

CHEM 3400 – Structure and Reactivity of Biomolecules

Fall Semester 2021

Instructor: Dr. Lei Li
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Time: Tuesday, Thursday, 12:45-14:00

Location: Petit Science Center (PSC) 255

(Online for the first two weeks 8/24, 8/26, 8/31, 9/2, video will be available in iCollege)

Prerequisites of the Course:

Chem 2410 with a C or better.

Required Textbook:

Organic Chemistry by John McMurry, 9th edition

Office Hours:

I am available to meet online via Webex in iCollege every Thursday 15:00 – 17:00.
Please e-mail in advance if you would like to meet in person.

Last day to withdraw is Tuesday, October 12, 2021

Learning Outcomes and Objectives:

The course is to teach students basic structure and function of biological molecules including carbohydrates, amino acids, peptides, proteins, lipids, and nucleic acids. The course will use organic chemistry as the general language to describe the reactivity of biomolecules and use arrow-pushing mechanisms to illustrate the transformation of biomolecules in the cell. By completing this course, students will develop a mechanistic understanding of the biochemical reactions that is the knowledge base for advanced courses in biochemistry, molecular and cell biology, immunology, and neurobiology.

Assessments and Grading:

There will be 2 midterm exams and a final exam, one midterm exam of the lower score will be dropped for calculating the final score of the course. There is not makeup exam. Exams are closed-book, only pens or pencil are allowed for the exams. Midterm exams are of 75 minutes long. The final exam is of 120 minutes long. The grading will be based on 200 points as detailed below. Note that some questions on the exams will be very similar in format to homework questions. Mastering homework will go a long way towards better performance on exams.

Point Distribution:

Attendance	10
Midterm exam 1 or 2	90
Final Exam	100
Total	200

Grade Breakdown:

Points	Percentage	Grade
190-200	≥95%	A+
180-189	≥90%	A
172-179	≥86%	A-
164-171	>82%	B+
156-163	≥78%	B
148-155	≥74%	B-
140-147	≥70%	C+
130-139	≥65%	C
120-129	≥60%	C-
110-119	≥55%	D
0-109	<55%	F

Academic Honesty: All exams must represent the student's individual, unaided efforts. Receiving unauthorized outside information or offering unauthorized information to another student during an examination is cheating. Any suspected offenses may be referred to the Department of Chemistry and the College of Arts and Sciences for appropriate action. Please refer to GSU's policy on academic dishonesty for more information: <https://deanofstudents.gsu.edu/student-conductpolicy-on-academic-honesty/>.

Makeup Policy: Any accommodation is strictly as agreed upon by the instructor and will be documented. Absence of in-person class because of COVID or other excuse require preapproval by Dean of Students (<https://deanofstudents.gsu.edu/>). For more information about COVID, please refer: <https://covidinfo.gsu.edu/>.

Family Educational Rights and Privacy Act: The Family Educational Rights and Privacy Act (FERPA) was enacted to give students access to their education records and to protect their privacy. Unless a student is legally dependent, the university is prohibited by FERPA from releasing student account information to a parent or guardian or other unauthorized third party without the student's consent. Students who wish to authorize an individual to have access to their student records should complete the Family Educational Rights and Privacy Act Waiver in the Dean of Students office. For more information regarding access to student records, visit the [Registrar](#).

COVID Guidelines: You are strongly encouraged to wear a mask during the lecture. Should a student test COVID positive, any accommodations to the class attendance policy will be informed by evolving guidance from the CDC on quarantine. There will be no major change to mode of course delivery, so students will be responsible for collecting notes for missed in-person classes and making up any work they miss during quarantine. Anyone who has a positive COVID test is encouraged to alert the University (<https://cc-gsu.force.com/s/>) so that appropriate contact tracing can be conducted.

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.

Lecture Schedule:

Dates of exams and lecture materials may be changed. **The instructor will announce the exact dates of the exams based on the progress of the lectures.**

Week	Date	Chapter	Lecture materials
1	8/24		Introduction and Review of Organic Chemistry: Electronegativity, acid and base, stereochemistry, chemical reactions and arrow pushing, carbonyl chemistry (Online videos via iCollege)
	8/26		
2	8/31		
	9/2		
3	9/7	Ch24	Introduction to amines, naming and Basicity
	9/9	Ch24	Amine Basicity and Acidity
4	9/13	Ch24	Amine Synthesis
	9/15	Ch24	Amine Reactions
5	9/21	Ch24	Spectroscopy of Amines, Summary, and Work Problems
	9/23	Ch25	Carbohydrate classification, Fischer Projection, DL sugar
6	9/28	Ch25	Anomers and reaction
	9/30	Ch25	Carbohydrate reaction
7	10/5	Ch25	Complex glycans
	10/7		In class Midterm Exam 1 (Chapter 24 and 25)
8	10/12	Ch26	Amino Acids Structure and Synthesis
	10/14	Ch26	Peptide, Analysis, and Sequencing
9	10/19	Ch26	Peptide Synthesis and SPPS
	10/21	Ch26	Protein and Enzyme
10	10/26	Ch27	Fatty acids
	10/28	Ch27	Lipids and Terpenoids
11	11/2	Ch27	Steroids and Biosynthesis
	11/4		In class Midterm Exam 2 (Chapter 26 and 27)
12	11/9	Ch28	DNA Structure and Pairing
	11/11	Ch28	DNA Replication and Transcription, RNA Translation
13	11/16	Ch28	DNA Sequencing, Synthesis and PCR
	11/18	Ch29	Metabolic pathways, biosynthesis of Fatty acids
14	Thanksgiving Break		No Class
15	11/30	Ch29	Glycolysis
	12/2	Ch29	The Citric Acid Cycle
12/7-12/14 (2 hours)			Final Exam (Chapter 24-27: 30%; Chapter 28-29: 70%)