

University College of the Cayman Islands

ASSOCIATE DEGREE SYLLABUS

COURSE NAME: ORGANIC CHEM I/Lab COURSE #: CHE211

COURSE DESCRIPTION

A course in nomenclature and classification of organic molecules, structure and reactivity of various functional groups such as hydrocarbons, alcohols, alkyl halides, alkenes and allylic systems.

Credits: 4

Prerequisite: CHE 111, CHE 112

COURSE OBJECTIVES

CHEMICAL BONDING

Students should be able to:

- Describe ionic bonds, multiple bonds in Lewis structures, polar covalent bonds and electronegativity, formal charge, sp³ hybridization and bonding in methane, sp³ hybridization and bonding in ethane, sp² hybridization and bonding in ethylene, sp hybridization and bonding in acetylene.

ALKANES AND CYCLOALKANES

Students should be able to:

- Understand the nomenclature of alkanes and cycloalkanes
- Describe the physical and chemical properties of alkanes and cycloalkanes
- Recognize the general unreactivity of alkanes
- Describe the following reactions of methane- combustion, substitution and oxidation.

ALCOHOLS AND ALKYLHALIDES

Students should be able to:

- Understand the nomenclature and classes of alcohols and alkylhalides
- Describe the physical properties of alcohols and alkylhalides

- Describe the bonding in alcohols and alkylhalides
- Describe the combustion of alcohols
- Describe the acid- base reactions using proton transfer
- Describe the acidity of alcohols
- Describe the preparation of alkyl halides from hydrogen halides and alcohols
- Describe the reaction of alcohols to produce carbonyl compounds and carboxylic acids
- Describe the structure, bonding and stability of carbocation
- Describe the mechanism for the conversion of an alcohol to an alkene
- Describe the formation of an ester
- Describe the effect of alcohol structure on reaction rate
- Describe the mechanism of the reaction of primary alcohols with hydrogen halides.
- Describe the halogenation of higher alkanes using regioselectivity.

ALKENES AND ALKYNES

Students should be able to:

- Understand the nomenclature and classes of alkenes and alkynes
- Describe the physical properties of alkenes and alkynes
- Describe the structure and bonding in alkenes and alkynes
- Describe the isomerism in alkenes and naming using the E-Z notational systems
- Describe the preparation of alkenes and alkynes
- Describe the addition reactions of alkenes and alkynes
- Describe the acidity of acetylene and terminal alkynes

DIENES

Students should be able to:

- Understand the classes of dienes and the allyl group
- Describe the allylic carbonations
- Describe the allylic free radicals
- Describe the allylic halogenation
- Describe the electron delocalization in conjugated dienes
- Describe the bonding in allenes
- Describe the preparation of dienes
- Describe the addition of hydrogen halides to conjugated dienes
- Describe the halogen addition to dienes
- Describe the Diels- Alder reaction
- Describe the electrocyclic reactions of polyenes

TEXTBOOK:

ORGANIC CHEMISTRY

AUTHOR: FRANCIS CAREY

PUBLISHER: Mc Graw Hill (fourth edition) 2000

ASSESSMENT

Laboratory/Assignments	40%
Mid-Term Test	20%
Final Examination	<u>40%</u>
Total	100%