Introduction to Organic Chemistry

HSSP - Summer 2018

Summary

Welcome to organic chemistry! In this course, we will provide you with an introduction to this diverse and expanding field of manipulating carbon atoms. Although we will not be able to cover the entire syllabus of a standard Organic Chemistry I course, we aim to provide you with a fundamental understanding of the ways of organic chemistry as well as give you the tools and skills you will need to succeed in any future organic chemistry courses you might take.

Course Material

Class	**Material**
June 30, 2018	General Chemistry Review ● Basic bonding concepts ● Lewis structures ● Electronegativity and bond polarity ● VSEPR theory, hybridization, MO theory ● Intermolecular forces Drawing Molecules ● Bond-line drawings ● Lone pairs and formal charges ● Three dimensional structures Resonance
July 7, 2018	Acids and Bases ● Bronsted-Lowry acids and bases ● Factors of acid/base strength ● Lewis acids and bases Alkanes Stereochemistry ● Overview of isomerism ● Designating configurations ● Stereoisomeric relationships
July 14, 2018	Chemical Reactivity and Mechanisms ● Thermodynamics of reactions ● Kinetics of reactions and Energy Diagrams ● Principles of arrow pushing ● Reversible and irreversible reaction arrows ● Nucleophiles and electrophiles ● Stability of radicals and carbocations Substitution Reactions
July 21, 2018	Alkenes ● Elimination reactions ● Additional reactions of alkenes
July 28, 2018	Alcohols and Phenols ● Introduction and nomenclature ● Polarity ● Reactions

	Ethers and Epoxides ● Introduction and nomenclature ● Reactions
August 4, 2018	Aldehydes and Ketones ● Introduction and nomenclature ● Carbonyl reactions Carboxylic Acids and Derivatives ● Formation ● Reactions
August 11, 2018	Overview of Miscellaneous Topics ● Aromatics and Pericyclic Reactions ● Alpha Carbon Chemistry ● Spectroscopy and Spectrometry Synthesis ● Examine some famous synthesis pathways such as vitamin B12 and oil of wintergreen (methyl salicylate)

Guidelines

Organic chemistry is not as scary as it seems, but it is by no means a trivial subject. Frequently, topics seem very simple initially, but by the time you realize you are falling behind, it is too late. The following guidelines will help you stay on track.

1. Practice: the best way to remember reactions and get better at drawing mechanisms is to practice drawing them without looking at the answer key. It is easy to fool yourself into thinking you know a reaction when you rationalize the answer from a solution. Be sure to do as many problems as you can until you are absolutely familiar with the concept.
2. Understand: understand why each step of a mechanism occurs and how each of the chemicals are involved. While it may be easier to simply memorize mechanisms and reagents, doing so restricts you to only the reactions you already have seen. Be sure to understand why certain solvents, reagents, and products are used, as well as why the arrow pushing proceeds as it does.
3. Preview: taking a look at the material before class will make the class far more valuable to you. There is a very limited amount of time in class, so we will have to move fairly quickly. Thus you need multiple exposures to solidify the material. The syllabus above provides the topics we've selected for this course. Be sure to preview them before coming to class.
4. Review: review soon after class to avoid losing too much information. Go through the practice problems and make sure you understand the concepts covered there. Then make sure to complete review problems.

Resources

- http://www.ochem4free.info/node/1
  Free (for the most part) online textbook of very good quality.
- Virtual Textbook of Organic Chemistry
  (Find this on Google) Provided by Michigan State University, this site provides more in-depth information on many common organic topics.
- *Organic Chemistry, 3rd Edition* by Dr. David Klein
  If you are serious about getting into organic chemistry, this book is an excellent source for the beginner who is self-studying. The first and second edition of this book both work, and are a lot cheaper.