

Course No.	Course Name	L-T-P-Credits
CY 501	Advanced Organic Chemistry	3-0-0: 3
Prerequisite: NIL		
Course Objectives:	The main objective of the course to introduce protection-deprotection chemistry and retrosynthetic analysis in organic syntheses. The students will understand the application of different organometallic reagents in the organic syntheses. The course will also help the students to know the concepts of asymmetric synthesis.	
Course Outcomes:	After successful completion of the course, students will be able to: <ol style="list-style-type: none"> 1. Understand basic concepts of protection-deprotection chemistry and retrosynthetic analysis in organic syntheses. 2. Understand the application of various organometallic reagents in organic syntheses. 3. Understand the concepts of asymmetric synthesis. 	
SYLLABUS		
Module	Contents	Hours
I	Principles of Retrosynthetic Analysis Basic principles and terminology of retrosynthesis analysis, synthetic equivalent, convergent and divergent syntheses, Important functional group interconversions, reversal of polarity, one group C-X and two group C-X disconnections, one and two group C-C disconnections.	13
II	Protection and Deprotection Chemistry Protection and deprotection of hydroxy, carbonyl, amino groups and carbon-carbon multiple bonds, chemo and regioselective protection and deprotection, illustration of protection and deprotection in synthesis.	5
III	Organic Syntheses Organic reagents: Organolithium reagents, organomagnesium reagents, organozinc reagents, organoboron, organotin reagents, organocopper reagents, organopalladium reagents for C-C bond formation reactions. Name reactions: Formation of C=C bonds by elimination reactions, syn elimination, Wittig and related reactions, McMurry reaction, Peterson olefination, Julia reaction and Tebbe olefination, aldol reaction, Baylis-Hillman reaction, Henry reaction, Suzuki coupling, Heck coupling, Stille coupling, Negishi coupling, Sonogashira coupling, Nozaki-Hiyama-Kishi coupling, Buchwald-Hartwig coupling and Ullmann coupling.	13

	Olefin metathesis: Mechanism of olefin metathesis, different generation of Grubbs catalysts and other catalyst for olefin metathesis. C-H activation: C-H functionalization and challenges, functionalization of non-acidic C(sp ³)-H Bonds by organometallic reagents.	
IV	Stereoselective Transformations Chiral synthesis, asymmetric synthesis, enantio- and diastereoselective synthesis, asymmetric hydrogenation, asymmetric dihydroxylation, asymmetric epoxidation.	5

Essential Readings:

1. W. Carruthers and I. Mendham, "Modern Methods of Organic Synthesis", Cambridge, 4th Edition.
2. S. Warren, "Organic Synthesis: The Disconnection Approach," Wiley.
3. R. O. C. Norman and J. M. Coxon, "Principles of Organic Synthesis," CRC Press, 3rd Edition.
4. J. Clayden, N. Greeves, S. Warren, "Organic Chemistry", Oxford, 2nd Edition.

Supplementary Readings:

1. M .B. Smith, "Organic Synthesis," Academic Press, 3rd edition.
2. R. K. Kar, "Fundamentals of Organic Synthesis: The Retrosynthetic Analysis," New Central Book Agency.