

**CHEM 12B Course Outline as of Fall 2000****CATALOG INFORMATION**

Dept and Nbr: CHEM 12B Title: ORGANIC CHEMISTRY

Full Title: Organic Chemistry

Last Reviewed: 1/27/2020

| Units   |      | Course Hours per Week |      | Nbr of Weeks | Course Hours Total |        |
|---------|------|-----------------------|------|--------------|--------------------|--------|
| Maximum | 5.00 | Lecture Scheduled     | 3.00 | 17.5         | Lecture Scheduled  | 52.50  |
| Minimum | 5.00 | Lab Scheduled         | 6.00 | 17.5         | Lab Scheduled      | 105.00 |
|         |      | Contact DHR           | 0    |              | Contact DHR        | 0      |
|         |      | Contact Total         | 9.00 |              | Contact Total      | 157.50 |
|         |      | Non-contact DHR       | 0    |              | Non-contact DHR    | 0      |

Total Out of Class Hours: 105.00

Total Student Learning Hours: 262.50

Title 5 Category: AA Degree Applicable

Grading: Grade Only

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly:

**Catalog Description:**

The second semester of an intensive one-year program based upon modern theoretical concepts of organic chemistry. All aspects of fundamental organic chemistry are studied, including nomenclature, chemical and physical properties, reactions and synthesis. The study includes theoretical aspects, reaction mechanisms, and multistep synthesis. The laboratory includes methods of purifying solids and liquids, determination of physical properties of organic compounds, isolation of natural products, synthetic reactions, chromatographic separations, and structure determination using infrared and nuclear magnetic resonance spectroscopy and gas chromatography/mass spectrometry. Chem 12A-12B is equivalent to Chem 112A-112B at University of California, Berkeley or Chem 128A, 128B, 128C, 129A, 129B, 129C at University of California, Davis. Transfer students are expected to complete this sequence prior to their junior year.

**Prerequisites/Corequisites:**

Chem 12A.

**Recommended Preparation:****Limits on Enrollment:**

**Schedule of Classes Information:**

Description: Second semester of a one year program based upon modern theoretical concepts of organic chemistry. (Grade Only)

Prerequisites/Corequisites: Chem 12A.

Recommended:

Limits on Enrollment:

Transfer Credit: CSU;UC.

Repeatability: Two Repeats if Grade was D, F, NC, or NP

**ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

|                   |                      |                     |             |
|-------------------|----------------------|---------------------|-------------|
| <b>AS Degree:</b> | <b>Area</b>          | Effective:          | Inactive:   |
| <b>CSU GE:</b>    | <b>Transfer Area</b> | Effective:          | Inactive:   |
|                   | B1                   | Physical Science    | Spring 2000 |
|                   | B3                   | Laboratory Activity |             |

|               |                      |                          |             |
|---------------|----------------------|--------------------------|-------------|
| <b>IGETC:</b> | <b>Transfer Area</b> | Effective:               | Inactive:   |
|               | 5A                   | Physical Sciences        | Spring 2007 |
|               | 5C                   | Fulfills Lab Requirement |             |

|                      |              |            |           |           |
|----------------------|--------------|------------|-----------|-----------|
| <b>CSU Transfer:</b> | Transferable | Effective: | Fall 1981 | Inactive: |
|----------------------|--------------|------------|-----------|-----------|

|                     |              |            |           |           |
|---------------------|--------------|------------|-----------|-----------|
| <b>UC Transfer:</b> | Transferable | Effective: | Fall 1981 | Inactive: |
|---------------------|--------------|------------|-----------|-----------|

**CID:**

CID Descriptor:CHEM 160S      Organic Chemistry for Science Majors Sequence A

SRJC Equivalent Course(s):      CHEM12A AND CHEM12B

**Certificate/Major Applicable:**

Not Certificate/Major Applicable

**COURSE CONTENT****Outcomes and Objectives:**

A successful student in Chemistry 12B should be able to:

1. use molecular orbital theory to predict outcomes of chemical reactions.
2. predict the products of reactions involving organic compounds.
3. be able to develop a multistep (4-6 steps) synthesis for reasonably complex compounds, using available starting materials.
4. write logical mechanisms for more complex organic reactions.
5. apply oxidation-reduction theory to organic compounds.
6. effectively communicate observations and subsequent conclusions by means of written laboratory reports. Follow the accepted standards for writing technical papers.
7. research primary and secondary literature, and use the computer resources for the construction of written reports
8. perform multistep (3-4 steps) syntheses in the laboratory.
9. purify and identify (GC/MS, NMR, IR) a variety of simple organic compounds in the laboratory.

## Topics and Scope:

### LECTURE MATERIAL

1. Reactions of Aromatic Compounds
2. Aldehydes and Ketones
3. Enols and Enolates
4. Carboxylic Acids and Their Derivatives
5. Beta-Dicarbonyl Compounds
6. Amines
7. Heterocyclic Compounds
8. Phenols and Aryl Halides
9. Carbohydrates
10. Lipids
11. Amino Acids and Proteins
12. Nucleic Acids

### LABORATORY MATERIAL

1. Mass Spectrometry
2. NMR and IR Spectroscopy
3. Organic Synthesis
4. Multistep Organic Synthesis

## Assignment:

Assignments for Chemistry 12B include:

1. Specific reading and study assignments (averaging 40-50 pages per week).
2. Completion of end-of-chapter exercises (averaging 25-30 problems per week).
3. Writing (on average) one laboratory report per week and previewing upcoming laboratory experiments and completion of the required pre-laboratory assignment.

## Methods of Evaluation/Basis of Grade:

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

|  |
|--|
| Written homework, Lab reports, Essay exams |
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|                     |
|---------------------|
| Writing<br>20 - 60% |
|---------------------|

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

|                                       |
|---------------------------------------|
| Homework problems, Lab reports, Exams |
|---------------------------------------|

|                            |
|----------------------------|
| Problem solving<br>5 - 10% |
|----------------------------|

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

|   |                                |
|---|--------------------------------|
| Class performances, LAB SKILL EVAL,<br>PARTICIPATION  | Skill Demonstrations<br>1 - 5% |
| <b>Exams:</b> All forms of formal testing, other than skill<br>performance exams.                   |                                |
| PROBLEM SOLVING & SHORT ESSAY   | Exams<br>30 - 75%              |
| <b>Other:</b> Includes any assessment tools that do not logically<br>fit into the above categories. |                                |
| None  | Other Category<br>0 - 0%       |

### **Representative Textbooks and Materials:**

#### LECTURE:

ORGANIC CHEMISTRY, M. Jones Jr., N.W. Norton and Company, 1997

ORGANIC CHEMISTRY, 6th Edition, Solomons, Wiley, 1996

INTRODUCTION TO ORGANIC CHEMISTRY, 4th Edition, Streitweiser, Heathcock,  
and Kosower, MacMillan, 1992

ORGANIC CHEMISTRY, 4th Edition, Wade, Prentice Hall, 1999

#### LABORATORY:

INTRODUCTION TO ORGANIC LABORATORY TECHNIQUES: A MICROSCALE  
APPROACH: 3rd

Edition, Pavia, Lampman, Kriz, and Engel, Saunders, 1999

EXPERIMENTAL ORGANIC CHEMISTRY: A MINISCALE APPROACH, Roberts, Gilbert,  
and Martin, Saunders, 1994