

SAULT COLLEGE
of Applied Arts and Technology
Sault Ste. Marie

COURSE OUTLINE

ORGANIC CHEMISTRY (THEORY)

CHM 117-2

Semester 1

revised February, 1980 (D. Heggart)



ORGANIC CHEMISTRY (THEORY) (CHM 117-2)

Semester 1

INTRODUCTION:

CHM 117-2 is the introductory course in Organic Chemistry offered at Sault College. Emphasis is placed on giving the student a vocabulary in Organic Chemistry and as such, this course could be entitled: "Structure and Function". Considerable time is spent on the bonding of carbon and the use of molecular models plays an important role. CHM 118-3 (Organic Chemistry Laboratory) is usually taken concurrent with CHM 117-2.

TEXT:

Menger, Goldsmith, Mandell; Organic Chemistry 2nd Ed., Benjamin (1975)

Traynham; Organic Nomenclature, Prentice-Hall (1966)

Evaluation is based upon 4 one hour tests per semester.

1

Structures

- draw correct structures, given chemical formula
- identify errors in incorrect structures
- draw structures representing family of compounds
- identify functional groups
- write general formula for organic families
- draw condensed and expanded structures
- review chemical bonding
- explain sp^3 , sp^2 , sp hybridization in organic compounds
- identify bond type and bond hybridization in given examples

2

Functionality

- review functional groups
- identify degree of substitution for olefins
- relate stability to functionality
- classify organic compounds as to saturated, unsaturated, cyclic, acyclic, aromatic, etc.
- apply Huckel's Rule to determine aromaticity
- identify 1° , 2° , 3° and 4° sites as well as vinylic, allylic and aryl
- identify conjugated and non-conjugated systems and relate to stability

3-5

Nomenclature

- apply rules of organic nomenclature to alkanes (alkyl groups), alkenes.
- draw structures of organic compounds given the name
- identify incorrect names and structures having errors

6

Molecular Geometry

- study the following types of isomerism; structural, functional, geometric, optical.
- distinguish between isomers and same compound
- apply (E) (Z) system to substituted olefins
- draw Sawhorse, and Newman projections for substituted ethane, butane
- draw boat and chair forms of cyclohexane and identify axial & equatorial substituents
- co-related conformation and stability
- draw P.E. diagram for conformers of n-butane
- classify organic compounds as to isomers, conformers, different compounds
- study optical activity and apply Sequence Rules to (R) (S) system of assigning absolute configuration
- learn the terminology of stereochemistry and apply it to the identification of enantiomers, meso, diastereomers, etc.

7-8

Nomenclature

- apply rules of organic nomenclature to alkynes and alcohols
- draw structures of organic compounds given the name

9

Stability of Organic Compounds

- understand the meaning of stability
- relate stability and structure using the 6 rules of evaluating stability
- classify defects in organic compounds
- identify the following intermediates - carbonium ion, carbonion, radical, carbene
- identify reaction type as stepwise or concerted based upon intermediate or transition state
- draw PE diagrams for reaction types
- identify kinetic vs. thermodynamic control in chemical reactions