Summer 2016
Chemistry 255
Organic Chemistry I Lecture
Time: MTWTh 10:20 – 11:20 am
Location: KH 471

Prof. Loyd D. Bastin
Office: Kirkbride 469A
Phone: (610) 499 – 4022
E-mail: lbastin@widener.edu

Prof. Krishna Bhat
Office: Kirkbride 571
Phone: (610) 499 – 4005
E-mail: kmbhat@mail.widener.edu

"All of these activities of living organisms are chemical in nature. To understand them we must understand the substances, how they are made up of molecules, how the molecules are made up of atoms."(Linus Pauling)

"UNLESS someone like you cares a whole awful lot, nothing is going to get better. It's NOT." (The Lorax)

Required Textbooks and Materials

Organic Chemistry: Principles and Mechanisms, Joel Karty, ISBN 978-0-393-91904-2
Study Guide and Solutions Manual to accompany Organic Chemistry: Principles and Mechanisms by Joel Karty and Marie M. Melzer, ISBN 978-0-393-92293-6
Molecular Visions Molecular Model Kit by Darling Models, ISBN 0-9648837-2-4

Office Hours

Dr. Bastin	Dr. Bhat
Monday 9:00 – 10:00 am	MTW 11:30 – 12:30 pm
Thursday 3:00 – 4:00 pm	and by appointment

Course Description

In this course we begin are journey into the world of organic chemistry. Organic chemistry was traditionally defined as the study of substances isolated from living systems, but organic chemistry has expanded due to the ability of synthetic chemist to synthesize most any molecule and is now defined as the study of compounds containing carbon. While organic chemistry opens the door to the understanding of living systems including but not limited to protein chemistry and pharmaceuticals, organic chemistry is also the basis of materials chemistry which has given us such commercial materials as fiberglass, plastic, lasers, and computers to name a few. We will learn to control the formation and breaking of covalent bonds in order to produce chemicals with desired structures and properties. In this first semester course, we will form the foundation of our organic chemistry knowledge by looking at the past as well as the present states of organic chemistry. We will explore the importance of molecular orbital theory, three-dimensional structure and chirality, constitution, and conformation to chemical reactivity. Once we have these concepts mastered, we will begin to control the formation and destruction of covalent bonds in addition to common characterization techniques for organic molecules. Prerequisite: Chem 146 and 148

Course Goals

We have five major goals in this course: 1) to promote effective written and oral communication of chemical nomenclature and structures of organic molecules (the language of organic chemistry); 2) to promote a basic knowledge of the concepts of organic molecules and their relationship to mathematics and other sciences in order a) to compare theoretical calculations and experimental results, b) to obtain and interpret spectra, c) to synthesize and characterize compounds, d) to design greener reactions and syntheses; and d) to recognize how chemistry relates to other disciplines and society; 3) to develop problem solving and analytical analysis skills. This knowledge will be judged based on start-ups, exams, and class participation.

Readings

The purpose of the readings is to prepare you for and supplement the lectures. You **MUST** read the assigned readings **before** the appropriate class (as outlined later), because we do not cover every detail of the readings and our lectures will be prepared based upon the assumption that you have prepared for class. Our lectures incorporate several different teaching styles. First, we ask questions during lecture and we expect thoughtful answers. Answering these questions requires that you have thoughtfully read the assigned material. Second, there will be days where you are asked to solve and present **questions during class. If you have not prepared for class, you will find difficulty solving these problems and you will gain little knowledge from this extremely useful experience. Third, we do not cover every detail of the readings and you are respon**sible for all of the material unless otherwise noted by us in class.

Class Activities

Class activities will include the presentation of new material and discussion of new and old material including sample problems, group problems, lecture, and questions. Although Karty will provide the basic knowledge of each topic, we will discuss aspects of the topics that are not covered by this tertiary textbook. We will delve into the history of many of the founding discoveries in organic chemistry in order to gain a greater perspective of our subject. These historical accounts will be taken from the primary chemical literature at the time of the discoveries in addition to some historical accounts of the discoveries. We will also move beyond the coverage in the text for some topics and also discuss how organic chemistry affects your life everyday. Again, much of this material will be provided in supplemental handouts and other information will be provided through lecture. These additional topics are meant to spawn an excitement for organic chemistry and to catalyze in-class discussions.

Grading

Startups (10 at 10 pts each)	110 pts
Exams (3 at 100 pts each)	300 pts
Final Exam	200 pts
Class Attendance/Participation	40 pts
Total	650 pts

This course uses the +/- grading system

Class Attendance/ Participation

Since organic chemistry is a difficult subject and requires your consistent dedication, you are expected to attend and **participate** in all class meetings and activities. A significant portion of your grade will be based upon your class participation, frequency and quality of questions, and preparedness and attendance of class based upon my subjective evaluation. Also, you will receive a failing grade in the course if you miss 7 or more class meetings.

Homework

The *homework* assignments are sets of problems that are designed to give you practice applying your knowledge to problems. These homework assignments are designed to be completed after reading of the appropriate sections of the textbook and to elaborate upon topics that we have covered during class time. The homework assignments are to be submitted for grading **prior to the beginning** of the appropriate class. They will **not** be accepted once class has begun. The homework assignments will be distributed the Thursday before they are due. The solutions will be discussed in class the following day. These homework assignments are designed to prepare you for the exams and to develop your problem solving skills, so if you have any problems with the questions, you are welcome to ask questions during office hours. The homework schedule is as follows:

Homework #1 – Due Tue, 5/31
Homework #2 – Due Mon, 6/6
Homework #3 – Due Mon, 6/13
Homework #4 – Due Mon, 6/20
Homework #5 – Due Mon, 6/27
Homework #6 – Due Mon, 7/5
Homework #7 – Due Tue, 7/12
Homework #8 – Due Mon, 7/18
Homework #9 – Due Mon, 7/25
Homework #10 – Due Mon, 8/1
Homework #11 – Due Mon, 8/8

Exams

You will have 3 mid-term exams and a final exam. These 4 exams provide a way for you to demonstrate your knowledge of the course through problem solving questions in addition to questions that test your conceptual understanding and general knowledge of the material. The only way to do well on the exams is to **practice**, **practice**, and then **practice** more. I suggest you review the homework assignments, the class problems, attempt ***all*** of the questions at the end of each chapter, and work through the practice exams. The practice exams may be found on my Chem 255 website 1 week before each exam. You will find this very rewarding when the exams roll around. Also, I have an abundance of organic chemistry textbooks in my office that I would be delighted to loan you if you want/need additional problems.

The final exam is ***cumulative***. If your percentage score on the final exam is higher than any one of the midterm exams, I will replace your lowest exam score with your percentage score of the final exam.

IF YOU ARE ABSENT FROM AN EXAM IT WILL COUNT AS A ZERO. There are no make-up exams given except under extenuating circumstances (ones beyond your control). I will be the sole judge as to whether or not sufficient extenuating circumstances exist. If you miss an exam and feel extenuating circumstances exist, you must contact me within 24 hours of the missed exam. If you do not, there will be no reconsideration under any circumstances. In addition, once an exam has been graded and returned to the class, no make-ups will be possible.

Academic Fraud

The Science Division and the Chemistry Department strictly enforce the University's policy on cheating and other forms of academic fraud. Cheating on an exam will result in automatic failure of the course. See the student handbook for details.

Grievance Procedure

Please refer to the student handbook, the science office, or myself if you have a problem.

Syllabus Modification

We reserve the right to change/modify the syllabus throughout the semester if needed. All changes will be announced in class and you are responsible for those changes whether you are present or absent during those class times.

Class Cancellation

We will notify the class via CampusCruiser email of any class cancellations.

Electronic Devices

In class, you are expected to refrain from using cell phones and other devices unless we give you an explicit assignment that requires internet access on the spot. If you use a personal computer or tablet to take notes during class, it is expected that you will not be doing other activities during this class period (e-mail, web-surfing, texting, working on materials for other classes, etc.). I expect you to silence your cell phone and ignore all incoming calls/texts during the class period. I will have my phone on hand in case of any emergency announcements from the University.

Learning Accommodations

In accordance with the Americans with Disabilities Act, any student has the right to request reasonable accommodation of a disability. Accommodations can be requested through Academic Support Services, Disabilities Services (520 E. 14th St., 610-499-1266). Disabilities Services is the office that authorizes all accommodations on campus. Please note that you will need to present documentation of your disability to Disabilities Services. It is important to make this request as soon as possible so that we will have time to make any necessary arrangements.

Learning and Studying Organic Chemistry

Organic Chemistry and your sophomore year will represent a significant jump in your intellectual growth. This year you will make significant strides up "Bloom's Taxonomy of Learning" and begin to realize your intellectual abilities. Much of your education to this point as focused on the acquisition of knowledge and comprehension of that knowledge with little emphasis on application and analysis. These lower levels of Bloom's taxonomy can be reached by memorization and last minute studying; however, that will not be the case in Organic Chemistry. Organic Chemistry focuses on the application, analysis, and synthesis of information. These intermediate levels of Bloom's Taxonomy require slow digestion of material over the course of time and a true understanding of the material in order to apply, analyze, and synthesize the material you learn.

Bloom's Taxonomy of Learning (from Benjamin S. Bloom *Taxonomy of educational objectives*)

Competence	Skills Demonstrated	Question Cues
Knowledge	▪ Observation and recall of information ▪ Knowledge of dates, events, places ▪ Knowledge of major ideas ▪ Mastery of subject matter	List, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.
Comprehension	▪ Understanding information ▪ Grasp meaning ▪ Translate knowledge into new context ▪ Interpret facts, compare, contrast ▪ Order, group, infer causes ▪ Predict consequences	Summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend
Application	▪ Use information ▪ Use methods, concepts, theories in new situations ▪ Solve problems using required skills or knowledge	Apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover
Analysis	▪ Seeing patterns ▪ Organization of parts ▪ Recognition of hidden meanings ▪ Identification of components	Analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer
Synthesis	▪ Use old ideas to create new ones ▪ Generalize from given facts ▪ Relate knowledge from several areas ▪ Predict, draw conclusions	Combine, integrate, modify, rearrange, substitute, plan, create, design, invent, what if?, compose, formulate, prepare, generalize, rewrite
Evaluation	▪ Compare and discriminate between ideas ▪ Assess value of theories, presentations ▪ Make choices based on reasoned argument ▪ Verify value of evidence ▪ Recognize subjectivity	Assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize

Tentative Lecture Schedule

Date	*Topic*	*Reading*
Week 1 5/23 – 5/26	Introduction and Syllabus What is Organic Chemistry? How cool is Organic Chemistry? Atomic and Molecular Structure (Review) Naming Simple Organic Compounds	 Chapter 1 Nomenclature 1
Week 2 5/30 – 6/2	*Monday, 5/30: NO CLASS – Memorial Day* 3-D Geometry, Intermolecular Interactions, and Physical Properties (Review) **Homework #1 – Due Tuesday, 5/31**	*Enjoy!!* Chapter 2
Week 3 6/6 – 6/9	Orbital Interactions I **Homework #2 – Due Monday, 6/6**	Chapter 3
Week 4 6/13 – 6/16	Conformational and Constitutional Isomers **Homework #3 – Due Monday, 6/13** **Thursday, 6/16: Exam #1**	Chapter 4 **Chapters 1-3**
Week 5 6/20 – 6/23	Chirality, Enantiomers, and Diastereomers Nomenclature of Stereocenters **Homework #4 – Due Monday, 6/20**	Chapter 5 Nomenclature 3.1
Week 6 6/27 – 6/30	An Introduction to Mechanisms and Thermodynamics **Homework #5 – Due Monday, 6/27**	Chapter 6 Interchapter 1.1-1.2
Week 7 7/4 – 7/7	*Monday, 7/4: NO CLASS – July 4th* An Overview of the Most Common Elementary Steps **Homework #6 – Due Monday, 7/5** **Thursday, 7/7: Exam #2**	Chapter 7 Interchapter 1.3-1.8 **Chapters 4-6**
Week 8 7/11 – 7/14	An Overview of the Most Common Elementary Steps (cont) S_n1 and E1 Reactions **Homework #7 – Due Tuesday, 7/12**	Chapter 7 Chapter 8
Week 9 7/18 – 7/21	S_n1 and E1 Reactions (cont) **Homework #8 – Due Monday, 7/18**	Chapter 8
Week 10 7/25 – 7/28	Competition among S_n2, S_n1, E2, and E1 Reactions (cont) **Homework #9 – Due Monday, 7/25**	Chapter 9
Week 11 8/1 – 8/4	Nucleophilic and Elimination Reactions in Synthesis **Homework #10 – Due Monday, 8/1** **Thursday, 8/4: Exam #3**	Chapter 10 **Chapters 7-9**
Week 12 8/8 – 8/11	Nucleophilic and Elimination Reactions in Synthesis (cont) **Homework #11 – Due Monday, 8/8** **Thursday, 8/11: Final Exam**	Chapter 10