

Chem 3400 - Structure and Reactivity of Biomolecules, Spring 2021

Format of lecture: The lectures are asynchronous. Each week the lectures will be posted on iCollege to cover the materials of the course. We will also have live weekly meetings online on Monday and Wednesday to help the students to review the lecture and solve problems in the homework. The instructor will answer questions about the course materials during the live session that will also be recorded and posted on iCollege.

Class time: Live sessions: 2 -3 pm, Monday and Wednesday

Textbook: Organic Chemistry by John McMurry, 9th edition. 8th edition is OK. Please check with the 9th edition about the correct homework assignment.

Instructor: Professor Jun Yin, Ph.D.

Email: junyin@gsu.edu, Phone: 404-4136090

Web: www.yinlabgsu.com

Teaching assistant: Mr. Britton Ody, Email: body1@student.gsu.edu

Office hours: Please email Dr. Jun Yin or Britton Ody to set up online meetings to get your questions answered about the course. Please feel free to ask questions during the live sessions of the course.

Exams

There are three midterm exams in total. Each midterm exam covers a separate segment of the course. The last midterm exam will be scheduled during the week for the final exams. The midterm exam of the lowest score will be dropped for calculating the final score of the course. There are no makeup exams. Exams are open-book and open-note. The students are forbidden to discuss with each other about answering the exam questions. The instructor will post the exam on iCollege and give the students 24 hours to answer the exams. The students shall print the exams, answer the questions, scanned the exams with answers, and upload them on iCollege before the deadline to get the exams graded.

Chemistry Department Student Conduct and Integrity Policy applies to the take-home exam of this course.

- All tests taken and homework must represent your individual, unaided efforts.
- To receive or offer information during an examination or on homework assignments is cheating.
- Use of graded materials from previous terms is not allowed. Students are not allowed to contact faculty or students at other institutions for help.
- Conduct or actions that disrupt class or test periods or falsification of information related to chemistry courses by any student will be taken as violation of the policies of the Board of Regents of the University System of Georgia and the GSU Student Code of Conduct, Section 6.0.
- Any suspected offenses may be referred to the Department Chair or the Dean of Students for appropriate disciplinary action.

Learning outcomes and the objectives of the course

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, the student will develop a mechanistic understanding of the biochemical reactions that is the knowledge base for advanced courses in chemical biology, biochemistry, molecular and cell biology, immunology, and neurobiology.

Prerequisites of the course

Two semesters of Organic Chemistry 2400 and 2410 with an average grade of C or better. Students do not meet these requirements should ask the instructor for preapproval.

Method of study

The students need to read the textbook, review the online lecture, take notes, attend the live sessions, and do the homework. Preview, review, and practice are the keys to a good performance in the course. Many of the exam questions are similar to the homework questions. The students need to make sure they can do the homework questions independently to do well in the exam.

Lecture schedule

Dates of the exams 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	1/11	24	Introduction Amine – naming, structures, and basicity, biological activities
	1/13	24	Amine – reactions
2	1/18	24	Amine - synthesis
	1/20	24	Amine - synthesis
3	1/25	24	Amine – heterocycles
	1/27	24	Amine - spectroscopy
4	2/1	25	Carbohydrates – Fisher projections, D/L, aldose, ketose
	2/3	25	Carbohydrates – cyclic structures, anomers
5	2/8	25	Carbohydrates - reactions
	2/9	25	Carbohydrates – disaccharides and polysaccharides
6	2/15		Midterm exam 1 – Chapter 24 and 25
	2/17	26	Amino acids – stereochemistry, acidity, and basicity
7	2/22	26	Peptides – peptide bond and solid phase peptide synthesis
	2/24	26	Protein – structure and enzymatic activity
8	3/1	27	Lipids – structures and reactivity
	3/3	27	Lipids – terpenoids
9	3/8	27	Lipids – terpenoids
	3/10	28	Nucleic acids – nucleotides, DNA and RNA
10	3/15		Spring break – no class
11	3/22	28	Nucleic acids – DNA sequencing, polymerase chain reaction (PCR)
	3/24	28	Nucleic acids – DNA replication and RNA translation
12	3/29		Midterm exam 2 – Chapter 26, 27 and 28
	3/31	30	Pericyclic reactions – molecular orbitals
13	4/5	30	Pericyclic reactions – electrocyclic reactions
	4/7	30	Pericyclic reactions – electrocyclic reactions
14	4/12	30	Pericyclic reactions – sigmatropic rearrangement
	4/14	31	Synthetic polymers – chain reaction
15	4/19	31	Synthetic polymers – step-growth
	4/21	31	Synthetic polymers – olefin metathesis
16	4/26		Midterm exam 3 – Chapters 30 and 31