

## Washtenaw Community College Comprehensive Report

### CEM 140 Organic Biochemistry Effective Term: Fall 2017

#### Course Cover

**Division:** Math, Science and Engineering Tech

**Department:** Physical Sciences

**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:**

**Consultation with all departments affected by this course is required.**

**Outcomes/Assessment**

**Objectives/Evaluation**

**Other:**

**Rationale:** 3 year syllabus review

**Proposed Start Semester:** Fall 2017

**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, and the reactions they undergo.

**Assessment 1**

Assessment Tool: ACS test

Assessment Date: Winter 2017

Assessment Cycle: Every Three Years

Course section(s)/other population: all

Number students to be assessed: all

How the assessment will be scored: Test will be scored according to ACS standards, it is all multiple-choice.

Standard of success to be used for this assessment: 70% of the students must score 70% or higher on the test.

Who will score and analyze the data: Full-time faculty

2. Characterize the main classes of biomolecules; carbohydrates, lipids, proteins, and nucleic acids, and their biological functions.

**Assessment 1**

Assessment Tool: ACS test

Assessment Date: Winter 2017

Assessment Cycle: Every Three Years

Course section(s)/other population: all

Number students to be assessed: all

How the assessment will be scored: Test will be scored according to ACS standards, it is all multiple-choice.

Standard of success to be used for this assessment: 70% of the students must score 70% or higher on the test.

Who will score and analyze the data: Full-time faculty

3. Briefly outline metabolic pathways and their regulation in the body, e.g. citric acid cycle, electron transport chain, glycolysis etc.

**Assessment 1**

Assessment Tool: ACS test

Assessment Date: Winter 2017

Assessment Cycle: Every Three Years

Course section(s)/other population: all

Number students to be assessed: all

How the assessment will be scored: Test will be scored according to ACS standards, it is all multiple-choice.

Standard of success to be used for this assessment: 70% of the students must score 70% or higher on the test.

Who will score and analyze the data: Full-time 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: Fall 2020

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: Chemistry faculty

### **Course Objectives**

1. Name and draw organic compounds based on 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

Ball, David. *General, organic and biological chemistry*, 1 ed. Baylor foundation, 2011, ISBN: 13:978-1-4533.

Manuals

Periodicals

Software

**Equipment/Facilities**

Level III classroom

Testing Center

Data projector/computer

Other: Chemistry laboratory

<b><u>Reviewer</u></b>	<b><u>Action</u></b>	<b><u>Date</u></b>
<b>Faculty Preparer:</b> <i>Breege Concannon</i>	<i>Faculty Preparer</i>	<i>Nov 21, 2016</i>
<b>Department Chair/Area Director:</b> <i>Kathleen Butcher</i>	<i>Recommend Approval</i>	<i>Jan 03, 2017</i>
<b>Dean:</b> <i>Kristin Good</i>	<i>Recommend Approval</i>	<i>Jan 06, 2017</i>
<b>Curriculum Committee Chair:</b> <i>David Wooten</i>	<i>Recommend Approval</i>	<i>Feb 16, 2017</i>
<b>Assessment Committee Chair:</b> <i>Ruth Walsh</i>	<i>Recommend Approval</i>	<i>Feb 27, 2017</i>
<b>Vice President for Instruction:</b> <i>Kimberly Hurns</i>	<i>Approve</i>	<i>Mar 07, 2017</i>