

Washtenaw Community College Comprehensive Report

BIO 215 Cell and Molecular Biology Effective Term: Spring/Summer 2022

Course Cover

College: Math, Science and Engineering Tech

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:

Other:

Rationale: No major updates to the master syllabus. Book change: I want to change the current textbook, which I did not require, to an OER version. Cell and Molecular Biology by Gerald Bergtrom.

Proposed Start Semester: Fall 2021

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: Outcome-related written questions on the unit exam

Assessment Date: Fall 2024

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: Outcome-related written questions on the unit exam

Assessment Date: Fall 2024

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: Outcome-related written questions on the unit exam

Assessment Date: Fall 2024

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: Outcome-related matching and short answer questions on the unit exam
Assessment Date: Fall 2024
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: Outcome-related short answer questions on the unit exam
Assessment Date: Fall 2024
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 a scientific format.

Assessment 1

Assessment Tool: Evaluation of written and/or oral presentation in scientific format
Assessment Date: Fall 2024
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 80% 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 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

Bregtrom, G. *Cell and Molecular Biology What We Know & How We Found Out*, ed. University of Wisconsin, Milwaukee, 2018, ISBN: 9790996150248.

Manuals

Periodicals

Software

Equipment/Facilities

Level I classroom

<u>Reviewer</u>	<u>Action</u>	<u>Date</u>
Faculty Preparer: <i>Brad Metz</i>	<i>Faculty Preparer</i>	<i>Aug 23, 2021</i>
Department Chair/Area Director: <i>Anne Heise</i>	<i>Recommend Approval</i>	<i>Aug 24, 2021</i>
Dean: <i>Victor Vega</i>	<i>Recommend Approval</i>	<i>Aug 26, 2021</i>
Curriculum Committee Chair: <i>Randy Van Wagnen</i>	<i>Recommend Approval</i>	<i>Dec 07, 2021</i>
Assessment Committee Chair: <i>Shawn Deron</i>	<i>Recommend Approval</i>	<i>Dec 08, 2021</i>
Vice President for Instruction: <i>Kimberly Hurns</i>	<i>Approve</i>	<i>Dec 08, 2021</i>

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.

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