

## Washtenaw Community College Comprehensive Report

### BIO 215 Cell and Molecular Biology Effective Term: Winter 2020

#### Course Cover

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

**Department:** Life Sciences

**Discipline:** Biology

**Course Number:** 215

**Org Number:** 12100

**Full Course Title:** Cell and Molecular Biology

**Transcript Title:** Cell and Molecular Biology

**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.**

**Course description**

**Outcomes/Assessment**

**Rationale:** Change of prerequisites based on new majors sequence being added in the department.

**Proposed Start Semester:** Fall 2019

**Course Description:** In this course, students explore the smallest unit of living things, the cell, at the molecular and genetic level. A comparative cellular examination of the three domains of life (Archaea, Bacteria and Eukarya) provides an understanding of similarities of cells, while further study investigates differentiation and variation which leads to the diversity of life. Molecular pathways are dissected in both prokaryotic and eukaryotic cells focusing on their regulation and control. DNA technology, including genetic analysis of genomes, genetic engineering, gene therapy and cloning are also investigated.

Laboratory topics focus on cell types and differentiation, enzymatic specificity and control, cellular respiration and DNA/molecular techniques.

#### 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**

BIO 161 minimum grade "C"

or

**Prerequisite**

BIO 162 minimum grade "C"

and

**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. Identify basic biological concepts in biochemistry.

**Assessment 1**

Assessment Tool: Written questions on the unit exam

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: Answer key and rubric

Standard of success to be used for this assessment: 75% of students will score 75% or higher

Who will score and analyze the data: Departmental faculty

2. Describe the characteristics of the three domains.

**Assessment 1**

Assessment Tool: Written questions on the unit exam

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: Answer key and rubric

Standard of success to be used for this assessment: 75% of students will score 75% or higher

Who will score and analyze the data: Departmental faculty

3. Explain the major biological pathways.

**Assessment 1**

Assessment Tool: Written questions on the unit exam

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: Answer key and rubric  
Standard of success to be used for this assessment: 75% of students will score 75% or higher  
Who will score and analyze the data: Departmental faculty

4. Identify significant historical events in the development of molecular lab techniques.

**Assessment 1**

Assessment Tool: Matching and short answer questions on the unit exam  
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: Answer key and rubric  
Standard of success to be used for this assessment: 75% of students will score 75% or higher  
Who will score and analyze the data: Departmental faculty

5. Perform a variety of molecular lab techniques and explain their significance.

**Assessment 1**

Assessment Tool: Short answer questions on the unit exam  
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: 75% of students will score 75% or higher  
Who will score and analyze the data: Departmental faculty

6. Present lab research in scientific format.

**Assessment 1**

Assessment Tool: Evaluation of written and/or oral presentation in scientific format  
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: 75% of students will score 75% or higher  
Who will score and analyze the data: Departmental faculty

**Course Objectives**

1. Explore the hierarchy of life.
2. Explain the emergent properties of life science systems.
3. Distinguish between living organisms by grouping them into the three domains.
4. Explain evolution as the unifying theme of biology.
5. Use inquiry as a way of exploring living organisms.
6. Explain the properties of atoms, bonds and elements.
7. Distinguish between carbohydrates, lipids, proteins and nucleic acids, and discuss their functions in cells.
8. Explain the properties of water and pH.
9. Discuss the characteristics and unique properties of Archaea.
10. Discuss the characteristics of and unique properties of Bacteria.
11. Discuss the characteristics and unique properties of Eukaryotic cells.
12. Compare and contrast the cells of the three domains.
13. Compare and contrast plant cells, fungal cells and animal cells.

14. Discuss the formation of tissues in eukaryotic multicellular organisms.
15. Detail the process of cellular respiration.
16. Detail the process of photosynthesis.
17. Detail the process of gene expression in both prokaryotes and eukaryotes.
18. Detail the processes of cell communications.
19. Explain the control mechanisms of the cell cycle in both prokaryotes and eukaryotes (both mitosis and meiosis).
20. Discuss the genetic basis of development.
21. Review the evolution of molecular biological techniques.
22. Identify researchers who were (and continue to be) instrumental in the development of molecular techniques.
23. Describe the various molecular techniques in historical context, and their expanding present applications.
24. Have students perform lab techniques possibly including, but not limited to: a) light microscope, b) micropipeting, c) PCR, d) restriction digestion, e) DNA extraction, f) spectrometry, g) chromatography, h) bacterial transformation, i) molecular hybridization, j) gene cloning, k) ELISA testing, and l) DNA fingerprinting.
25. Prepare a lab research paper based on student-generated experimental design in scientific format, including literature search and bibliography.
26. Orally present their research findings and its scientific significance to the class.

## New Resources for Course

### Course Textbooks/Resources

Textbooks  
Manuals  
Periodicals  
Software

### Equipment/Facilities

Level I classroom

<u>Reviewer</u>	<u>Action</u>	<u>Date</u>
<b>Faculty Preparer:</b> <i>Brad Metz</i>	<i>Faculty Preparer</i>	<i>Nov 19, 2018</i>
<b>Department Chair/Area Director:</b> <i>Anne Heise</i>	<i>Recommend Approval</i>	<i>Nov 20, 2018</i>
<b>Dean:</b> <i>Kristin Good</i>	<i>Recommend Approval</i>	<i>Nov 26, 2018</i>
<b>Curriculum Committee Chair:</b> <i>Lisa Veasey</i>	<i>Recommend Approval</i>	<i>Sep 14, 2019</i>
<b>Assessment Committee Chair:</b> <i>Shawn Deron</i>	<i>Recommend Approval</i>	<i>Sep 20, 2019</i>
<b>Vice President for Instruction:</b> <i>Kimberly Hurns</i>	<i>Approve</i>	<i>Sep 26, 2019</i>