**S3688: Introduction to Organic Chemistry**

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Email is a really good way to reach me for any questions or missing handouts.

**Course Description**

Organic chemistry is the chemistry of carbon, the backbone of all life on Earth. This course will provide an introduction to organic chemistry, reactions, and mechanisms. We will learn basic synthesis processes and the way mechanisms demonstrate how a reaction proceeds. Along the way, we will see the biological and practical applications of these reactions such as understanding how DNA replication errors, medicine, and synthetic materials work. Topics will include nomenclature, nucleophilic substitution reactions, elimination reactions, alkene chemistry, and benzene chemistry.

This class will presuppose a good portion of chemistry, especially VSEPR theory, hybridization, and electronegativity. At the start of every class I’ll do a brief review of the general chemistry needed to understand the lecture.

I can stay after class nearly every week. So if anyone has questions, needs help, wants to learn more, or wants to talk about life, I can work with you generally for as long as you want.

**About Me**

Hi, I’m a freshman here at Harvard College, and I intend to concentrate in Molecular and Cellular Biology. My high school had a half-year organic chemistry class, which I took and thought was very useful. This class is partially based on what I learned there and also based on stuff that I learned from doing organic chem outside the classroom. I’m teaching this course both because I love this topic, and because my current college classmates are often jealous of how I have a head start on them with my organic chemistry knowledge.

**Homework**

I will be photocopying pages and assigning problems from Organic Chemistry by Francis A. Carrey. Organic chemistry, like most math or sciences, is best learned through practice. I strongly suggest that you do this homework in order to keep up and practice your new knowledge. And the first part of class will be devoted to going over the homework.

**Syllabus**

**Week 1: Intro, Alkanes, and Nomenclature**

What is Organic Chemistry?

Review: Structure of Carbon

Learn: Definition of Alkane, Drawing Organic Molecules, Nomenclature of Alkanes, Halides, and Alcohols

**Week 2: Alkenes and Mechanisms**

Review: Electronegativity, Partial Charges, Nucleophiles and Electrophiles

Learn: Alkene Nomenclature, Alkene as Nucleophile, Alkene Mechanism

**Week 3: Alkene Electrophilic Addition Reactions**

Review: Nucleophile and Electrophile, Alkene Mechanism

Learn: More Alkene Electrophilic Addition Reactions, Markovnikov’s Rule, Stabilization of Carbocations

**Week 4: Alkynes, Alkenes, and Radicals**

Review: Alkene structure

Learn: Alkyne reactions, More on Alkenes, polymerization

**Week 5: Nucleophilic Substitution Reaction and Mechanisms**

Learn: Sn2 Mechanism, Strength of Nucleophile, Quality of Leaving Group

Steric Hindrance vs. Stabilization of Carbocation, Sn1 vs. Sn2

Biological Applications

**Week 6: Elimination Reaction, Mechanism, and Comparison**

Learn: E2 Mechanism, Strength of Nucleophile, Quality of Leaving Group

E vs. Sn, Synthesis Pathways, Biological Applications

**Week 7: Benzene: History, Structure, Mechanisms**

Review: Hybridization, π bonds, Resonance

Learn: History of Benzene, Nomenclature of Benzene, Description of Structure

**Week 8: Benzene, Electrophilic Substitution, Cool Stuff**

Learn: Electrophilic Substitution Mechanism, Biological Applications, Cool Reactions