

20MSC506T					Organic Chemistry II					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	0	3	4.5	6	25	50	25	--	--	100

**COURSE OBJECTIVES**

- To acquire the basic understanding of reagents.
- To understand numerous name reactions involved in organic synthesis.
- To demonstrate the disconnection approach.
- To explain the basic concepts of natural product chemistry.

**UNIT 1 OXIDATION/REDUCTION AND OTHER REAGENTS****12 Hrs.**

Osmium tetroxide, DDQ, selenium dioxide,  $\text{Ti}(\text{NO}_3)_3$ , CAN,  $\text{MnO}_2$ ,  $\text{Ag}_2\text{CO}_3$ , Hypervalent iodine(V) (Dess-Martin reagent), Oppenauer oxidation ( $\text{Al}(\text{O}^i\text{Pr})_3$ ),  $\text{NaIO}_4$ , Tetrapropyl ammonium peruthenate. Organic peroxides (Sharpless epoxidation, Baeyer Villiger oxidation), PCC, PDC, Dimethyl sulfoxide (Moffatt oxidation, Swern oxidation). Catalytic hydrogenation (Pt, Pd, Fe, Ni, Rh, Ru catalysed), Clemmensen reduction, Wolff Kishner reduction, Reduction with diimide ( $\text{NH}_2\text{-NH}_2$ ) and Birch reduction.  $\text{NaBH}_4$ ,  $\text{NaBH}_3\text{CN}$ ,  $\text{LiAlH}_4$ , DIBAL-H, Applications of hydroboration. Mechanism of metal hydride reduction of saturated and unsaturated carbonyl compounds, acids, esters and nitriles. Addition of Grignard reagents, organozinc, and organolithium reagents to carbonyl and unsaturated carbonyl compounds, Lithium Organocuprates, ylides of sulfur, phosphorous and nitrogen. Organosilanes, Organostannes reagents.

**UNIT 2 ADVANCED NAME REACTIONS****8 Hrs.**

Detailed study of Neber, Prins, Bouveault Blanc Reaction, Appel reaction, Vilsmeier-Haack Reaction, Tishchenko Reaction, Fukuyama reaction, McMurry reaction, Jones Oxidation, Wilkinson reaction, Woodward and Prevost Reaction, Oxymercuration-Demercuration reaction. Cross coupling reactions: Stille, Suzuki, Sonogashira, Heck, Negishi, Hiyama, Kumada couplings. Mitsunobu reaction, Buchwald Hartwing reaction, Swern oxidation reaction, Michael addition, Darzen's glycidic ester synthesis, Mannich reaction Dickmann reaction, Wittig reaction, Knoevanagel reaction. Multicomponent reactions: Olefin metathesis, Passerine reaction, Ugi reaction, Phase transfer catalysis.

**UNIT 3 RETEROSYNTHESIS AND DISCONNECTION APPROACH****10 Hrs.**

An introduction to Synthons and synthetic equivalents, disconnection approach, functional group interconversions. One group C-X and two group disconnections in 1,2, 1,3, 1,4 & 1,5- difunctional compounds. Retro- synthesis of Alkene, acetylenes and aliphatic nitro alcohols and carbonyl compounds, amines, the importance of the order of events in organic synthesis, chemoselectivity, regioselectivity. Diels Alder reaction, Michael addition and Robinson annulation.

**UNIT 4 NATURAL PRODUCTS - ALKALOIDS AND TERPENOIDS****10 Hrs.**

Alkaloids: Phenyl ethyl amine, quinine, nicotine, peptides, nucleoside and nucleotide structure, synthesis, biogenesis.

Terpenoids: Isoprene rules, acyclic monoterpenoids, central geraniolneral, linalool monocyclic monoterpenoids; terpenol, structure elucidation, synthesis and biogenesis. Higher terpenoids: sesqui-, di-, sester-, tri-, tetra- terpenoids.

**40 Hrs.****COURSE OUTCOMES**

On completion of the course, student will be able to

- CO1– Understand various reagents involved in different chemical transformation.  
 CO2– Acquire knowledge about various advanced reagents  
 CO3– Understand the advanced name reactions and their applications.  
 CO4– Apprehend the synthesis and application of different types of reagents.  
 CO5– Plan different organic synthesis.  
 CO6– Understand the chemistry of natural products.

**TEXT/REFERENCE BOOKS**

1. A guide book to mechanism in Organic chemistry (Orient-Longmens)- Peter Sykes.
2. Organic reaction mechanism (Benjamin) R. Breslow.
3. Organic Synthesis, The Disconnection Approach, Stuart Warren.
4. Simonson: Terpenes.
5. Manskey and Holmes: Alkaloids.

**END SEMESTER EXAMINATION QUESTION PAPER PATTERN****Max. Marks: 100**

Part A/Question:

Part B/Question:

**Exam Duration: 3 Hrs**