Semester	AUG 2023
Open to semester	1
Course code	**CH1113**
Course title	**Principles of Organic Chemistry**
Credits	3 /
Course Coordinator & participating faculty (if any)	Amrita Hazra* and B. Gnanaprakasam
Nature of Course	Lectures and Tutorials
Pre-requisites	None
Objectives (goals, type of students for whom useful, outcome etc)	The main objective of this course is to help students approach the subject of organic chemistry in a step-by-step and logical manner through an understanding of its core principles. This course includes structural chemistry of organic compounds with an emphasis on electronic structure, reactivity, conformation and stereochemistry. These concepts are fundamental for gaining an appreciation for the mechanistic approach forms the base of organic chemistry. Emphasis will be provided to developing problem-solving skills unique to organic chemistry. Organic chemistry has served as a great tool and contributed to the development of several important discoveries in synthetic organic chemistry and drug discovery. This course directs the student to gain a solid understanding of the organic chemistry that they encounter in their day-to-day life, fundamentals of organic chemistry, classification and mechanistic aspects of several organic reactions. The final goal of the course is to understand and identify the fundamentals of basic organic synthesis and its role in industrial applications.
Course contents (details of topics /sections with no. of lectures for each)	Organic Chemistry in day to day Life: (1 h) History, Medicines, petrochemicals, polymers, soaps and detergents; dyes, cosmetics, Artificial Sweeteners, Food additives etc. Introduction to organic chemistry: (3 h) a) Arrow pushing concepts in organic chemistry; c) Inductive effects; d) Hyperconjugation; e) Mesomeric effects; f) Resonance; g) Tautomerism h) Carbocation, Carbanion Acidity, basicity, and pKa: (2 h) Acidity, Basicity, definition of pKa, factors that influence the

	acidity and basicity, levelling effect, predicting acid strengths, HSAB Principle. Aromatic compounds (2 h) Aromaticity, anti-aromaticity and non-aromaticity. Stereochemistry: (3 h) Importance of stereochemistry, Chirality, Chirality in biomolecules (proteins, carbohydrates), drugs that interact with chiral biomolecules, assigning chirality, stereochemical descriptors, R and S, E and Z notations. Interaction of chiral molecules with light, optical activity. Conformational analysis: (2 h) Acyclic systems such as ethane, propane and n-butane and cyclic molecules such as cyclohexane. Classifications of Organic Reactions: Important reactive Intermediates: (2 h) Free radicals, Carbenes, and nitrenes, review of carbocations, carbanions, Addition Reactions: (4 h) Modes of additions reactions. Nucleophilic, electrophilic, free radical addition reactions; Nucleophilic addition to carbonyl groups, angle of nucleophilic attack on aldehydes and ketones; aldol and related reactions; Electrophilic addition reactions to Alkenes and alkynes. Substitution Reactions: (4 h) Types of substitution reactions: Nucleophilic substitution at saturated carbon; SN1 and SN2 mechanisms for nucleophilic substitution. Aromatic electrophilic and nucleophilic substitutions; examples for free radical substitutions. Elimination Reactions: (3 h) Types of elimination reactions. Factors affecting the elimination reactions. Substitution and elimination. Elimination happens when the nucleophilic attacks hydrogen instead of carbon.
Evaluation /assessment	End-Sem Examination-40% Mid-Sem Examination-35% Others-Others 25%%
Suggested readings (with full list of authors, publisher, year, edn etc.)	Clayden, Greeves, Warren and Wothers, Organic Chemistry, (Oxford University Press)