

San José State University
Department of Chemistry
CHEM 112B Organic Chemistry II

Instructor:	Dr. David Brook
Office location:	SCI 166
Telephone:	(408) 924-4994
Email:	david.brook@sjsu.edu
Office hours:	TuTh 1430-1530 and by appointment
Class days/time:	TuTh 0900-1015
Classroom:	Morris-Dailey Auditorium
Prerequisites:	CHEM 112A with a grade of C or better

Online Information

Copies of the course syllabus and other materials may be found on the Canvas learning management system course website. Homework will be linked through Canvas but requires a subscription to 'Achieve'. You are responsible for regularly checking with the messaging system through MySJSU (or other communication system as indicated by the instructor) to learn of any updates. Please put 'CHEM112B' in the subject line of any email related to this class

Course Description and Goals

A continuation of Chem 112A. Several more classes of organic compounds will be studied in some detail. There will be an emphasis on thorough mechanistic understanding of reactions, this is not just a "memorization" course. Review of concepts from the first semester is strongly encouraged. We will ultimately apply our understanding of classes of organic compounds to develop an appreciation for more complex biological systems.

Organization:

The course is organized into several modules, each covering a particular set of functional groups and their reaction pathways.

Class period: The class period (TuTh 9-10:15 am) will either be used for lectures on new material, or working through example problems with instructor guidance in a 'flipped' classroom

Online material: To support the 'flipped' format, and to provide students opportunity to review material, each module will include multiple short videos covering key concepts, along with notes and readings from the textbook. These will be accessible on canvas and should be accessed before the class period.

Homework: Each module will include several homework exercises. Homework will use 'Achieve' (accessible through canvas) and include two types of exercises. There are ten "regular" homework exercises in which questions can be repeated multiple times with a small loss of potential credit with each attempt. In adaptive quizzes, you keep answering

questions until you get to the number of points needed to complete the quiz. As long as you complete the quiz you get full credit.

Exams: There are three midterm exams and a final exam, all of which will be taken during a class period. The lowest of the three midterm exam grades will be dropped. Exams from previous years will be available on Canvas for reference and practice.

Course Learning Outcomes

Upon successful completion of this course students will be able to:

1. Show mastery of the topics covered in CHEM 112A (Ch 1-11, 14, 16 of McMurry, Organic Chemistry)
2. Show mastery of the material covered in CHEM 112B (Ch 17-28 of McMurry)
3. Identify the main classes of organic compounds by functional group, provide IUPAC names for simple organic molecules and draw skeletal structures for given IUPAC names
4. Recall the main reactions of, and main synthetic routes for alkenes, alkyl halides, aromatic compounds, alcohols, ethers, thiols, thioethers, amines, aldehydes, ketones, carboxylic acids, esters, amides, acid chlorides, acid anhydrides and nitriles.
5. Suggest appropriate mechanisms for the above reactions using the curved arrow formalism, and be able to describe how the mechanism may change according to the structure of the molecule and/or the reaction conditions
6. Predict reaction products based on a knowledge of reaction mechanism
7. Suggest possible pathways for short (3-4 steps) multistep syntheses of organic compounds, accounting for functional group/reaction condition incompatibility and understanding and using the concept of protecting groups as necessary

Program Learning Objectives

This class contributes toward program learning objective 1, listed on the department website:

PLO 1.1 - Students will be able to identify, formulate, and solve a range of chemistry problems (fundamental to complex) through application of mathematical, scientific, and chemical principles.

PLO 1.2 - Students will be able to recognize, relate, and/or apply chemistry terms and concepts to propose and solve interdisciplinary and multidisciplinary real world problems.

http://www.sjsu.edu/chemistry/Academic_Programs/undergraduate_program_learning_objectives.html

Required Items

Textbook

- McMurry, Organic Chemistry
or
- Organic Chemistry (McMurry) on ChemistryLibre texts:
[https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Organic_Chemistry_\(McMurry\)](https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Organic_Chemistry_(McMurry))

Online Homework

- Register on Macmillan Achieve. Directions are given in canvas

Useful but not essential:

- McMurry, Study Guide and Solutions. Manual for Organic Chemistry
- Weeks, Pushing Electrons
- Scudder, Electron Flow in Organic Chemistry
- ACS organic chemistry exam study guide

Other equipment requirements

- A set of molecular models.

Course Requirements and Assignments

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in [University Policy S12-3](http://www.sjsu.edu/senate/docs/S12-3.pdf) at <http://www.sjsu.edu/senate/docs/S12-3.pdf>.

Grades

Grades will be based on online homework (170 points), the best two of three mid-term exams (100 points each), and a final exam (200 points) (570 points total). Dates are given in the class schedule below.

Online Homework

Online homework will be completed using Macmillan Achieve (cost \$45) via Canvas. In addition to contributing to your grade, the online homework problems give you important practice and feedback in solving problems in organic chemistry. There are ten sets of homework problems and fourteen adaptive quizzes for the semester. Each problem set has a deadline indicated on the course schedule. You may ask for an extension on a particular problem set for a legitimate reason, but I strongly recommend you get as much done as you can before the deadline. For the homework you may take repeated attempts to answer each question correctly, but each time you lose 5% of the possible credit. For the adaptive quizzes you need to reach the listed point total to get full credit. If particular problems are causing you grief, I am happy to provide help, either via email or in office hours. If by email, make sure to include your name and the problem set and question number.

ONLINE HOMEWORK IS AN IMPORTANT PART OF YOUR GRADE. IT MUST BE COMPLETED BY MIDNIGHT ON THE DAY OF THE FINAL. Even if the website accepts answers after this time they will not contribute toward your final grade.

Midterm and final exams

Exams will be part multiple choice, part short answers. Though they will focus on the most recently studied material, because of the way the course is structured this will, of necessity, include material covered in earlier lectures and in CHEM 112A.

Letter Grades

Letter grades will not be assigned to individual exams or homework. Final letter grades will be based on the point total of all graded work. To earn a grade of A students need to score 90% or greater over the whole semesters work. Lower grades (including +/–) will be

assigned in 5% intervals below this, i.e. 85%-89% A–, 80%-84% B+, 75-79% B , 70-74% B–, 65-69% C+, 60-64% C, 55-59% D+, 50-54% D.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>

Class Schedule (Tentative)

Week	Topics	Chapters (From McMurry)
1: Aug 23, 25	Review 112A, Aromaticity	15
2: Aug 30, Sept 1	Aromatic Chemistry	16
3: Sept 6, 8	Alcohols, Phenols	17
4: Sept 13, 15	Ethers, Epoxides, Sulfides, Amines	18, 24
5: Sept 20, 22	Exam 1 (Sept 22)	
6: Sept 27, 29	Aldehydes and Ketones, Nucleophilic addition	19
7: Oct 4, 6	Carboxylic Acids and Nitriles	20
8: 11, 13	Nucleophilic Acyl Substitution	21
9, Oct 18, 20	Exam 2 (Oct 20)	
10: Oct 25, 27	Carbonyl alpha substitution	22
11: Nov 1, 3	Carbonyl condensation	23
12: Nov 8, 10	Carbonyl Condensation	23
13: Nov 15, 17	Exam 3 (Nov 17)	
14, Nov 22, 29	Polymer Chemistry	
15: Nov Dec 1, 6	Biomolecules	31