CH-909 Catalysis for Advanced Organic Chemistry

Credit Hours: 3-0

Prerequisite: Nil

Course Objectives

Students will acquire knowledge and understanding about catalysis, organocatalysis and their use in the asymmetric synthesis.

Course Outcomes

After completion of this course, students will have idea regarding the nature and the mechanism of complex asymmetric synthesis by the use of organ catalysis and organometallic compounds.

Course Contents

Types of catalysis; Heterogeneous Catalysis; Homogenous Catalysis, Carbanions, and the structure of organometallics. Generation and reactivity of Grignard (Mg) reagents, Generation, and reactivity of organolithiums, C-H functionalization in Organic synthesis – perspective, mechanisms, C-H functionalization by carbenes, nitrenes, Catalytic coordination assisted C-H activation – Ru, Rh., Palladium catalysed C-H activation - C-C cross coupling, C-H/C-H coupling. Direct intermolecular arylation of heterocyclic C-H bonds. C-H oxidation, Asymmetric synthesis, Asymetric organocatalysis, Evans' Alkylation, Evans' oxazolidinone enolates, Asymmetric alkylation of different enolates, Synthesis of the Prelog-Djerassi lactonic acid, Evans aldol reaction, Asymmetric Hydroboration, Asymmetric Allylation, Corey bakshi Shibata Reagent, Sharpless Asymmetric Epoxidation, Sharpless Asymmetric Dihydroxylation, Organocatalytic synthesis of carbohydrates.

Recommended Books

1. R.H. Crabtree, The Organometallic Chemistry of the Transition Metals, 5th Ed, 2009, ISBN: 978-0-470-25762-3.
2. Iwao Ojima, Catalytic Asymmetric Synthesis, Third Edition, Print ISBN:9780470175774 Online ISBN:9780470584248 |DOI:10.1002/9780470584248 (2010).

3. Alfred Hassner, Advances in Asymmetric Synthesis. ISBN: 9780080552644 Elsevier publisher. (1995).