Spring 2019 Chemistry 8A

Instructor: Dr. Kirk Kawagoe (dr.k)
Office: ANX-5
Email: via Canvas

Class schedule

Lectures are posted on YouTube. See canvas for links.

Office Hours
M 11:00 AM – 12:30 PM(Phy77)
Tu 11 AM – 12:30 PM (Phy77)
Friday 12 PM – 1 PM (Phy 77)
Office hours are screencast live via Zoom (online)
The Zoom links will be posted on Canvas.

Course Materials

- Chemistry: Essential organic chemistry, 2nd Edition. Paula Bruice. ISBN: 9780321596956
- I have books you can borrow on the promise that you will return them.
- Organic Molecular Model Kit (strongly recommended)
- Scantrons form 882E (letter answers)
- Lecture: Links to notes and YouTube on Canvas.

Attendance Policies

This is a hybrid class. To be counted for attendance, I will review your use of the Canvas page and your use of the discussion board. If you do not participate in the mandatory discussions for a week, I will assume you are absent.

Disabled Students Programs Services

If you have a verified need for an academic accommodation or materials in alternate media (i.e., Braille, large print, electronic text, etc.) per the Americans with Disabilities Act (ADA) or Section 504 of the Rehabilitation Act, I will be happy to accommodate you. Contact DSPS to arrange for accommodations.

Homework

Links and due dates for homework are found in the Canvas Assignments.

- You are required to answer the questions, check your answers in a **different colored pen**, and submit them via canvas by the due date (if you are a day late, I will forgive it at least twice during the semester).
- See the How-to video linked on Canvas on the process of answering questions.
- When submitting your assignment it must be in one document and in order. Scans to pdf are preferred.
- If you have questions, submit them via the Discussion board.

Exams and Quizzes

- Quizzes will be given following each homework assignment. The are meant to reflect the homework and prepare you for the exams. They are open note/book/resource, but you get only two minutes per question.
- Midterm exams will be scheduled according to the best time available to *most* students. Since this is a hybrid class, we don't have an official class time and scheduling a good time can be difficult. For individual difficulties, we can make arrangements for other times. Your exam will consist of questions similar to your homework.
- Your final exam will consist of question types (not usually the exact questions) found in your class exams. Again, we will have to schedule times for finals, but the most likely time is Friday morning of Finals Week.

Grading and Exams

- The **grading scale** *starts* as:
  A = 100% - 90%; B = 89% - 80%; C = 79% - 70%; D = 69% - 60%; F = 59% - 0%
  Exams, homework, and the final are not curved, but the overall grades in the class may be curved at the end of the semester.
- Exams are cumulative with the emphasis being on the most recent material covered.
- Exam dates are found in the accompanying schedule, I will try and stick with this exam schedule, but may alter the material covered or dates if necessary. There are no makeup exams. If you miss an exam, you will receive a zero. At the end of the semester, I will replace your lowest exam score with the average of your homework and quiz scores.

Class Exams	50 %
Homework	15 %
Quizzes	15%
Final exam	20 %
Total	100 %

Academic Dishonesty

Cheating is the act or attempted act of taking an examination or performing an assigned, evaluated task in a fraudulent or deceptive manner. Cheating may include, but is not limited to, copying from another's work, supplying one's work to another, giving or receiving copies of examinations without an instructor's permission, using or displaying notes or devices inappropriate to the conditions of an examination, allowing someone other than the officially enrolled student to represent the student, or failing to disclose research results completely.

You are encouraged to work together on labs. However, ***your individual work must be evident***. **Do not copy work or allow others to copy from your work**. Instances of confirmed cheating will generally result in failure and be referred to the Dean for further action.

Electronic devices such as cell phones, tablets, etc. are not allowed during exams and must be put away in a backpack or purse; confirmed use of these devices constitutes cheating.

In general, students will get either an F for the course or minus the number of points on the assignment for cheating or plagiarism. The colleges academic dishonesty policy is found in your College Catalog (Pages 49-50, RC 2017-18 Catalog).

Course description (Information if you transfer this course to another institution)

CHEM-8 - Elementary Organic Chemistry

A survey of the important classes of organic compounds with emphasis upon materials of interest to students in the biological sciences. This thorough introduction to organic chemistry is recommended for students who need to take Chemistry 28A or for biology majors, students in prehealth sciences or environmental sciences. PREREQUISITES: Chemistry 1A or 3A. ADVISORIES English 1A. (A, CSU-GE, UC, I)
Course Hours Per Week: Lecture 3, Lab 0
Semester Hours Credit 3

Learning Outcomes and Objectives

- Analyze simple IR and NMR spectra to determine the structure of an unknown compound.
- Analyze the structural formula and line-bond formula of an organic compound, recognize its functional groups and name it properly using the IUPAC nomenclature.
- Complete the reactions of simple aliphatic and aromatic molecules, including amines and carbonyls.
- Draw structural formulas and line-bond formulas given the systematical name of an organic compound.
- Evaluate the molecular structure of biomolecules such as carbohydrates, lipids, amino acids, proteins and nucleic acids.
- Identify isomers and stereoisomers, recognizing asymmetric carbon atoms that cause chirality.
- Illustrate the mechanism of reactions by correctly writing a balanced chemical equation and when appropriate using arrow notation.

Student Learning Objectives

- CHEM-8 SLO1: Analyze simple IR and NMR spectra to determine the structure of an unknown compound.
- CHEM-8 SLO2: Analyze the structural formula of an organic compound, recognize its functional groups and name it properly.
- CHEM-8 SLO3: Complete the reactions of simple aliphatic and aromatic molecules, showing the reaction mechanisms.
- CHEM-8 SLO4: Draw a structural formula of an organic compound given the systematical name.
- CHEM-8 SLO5: Identify S and R stereoisomers.

Course Outline

A. Covalent bonding and shapes of molecules.
   - Electronic configuration and orbital diagrams.
   - Lewis structures and formal charges.
   - Polar covalent and non-polar covalent bonds.
   - Intermolecular forces and their effects on physical properties of organic molecules.
   - Hybridization of molecular orbitals (sp, sp2, and sp3).
   - Formal charges

B. Acids and Bases.
   - Lewis and Bronsted definitions.
   - Nucleophiles and Electrophiles.

C. Alkanes, cycloalkanes and alkyl halides.
   - The basics of organic nomenclature.
   - Classification and properties of alkanes, alkyl halides, alcohols, ethers and amines.
   - Newman projections
   - Chair conformation of cycloalkanes.

D. Alkenes and alkynes.
   - Nomenclature of organic molecules containing double and triple bonds.
   - Classification of isomers using the cis/trans and E/Z notation systems.
   - Degrees of unsaturation.

E. Reactions of alkenes.
   - Addition reactions
   - The rule of Markovnikov and its mechanistic background.
   - Hydride shift.

F. Chirality and stereo-isomerism.
   - Asymmetric carbon atoms and their effects on stereochemical behavior.
   - S and R classification of chiral carbons.
   - Fischer projections

G. Alkyl halides.
   - Nucleophilic substitution reactions.
   - Replacement of the halogen by nucleophiles such as cyanide, alkoxide, and azide, including the reaction mechanisms.

H. Benzene and its derivatives.
   - Nomenclature
   - Substitution reactions, including reaction mechanisms
   - Reactions of substituted benzene rings considering ortho/para directors and meta directors.

I. Alcohols, ethers, and thiols.
   - Nomenclature.
   - Physical properties.
   - Syntheses and reactions, including reaction mechanisms.

J. Amines.
   - Nomenclature.
   - Physical properties.
   - Simple reactions, including reaction mechanisms.

K. Aldehydes and ketones
   - Nomenclature.
   - Physical properties.
   - Syntheses and reactions, including reaction mechanisms.

L. Carboxylic acids and other carbonyls.
   - Nomenclature of carboxylic acids, acyl chlorides, esters and amides.
   - Physical properties.
   - Syntheses and reactions, including reaction mechanisms.

M. Structure determination.
   - Analysis of simple infrared spectra.
   - Analysis of simple nuclear magnetic resonance spectra.

N. Introduction to bio-molecules.
   - Carbohydrates
   - Lipids
   - Amino acids
   - Proteins
   - Nucleic acids.

Chem 8 Spring 2020 - Kawagoe Tentative Lecture, Homework, and Exam Schedule

	Tentative Lecture Schedule	Other notes
Week 1	Ch. 1 & 2 Lecture materials are posted at the end of the previous week.	Due Sunday Midnight: 1/19/2020 • Turn in Homework Ch 1 via Canvas. • Quizzes are given at the end of **each week** covering the homework and lecture.
Week 2	Ch. 2 Cont. Ch. 3 (posting end of week 1)	Sunday Midnight 1/26/2020 via Canvas. • Turn in Homework Ch 2 • Chapter 2 Quiz
Week 3	Ch. 3 (Cont.) Ch. 4	Sunday Midnight (remaining dates posted on canvas) • Turn in Homework Ch 3 • Chapter 3 Quiz
Week 4	Ch. 4 (Cont.) Ch. 5	Sunday Midnight • Turn in Homework Ch 4 • Chapter 4 Quiz
Week 5	Ch. 5 (Cont.) Ch. 6	Exam 1 - Ch. 1–4 (In person, Time and date to be determined (TBD)) Sunday Midnight: • Turn in Homework Ch 5 • Chapter 5 Quiz
Week 6	Ch. 6 (Cont.) Ch. 7	Sunday Midnight: • Turn in Homework Ch 6 • Chapter 6 Quiz
Week 7	Ch. 7 (Cont.) Ch. 8	Sunday Midnight: • Turn in Homework Ch 7 • Chapter 7 Quiz
Week 8	Ch. 8 (Cont.) Ch. 9	Sunday Midnight: • Turn in Homework Ch 8 • Chapter 8 Quiz
Week 9	Ch. 9 (Cont.) Ch. 10	Exam 2 – Ch. 5–8 (Time and date TBD) Sunday Midnight: • Turn in Homework Ch 9 • Chapter 9 Quiz
Week 10	Ch. 10 (Cont.) Ch. 11	Sunday Midnight: • Turn in Homework Ch 10 • Chapter 10 Quiz
Week 11	Ch. 11 (Cont.) Ch. 12	Sunday Midnight: • Turn in Homework Ch 11 • Chapter 11 Quiz
Week 12	Ch. 12 (Cont.) Ch. 13	Sunday Midnight: • Turn in Homework Ch 12 • Chapter 12 Quiz
Week 13	Ch. 13 (Cont.) Ch. 14	Exam 3 – Ch 9–12 (Time and date TBD) Sunday Midnight: • Turn in Homework Ch 13 • Chapter 13 Quiz
Week 14	Ch. 14 (Cont.) Ch. 15	Sunday Midnight: • Turn in Homework Ch 14 • Chapter 14 Quiz
Week 15	Ch. 15 (Cont.) Ch. 16	Sunday Midnight: • Turn in Homework Ch 15 • Chapter 15 Quiz
Week 16	Ch. 16 (Cont.) **Ch. 19**	Sunday Midnight: • Turn in Homework Ch 16 • Turn in Homework Ch 19 • Chapter 16 & 19 Quiz (combined)
Week 17		Exam 4 – Ch 13–15, 19 (Time and date TBD)
Week 18	Finals week, no lecture.	Final Exam TBD