CHEMISTRY 12A – ORGANIC CHEMISTRY (5 UNITS)

COURSE OVERVIEW

Summary

Chemistry 12A is the first of the two classes in the canonical organic chemistry series that is offered at the undergraduate level. This class is the College of Chemistry equivalent of Chemistry 3A, which is a class traditionally taken by MCB and other health-related majors. This class is more thorough and more difficult than the 3A/3B series, and there is a larger emphasis on multistep syntheses and arrow-pushing mechanisms. The class size of the 12 series is significantly smaller than the 3 series; most students in 12A will also be College of Chemistry majors.

Chemistry 12A teaches the fundamentals of organic structure, investigates the main four organic elementary steps, and finishes with some basic organic reactions and a discussion of aromaticity. Each week, there is a 5-hour lab that teaches techniques frequently used in the real organic laboratory setting. There is a strong emphasis on characterization methods in the lab section, especially with NMR. NMR will be taught from the beginning; no prior knowledge is necessary.

Prerequisites

- General Chemistry (Required)

Topics Covered

- Orbitals, bonding, and structure
- Conformational analysis, stereochemistry
- Substitution and elimination reactions: S_N2, S_N1, E2, E1
- Electrophilic addition reactions of alkenes and alkynes
- Aromaticity

Lab topics covered

- Chromatography: TLC and column
- Recrystallization
- HPLC
- NMR

WORKLOAD

Course Work

- 3 midterms
- 1 lecture final exam (finals week)
- 9 problem sets
- 16-20 online problem sets
- 1 lab final exam (last week of classes)
- 10 lab reports, finished in the lab session
- 1 formal lab report
- 3 lab lecture quizzes

Time Commitment

4 hours of lecture per week (including 1 hour for lab lecture), 5 hours of lab section per week, up to 15 hours of homework per week.

CHOOSING THE COURSE

When to take

This class is required for College of Chemistry majors. It is fall-only. Organic chemistry traditionally is the next step after general chemistry. Take it in fall of your sophomore year. This class is very time-intensive, so plan your semester accordingly.

What next?

- Chem 12B: Organic Chemistry
- Chem 135: Chemical Biology

ADDITIONAL COMMENTS/TIPS

This class does not need any prior organic chemistry knowledge, everything is taught from the very basics, including lab concepts.

Rather than following a somewhat traditional path of memorization in organic chemistry, this course *heavily favors a fundamental conceptual understanding* via orbital interactions and arrow pushing HOMO->LUMO mechanisms. You can do well in the class without memorizing very much. The goal of the class is to rationalize how reactions you've haven't seen before, will work, based on the fundamental steps you've seen covered in lecture.

The weekly lab reports are finished in the lab period, you don't do them at home.

Attendance is often indirectly taken at lectures.

The time commitment for this class is high, but you will come out of the class feeling confident with the skill base that you've acquired. This class is unusual because it stresses understanding of the most basic concepts, rather than memorization.

Chem 12B focuses on organic synthesis, and uses some background from 12A.

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