

CHEMISTRY 263 - Section A2
Lecture Outline 1 and Assignment 1

TR 12:30-13:50
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Office: W5-09A

Assignment 1: (covers ca 4 lectures)

Read: TWG Solomons and CB Fryhle "Organic Chemistry" 11th Edition (2014):

Functional Group List on page 76 and **Periodic Table** Inside front Cover (One page back from Inside Back Cover earlier Editions)

Relative **Strength of Acids** and Bases on Inside Front Cover - same table page 111 (page 101 9th Edition & page 105 - 8th Edition)

Chemical Shift Ranges in NMR – inside back cover & facing page

Chapter 9 - Nuclear Magnetic Resonance (NMR) Spectroscopy
- read all for overview; study sections 9.1 to 9.12

Chapter 13 - Conjugated Unsaturated Systems

Problems: (Do **Not** turn in, answers available in "Study Guide and Solutions Manual for Organic Chemistry" for Solomons. This is available in the Bookstore. Do the same problem numbers for 8th and 9th Editions

Chapter 9: 9.1 to 9.9 (both solved & review problems); 9.16; 9.23; 9.24

Chapter 13: 13.1 to 13.6 (both solved & review problems); 13.20; 13.25; 13.35; 13.40; 13.45

Lecture Outline 1: Nuclear Magnetic Resonance (NMR) Spectroscopy, Conjugated Systems and Ultraviolet Spectroscopy

I. Introduction, Brief Review and Recap of Chem 161/261

For content please click on “previous term” (Chem 164) Lecture Outline Assignment 1 at http://www.chem.ualberta.ca/~vederas/Chem_263/index.html

II. Nuclear Magnetic Resonance (NMR) Spectroscopy

A. Electromagnetic Spectrum

B. Principle of NMR and Instrumentation

C. Proton Chemical Shift: Peak Position and Integration

1. Shielding and Deshielding of Hydrogens – Chemical Shifts

2. Tetramethylsilane (TMS) standard

3. Equivalent and Non-equivalent Hydrogens

D. Spin-Spin Splitting

E. Basics of Carbon-13 NMR Spectroscopy

F. Basics of 2D NMR Spectroscopy

III. Conjugated Systems and Resonance

- A. Nomenclature of Dienes and Allyl vs Vinyl
- B. Allyl Radical, Cation, and Anion - Stabilization and Resonance
- C. Addition Reactions of Dienes
- D. Allylic Radicals and Allylic Cations - Rubber and Polystyrene

IV. Energy Characteristics of Allylic Systems

- A. Stability of Conjugated Dienes
 - 1. Bond Lengths
 - 2. Conformation
- B. Visible and Ultraviolet Spectroscopy
 - 1. Measurement of spectra
 - 2. Absorption energies
 - 3. Biological significance

V. Electrocyclic Reactions of Alkene Systems

- A. Diels-Alder and Retro Diels-Alder
 - 1. General Form of reaction
 - 2. Stereochemistry