

CH 005: BIO-ORGANIC CHEMISTRY

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Originator

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Justification / Rationale

Textbook Update

Class size maximum reduced to 20 students, based on lab safety concerns.

Effective Term

Spring 2020

Credit Status

Credit - Degree Applicable

Subject

CH - Chemistry

Course Number

005

Full Course Title

Bio-organic Chemistry

Short Title

BIO-ORGANIC CHEMISTRY

Discipline**Disciplines List**

Chemistry

Modality

Face-to-Face

Catalog Description

This course is a survey of organic chemistry and biochemistry with an emphasis on the health sciences. It covers the major functional groups of organic compounds. The biologically active macromolecules and their components are discussed. Bioenergetics and metabolism are a substantial part of this course. The course is intended for health sciences students in dental hygiene, physician assistant, and related programs. Note: This course, in conjunction with CH 003 or CH 004, satisfies the requirements for those Health Sciences programs that require one year of chemistry other than general chemistry.

Schedule Description

This course is a survey of organic chemistry and biochemistry with an emphasis on the health sciences. This course, in conjunction with CH-003 or CH-004, satisfies the requirements for those Health Sciences programs that require one year of chemistry other than general chemistry. Prerequisite: CH-003 or CH-004 IGETC: 5A, 5C

Lecture Units

3

Lecture Semester Hours

54

Lab Units

1

Lab Semester Hours

54

In-class Hours

108

Out-of-class Hours

108

Total Course Units

4

Total Semester Hours

216

Prerequisite Course(s)

CH 003 or CH 004

Required Text and Other Instructional Materials**Resource Type**

Book

Author

Smith, J., G.

Title

General, Organic, Biological Chemistry

Edition

4th

City

New York, NY

Publisher

McGraw-Hill Education

Year

2018

College Level

Yes

Flesch-Kincaid Level

12

ISBN #

9781259883989

Resource Type

Manual

Author

Heasley, V.L., Christensen, V.J., Heasley, G.E.

Title

Laboratory manual for Bio-Organic Chemistry

Publisher

Pearson

Year2015-01-01

Class Size Maximum

20

Entrance Skills

Describe the concepts of chemical bonding.

Requisite Course Objectives

CH 003-Demonstrate an understanding of the fundamental concepts of chemistry with their applications to human affairs.

CH 003-Discuss major historical chemistry discoveries which have been a part of human social and technological development.

CH 004-Describe the major principles of chemistry.

CH 004-Describe the major categories of inorganic and organic chemical and biochemical reactions.

Entrance Skills

Describe the different types of chemical reactions.

Requisite Course Objectives

CH 003-Demonstrate an understanding of the fundamental concepts of chemistry with their applications to human affairs.

CH 003-Solve chemistry problems with the coupled recognition that calculation methods in chemistry are shared in other domains such as business, economics, and technology.

CH 003-Demonstrate the ability to collect and interpret the data

CH 004-Describe the major categories of inorganic and organic chemical and biochemical reactions.

CH 004-Balance reactions and perform calculations based on balanced reactions.

Entrance Skills

Predict the physical and chemical properties of a compound based on its structure.

Requisite Course Objectives

CH 003-Demonstrate an understanding of the fundamental concepts of chemistry with their applications to human affairs.

CH 003-Solve chemistry problems with the coupled recognition that calculation methods in chemistry are shared in other domains such as business, economics, and technology.

CH 003-Demonstrate the ability to raise questions and how to formulate them clearly

CH 004-Describe the major functional groups of organic compounds.

Entrance Skills

Demonstrate laboratory techniques safely.

Requisite Course Objectives

CH 003-Demonstrate use of tools and instruments involved in making findings in chemical behavior.

CH 003-Demonstrate the ability to work in teams and to respect other people's opinions

CH 004-Collect and interpret data in the lab.

Course Content

1. Review of chemical bonding principles.
2. Alkanes, alkenes, and the concept of isomerism.
3. The physical and chemical properties and nomenclature of alkanes, alkenes, aromatics, alcohols, ethers, thiols, aldehydes, ketones, amines, carboxylic acids, and their derivatives.
4. The chemical nature and structural features of carbohydrates, amino acids, proteins, and lipids.
5. The transport and homeostatic mechanisms of the body.
6. Energy production in the cell.
7. Catabolic and anabolic pathways for monosaccharides, amino acids, and lipids.
8. The interrelationships of the metabolic pathways.

Lab Content

1. Perform reactions typical of the functional groups of organic compounds.
2. Examine carbohydrates by specific tests and use of a polarimeter.
3. Examine the acid-base properties and other reactions of amino acids and proteins.

4. Perform standard tests to identify functional groups and types of macromolecules.
5. Use thin layer chromatography to identify analgesics.

Course Objectives

Objectives	
Objective 1	Describe the ways in which carbon forms bonds and the differences between inorganic and organic compounds.
Objective 2	Explain the concept of isomerism.
Objective 3	Describe the chemical properties of the functional groups and compounds containing them.
Objective 4	Describe the physical and chemical properties of carbohydrates, lipids, amino acids, proteins, and nucleic acids.
Objective 5	Describe the process of energy production within the cell.
Objective 6	Delineate and explain the major catabolic and anabolic pathways of monosaccharides, lipids, amino acids, and their interrelationships.
Objective 7	Outline the major nutritional requirements.
Objective 8	Discuss the major transport and homeostatic mechanisms of the body.

Student Learning Outcomes

Upon satisfactory completion of this course, students will be able to:	
Outcome 1	Analyze collected data to draw plausible conclusions.
Outcome 2	Relate organic chemical concepts to human metabolic processes.
Outcome 3	Apply organic and biochemical terminology to processes found in living systems.
Outcome 4	Perform basic organic and biochemical laboratory experiments safely and accurately.

Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Discussion	Classroom discussion to improve critical thinking.
Lecture	1. Lecture presentations including visual aids. 2. Handouts summarizing lecture material.
Laboratory	Laboratory work to give "hands-on" knowledge. The laboratory sessions have a large theoretical component.

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	The laboratory assignments will be graded for ability to follow directions and for clarity of presentation. Worksheets related to specific lecture concepts are provided. Quizzes may be in class or out of class.	In and Out of Class
Student participation/contribution	Students are expected to participate in problem-solving during lecture, including in-class questions and worksheets.	In Class Only
Mid-term and final evaluations	There will be a comprehensive final examination on the lecture material.	In Class Only
Tests/Quizzes/Examinations	Examinations including multiple-choice, short-answer, and long-answer questions.	In Class Only

Laboratory projects

Students will read through an upcoming laboratory experiment, answer pre-laboratory questions outside of class to show they are prepared, then come to class and perform the laboratory experiment. In and Out of Class

While performing the experiment they will write down relevant observations and results.

After lab they will answer several follow-up questions to test their understanding of the experiment and its results.

All of this information before, during, and after the experiment will be committed to writing and turned in at a later date.

Experiments are performed weekly.

Assignments**Other In-class Assignments**

1. Examinations consisting of multiple-choice, short-answer, and long-answer questions.
2. Quizzes consisting of multiple-choice and short-answer questions.
3. Laboratory experiments and associated handouts.

Other Out-of-class Assignments

1. Quizzes consisting of short-answer and long-answer questions.
2. Laboratory handouts.

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

Funding Agency Category

Not Applicable

Program Status

Program Applicable

Transfer Status

Transferable to both UC and CSU

General Education Status

Not applicable

Support Course Status

Course is not a support course

C-ID

CHEM 102

Allow Audit

No

Repeatability

No

Materials Fee

No

Additional Fees?

No

Approvals**Curriculum Committee Approval Date**

11/05/2019

Academic Senate Approval Date

11/14/2019

Board of Trustees Approval Date

12/19/2019

Chancellor's Office Approval Date

6/08/2020

Course Control Number

CCC000161480

Programs referencing this courseLiberal Arts: Math and Science AA Degree (<http://catalog.collegeofthedesert.eduundefined?key=29/>)Health Science AS Degree (<http://catalog.collegeofthedesert.eduundefined?key=65/>)Nutrition and Dietetics AS-T Degree (<http://catalog.collegeofthedesert.eduundefined?key=7/>)