

Course (Unit) Title	Organic Chemistry I
Course (Unit) Code	CHE104G3
Credit Value	03 (45 hours of lectures and tutorials)
Objective/s	• Describe the significance of organic compounds • Discuss mechanisms of different classes of organic reactions • Explain the fundamentals of organic stereochemistry • Outline the chemistry of alicyclic compounds
Intended Learning Outcomes	• Apply prior knowledge in organic chemistry • Outline mechanisms of organic reactions • Determine absolute configuration of organic molecules • Demonstrate properties of alicyclic compounds
Contents	Overview of Organic Compounds • Organic compounds in daily life: agrochemicals, drugs, cosmetics, surfactants, food additives, petroleum products, and other compounds • Functionalized organic compounds: review of hydrocarbons, alkyl halides, alcohols, ethers, aldehydes, ketones, carboxylic acids and their derivatives, amines and diazonium salts, synthesis and reactions of dicarbonyl compounds (diketones, ketoacids and ketoesters) and α,β-unsaturated carbonyl compounds Organic Reaction Mechanisms • Organic reactions: introduction, classification • Kinetics and energetics: energy profiles, kinetic control, thermodynamic control • Reactive intermediates: structure and stability of carbanions, carbocations, carbenes and carbon free radicals • Substitution reactions: S_N1, S_N2, S_Ni and S_E mechanisms • Elimination reactions: $E1$, $E2$, $E1cB$, E_α, E_β and pyrolytic elimination mechanisms • Addition reactions: A_N, A_E and A_R mechanisms • Factors affecting organic reactions Stereochemistry of Organic Compounds • Stereoisomers: conformational isomers, configurational isomers • Chirality: symmetry elements, optical activity, specific rotation, enantiomeric excess • Racemic modification, resolution • Fischer projection, Newman projection, Sawhorse representation • Configurational nomenclature: D-L nomenclature, <i>threo</i> and <i>erythro</i> nomenclature, R-S system, E-Z nomenclature • Chirality in molecules devoid of chiral centres: allenes, cumulenes, spiranes, biphenyls, and other relevant compounds

	Alicyclic Chemistry • Nomenclature, synthesis, reactions and properties of 3, 4, 5 and 6-membered alicyclic compounds and decalin • Conformational analysis of alicyclic rings
Teaching and Learning Methods / Activities	Lectures, Tutorials and Assignments
Evaluation	In-course Assessments 30% End of Course Examination 70%
Recommended References	• McMurry J. E.; <i>Organic Chemistry</i>. 9th Edition. Boston: Cengage Learning, 2016. • Maskill H., <i>Mechanisms of Organic Reactions</i>. Reprinted with corrections. New York: Oxford University Press, 1999. • Eliel E. L.; Wilen S.H. and Doyle M.P., <i>Basic Organic Stereochemistry</i>. New York: John Wiley & Sons, 2001. • Finar I. L., <i>Organic Chemistry</i> Vol. 1. 6th Edition. Pearson Education Ltd, 2012.