Semester	AUG 2022
Open to semester	7,13,21
Course code	**CH4114/CH6164**
Course title	**Organic Synthesis - II**
Credits	4 /4
Course Coordinator & participating faculty (if any)	Srinivas Hotha
Nature of Course	Lectures
Pre-requisites	Organic Synthesis-I (CHM321)
Objectives (goals, type of students for whom useful, outcome etc)	• To gain further understanding of metal-catalysed reactions in organic synthesis • To be able to plan a multistep syntheses vis a vis retrosynthesis • To build enough knowledge for independent planning of the total synthesis of complex molecules • To gain insights of heterocyclic chemistry • Practical Problem Solving
Course contents (details of topics /sections with no. of lectures for each)	Section#1- Formation Carbon-Carbon single(?)bond: 9h Organometallic reagents in action: Organotitanium, organozinc, organoboron reagents. Palladium catalyzed coupling reactions: Heck coupling, Negishi reaction, Stille coupling, Suzuki coupling, Sonogashira coupling, Trost-Tsuji Reaction, Synthesis of carbocyclic systems: Ring-closing olefin metathesis (Grubb's metathesis), photoredox catalysis using transition metal complex. Section#2-Retrosynthestic Analysis: 7h Tactics in organic synthesis. How to achieve the desired transformation? An Ideal Organic synthesis: A fantasy or an achievable goal. Synthons as universal (but abstract) building blocks in assembling a molecular framework and real synthetic equivalents; Synthons are idealized reagents; choosing a disconnection approach for multiple step syntheses. Functional group interconversion; Two-group disconnections are better than one C-C disconnections; Donor and acceptor synthons; Two-group C-C disconnections. Section#3-Saturated heterocycles and stereoelectronics 5h

	Reactions of heterocycles, conformation of saturated heterocycles: the anomeric Effect; Making heterocycles: ring-closing reactions; Baldwins's rules. Section#4-Aromatic heterocyclic: structures, reactions and synthesis 8h Aromatcity survives when parts of benzene's ring are replaced by nitrogen atoms; Six-membered aromatic heterocycles can have oxygen in the ring; Five-membered heterocycles are good nucleophiles; Furan and thiophene are oxygen and sulfur analogues of pyrrole; More reactions of five-membered heterocycles; Five-membered rings with two or more nitrogen atoms; Benzo-fused heterocycles; Putting more nitrogen atoms in a six-membered ring; Fusing rings to pyridines: quinolines and isoquinolines; Heterocycles can have many nitrogens but only one sulfur or oxygen in any ring; Pyrroles, thiophenes, and furans from 1,4-dicarbonyl compounds; How to make pyridines: Hantzsch pyridine synthesis; Pyrazoles and pyridazines from hydrazine and dicarbonyl compounds; Pyrimidines can be made from 1,3-dicarbonyl compounds and amidines. Oxazoles and Tetrazoles; The Fischer indole synthesis; Quinolines and isoquinolines. Section#5- Asymmetric Synthesis: 6h Chiral pool synthesis, chiral auxillary, organocatalysis, enantioselective desymmetrisation and radical conjugate addition reactions Section# 6 - Chemistry of Natural Products 6h Classification of Natural Products: Polyketides, terpenoids, steroids, alkaloids; Structure elucidation; Modern synthetic methods in total synthesis of alkaloids, terpenes and steroids, etc
Evaluation /assessment	End-Sem Examination-50% Mid-Sem Examination-35% Others-15%
Suggested readings (with full list of authors, publisher, year, edn etc.)	1. Organic chemistry by Jonathen Clayden, N. Greeves, S. Warren, P. Wothers Oxford University Press, 1st edition, 2001 2. Organic Synthesis, the Disconnection Approach, Warren, S. G. New York : Wiley, 2nd edition, 2008

	3. The Logic of Chemical Synthesis by E. J. Corey & Xue-Min Cheng, 1995 4. Classics in Total Synthesis by K C Nicolaou & Sorensen,2008 5. Advanced organic chemistry, Parts A and B, Francis A. Carey and Richard J. Sundberg, Springer, 5th edn, 2007 and 2008