

CHEM 12A Course Outline as of Fall 2014**CATALOG INFORMATION**

Dept and Nbr: CHEM 12A Title: ORGANIC CHEMISTRY
 Full Title: Organic Chemistry
 Last Reviewed: 2/10/2020

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:

For students majoring in chemistry, biochemistry, chemical engineering, or a closely related field such as molecular and cell biology. The first 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. Students transferring to a four-year college or university are expected to complete this sequence prior to their junior year.

Prerequisites/Corequisites:

Course Completion of CHEM 1B OR Course Completion of CHEM 4B

Recommended Preparation:**Limits on Enrollment:****Schedule of Classes Information:**

Description: For students majoring in chemistry, biochemistry, chemical engineering, or a closely related field such as molecular and cell biology. The first 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. Students transferring to a four-year college or university are expected to complete this sequence prior to their junior year. (Grade Only)

Prerequisites/Corequisites: Course Completion of CHEM 1B OR Course Completion of CHEM 4B

Recommended:

Limits on Enrollment:

Transfer Credit: CSU;UC.

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

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	Area	Effective:	Inactive:
CSU GE:	Transfer Area	Effective:	Inactive:
	B1	Physical Science	Spring 2000
	B3	Laboratory Activity	

IGETC:	Transfer Area	Effective:	Inactive:
	5A	Physical Sciences	Spring 2007
	5C	Fulfills Lab Requirement	

CSU Transfer: Transferable	Effective:	Fall 1981	Inactive:
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UC Transfer: Transferable	Effective:	Fall 1981	Inactive:
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CID:

CID Descriptor:CHEM 150	Organic Chemistry for Science Majors I, with Lab
SRJC Equivalent Course(s):	CHEM12A
CID Descriptor:CHEM 160S	Organic Chemistry for Science Majors Sequence A
SRJC Equivalent Course(s):	CHEM12A AND CHEM12B

Certificate/Major Applicable:

Major Applicable Course

COURSE CONTENT

Student Learning Outcomes:

Upon completion of the course, students will be able to:

1. Identify and explain the basic concepts, terminology, and theories of organic chemistry and biochemistry.
2. Relate the molecular level structures of organic and biological compounds to their physical and chemical properties.
3. Propose appropriate synthetic routes for organic compounds, use reaction mechanisms to explain those routes, and modern analytical methods to analyze and identify the products.
4. Perform laboratory experiments safely and interpret observations in order to validate theoretical ideas.
5. Maintain laboratory notebook and complete written reports detailing conclusions based on the notebook record.

Objectives:

1. Predict and explain three-dimensional structures, including conformational changes, for organic compounds.
2. Name organic compounds.
3. Predict structures for products of organic reactions.
4. Predict and explain relative physical properties and reactivities of organic compounds.
5. Suggest appropriate methods for the syntheses of organic compounds.
6. Predict and explain mechanisms for organic reactions.
7. Make observations and apply chemical concepts in the laboratory.
8. Use common laboratory techniques to synthesize, isolate, purify, and identify organic compounds.
9. Analyze compounds by instrumental methods.

Topics and Scope:

LECTURE MATERIAL

1. Bonding and structure of organic compounds
2. Alkanes, cycloalkanes and alkyl halides
3. Stereochemistry
4. Alkenes, alkynes and alcohols
5. Nucleophilic substitution and elimination reactions
6. Dienes and polyenes
7. Aromaticity and aromatic compounds
8. Spectroscopy

LABORATORY MATERIAL

1. Crystallization
2. Melting point determination
3. Spectroscopy
4. Distillations
5. Chromatography
6. Extraction
7. Nuclear magnetic resonance (NMR) spectroscopy
8. Infrared (IR) spectroscopy
9. Isolation of organic compounds
10. Synthesis of organic compounds
11. Structure determination
12. Maintaining a research-style laboratory notebook

Assignment:

1. Specific reading and study assignments averaging 40-50 pages per week.
2. Completion of end-of-chapter exercises averaging 20-25 problems per week.
3. Laboratory experiments: identification of unknowns and products of reactions by physical, instrumental, and spectroscopic methods.
4. Laboratory notebook records detailing experimental observations and typed reports summarizing findings. (10-15 reports per semester)
5. Lecture and laboratory exams (4 to 6) plus a comprehensive final exam.

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.

Lab reports

Writing
10 - 25%

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

Lab reports

Problem solving
5 - 10%

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

Lab skill technique/accurate lab results

Skill Demonstrations
10 - 20%

Exams: All forms of formal testing, other than skill performance exams.

Multiple choice, Completion, Problem solving and short essay

Exams
50 - 70%

Other: Includes any assessment tools that do not logically fit into the above categories.

Class Participation

Other Category
0 - 5%

Representative Textbooks and Materials:

Organic Chemistry, 8th ed., Francis Carey, McGraw Hill, 2011

Organic Chemistry, 4th ed., Maitland Jones, Jr., W.W. Norton & Co. 2010

Introduction to Organic Laboratory Techniques: A Microscale Approach,

5th ed., Pavia, Lampman, Kriz, and Engel, Brooks/Cole, 2013

Multiscale Operational Organic Chemistry, 2nd ed., Lehman, Pearson 2009