

Organic Chemistry I

Course: CHEM 2400, CRN 52356 (3 credits)
Semester: Summer 2020
Instructor: Dr. Joan Mutanyatta-Comar
E-mail: jmutanyattacomar@gsu.edu
Office hours: Online by WebEx. Please email me to schedule.
I will respond within 24 hrs.
M-F: 10:30 am – 3:00 pm.

Course Description

This is CHEM2400: Organic Chemistry I. It is the first of a two-semester sequence of Organic Chemistry and is taught by faculty at Georgia State University's Chemistry Department. Topics include IUPAC nomenclature, reactions, methods of preparation and physical and chemical properties of the common classes of carbon compounds, with an emphasis on modern electronic and mechanistic theories. This course is designed for students majoring in science, engineering, pre-medicine, pre-dentistry, and pre-pharmacy.

This course will be taught 100% online via iCollege and is fully asynchronous. However, there will be synchronous office hours via WebEx that I hope you will be able to schedule by sending me an email. You have the option to work through the material at your own pace. However, matching your pace with the schedule outlined in the syllabus will ensure that you have completed each module before taking quizzes and exams.

I expect that full participation in this course will require approximately 12 hours per week, which involves interacting with readings, videos, and completing assessments.

****Please do note that this syllabus reflects a plan for the semester. Deviations may become necessary as the semester progresses.****

Learning Outcomes

Upon completion of this course, you should be able to:

- Identify and write names of organic compounds based on functional groups present in compounds.
- Evaluate the relationship that exists between the structure of an organic molecule and its physical and chemical properties.
- Demonstrate writing organic chemistry mechanisms and predicting the outcome of organic reactions.
- Analyze and design multi-step syntheses of organic compounds.
- Analyze, interpret data and develop logical conclusions based on organic chemistry concepts.

Your new skills should help you in the following ways:

- Prepare you for Organic Chemistry II and Biochemistry which are required/recommended for medical, pharmacy, dental, veterinary schools etc.
- Prepare you for other STEM disciplines such as chemical engineering. Understanding the properties of organic molecules and how reactions occur is critically important to understanding the processes in an industrial plant.
- Organic chemistry teaches important career readiness competencies and skills such as critical thinking/problem-solving skills, teamwork, and work ethics.

Schedule

Although this is an online course, we do have a set schedule. You'll want to refer to the calendar below frequently as we work together. I've also designed the iCollege course in such a way to help us all stay on track, including building in **Weekly Modules, Quizzes, Exams and Due Dates Attached To Graded Items**. If this is your first time taking an online course, you'll want to review resources for learning remotely at [GSU's CETL website](#). Please note that deviations may become necessary as the semester progresses. Therefore, please check iCollege announcements daily.

This course consists of a welcome module, 11 modules and a wrap-up module. The eleven modules are equivalent to 11 chapters to be covered in this course from the textbook Organic Chemistry by John McMurry, 9th Ed. Each module, along with the wrap-up module, has a suggested start date. You have the option to work through the material at your own pace. However, matching your pace with the schedule outlined in the syllabus will ensure that you have completed each module before taking quizzes and exams. While you're working, I'll also be working hard to give you quality feedback and grade your assessments immediately after the due dates.

So, how much time do you need to spend working on this course? Well, since this is a 3-Credit Hour course GSU recommends that you spend around **3 hours or more per week** interacting with readings, videos, and other sorts of content and **then 3 hours per credit hour per week** completing activities and assessments (**Total = 12 hours/week**).

Please talk to your instructor and your advisor before withdrawing from this course. We care about your success and are here to discuss your options with you. The last day to withdraw without penalty is July 6, 2020.

Modules and *suggested* Start dates

1. Welcome Module (June 8)
2. Module 1 (June 8)
3. Module 2 (June 10)
4. Module 3 (June 15)
5. Module 4 (June 17)
6. Module 5 (June 22)
7. Module 6 (June 24)
8. Module 7 (June 29)
9. Module 8 (July 06)
10. Module 9 (July 13)
11. Module 10 (July 17)
12. Module 11 (July 22)
13. Wrap-up (July 30)

Your To-do List

Below is a list of your assignments, along with due dates and the purpose of the assignments. Details of the material that will be covered on each PAUSE-Check Yourself Assessment, quiz and exam will be indicated in the announcements prior to the respective assessments, quizzes and exams.

Welcome Module (June 8)

- Look at the Welcome module, meet your instructor and read the syllabus in detail. This will help you familiarize yourself with the requirements for this course.
- Welcome Module Quiz-This survey helps me to know you better as a student and learn how I can better support you so that you succeed in this course. It also encourages you to begin thinking about the course content and plan how to meet the requirements outlined in the syllabus to ensure successful completion of this course.

Module 1: Chapter 1 (June 8-June 14)

- Watch video
- Three PAUSE: Check Yourself Assessments (2 points each)
- End of Module Quiz 1(4 points)

Module 2: Chapter 2 (June 8-June 14)

- Watch video
- Two PAUSE: Check Yourself Assessments 2-1 (10 points)

Module 3: Chapter 3 (June 15-June 21)

- Watch video
- Two PAUSE: Check Yourself Assessments (5 points each)
- (June 19) Exam 1: based on all content in modules 1-3 (out of 90 points)

Module 4: Chapter 4 (June 17-June 28)

- Watch video
- Two PAUSE: Check Yourself Assessments (5 points each)

Module 5: Chapter 5 (June 22-June 28)

- Watch video
- Two PAUSE: Check Yourself Assessments (5 points each)

Modules 6&7: Chapters 6&7 (June 24-July 5)

- Watch video
- Two PAUSE: Check Yourself Assessments (10 points each)
- (June 30) Exam 2: based on content in modules 3 (slides 19-27), 4 & 5 (out of 90 points)

July 6: Last day to withdraw with grade “W”

Module 8: Chapter 8 (July 6-July 12)

- Watch video
- Two PAUSE: Check Yourself Assessments (5 points each)

Module 9: Chapter 9 (July 13-July 19)

- Watch video
- Two PAUSE: Check Yourself Assessments (5 points each)
- (July 17) Exam 3: based on content in modules 6, 7, and 8 (out of 90 points)

Module 10: Chapter 10 (July 17-July 23)

- Watch video
- Two PAUSE: Check Yourself Assessments (5 points each)

Module 11: Chapter 11 (July 22-July 27)

- Watch video
- Two PAUSE: Check Yourself Assessments (5 points each)
- (July 24) Exam 4: based on content in modules 9, 10 and part of 11 (out of 90 points)

Wrap-up (July 30)

- **Final Exam:** Cumulative - based on all content in modules 1-11

List of modules (=chapters) and topics to be covered in Organic Chemistry I, CHEM 2400 (Book: Organic Chemistry by McMurry 9th Ed.)

1. Module 1: Chapter 1- Structure and Bonding

Atomic structure (nucleus, orbitals, electronic configurations), chemical bond theory (valence bond theory and molecular orbital theory), hybridization (carbon, nitrogen, oxygen, phosphorus and sulfur), drawing chemical structures.

2. Module 2: Chapter 2-Polar Covalent Bonds; Acids and Bases

Electronegativity, dipole moments, formal charges, resonance, acids and bases (the Brønsted-Lowry definition, pK_a, acid and base strength, organic acids, organic bases, the Lewis definition).

- 3. Module 3: Chapter 3-Organic Compounds: Alkanes and their Stereochemistry**
Functional groups, alkane and alkane isomers, alkyl groups, naming alkanes, properties of alkanes, conformations of alkanes.
- 4. Module 4: Chapter 4-Organic Compounds: Cycloalkanes and their Stereochemistry**
Naming cycloalkanes, *cis-trans* isomerism in cycloalkanes, stability of cycloalkanes (ring strain), conformations of cycloalkanes, conformations of cyclohexanes (monosubstituted, disubstituted, trisubstituted etc).
- 5. Module 5: Chapter 5-Stereochemistry at Tetrahedral Centers**
Enantiomers and the tetrahedral carbon, chirality, optical activity, sequence rules for specifying configuration, diastereomers, meso compounds, racemic mixtures and the resolution of enantiomers, a review of isomerism, chirality at nitrogen, phosphorus and sulfur, prochirality.
- 6. Module 6&7: Chapters 6 & 7**
Naming alkenes, *cis-trans* isomerism in alkenes, *E/Z* designation in alkenes, calculating degree of unsaturation, types of organic reactions, stability of alkenes, describing a reaction (rates, energy changes, energy diagrams, transition states, intermediates), electrophilic addition reactions of alkenes (Markovnikov's rule), carbocation structure and stability, carbocation rearrangements, bond dissociation energies.
- 7. Module 8: Chapter 8-Alkenes: Reactions and Synthesis**
Preparation of alkenes, reactions of alkenes: halogenation, halohydrin formation, hydration (oxymercuration and hydroboration), hydrogenation (reduction), oxidation (epoxidation, hydroxylation, cleavage to carbonyl compounds), addition of carbenes (cyclopropane synthesis), reaction stereochemistry (addition of water to an achiral and a chiral alkene).
- 8. Module 9: Chapter 9-Alkynes: An Introduction to Organic Synthesis**
Naming alkynes, preparation of alkynes (elimination reactions of dihalides), reactions of alkynes (halogenation, addition of HX, hydration, reduction, oxidative cleavage), alkyne acidity (formation of acetylide anions), alkylation of acetylide anions, an introduction to organic synthesis.
- 9. Module 10: Chapter 10-Organohalides**
Naming and structure of alkyl halides, preparation of alkyl halides (addition of HX to alkenes, radical halogenation of alkanes, allylic bromination of alkenes, from alcohols), stability of allyl radical, reactions of alkyl halides (Grignard reagents), organometallic coupling reactions, oxidation and reduction in organic chemistry.
- 10. Module 11: Chapter 11-Reactions of Alkyl Halides: Nucleophilic Substitutions and Eliminations**
The S_N2 , S_N1 $E2$, $E1$ and $E1cB$ reactions and their characteristics, Zaitsev's rule, the $E2$ reaction and cyclohexane conformation.

Grading and Assessments

Grading

This is how the chemistry department awards grades for courses:

A+ = 95%; **A** = 90%; **A-** = 87%; **B+** = 84%; **B** = 80%; **B-** = 77%; **C+** = 74%; **C** = 70%;
C- = 67%; **D** = 60%; **F** = < 60%

Note: CHEM 2400 is a prerequisite for Organic Chemistry II (CHEM 2410). A grade of “C” or higher in CHEM 2400 is required for registration into CHEM 2410.

Assessments

I have designed a variety of assessments to help you develop and practice critical thinking/problem-solving skills you need to successfully complete this course.

- **Four in-course exams** will be given during the seven weeks. At the end of the period, the lowest grade will be dropped. The average score from the remaining three exams will count **65%** of your final grade. You are strongly encouraged to take all four ‘in-course’ exams.

Exams 1 & 3 will open on Friday 8:00 am and due on Sunday at 11:30 pm

Exam 2 will be open on Tuesday at 8:00 am and due on Thursday at 11:30 pm

Exam 4 will be open on Friday 8:00 am and due on Sunday 11:30 pm

Each exam will be a total of 90 points.

- **Eleven Quizzes** (in the form of “PAUSE: Check Yourself Assessments”) will be given during the seven weeks. These will be for a total of 10 points per module. At the end of the period, the lowest grade will be dropped. The remaining ten quizzes will count for **15%** of the final grade.
- At the end of the semester, you will take a **cumulative final exam** which will count for **20%** of the final grade. **The final exam will consist of 60 questions/1 point each and will be for 1hr 35 minutes. It will open on Thursday (7/30/20) at 8:00 am and close on Saturday (8/1/20) at 8:00 pm.**

Getting Help and Accessing Resources

Note that this is a **100%** online course. Here are a few tips to get you started:

Contacting Your Instructor

I prefer to be contacted by email (jmutanyattacomar@gsu.edu). I will respond within 24 hours. Please send emails to me from your GSU e-mail account (e.g., jcole1@student.gsu.edu). Please put the course name in the subject of your email.

Please do not email me from iCollege

Accessing the Course

You can login to your course via iCollege using your GSU CampusID and password. For help finding and pinning your course in iCollege, please review [iCollegeNow!’s finding and Pinning Your Course page](#)

Technology Questions

For technology-specific questions and issues, please contact the IIT Help Desk at help@gsu.edu or 404-413-4357.

For iCollege-specific questions you may also use the USG's 24/7 D2L helpdesk: <https://d2lhelp.view.usg.edu/s/>

Required Textbook and Optional Materials

The following resources are required for this course:

Required Text:

1. "Organic Chemistry" by John McMurry, 9th Edition. Chapters 1-11 will be covered at a rate of approximately two chapters per week. This book can be purchased online at [Cengage website](#) (Student Edition, ISBN: 978-1-305-08048-5; Loose-leaf Edition ISBN: 978-1-305-63871-6).
2. Preparing for Your ACS Examination in Organic Chemistry: The Official Guide, ISBN 0-9708042-1-0. This book can be purchased from the [ACS official site](#)
It consists of questions for both Organic Chemistry I & II. Although the final exam in this online course will not be ACS, this book will help enhance your strategies in problem-solving skills.
3. **Molecular Kit:** This kit can be purchase from [Andrus Educational Supplies](#) or [Duluth labs](#). It is helpful for chapter 5: Stereochemistry.

Optional Text:

1. FREE Alternative Textbook : Online Organic Chemistry Text and Material by William Reusch's written for MSU. This text can be found by clicking [here](#).
This text follows Creative Commons Licensing which you can review [here](#)
2. Organic Chemistry I as a Second Language, 2nd Ed, by David Klein ISBN -13 978-0470-12929-6. This book can be purchased online.

Are There Any Required Meetings?

No. There will be no face-to-face meetings. This course is 100% online. However, to help you with time management, I suggest that you prepare a weekly schedule and block specific times for all your courses and other activities like work, rest etc. Sticking to this schedule will help you manage your time effectively.

Are There Any Additional Fees?

This course has no additional fees.

How Do I Succeed in this Course?

If this is your first time taking an online course, you will need to practice time management skills. Below are some tips to help you achieve this. **Examples of what successful students should expect to do in this course:** (modified from 4Faculty.org at Santa Barbara City College)

Responsibilities:

Successful students, ones who earn A's and B's, follow both oral and written instructions. The syllabus and assignment sheets are the primary sources of instructions in any college course, so successful students read them carefully and refer to them regularly. They also check iCollege daily for class announcements and updates.

Instructions:

Successful students write down any instructions given orally by the instructor; they also are careful to make sure that they have taken accurate notes and ask questions before due dates. They also read and re-read written instructions and ask questions for clarification as needed. I suggest that you set aside at least 3 hours/day to watch videos and write notes on provided PowerPoint slides, review the notes, and work on assigned problems. You will strengthen your problem-solving skills if you begin working on assigned textbook problems, followed by ungraded worksheets on iCollege and finally questions in the ACS study guide book.

Information:

Successful students look up information first so that they ask informed questions, not questions they already have the answers to. If they cannot find the answers, they contact the instructor after class, during office hours or by email before taking quizzes and exams.

Course Policies

I have developed several policies that seem to work well in this course. Please review these very closely. You will have an opportunity to voice your opinion on these policies and other aspects of the course during the semester when you schedule online office hours.

Attendance Policy

Class will never be cancelled unless an official from the Chemistry Department gives the class personal notification. Don't assume a note to be enough without checking the Department's office.

The University requires that faculty members must, on a date after the mid-point of the course to be set by the Provost (or his designee)

1. Give a **WF** to all students who are on their rolls but are no longer taking the class and
2. Report the last day the student attended or turned in an assignment. Students who are withdrawn may petition the Departmental Chair for reinstatement into their classes.

Make-up Quiz and Exam Policy

If for some substantial reason you cannot take a quiz or an exam at the scheduled time, please feel free to contact me by email prior to the due date, or exam date.

Athletes

If you are an athlete, please email me proper documentation, BEFORE you leave for a game/tournament to be able to make-up the work for that week.

Religious Holy Day

A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent for the observance of a religious holy day shall be allowed to take an exam or complete an assignment scheduled for that day within a reasonable time after the absence.

Grades Policy

If you have any concerns about the way your exam was graded, for example, if you believe your answer is correct and it was graded wrong, please feel free to email me and I will take a look at your answer. I strongly encourage every student to look at all graded quizzes and exams. Please email me to schedule a WebEx meeting to go over all the questions you may have not answered correctly. This is good practice to make sure you do not get the same concepts incorrect on the next exam.

Final letter grades will only be available on PAWS/GoSolar. They will not be posted on iCollege. Please note that grades cannot be given to students by phone.

Course Evaluation

Your constructive assessment of this course plays an indispensable role in shaping education at Georgia State. Upon completing the course, please take time to fill out the online course evaluation.

Academic Honesty

Chemistry Departments Student Integrity Policy: The Department of Chemistry follows the University policy on academic honesty published in the “Faculty Affairs Handbook” and the “On Campus: The Undergraduate Co-Curricular Affairs Handbook”.

All exams and assessments taken must represent the student’s individual, unaided effort.

- 1) Unauthorized sharing/collaboration on assignments using any means including social media/group messaging apps such as GroupMe or Slack constitutes academic dishonesty and will be reported as such to the Department’s Chairman and the Dean’s office for appropriate action.
- 2) KNOWING about such sharing and not reporting it also constitutes academic dishonesty especially if close review of the evidence reveals sufficient evidence that implicates all individuals responsible.
- 3) Please remember that there is no statute of limitations on academic dishonesty, so if it turns out after grades are reported that there was cheating or knowledge of cheating that was unreported, grades can be changed after the fact.

Other Policies

Students Requiring Testing Accommodations

Students who wish to request testing accommodations may do so by registering with the [Access & Accommodations Center \(AACE\)](#). Students may only be accommodated upon issuance by AACE of a signed Accommodation Plan and are responsible for providing a copy of that plan to instructors of all classes in which an accommodation is sought.

FERPA

In keeping with USG and university policy, this course website will make every effort to maintain the privacy and accuracy of your personal information. Specifically, unless otherwise noted, it will not actively share personal information gathered from the site with anyone except university employees whose responsibilities require access to said records. However, some information collected from the site may be subject to the Georgia Open Records Act. This means that while we do not actively share information, in some cases we may be compelled by law to release information gathered from the site. Also, the site will be managed in compliance with the Family Educational Rights and Privacy Act (FERPA), which prohibits the release of education records without student permission.

Basic Needs Statement

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable us to provide resources that we may possess. The [Embark program at GSU](#) provides resources for students facing homelessness and [Panther's Pantry](#) provides resources for students facing food insecurity.