CHM 251ORGANIC CHEMISTRY I

COURSE DESCRIPTION:

Prerequisites: CHM 152with a C or better

Corequisites: None

This course provides a systematic study of the theories, principles, and techniques of organic chemistry. Topics include nomenclature, structure, properties, reactions, and mechanisms of hydrocarbons, alkyl halides, alcohols, and ethers; further topics include isomerization, stereochemistry, and spectroscopy. Upon completion, students should be able to demonstrate an understanding of the fundame concepts of covered organic topics as needed in **QHM** Laboratory experiments, including spectroscopy and chromatography, and compubased exercises augment and reinforce the basic principles discussed in lecture as well as provide practical place. This course has been approved to satisfy the Comprehensive Articulation Agreement for transferability as an applier and/or elective course requirement Course Hours Per Week: Class, 3. Lab, 3. Semester Hours Credit, 4.

LEARNING OUTCOMES:

Upon completion of this course, students will be able to:

- a. Describe the electronic structure of the atom.
- b. Explain electronegativity.
- c. Write molecular and structural formulas.
- d. Describe acids and bases.
- e. Identify the potential for hydrogen bonding.
- f. Identify functional groups.
- g. Use organic nomenclature.
- h. Describe alkanes, alkenes, and alkynes.
- i. Describe geometric isomerism in alkenes and cyclic compounds.
- j. Explain the properties of organohalogen compounds.

k.

- D. Cycloalkanes
- III. Introduction to molecular geometry
 - A. Ethane
 - B. Energy in molecules
 - C. Rotation and conformation
 - D. Intramolecular effects
 - E. cisandtransisomers
 - F. Physical properties of alkanes
- IV. Hydrocarbons, alkenes and alkynes
 - A. Alkenes
 - B. Hybrid bonding indouble and triple bonds
 - C. $spandsp^2 bonds$
 - D. p-p covalent bonding, bonds
 - E. Single bonds: bonds
 - F. scharacter,p character and the energy of bonding orbitals
 - G. Bond energy
 - H. Unsaturation equivalent
 - I. Introduction to nomco nightal cim Tin @ Notice new Text (2015)

- VII. Making and breaking chemical bonds
 - A. scharacter,p character and the energy of bonding orbitals
 - B. Combustion
 - C. Bond energy
 - D. Free radical substitution
 - E. Reactive intermediates

VIII. Addition reactions to orbitals

- A. Acids and bases
- B. Protons
- C. Energy changes
- D. Stereochenistry
- E. Introduction to electrophilic addition reactions

IX Basic nomenclature

- A. Alkanes and branched alkanes
- B. Alkenes, alkynes
- C. Rings
- D. Alcohols
- E. Halides
- F. Multiple functionality

X. Bectrophilic addition to bonds

- A. Heterolytic cleavage
- B. Electrophiles
- C. Electrophilic attak
- D. Nucleophiles
- E. Markownikoff rule

XI. Unsaturated systems

- A. Electrophilic addition
- B. Dehydration of alcohols
- C. Stabilization of intermediates by resonance

XII. Introduction to stabilized systems

- A. Hydrogenation
- B. Heat of hydrogenation
- C. Dienes
- D. Introduction to resonance

XII. Benzene

- A. Cyclohexane
- B. Cyclohexene
- C. Bonding
- D. Stabilization
- E. Aromaticity

XIV. Spectroscopy

- A. Infrared spectrum
- B. Nuclear magnetic resonance spectra
- XV. Electrophilic addition to benzene and aromatic systems

A. Electrophilic addition

B.