UNIVERSITY OF CALGARY
DEPARTMENT OF CHEMISTRY
COURSE SYLLABUS
Winter 2015

COURSE: CHEMISTRY 551 – Organic Synthesis

LEC	DAYS	TIME	ROOM	INSTRUCTOR	OFFICE	PHONE	EMAIL	OFFICE HOURS
L01	MWF	11:00-11:50	SH 274	Dr. T.G. Back	SB 217	220-6256	tgback@ucalgary.ca	TBA
T01	W	13:00-13:50	SH 288	Dr. T.G. Back	SB 217	220-6256	tgback@ucalgary.ca	TBA

The course emphasizes strategy and tactics in the design of total organic syntheses and is loosely based around the following topics. In each topic, specific reactions and reagents are introduced and their applications are illustrated in the total synthesis of drug molecules, pheromones, alkaloids, steroids and other natural and unnatural products.

History and Milestones of Organic Synthesis

Logistics

The Retrosynthetic Approach: bond disconnections, transforms, synthons, synthetic equivalents, umpolung

Chemoselectivity

Aromatic Chemistry

Amination Reactions

Protecting Groups in Synthesis

Stereoselectivity: diastereoselectivity, enantioselectivity, chiral templates, resolution, chiral auxiliaries, chiral catalysts

Alkene synthesis

Cycloadditions: masked functionality, Diels-Alder and hetero-Diels-Alder, ketenes and alkenes in [2+2] reactions, photochemical cycloadditions, cascade processes

Carbonyl Condensations: enolate chemistry, aldol regio- and stereochemistry, directed aldol reactions, surrogate aldol reactions

Aliphatic Nitro Compounds

Oxidative Cleavage

Three-Membered Rings as Synthetic Intermediates and Targets

Rearrangements: ring contractions and ring expansions; Beckmann, Curtius, Tiffeneau-Demjanov, carbocation, biomimetic, sigmatropic

Department Approval: Approved by Department Head Date: November 27, 2014