**Department of Chemistry Syllabus**

This syllabi is advisory only. For details on a particular instructor's syllabus (including books), consult the instructor's course page. For a list of what courses are being taught each quarter, refer to the Courses page. *Every instructor has prerogative to teach the course as they see fit and ultimately the instructor's syllabus supersedes all others.*

***CHE 8B: Organic Chemistry: Brief Course***

Approved:

Suggested Textbook: (actual textbook varies by instructor; check your instructor)

“Essential Organic Chemistry, 3rd Edition”, P. Y. Bruice

Mastering Chemistry Software

 “Experiments for a Brief Course in Organic Chemistry”, “Summer 2015”

Molecular Models for visualization and laboratory.

Goggles and 100% cotton lab coat

Suggested Schedule:

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Week 1

 Introduction

 Structure and Properties of Alcohols

 Reactions of Alcohols

Week 2

Reactions of Alcohols

Aromaticity

Quiz 1 – Chap. 9

Week 3

Reactions of Aromatic Compounds

Carbonyl Properties and Naming

Aldehydes and Ketones

Week 4

Quiz 2 – Chap 7 / 12.

Reactions of Aldehydes and Ketones

Reactions of Enols/Enolates

Week 5

Properties Adjacent to Carbonyls

Structures of Carbohydrates

Properties and Biology of Monosaccharides

 Quiz 3 – Chap. 13

Week 6

Properties and Biology of Disaccharides and Polysaccharids

Structure of Carboxylic Acids and Derivatives

Quiz 4 – Chap. 16

Week 7

pKa and Properties of Carboxylic Acids

Reactions of Carboxylic Acids and Derivatives

Week 8

Quiz 5 – Chap. 11

Structure of Amino-Acids

pKa and PI

Week 9

 Structure of Proteins

 Lipids and Sterols

Week 10

Quiz 6 – Chap. 17/20

Membranes

Final

Lab Schedule

Week 1 Check-in.

 Expt. I – Molecular Models

Week 2 Expt. IX – Separation of Two Dyes

Week 3 Expt. VIII – Isolation of Caffeine

Week 4 Expt. XI – Synthesis of 2-Chloro-2-methybutane

Week 5 Expt. VI – Synthesis of Dibenzolactone

Week 6 Expt. V - Carbohydrates

Week 7 Expt. II – Conversion of Maleic Anhydride to Fumaric Acid

Week 8 Expt. IV – Fats, Soaps, and Detergents

Week 9 Expt. X - Amino-Acid Paper Chromatography

 Check out.

Additional Notes:

Prerequisites: CHE-8A with a passing grade.

Learning Goals:

Upon successful completion of this course students should be able to:

Understand and explain the reactions of alcohols and ethers including determining the products of reaction, reagents used in reactions and mechanisms.

Determine if a compound is aromatic.

Understand and explain electrophilic aromatic substitution reactions such as halogenation, nitration, sulfonation, Friedel-Crafts acylation and alkylation including mechanisms and reagents.

Understand and explain the affects of substitution on the rate and position of electrophilic aromatic substitution reactions as well as pKa of phenols, anilines, and benzoic acids.

Integrate reactions of aromatic systems, aldehydes, ketones and carboxylic acid derivatives into multi-step synthesis of target compounds from given starting materials.

Name alcohols, ethers, aldehydes, ketones, carboxylic acid derivatives, and aromatic compounds using IUPAC nomenclature and recognize selected common names.

Understand and explain the reactions of carboxylic acid derivatives, aldehydes and ketones such as nucleophilic substitution and nucleophilic addition including determining the products of reaction, reagents used in reactions and mechanisms.

Understand and explain the reactions adjacent to a carbonyl group such as the aldol reaction and -keto-ester synthesis including determining the products of reaction, reagents used in reactions and mechanisms.

Describe and identify molecules as carbohydrates and determine if they are aldoses or ketoses, reducing sugars, and/ or D vs. L structures.

Predict the products of basic reactions of monosaccarides including the Killani-Fischer Synthesis, oxidation/reduction, and hemiacetal formations.

 Understand and describe the differences between mono-, di-, and polysaccarides and the roles of specific examples in living systems.

Describe and identify simple amino acids, peptides and proteins and understand the effects of pH on structure and make predictions on pKa, and pI.

Describe and identify peptide bonds, and primary, secondary, tertiary and quarternary structure of proteins including disulfide bonds and sequence determination.

Describe and identify fatty acids, fats, terpenes and steroids and the roles of specific examples in living systems