

Course Outline of Record

1. Course Code: CH-005
2.
 - a. Long Course Title: Bio-organic Chemistry
 - b. Short Course Title: BIO-ORGANIC CHMISTRY
3.
 - a. Catalog Course 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.
 - b. Class Schedule Course 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.
 - c. Semester Cycle (*if applicable*): Fall & Spring semesters
 - d. Name of Approved Program(s):
 - LIBERAL ARTS with emphasis in Health Education and Nutrition-H AA Degree and Transfer Preparation
4. Total Units: 4.00 Total Semester Hrs: 108.00
 Lecture Units: 3 Semester Lecture Hrs: 54.00
 Lab Units: 1 Semester Lab Hrs: 54.00
 Class Size Maximum: 24 Allow Audit: No
 Repeatability No Repeats Allowed
 Justification 0
5. Prerequisite or Corequisite Courses or Advisories:
Course with requisite(s) and/or advisory is required to complete Content Review Matrix (CCForm I-A)
 Prerequisite: CH 003 or
 Prerequisite: CH 004
6. Textbooks, Required Reading or Software: (*List in APA or MLA format.*)
 - a. McMurry, J., Ballantine, D.S., Hoeger, C.A., Peterson, V.E. (2013). *Fundamentals of General, Organic, and Biological Chemistry* (7th /e). New York, NY Pearson. ISBN: 9780321750839
 College Level: Yes
 Flesch-Kincaid reading level: 12
 - b. Smith, J., G. (2016). *General, Organic, & Biological Chemistry* (3rd/e). New York, NY McGraw-Hill. ISBN: 9780073511245
 College Level: Yes
 Flesch-Kincaid reading level: 12
 - c. Heasley, V.L., Christensen, V.J., Heasley, G.E.. *Laboratory manual for Bio-Organic Chemistry*. Pearson , 01-01-2015.
 - d. Selected articles from: J. Chem. Education, Science News, and Discover
7. Entrance Skills: *Before entering the course students must be able:*
 - a. Describe the concepts of chemical bonding.
 - CH 004 - Understand the major principles of inorganic and organic chemistry.
 - CH 003 - Demonstrate an understanding of the fundamental concepts of chemistry with their applications to human affairs.

CH 005-Bio-organic Chemistry

- CH 003 - Discuss major historical chemistry discoveries which have been a part of human social and technological development.
- CH 004 - Understand the major categories of inorganic and organic chemical reactions.

b.

Describe the different types of chemical reactions.

- CH 003 - Demonstrate an understanding of the fundamental concepts of chemistry with their applications to human affairs.
- CH 004 - Describe the major categories of inorganic and organic chemical and biochemical reactions.
- CH 004 - Demonstrate the ability to balance reactions coupled with the performance calculations based on balanced reactions.
- 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

c.

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

- 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 - Understand the major functional groups of organic compounds.

d.

Demonstrate laboratory techniques safely.

- 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 - Demonstrate the ability to collect and interpret data in the lab

8. Course Content and Scope:

Lecture:

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: *(if the "Lab Hours" is greater than zero this is required)*

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.

9. Course Student Learning Outcomes:

1. Describe the chemical makeup of living organisms and the chemical reactions and processes that maintain life.
2. Perform laboratory experiments safely and correctly.

CH 005-Bio-organic Chemistry

10. Course Objectives: *Upon completion of this course, students will be able to:*
- Describe the ways in which carbon forms bonds and the differences between inorganic and organic compounds.
 - Explain the concept of isomerism.
 - Describe the chemical properties of the functional groups and compounds containing them.
 - Describe the physical and chemical properties of carbohydrates, lipids, amino acids, proteins, and nucleic acids.
 - Describe the process of energy production within the cell.
 - Delineate and explain the major catabolic and anabolic pathways of monosaccharides, lipids, amino acids, and their interrelationships.
 - Outline the major nutritional requirements.
 - Discuss the major transport and homeostatic mechanisms of the body.
11. Methods of Instruction: *(Integration: Elements should validate parallel course outline elements)*
- Discussion
 - Laboratory
 - Lecture
12. Assignments: *(List samples of specific activities/assignments students are expected to complete both in and outside of class.)*
- In Class Hours: 108.00
- Outside Class Hours: 108.00
- In-class Assignments

| |
|--|
| <ol style="list-style-type: none">Examinations consisting of multiple choice, short-answer, and long-answer questions.Quizzes consisting of multiple choice short answer questions.Laboratory experiments and associated handouts. |
|--|
 - Out-of-class Assignments

| |
|--|
| <ol style="list-style-type: none">Quizzes consisting of short answer and long answer questions.Laboratory handouts. |
|--|
13. Methods of Evaluating Student Progress: *The student will demonstrate proficiency by:*
- Written homework
The laboratory assignments will be graded for ability to follow directions and for clarity of presentation.
 - Laboratory projects
This will serve to show whether a student can perform basic laboratory techniques and collaborate with other students.
 - True/false/multiple choice examinations
Examinations including essay and multiple-choice questions.
 - Mid-term and final evaluations
There will be a comprehensive final examination on the lecture material.
 - Student participation/contribution
Students are expected to participate in problem-solving during lecture and performing experiments during lab.
 - Other
 1. Examinations for laboratory material.
 2. One comprehensive paper based on journal readings.
14. Methods of Evaluating: Additional Assessment Information:
15. Need/Purpose/Rationale -- *All courses must meet one or more CCC missions.*
- PO-GE C1-Natural Sciences
- Explain concepts and theories related to physical, chemical, and biological natural phenomena.
- Apply the scientific process and its use and limitations in the solution of problems.
- Draw a connection between natural sciences and their own lives.
- IO - Scientific Inquiry
- Collect and analyze data. Skills of data collection include an understanding of the notion of hypothesis testing and specific methods of inquiry such as experimentation and systematic observation.

Analyze quantitative and qualitative information to make decisions, judgments, and pose questions.

IO - Critical Thinking and Communication

Apply principles of logic to problem solve and reason with a fair and open mind.

16. Comparable Transfer Course

| University System | Campus | Course Number | Course Title | Catalog Year |
|-------------------|--------|---------------|--------------|--------------|
|-------------------|--------|---------------|--------------|--------------|

17. Special Materials and/or Equipment Required of Students:

| |
|--------------------------------------|
| Calculator with scientific functions |
|--------------------------------------|

18. Materials Fees: Required Material?

| Material or Item | Cost Per Unit | Total Cost |
|------------------|---------------|------------|
|------------------|---------------|------------|

19. Provide Reasons for the Substantial Modifications or New Course:

Prerequisite change to include CH-003 as an alternative to CH-004 (C-ID alignment); textbook update.

20. a. Cross-Listed Course (*Enter Course Code*): *N/A*
 b. Replacement Course (*Enter original Course Code*): *N/A*

21. Grading Method (*choose one*): Letter Grade Only

22. MIS Course Data Elements

- a. Course Control Number [CB00]: CCC000161480
 b. T.O.P. Code [CB03]: 190500.00 - Chemistry, General
 c. Credit Status [CB04]: D - Credit - Degree Applicable
 d. Course Transfer Status [CB05]: A = Transfer to UC, CSU
 e. Basic Skills Status [CB08]: 2N = Not basic skills course
 f. Vocational Status [CB09]: Not Occupational
 g. Course Classification [CB11]: Y - Credit Course
 h. Special Class Status [CB13]: N - Not Special
 i. Course CAN Code [CB14]: *N/A*
 j. Course Prior to College Level [CB21]: Y = Not Applicable
 k. Course Noncredit Category [CB22]: Y - Not Applicable
 l. Funding Agency Category [CB23]: Y = Not Applicable
 m. Program Status [CB24]: 1 = Program Applicable

Name of Approved Program (*if program-applicable*): *N/A*

Attach listings of Degree and/or Certificate Programs showing this course as a required or a restricted elective.)

23. Enrollment - Estimate Enrollment

First Year: 0

Third Year: 0

24. Resources - Faculty - Discipline and Other Qualifications:

- a. Sufficient Faculty Resources: Yes
 b. If No, list number of FTE needed to offer this course: *N/A*

25. Additional Equipment and/or Supplies Needed and Source of Funding.

| |
|------------|
| <i>N/A</i> |
|------------|

26. Additional Construction or Modification of Existing Classroom Space Needed. (*Explain:*)

| |
|------------|
| <i>N/A</i> |
|------------|

27. FOR NEW OR SUBSTANTIALLY MODIFIED COURSES

CH 005-Bio-organic Chemistry

Library and/or Learning Resources Present in the Collection are Sufficient to Meet the Need of the Students Enrolled in the Course: Yes

28. Originator Robert Guinn Origination Date 10/08/16