGESTED EVALUATION METHODS:**

- Tutorial problems
- Assignment problems
- Quizzes

**MODULE VIII LATTICES**

L	T	P	EL
3	1	0	3

Partial ordering – Posets – Lattices as Posets – Properties of lattices - Lattices as algebraic systems – Sub lattices

**SUGGESTED ACTIVITIES :**

- Problem Solving sessions
- Applications in real life problems

**SUGGESTED EVALUATION METHODS:**

<ul style="list-style-type: none"><li>• Tutorial problems</li><li>• Assignment problems</li><li>• Quizzes</li></ul>					
<b>MODULE IX      BOOLEAN ALGEBRA</b>		<b>L</b>	<b>T</b>	<b>P</b>	<b>EL</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>
Direct product and Homomorphism – Some special lattices – Boolean algebra					
<b>SUGGESTED ACTIVITIES :</b> <ul style="list-style-type: none"><li>• Problem Solving sessions</li><li>• Applications in real life problems</li></ul>					
<b>SUGGESTED EVALUATION METHODS:</b> <ul style="list-style-type: none"><li>• Tutorial problems</li><li>• Assignment problems</li><li>• Quizzes</li></ul>					

### OUTCOMES:

#### Upon completion of the course, the students will be able to:

- Identify techniques to test the logic of a program.
- Identify structures at many levels.
- Work with a class of functions which transform a finite set into another finite set which relates to input and output functions in Computer Science.
- Discuss the counting principles.
- Point out the properties of algebraic structures such as groups, rings and fields.

### TEXT BOOKS:

1. Kenneth H. Rosen, "Discrete Mathematics and its Applications", Tata McGraw Hill Pub. Co. Ltd., New Delhi, 7th Edition, Special Indian edition, 2011.
2. Tremblay J.P. and Manohar R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill Pub. Co. Ltd, New Delhi, 30th Reprint, 2011. 22.
3. Susanna S. Epp, "Discrete Mathematics with Applications" Cengage Learning, New Delhi, 8th Edition, 2016.

### REFERENCES:

1. Ralph. P. Grimaldi, "Discrete and Combinatorial Mathematics: An Applied Introduction", Pearson Education Asia, Delhi, 4th Edition, 2007.
2. Thomas Koshy, "Discrete Mathematics with Applications", Elsevier Publications, 2006. 3
3. Seymour Lipschutz and Mark Lipson, "Discrete Mathematics", Schaum's Outlines, Tata McGraw Hill Pub. Co. Ltd., New Delhi, 3rd Edition, 2010.