

COLLEGE OF CHEMISTRY COURSE GUIDE (../INDEX.HTML)

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BIOE 11 - ENGINEERING MOLECULES 1 (3 UNITS)

COURSE OVERVIEW

SUMMARY

Bioengineering 11 is a lower division bioengineering course. The course provides students with a background in organic chemistry and biochemistry. The first third of the course is organic chemistry, and the other two thirds focus on biochemistry. See the topics listed below. The course emphasizes the basics and is not meant to be an advanced course in any of the topics. There are not many assignments outside of lecture.

PREREQUISITES

CHEM 3A (chem3a.html) or CHEM 12A (chem12a.html)

TOPICS COVERED

- Organic chemistry
 - Functional groups and basic molecular orbital theory
 - Reaction mechanisms including carbonyl chemistry
 - Delocalization, conjugation, pKa
 - Nucleophilic substitutions, equilibria and rates
 - SN1, SN2, stereochemistry, and enolates
- Basic biology principles (ex. central dogma)
 - DNA, RNA, amino acid, and protein structures

- Enzyme catalysis and metabolism
- Protein engineering
 - Protein biosynthesis and regulation
 - Methods for protein purification and DNA synthesis
- DNA structure and enzymatic manipulation
- Synthetic biology tools (ex. CRISPR)

WORKLOAD

COURSEWORK

- 2 Midterms
- 1 Final
- 4 Homework Assignments

TIME COMMITMENT

3 hours of lecture per week. Approximately 30 minutes per homework assignment.

CHOOSING THE COURSE

WHEN TO TAKE

The course is only offered in the Spring. Bioengineering students typically take this as an underclassman. Chemical engineering students can take it any year, since it doesn't serve as a prerequisite for any chemical engineering course.

WHAT NEXT?

- BIOE 103 - Engineering Molecules 2 ([bioe103.html](#))

ADDITIONAL COMMENTS AND TIPS

The exams are very straightforward if you attend lecture. Pay attention to specific things that the professor highlights in lectures, as they will likely be on the exams.

For both bioengineering and chemical engineering majors, students can choose between Biology 1A and BioE 11 to take for a biology requirement. I felt BioE 11 was sufficient to obtain the biology background needed as an engineer.

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(https://www.coursera.org/courses/course-details?id=coursera_ugrad_curr_lang=en) students/peer-

-advising