Washtenaw Community College Comprehensive Report

CEM 140 Organic Biochemistry
Effective Term: Winter 2022

Course Cover

College: Math, Science and Engineering Tech
Division: Math, Science and Engineering Tech
Department: Chemistry
Discipline: Chemistry
Course Number: 140
Org Number: 12320
Full Course Title: Organic Biochemistry
Transcript Title: Organic Biochemistry
Is Consultation with other department(s) required: No
Publish in the Following: College Catalog , Time Schedule , Web Page
Reason for Submission: Three Year Review / Assessment Report
Change Information:
Outcomes/Assessment
Objectives/Evaluation
Rationale: The American Chemical Society (ACS) test was previously used for assessment and given on the last day of laboratory; now we will use common questions on unit tests in the course.
Proposed Start Semester: Fall 2021
Course Description: This course is an introduction to both organic chemistry and biochemistry for nursing and other health services students. Major topics covered are the structure and functional groups of organic compounds, structures of biological molecules, mechanism of enzyme-catalyzed reactions, metabolism and bioenergetics.

Course Credit Hours

Variable hours: No
Credits: 4
Lecture Hours: Instructor: 45 **Student:** 45
Lab: Instructor: 45 **Student:** 45
Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 90 **Student:** 90
Repeatable for Credit: NO
Grading Methods: Letter Grades
Audit
Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-level Reading & Writing

College-Level Math

Requisites

Prerequisite
CEM 105 minimum grade "C"
or

Prerequisite
CEM 111 minimum grade "C"

General Education

MACRAO
MACRAO Science & Math
MACRAO Lab Science Course
General Education Area 4 - Natural Science
Assoc in Applied Sci - Area 4
Assoc in Science - Area 4
Assoc in Arts - Area 4
Michigan Transfer Agreement - MTA
MTA Lab Science

Request Course Transfer

Proposed For:

Student Learning Outcomes

1. Characterize and name organic compounds as well as the reactions they undergo.
   Assessment 1
   Assessment Tool: Common, outcome-related questions on unit tests
   Assessment Date: Winter 2023
   Assessment Cycle: Every Two Years
   Course section(s)/other population: All students
   Number students to be assessed: All students
   How the assessment will be scored: Answer key
   Standard of success to be used for this assessment: 70% of students will score 70% or higher
   Who will score and analyze the data: Departmental faculty

2. Characterize the main classes of biomolecules (carbohydrates, lipids, proteins, and nucleic acids) and their biological functions.
   Assessment 1
   Assessment Tool: Common, outcome-related questions on unit tests
   Assessment Date: Winter 2023
   Assessment Cycle: Every Two Years
   Course section(s)/other population: All sections
   Number students to be assessed: All students
   How the assessment will be scored: Answer key
   Standard of success to be used for this assessment: 70% of students will score 70% or higher
   Who will score and analyze the data: Departmental faculty

3. Outline metabolic pathways and their regulation in the body, e.g. citric acid cycle, electron transport chain, glycolysis etc.
   Assessment 1
   Assessment Tool: Common, outcome-related questions on unit tests
   Assessment Date: Winter 2023
   Assessment Cycle: Every Two Years
   Course section(s)/other population: All sections
   Number students to be assessed: All students
   How the assessment will be scored: Answer key
   Standard of success to be used for this assessment: 70% of students will score 70% or higher
   Who will score and analyze the data: Departmental faculty

4. Follow the scientific process in the laboratory by properly collecting and recording data, calculating and analyzing results, and drawing conclusions based on the analyses.

Assessment 1

Assessment Tool: Lab reports
Assessment Date: Winter 2023
Assessment Cycle: Every Three Years
Course section(s)/other population: All
Number students to be assessed: All
How the assessment will be scored: Rubric
Standard of success to be used for this assessment: 70% of the students will score a 6 of 9 (67%) or higher
Who will score and analyze the data: Departmental faculty

Course Objectives

1. Name and draw organic compounds based on the International Union of Pure and Applied Chemistry (IUPAC) rules.
2. Predict physical and chemical properties based on structure.
3. Predict reaction products of major reaction types.
4. Define chirality, and identify chiral compounds and their enantiomeric and diastereomeric relationships.
5. Classify and draw Fischer and Haworth projections of carbohydrates, identify carbohydrates given structures, and describe their functions.
6. Identify the major classes of lipids, their hydrolysis products, and describe their functions.
7. Show how proteins are made up of amino acids, and relate the importance of their structure with their function.
8. Explain how enzymes work, how they are inhibited, and the types of reactions they catalyze.
9. Show how the genetic code results in particular proteins, and the general structure of nucleic acids.
10. Draw an outline of the common catabolic pathways, and where they occur in the cell.
11. Show how carbohydrates are metabolized and synthesized in the body.
12. Show the metabolism of fatty acids.
13. Outline the catabolic fate of amino acids.
14. Show the overall energy (ATP) production for each of the biomolecules.
15. Show how each of the macronutrients' metabolism is inter-related.
16. Briefly explain the pH balance of the blood, and the main buffers involved in homeostasis.
17. Observe laboratory safety procedures.
18. Keep a laboratory journal.
19. Interpret and follow written procedures.
20. Manipulate laboratory equipment to make measurements.
21. Make observations and collect data.
22. Interpret and summarize data and calculate results.
23. Draw conclusions based on experimental results.

New Resources for Course

Course Textbooks/Resources

Textbooks

Stoker, H. Stephen. *Organic and Biochemistry*, 5 ed. Cengage, 2017, ISBN: 9781285853918.

Manuals
Periodicals
Software

Equipment/Facilities

Level III classroom
Testing Center
Data projector/computer

Other: Chemistry laboratory

Reviewer	Action	Date
Faculty Preparer:		
Breege Concannon	*Faculty Preparer*	*Jul 09, 2021*
Department Chair/Area Director:		
Tracy Schwab	*Recommend Approval*	*Jul 12, 2021*
Dean:		
Victor Vega	*Recommend Approval*	*Jul 20, 2021*
Curriculum Committee Chair:		
Randy Van Wagnen	*Recommend Approval*	*Sep 23, 2021*
Assessment Committee Chair:		
Shawn Deron	*Recommend Approval*	*Oct 01, 2021*
Vice President for Instruction:		
Kimberly Hurns	*Approve*	*Oct 10, 2021*