

BIOLOGY - MICROBIOLOGICAL, MOLECULAR, AND BIOMEDICAL SCIENCES - ASSOCIATE OF SCIENCE DEGREE (AS)

Degree Quick Facts

- **Instructional School:** Math and Science
- **Department:** Biological Sciences
- **Program Code:** BIOL-MMBS.AS
- **Program Type:** Academic Transfer
- **Available Fully Online:** No
- **Eligible for Federal Financial Aid:** Yes

Explore More About This Program: <https://cwi.edu/program/biology>

Degree Requirements

Course	Course Title	Min Credits
General Education Requirements		
<i>Complete the following course to fulfill the Connecting with Ideas requirement:</i>		
CWI 101	Connecting With Ideas	3
<i>Complete the following courses to fulfill the GEM 1 requirement:</i>		
<u>GEM 1 - Written Communication course</u>		3
<u>GEM 1 - Written Communication course</u>		3
<i>Complete the following course to fulfill the GEM 2 requirement:</i>		
<u>GEM 2 - Oral Communication course</u>		2
<i>Complete one of the following courses to fulfill the GEM 3 requirement:</i>		
Select one of the following:		3-5
MATH 143	College Algebra	
MATH 147	College Algebra and Trigonometry	
MATH 160	Survey of Calculus	
MATH 170	Calculus I	
<i>Complete the following courses to fulfill the GEM 4 requirement:</i>		
BIOL 111	Biology I	3
BIOL 111L	Biology I Lab	1
Select one of the following options:		4
Option 1:		
CHEM 101	Introduction to Chemistry ¹	
CHEM 101L	Introduction to Chemistry Lab ¹	
Option 2:		
CHEM 111	General Chemistry I ¹	
CHEM 111L	General Chemistry I Lab ¹	
<i>Complete the following courses to fulfill the GEM 5 requirement:</i>		
<u>GEM 5 - Humanistic & Artistic Ways of Knowing course</u>		3
<u>GEM 5 - Humanistic & Artistic Ways of Knowing course</u> ²		3
<i>Complete the following courses to fulfill the GEM 6 requirement:</i>		
SCIE 102	Ethics in Science ³	3
<u>GEM 6 - Social & Behavioral Ways of Knowing course</u> ²		3
<i>Complete the following course to fulfill the Global Perspectives requirement:</i>		
MMBS 106	Making Sense of the Micro-biotic-me	3
Major Requirements		
BIOL 112	Biology II	3
BIOL 112L	Biology II Lab	1
CHEM 111	General Chemistry I ⁴	3
CHEM 111L	General Chemistry I Lab ⁴	1

CHEM 112	General Chemistry II	3
CHEM 112L	General Chemistry II Lab	2
Select one of the following options:		4
Option 1:		
MMBS 250	General Microbiology	
MMBS 250L	General Microbiology Lab	
Option 2:		
MMBS 260	Introduction to Cell Biology	
MMBS 260L	Introduction to Cell Biology Lab	
MMBS 280	Genetics	3
MMBS 280L	Genetics Lab	1
Select 0-6 credits from the Major Electives course list below to bring the total credits earned to 60, if needed		0-6

Minimum Credit Hours Required **60**

- ¹ Students who have prior experience with chemistry are strongly encouraged to take the Chemistry Placement exam at the CWI Assessment Center. Passing the Chemistry Placement exam will allow students to register directly into CHEM 111 General Chemistry I and will enable them to complete additional credits from the Major Electives list.
- ² Course must come from a different discipline.
- ³ This course fulfills the Ethical Reasoning requirement for an associate degree from CWI.
- ⁴ If students completed CHEM 111 General Chemistry I to fulfill their GEM 4 requirement, they must take an additional four (4) credits of coursework from the Major Electives course list below.

Biology - Microbiological, Molecular, and Biomedical Sciences: Major Electives

Course	Course Title	Min Credits
BIOL 104	Professions in Biology	3
BIOL 113	Biology III: Principles of Structure and Function	3
BIOL 113L	Biology III: Principles of Structure and Function Lab	1
BIOL 227	Human Anatomy and Physiology I	3
BIOL 227L	Human Anatomy and Physiology I Lab	1
BIOL 293	Biology Internship	1-3
CHEM 253	Quantitative Analysis	3
CHEM 253L	Quantitative Analysis Lab	2
CHEM 298	Organic Chemistry I	3
CHEM 298L	Organic Chemistry I Lab	2
ENGL 202	Technical Communication	3
ENVI 260	General Ecology	3
ENVI 260L	General Ecology Lab	1
MATH 144	Trigonometry	2
MATH 147	College Algebra and Trigonometry	5
MATH 153	Statistical Reasoning	3
MATH 170	Calculus I	5
MATH 175	Calculus II	4
MMBS 250	General Microbiology	3
MMBS 250L	General Microbiology Lab	1
MMBS 260	Introduction to Cell Biology	3
MMBS 260L	Introduction to Cell Biology Lab	1
MMBS 270	Introduction to Pharmacology	3
PHYS 111	General Physics I	3
PHYS 111L	General Physics I Lab	1
SCIE 225	Essential Principles of Scientific Research	1

Plan of Study Guide

The course sequence listed below is strongly recommended in order to complete your program requirements. Please register for each semester as shown using the Student Planning tool in myCWI. Plans may be modified to fit the needs of part-time students by adding additional semesters. Consult your Student Success Advisor for any questions regarding this course sequence plan.

First Year

Fall		Credit Hours
BIOL 111	Biology I (GEM 4)	3
BIOL 111L	Biology I Lab (GEM 4)	1
Select one of the following options (GEM 4):		4
Option 1:		
CHEM 101	Introduction to Chemistry	
CHEM 101L	Introduction to Chemistry Lab	
Option 2:		
CHEM 111	General Chemistry I	
CHEM 111L	General Chemistry I Lab	
CWI 101	Connecting With Ideas	3
Select one of the following (GEM 3):		3-5
MATH 143	College Algebra	
MATH 147	College Algebra and Trigonometry	
MATH 160	Survey of Calculus	
MATH 170	Calculus I	
Total Semester Credit Hours		14

Spring

BIOL 112	Biology II ²	3
BIOL 112L	Biology II Lab ²	1
CHEM 111	General Chemistry I ³	3
CHEM 111L	General Chemistry I Lab ³	1
ENGL 101	Writing and Rhetoric I (GEM 1)	3
SCIE 102	Ethics in Science (GEM 6) ⁴	3
GEM 2 - Oral Communication course		2
Total Semester Credit Hours		16

Second Year

Fall		Credit Hours
CHEM 112	General Chemistry II	3
CHEM 112L	General Chemistry II Lab	2
ENGL 102	Writing and Rhetoric II (GEM 1)	3
Select one of the following options:		4
Option 1:		
MMBS 250	General Microbiology ⁵	
MMBS 250L	General Microbiology Lab ⁵	
Option 2:		
MMBS 260	Introduction to Cell Biology ⁵	
MMBS 260L	Introduction to Cell Biology Lab ⁵	
GEM 5 - Humanistic & Artistic Ways of Knowing course		3
Total Semester Credit Hours		15

Spring

MMBS 106	Making Sense of the Micro-biotic-me (Global Perspectives)	3
MMBS 280	Genetics ⁶	3
MMBS 280L	Genetics Lab ⁶	1
GEM 5 - Humanistic & Artistic Ways of Knowing course ⁷		3

GEM 6 - Social & Behavioral Ways of Knowing course ⁶		3
Major Electives	Select 0-6 credits from the list below to bring the total credits earned to 60, if needed ⁸	0-6
Total Semester Credit Hours		15
Minimum Credit Hours Required		60

- ¹ Students who have prior experience with chemistry are strongly encouraged to take the Chemistry Placement exam at the CWI Assessment Center. Passing the Chemistry Placement exam will allow students to register directly into CHEM 111 General Chemistry I and will enable them to complete additional credits from the Major Electives list.
- ² BIOL 112 and BIOL 112L are best taken within a semester of completing BIOL 111 and BIOL 111L to ensure greater success.
- ³ If CHEM 111 General Chemistry I was completed to fulfill your GEM 4 requirement, you should complete four (4) credits of coursework from the Major Electives course list instead.
- ⁴ This course fulfills the Ethical Reasoning requirement for an associate degree from CWI.
- ⁵ MMBS 250 and MMBS 250L are only offered in the Spring. MMBS 260 and MMBS 260L are not offered on a consistent basis. Depending on your start term and desired course, you may choose to take a course from the Major Electives list below in your third semester and the required MMBS course in your fourth semester.
- ⁶ MMBS 280 and MMBS 280L are only offered in spring. Depending on your start term you may be required to take your capstone course in your third semester and the second GEM 5 or GEM 6 course in your fourth semester.
- ⁷ Course must come from a different discipline.
- ⁸ See catalog and possible transfer institution for elective options. To determine which elective is appropriate, consult your advisor and refer to the applicable 2+2 guide.

Biology - Microbiological, Molecular, and Biomedical Sciences: Major Electives

Course	Course Title	Min Credits
BIOL 104	Professions in Biology	3
BIOL 113	Biology III: Principles of Structure and Function	3
BIOL 113L	Biology III: Principles of Structure and Function Lab	1
BIOL 227	Human Anatomy and Physiology I	3
BIOL 227L	Human Anatomy and Physiology I Lab	1
BIOL 293	Biology Internship	1-3
CHEM 253	Quantitative Analysis	3
CHEM 253L	Quantitative Analysis Lab	2
CHEM 298	Organic Chemistry I	3
CHEM 298L	Organic Chemistry I Lab	2
ENGL 202	Technical Communication	3
ENVI 260	General Ecology	3
ENVI 260L	General Ecology Lab	1
MATH 144	Trigonometry	2
MATH 147	College Algebra and Trigonometry	5
MATH 153	Statistical Reasoning	3
MATH 170	Calculus I	5
MATH 175	Calculus II	4
MMBS 250	General Microbiology	3
MMBS 250L	General Microbiology Lab	1
MMBS 260	Introduction to Cell Biology	3
MMBS 260L	Introduction to Cell Biology Lab	1
MMBS 270	Introduction to Pharmacology	3
PHYS 111	General Physics I	3
PHYS 111L	General Physics I Lab	1
SCIE 225	Essential Principles of Scientific Research	1

Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Know evolution, biology's core theme, as a pattern and a process and understand relationships that characterize the diversity of microbial organisms. *(Addresses V&C Con 1)*
- Know and apply the concepts of structure and function; information flow, exchange, and storage; and pathways and transformations of energy and matter in microbial organisms. *(Addresses V&C Con 2, 3, 4)*
- Apply the scientific method, quantitative reasoning, and modeling to analyze and evaluate problems in microbiology. *(Addresses V&C Comp 1, 2, 3)*
- Recognize the interdisciplinary nature of science, communicate and collaborate with others, and understand the relationship between microbiology and critical issues affecting human populations. *(Addresses V&C Comp 4, 5, 6)*

(Outcomes map to Vision and Change [V&C] Core Concepts published by the National Science Foundation and the American Association for the Advancement of Science 2011.)

NOTE: These outcomes apply to all students graduating with a Biological Sciences degree. Specific degrees may have additional and/or specialized outcomes.