



2016-2017 PETITION/PROGRAM SHEET

Degree: Bachelor of Science
Major: Biological Sciences
Concentration: Cellular, Molecular, and Developmental Biology

About This Major . . .

The Bachelor of Science degree with a Biological Sciences major provides a broad background in the biological sciences. Students choose biology courses from four categories: cellular, molecular, and developmental biology; anatomical and physiological biology; organismal biology; and ecology, evolution, and systematics.

For more information on what you can do with this major, go to http://www.coloradomesa.edu/career/whatmajor.html

All CMU baccalaureate graduates are expected to demonstrate proficiency in critical thinking, communication fluency, quantitative fluency, and specialized knowledge/applied learning. In addition to these campus-wide student learning outcomes, graduates of this major will be able to:

- 1. Demonstrate a breadth of knowledge in the life sciences with an accompanying depth of knowledge particularly in the key areas of cell and molecular biology, ecology, evolution, and genetics. (Specialized Knowledge)
2. Utilize the scientific approach to address novel questions and problems through the development of hypotheses, design of experiments, collection of data, analysis of data, and interpretation of results. (Quantitative Fluency/Applied Learning)
3. Identify, examine, evaluate, and discuss the scientific literature. (Critical Thinking)
4. Articulate biological principles and ideas effectively, both in written and oral form. (Communication Fluency)

NAME: \_\_\_\_\_ STUDENT ID #: \_\_\_\_\_

LOCAL ADDRESS AND PHONE NUMBER: \_\_\_\_\_

\_\_\_\_\_ ( ) \_\_\_\_\_

I, (Signature) \_\_\_\_\_, hereby certify that I have completed (or will complete) all the courses listed on the Program Sheet. I have read and understand the policies listed on the last page of this program sheet. I further certify that the grade listed for those courses is the final course grade received except for the courses in which I am currently enrolled and the courses which I complete next semester. I have indicated the semester in which I will complete these courses.

Signature of Advisor \_\_\_\_\_ Date \_\_\_\_\_ 20\_\_\_\_\_

Signature of Department Head \_\_\_\_\_ Date \_\_\_\_\_ 20\_\_\_\_\_

Signature of Registrar \_\_\_\_\_ Date \_\_\_\_\_ 20\_\_\_\_\_

**DEGREE REQUIREMENTS:**

- 120 semester hours total (Students must complete a minimum of 30 of the last 60 hours of credit at CMU, with at least 15 semester hours in major discipline courses numbered 300 or higher).
- 40 upper division credits (A minimum of 15 taken at the 300-400 course levels within the major at CMU).
- 2.00 cumulative GPA or higher in all CMU coursework.
- A 2.5 GPA is required in the major courses. A "C" or higher is required in all major courses.
- Pre-collegiate courses (usually numbered below 100) cannot be used for graduation.
- A student must follow the CMU graduation requirements either from 1) the program sheet for the major in effect at the time the student officially declares a major; or 2) a program sheet for the major approved for a year subsequent to the year during which the student officially declares the major and is approved for the student by the department head. Because a program may have requirements specific to the degree, the student should check with the faculty advisor for additional criteria. It is the student's responsibility to be aware of, and follow, all requirements for the degree being pursued. Any exceptions or substitutions must be approved by the student's faculty advisor and Department Head.
- When filling out the program sheet a course can be used only once.
- Essential Learning Capstone should be completed between 45 and 75 hours.
- See the "Requirements for Undergraduate Degrees and Certificates" in the catalog for additional graduation information.

**ESSENTIAL LEARNING REQUIREMENTS** (31 semester hours)

See the current catalog for a list of courses that fulfill the requirements below. If a course is an Essential Learning option and a requirement for your major, you must use it to fulfill the major requirement and make a different selection for the Essential Learning requirement.

Course No	Title	Sem.hrs	Grade	Term/Trns
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**English** (6 semester hours, must receive a grade of "C" or better and must be completed by the time the student has 60 semester hours.)

ENGL 111	English Composition	3	_____	_____
ENGL 112	English Composition	3	_____	_____

**Math** (3 semester hours, must receive a grade of "C" or better and must be completed by the time the student has 60 semester hours.)

MATH 151	Calculus I	5*	_____	_____
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\*3 credits apply to the Essential Learning requirements and 2 credits apply to electives

**Humanities** (3 semester hours)

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**Social and Behavioral Sciences** (6 semester hours)

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**Natural Sciences** (7 semester hours, one course must include a lab.)

CHEM 131/131L and CHEM 132/132L are recommended. Both are prerequisites for upper level chemistry. If chosen, 7 credits apply to the Essential Learning requirement and 3 credits apply to electives.

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**History** (3 semester hours)

HIST	_____	_____	_____	_____
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**Fine Arts** (3 semester hours)

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**WELLNESS REQUIREMENT** (2 semester hours)

KINE 100	Health and Wellness	1	_____	_____
KINA 1	_____	1	_____	_____

**ESSENTIAL LEARNING CAPSTONE** (4 semester hours)

ESSL 290	Maverick Milestone (see English & math pre-reqs)	3	_____	_____
ESSL 200	Essential Speech (co-requisite)	1	_____	_____

**FOUNDATION COURSES** (17-19 semester hours) Must receive a grade of "C" or better and should be completed by the end of the sophomore year.

BIOL 105	Attributes of Living Systems	3	_____	_____
BIOL 105L	Attributes of Living Systems Lab	1	_____	_____
PHYS 111*	General Physics I	4	_____	_____
PHYS 111L*	General Physics I Lab	1	_____	_____
PHYS 112*	General Physics II	4	_____	_____
PHYS 112L*	General Physics II Lab	1	_____	_____
STAT 200	Probability and Statistics	3	_____	_____
OR MATH 152	Calculus II	5	_____	_____

\*A higher level subject can be taken in the same category with advisor approval.

**BIOLOGICAL SCIENCES MAJOR REQUIREMENTS**

(53 semester hours) A 2.5 GPA is required in the major courses. A "C" or better is required in all major courses.

**Required Core Courses** (10 semester hours)

BIOL 208	Fundamentals of Ecology and Evolution	3	_____	_____
BIOL 208L	Fundamentals of Ecology and Evolution Lab	1	_____	_____
BIOL 301	Principles of Genetics	3	_____	_____
BIOL 301L	Principles of Genetics Lab	1	_____	_____
BIOL 483	Senior Thesis	2	_____	_____

**Required Related Study Area** (31 semester hours)

BIOL 102	Plant & Animal Biodiversity	3	_____	_____
BIOL 102L	Plant & Animal Biodiversity Lab	1	_____	_____
OR BIOL 108	Diversity of Organisms	3	_____	_____
BIOL 108L	Diversity of Organisms Lab	1	_____	_____
BIOL 302	Cellular Biology	3	_____	_____
BIOL 310	Developmental Biology	3	_____	_____
BIOL 310L	Developmental Biology Lab	2	_____	_____
BIOL 371L	Laboratory Investigations in Cellular & Molecular Biology I	3	_____	_____
CHEM 315	Biochemistry I	3	_____	_____
BIOL 425	Molecular Genetics	3	_____	_____
CHEM 311†	Organic Chemistry I	4	_____	_____
CHEM 311L†	Organic Chemistry I Lab	1	_____	_____
CHEM 312†	Organic Chemistry II	4	_____	_____
CHEM 312L†	Organic Chemistry II Lab	1	_____	_____

† CHEM 311/311L and 312/312L require CHEM 131/131L and 132/132L as prerequisites. Students should take CHEM 131/131L and 132/132L for the Essential Learning Natural Sciences.

Course No	Title	Sem.hrs	Grade	Term/Trns
<b>Additional Biology Courses</b> (12 semester hours chosen from the lists below)				

Course No	Title	Sem.hrs	Grade	Term/Trns
<b>Electives</b> (11-13 semester hours) (All college level courses appearing on your final transcript, <b>not listed above</b> , that will bring your total semester hours to 120 hours, including 40 upper division hours.) Up to 7 upper division hours may be needed. Research courses are recommended.				
MATH 151	Calculus I	2*		
CHEM 131/131L/132/132L		3*		

- Category 1: Cellular, Molecular, and Developmental**  
 BIOL 343 Immunology (3)  
 BIOL 344/344L Forensic Molecular Biology and Lab (3) / (1)  
 BIOL 442 Pharmacology (3)  
 CHEM 315L Biochemistry I Lab (1)  
 CHEM 316 Biochemistry II (3)

- Category 2: Organismal**  
 BIOL 250/250L Intro to Microbiology and Lab (3) / (2)  
 BIOL 316/316L Animal Behavior and Lab (3) / (1)  
 BIOL 322/322L Plant Identification and Lab (2) / (2)  
 BIOL 331/331L Insect Biology and Lab (3) / (2)  
 BIOL 333 Marine Biology (3)  
 BIOL 335/335L Invertebrate Zoology and Lab (3) / (1)  
 BIOL 336/336L Fish Biology and Lab (3) / (1)  
 BIOL 350/350L Microbiology and Lab (3) / (1)  
 BIOL 411/411L Mammalogy and Lab (3) / (1)  
 BIOL 412/412L Ornithology and Lab (3) / (1)  
 BIOL 413/413L Herpetology and Lab (3) / (1)  
 BIOL 421 Plant Physiology and Lab (3) / (1)  
 BIOL 431/431L Animal Parasitology and Lab (3) / (1)  
 BIOL 433 Marine Invertebrate Communities (3)  
 BIOL 450/450L Mycology and Lab (3) / (2)

- Category 3: Anatomical and Physiological**  
 BIOL 209/209L Human Anatomy & Physiology I and Lab (3) / (1)  
 BIOL 210/210L Human Anatomy & Physiology II and Lab (3) / (1)  
 BIOL 241 Pathophysiology (4)  
 BIOL 341/341L General Physiology and Lab (3) / (1)  
 BIOL 342/342L Histology and Lab (2) / (2)  
 BIOL 409/409L Gross and Developmental Human Anatomy (2) / (2)  
 BIOL 410/410L Human Osteology and Lab (3) / (1)  
 †BIOL 421/421L Plant Physiology and Lab (3) / (1)  
 BIOL 423/423L Plant Anatomy and Lab (3) / (2)  
 BIOL 426/426L Intro to Electron Microscopy and Lab (2) / (2)  
 BIOL 441 Endocrinology (3)

- Category 4: Ecology, Evolution, and Systematics**  
 BIOL 211/211L Ecosystem Biology and Lab (4) / (1)  
 BIOL 315 Epidemiology (3)  
 BIOL 320 Plant Systematics (3)  
 BIOL 321/321L Taxonomy of Grasses and Lab (2) / (2)  
 BIOL 403 Evolution (3)  
 BIOL 405/405L Adv. Ecological Methods and Lab (3) / (2)  
 BIOL 406 Plant-Animal Interactions (3)  
 BIOL 407 Tropical Field Biology (3-5)  
 BIOL 408 Desert Ecology (3)  
 BIOL 414/414L Aquatic Biology and Lab (3) / (1)  
 BIOL 415 Tropical Ecosystems (2)  
 BIOL 418/418L Wildlife Management and Lab (3) / (2)

NOTE: Topics courses (BIOL 196/296/396/496) as well as research courses (BIOL 387/487), internships (BIOL 499), teaching practicum (BIOL 493), and independent study (BIOL 495) may not be used as Additional Biology Courses but must be used for elective credit.

## SUGGESTED COURSE SEQUENCING FOR A MAJOR IN BIOLOGICAL SCIENCES – CELLULAR, MOLECULAR, AND DEVELOPMENTAL BIOLOGY

This is a recommended sequence of course work. Certain courses may have prerequisites or are offered only during the fall or spring semesters. It is the student's responsibility to meet with the assigned advisor and check the 2-year course planning matrix on the Colorado Mesa website for course availability.

### FRESHMAN YEAR

Fall Semester	Hours	Spring Semester	Hours
BIOL 105	3	BIOL 102	3
BIOL 105L	1	OR BIOL 108	3
ESSL	4	BIOL 102L	1
(CHEM 131	1	OR BIOL 108L	3
(CHEM 131L	5	ESSL	4
MATH 151*	1	(CHEM 132	1
KINE 100	15	(CHEM 132L	3-5
		STAT 200	3
		OR MATH 152	15-17
		ENGL 111	15-17

\*Professional schools (medical, veterinary, dental) may require one or two semesters of calculus. Math 151 and 152 will fulfill the MATH requirement.

### SOPHOMORE YEAR

Fall Semester	Hours	Spring Semester	Hours
BIOL 208	3	BIOL 301	3
BIOL 208L	1	BIOL 301L	1
CHEM 311	4	CHEM 312	4
CHEM 311L	1	CHEM 312L	1
ENGL 112	3	ESSL	3
ESSL	3	ESSL	3
	15		15

### JUNIOR YEAR

Fall Semester	Hours	Spring Semester	Hours
BIOL 302	3	BIOL 310	3
PHYS 111	4	BIOL 310L	2
PHYS 111L	1	PHYS 112	4
CHEM 315	3	PHYS 112L	1
ESSL 290	3	ESSL	3
ESSL 200	1	KINA	14
	15		14

Take MCAT in spring or early fall of senior year for following fall admission for medical school.

### SENIOR YEAR

Fall Semester	Hours	Spring Semester	Hours
BIOL 371L	3	BIOL 425	3
ESSL	3	BIOL 483	2
BIOL XXX (selected from list)	4	BIOL XXX (selected from list)	8
Electives*	5	Electives*	1-3
	15		14-16

#### POLICIES:

1. Please see the catalog for a complete list of graduation requirements.
2. This program sheet must be submitted with your graduation planning sheet to your advisor during the **semester prior to the semester of graduation, no later than October 1 for spring graduates, no later than March 1 for fall graduates.** You must turn in your "Intent to Graduate" form to the Registrar's Office **by September 15 if you plan to graduate the following May, and by February 15 if you plan to graduate the following December.**
3. Your advisor will sign and forward the Program Sheet and Graduation Planning Sheet to the Department Head for signature. Finally, the Department Head will submit the signed forms to the Registrar's Office. (Students cannot handle the forms once the advisor signs.)
4. If your petition for graduation is denied, it will be your responsibility to reapply for graduation in a subsequent semester. Your "Intent to Graduate" does not automatically move to a later graduation date.
5. NOTE: During your senior year, you will be required to take a capstone exit assessment/project (e.g., Major Field Achievement Test).