CH 010B: ORGANIC CHEMISTRY II

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Originator

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Justification / Rationale

Course periodic review.
Update SLOs

Effective Term

Fall 2018

Credit Status

Credit - Degree Applicable

Subject

CH - Chemistry

Course Number

010B

Full Course Title

Organic Chemistry II

Short Title

ORGANIC CHEMISTRY II

Discipline

Disciplines List
Chemistry

Modality

Face-to-Face

Catalog Description

This course is the second of a two-semester sequence covering the basic principles and concepts of organic chemistry. Ethers, epoxides, sulfides, conjugated systems, UV spectroscopy, aromatic compounds, ketones and aldehydes, amines, carboxylic acids and carboxylic acid derivatives and synthetic polymers are being covered. An introduction is made to biochemical compounds: carbohydrates, nucleic acids, amino acids, peptides, proteins and lipids. Condensation and Alpha substitution reactions are introduced. Review from the first semester of Organic Chemistry I, of IR, Mass Spectroscopy, NMR Spectroscopy. The course is designed for chemistry, biology and pre-professional majors.

Schedule Description

This course is the second of a two-semester sequence covering the basic principles and concepts of organic chemistry. Prerequisite: CH-010A IGETC: 5A, 5C

Lecture Units

4

Lecture Semester Hours

72

Lab Units

1

Lab Semester Hours

54

In-class Hours

126

Out-of-class Hours
144

Total Course Units
5

Total Semester Hours
270

Prerequisite Course(s)
CH 010A

Required Text and Other Instructional Materials

Resource Type
Book

Author
Wade, L.G. (2013). Organic Chemistry (8th/ed.)Upper Saddle River, NJ

Title
Organic Chemistry

Edition
8th

Publisher
Prentice Hall

Year
2013

College Level
Yes

Flesch-Kincaid Level
12

Resource Type
Book

Author
Mayo, Pike, Forbes

Title
Microscale Organic Laboratory

Edition
5th

City
New York, NY

Publisher
John Wiley Sons Inc.

Year
2011

College Level
Yes

Flesch-Kincaid Level
12

Class Size Maximum
20

Course Content

1. Structure determination by spectrophotometry, including visible, UV, IR, NMR, and also using Abbe refractometer,polarimeter, GC, & GC-MS.
2. Reactions of ethers, epoxides, thioethers, sulfides, aromatic compounds, including substitutions, acylation, aldehydes and ketones.
3. Condensation reactions and enolate reactions.
4. Carboxylic acids and derivatives.
5. Amines.
6. Synthetic polymers
7. Chemistry of carbohydrates, lipids, amino acids, proteins and nucleic acids; this includes synthetic and degradative techniques.

Lab Content

Diels-Alder reaction experiment, Electrophilic Aromatic Substitution, Halogenation using NBS, Nucleophilic Aromatic Substitution, Preparation of Isopentyl Acetate (Banana Oil), Aldol reaction, preparation of Nylon-6,6, slime and silly puttty. Isolation of caffeine. Learn how to use a polarimeter.
Extraction of essential oils from herbs and spices using steam distillation with dry ice and identification using GC, GC-MS, IR and NMR.

Instrumentation used for the entire semester: melting point apparatus, Abbe Refractometer, Polarimeter, GC, GC-MS, IR, NMR, UV-VIS.

Learn different techniques and how to use different instruments. Also, learn about safety procedures in performning experiments, handling the chemical reagents and in discarding the chemicals.

Course Objectives

	Objectives
Objective 1	Demonstrate the ability to use spectroscopy(IR,NMR,UV, and Mass spectroscopy) in structure determination.
Objective 2	Recognize between meta-directing and ortho-para-directing benzene substituents and the mechanisms involved.
Objective 3	Describe REDOX reactions found in organic chemistry.
Objective 4	Describe the chemistry of aldehydes and ketones, including substitution and aldol reactions.
Objective 5	Describe the chemistry of carboxylic acids and their derivatives.
Objective 6	Describe reactions of acyl and dicarbonyl compounds.
Objective 7	Describe the properties of amines.
Objective 8	Describe the chemistry of carbohydrates, lipids, amino acids, proteins and nucleic acids.
Objective 9	Describe the chemistry of ethers, epoxides, thioethers, sulfides and conjugated systems.

Student Learning Outcomes

	Upon satisfactory completion of this course, students will be able to:
Outcome 1	Develop a multi-step synthetic pathway to create a target molecule.
Outcome 2	Write a mechanism for an organic reaction.
Outcome 3	Apply organic concepts to processes found in biochemical systems.
Outcome 4	Synthesize a target molecule from amongst similar possible products.
Outcome 5	Predict the outcome of a chemical reaction based on steric hindrance and electronic activity.

Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Demonstration, Repetition/Practice	
Collaborative/Team	
Activity	

Technology-based instruction	
Participation	
Observation	
Lecture	Lecture presentations including visual aids, power point.Handouts summarizing lecture material.Classroom discussion to improve critical thinking
Laboratory	Laboratory work to give “hands-on” knowledge, using the following instruments: IR, GC,GC-MS,NMR, UV-VIS, melting point apparatus,glass equipment,polarimeter,Abbe refractometer, labquest, Vernier. The laboratory sessions have a small theoretical component that includes safety procedures.
Journal	
Experiential	
Discussion	

Methods of Evaluation

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
Written homework		
Self-paced testing,Student preparation		
Student participation/contribution		
Mid-term and final evaluations	Five exams and a cumulative final exam.	
Tests/Quizzes/Examinations	Exams are multiple choice exams, fill in the blanks and problems where they have to show all the work, like the entire mechanism of a reaction.	
Group activity participation/observation		
Presentations/student demonstration observations		
Computational/problem-solving evaluations		
Laboratory projects	12 experiments	
Term or research papers	Students have to type a report for the last experiment	
Guided/unguided journals	Students need to read a journal and write an abstract	

Assignments

Other In-class Assignments

1. Take and complete the written exams
2. Oral presentations
3. Complete the experiments in the lab and identify unknowns in the laboratory section.

Other Out-of-class Assignments

1. Read all relevant material.
2. Complete all assigned problems.
3. Complete all assigned laboratory experiments in the laboratory textbook and maintain a well-organized notebook.
4. Do the practice quizzes at home
5. Complete the typed report on the last experiment
6. Read an article in a journal and complete a typed abstract

Grade Methods

Letter Grade Only

COD GE

C1 - Natural Sciences

CSU GE
B1 - Physical Science
B3 - Laboratory Activity

IGETC GE
5A - Physical Science
5C - Science Laboratory

MIS Course Data

CIP Code
40.0501 - Chemistry, General.

TOP Code
190500 - Chemistry, General

SAM Code
E - Non-Occupational

Basic Skills Status
Not Basic Skills

Prior College Level
Not applicable

Cooperative Work Experience
Not a Coop Course

Course Classification Status
Credit Course

Approved Special Class
Not special class

Noncredit Category
Not Applicable, Credit Course

Program Status
Program Applicable

Transfer Status
Transferable to both UC and CSU

C-ID
CHEM 160S

Allow Audit
No

Repeatability
No

Materials Fee
No

Additional Fees?
No

Approvals

Curriculum Committee Approval Date
11/7/2017

Academic Senate Approval Date
11/30/2017

Board of Trustees Approval Date
12/15/2017

Course Control Number
CCC000238906

Programs referencing this course
Chemistry UC Transfer Pathway AS Degree (http://catalog.collegeofthedesert.eduundefined?key=274/)
Liberal Arts: Math and Science AA Degree (http://catalog.collegeofthedesert.eduundefined?key=29/)
Chemistry AS-T Degree (http://catalog.collegeofthedesert.eduundefined?key=41/)
Chemistry AS Degree (http://catalog.collegeofthedesert.eduundefined?key=75/)