

21PCM108T					Organic Chemistry					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hours/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	0	0	3	3	25	50	25	--	--	100

### COURSE OBJECTIVES

- To impart a comprehensive knowledge of reaction pathways of substitution, addition, elimination and some important named reactions in organic chemistry
- To design synthetic strategies of many important chemicals such as drugs, plastics, food additives, fabrics etc.
- To develop the concept of stereo chemical features of organic molecules that explains many physical and chemical properties on the basis of their spatial orientations
- To provide knowledge about hetero cyclic compounds, properties, design and chemical reactions
- To provide special attention to the organic transformations and synthesis techniques of natural/biological products that motivate students to analyze various research problems
- To impart knowledge on the complicated and diverse structures of biological molecules

### UNIT I REACTIONS AND REAGENTS IN ORGANIC CHEMISTRY

**10 Hrs.**

Nucleophilic substitution reaction mechanisms; Free radical reactions, allylic halogenation, auto-oxidation, free radical rearrangements; Electrophilic substitution reaction mechanisms, ESR of aromatic compounds, pyrolytic elimination; Addition reactions involving electrophiles, nucleophiles and free-radicals. Grignard, organozinc and organolithium reagents; Enolates- Aldol, Knoevenagel, Claisen, Perkin and Stobbe reactions; Wagner-Meerwin, Pinacol Pinacolone, PPA cyclization and Fries rearrangement, Wolff and Arndst-Eistert, Hoffmann, Curtius, Schmidt, Lossen, Beckmann reaction; Aldol condensation, Wittig, Prevost, Simmons Smith, Nef reaction, Favorskii, Baeyer-Villiger oxidation.

### UNIT II STERO-CHEMISTRY

**8 Hrs.**

Optical isomerism: concepts, optical Activity, Specific Rotation, Chirality/Asymmetry, Enantiomers, Molecules with two or more chiralcenters, Distereoisomers, Relative and absolute configuration: D/L and R/S designations. Threo and erythro dia stereomers, meso compounds, resolution of enantiomers, inversion, retention and racemization. Stereo selective and stereo specific synthesis. Enantiomeric and diastereomeric excess: definition, determination and control. Examples of selected stereo chemical named reactions and mechanism.

### UNIT III HETEROCYCLIC CHEMISTRY, BIOMOLECULES AND CHEMICAL BIOLOGY

**10 Hrs.**

Preparation, properties and chemical reactions of five membered hetero cyclic compounds (Pyrrole, Furan, Thiophenes). Preparation, properties and chemical reactions of six membered hetero cyclic compounds (Pyridines, Pyrylium salt), Introduction to fused, other heterocyclics: nomenclature, types, reactions and properties of selected heterocyclics (Indoles, benzofurans, pyrazines, quinolines). Classification of Amino acids; Zwitter ion structure and Isoelectric point; Overview of Primary, Secondary, Tertiary and Quaternary structure of Proteins; Determination of Primary structure of peptides; Synthesis of simple peptides by N-protection and C-activating groups; Merrifield solid phase synthesis; Overview of enzyme action, coenzymes and cofactors and their role in biochemical reactions; The beta-lactam antibiotics: Penicillins, and other beta-lactams, Antibiotic Resistance.

### UNIT IV UNIT PROCESSES OF ORGANIC SYNTHESIS

**8 Hrs.**

Principles of a few selected unit processes such as oxidation, reduction, alkylation, halogenations, sulphonation, nitration, esterification and polymerization and important organic products related to the same.

**Max. 36 Hrs.**

### COURSE OUTCOMES

On completion of the course, student will be able to

CO1: To understand the reaction pathways of substitution, addition, elimination and some important named reactions in organic chemistry

CO2: Understand the basic concepts, importance of stereo chemistry

CO3: Enable to illustrate and appraise about the structure, classification, nomenclature and designating the chiral compounds

CO4: Understand the importance of various hetero cyclic compounds and able to design or understand site specific synthesis

CO5: Understand the structural and functional aspects of amino acids, peptides, proteins, enzymes and antibiotics

CO6: Evaluate and apply the concepts of natural product chemistry in real life

**TEXT/REFERENCE BOOKS**

1. Morrison, R. T. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
2. Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
3. Graham Solomons, T.W. Organic Chemistry, John Wiley & Sons, Inc.

**END SEMESTER EXAMINATION QUESTION PAPER PATTERN**

**Max. Marks: 100**

Part A: 10 Questions each carrying 5 marks

Part B: 5 Questions each carrying 10 marks

**Exam Duration: 3 Hrs.**

50 Marks

50 Marks