

BIOLOGY, BIOLOGICAL SCIENCES (BS)

Degree: Bachelor of Science
Major: Biological Sciences
Concentration: Biology
Program Code: 3410

About This Major . . .

The Bachelor of Science degree with a Biological Science major provides a broad background in the biological sciences. Students choose biology courses from four areas: cell, developmental, and molecular biology; anatomical and physiological biology; organismal biology; and ecology, evolution, and systematics. Students wishing to obtain teacher certification complete a concentration in Teacher Licensure. The Biology Concentration also offers field courses on tropical ecosystems in Ecuador and on marine invertebrate communities in Oregon. The Department of Biology operates the only electron microscope facility in the area. Graduates of our program pursue careers in the medical field, plant pathology, wildlife biology, cell biology or biotechnology, among just a few of the career options available with a Biology degree from Colorado Mesa University.

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 specialized knowledge/applied learning, quantitative fluency, communication fluency, critical thinking, personal and social responsibility, and information literacy. 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, organismal diversity, 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)

Institutional Degree Requirements

The following institutional degree requirements apply to all CMU baccalaureate degrees. Specific programs may have different requirements that must be met in addition to institutional requirements.

- 120 semester hours minimum.
- 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 (an alternative credit limit applies to the Bachelor of Applied Science degree).
- 2.00 cumulative GPA or higher in all CMU coursework.

- A course may only be used to fulfill one requirement for each degree/certificate.
- No more than six semester hours of independent study courses can be used toward the degree.
- Non-traditional credit, such as advanced placement, credit by examination, credit for prior learning, cooperative education and internships, cannot exceed 30 semester credit hours for a baccalaureate degree. A maximum of 15 of the 30 credits may be for cooperative education, internships, and practica.
- Pre-collegiate courses (usually numbered below 100) cannot be used for graduation.
- Capstone exit assessment/projects (e.g., Major Field Achievement Test) requirements are identified under Program-Specific Degree Requirements.
- The Catalog Year determines which program sheet and degree requirements a student must fulfill in order to graduate. Visit with your advisor or academic department to determine which catalog year and program requirements you should follow.
- See "Requirements for Undergraduate Degrees and Certificates" in the catalog for a complete list of graduation requirements.

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.

Code	Title	Semester Credit Hours
English ¹		
ENGL 111	English Composition-GTC01	3
ENGL 112	English Composition-GTC02	3
Mathematics ¹		
MATH 113	College Algebra-GTMA1 ²	3
History		
Select one History course		3
Humanities		
Select one Humanities course		3
Social and Behavioral Sciences		
Select one Social and Behavioral Sciences course		3
Select one Social and Behavioral Sciences course		3
Fine Arts		
Select one Fine Arts course		3
Natural Sciences ³		
Select one Natural Sciences course		3
Select one Natural Sciences course with a lab		4
Total Semester Credit Hours		31

¹ Must receive a grade of "C" or better and must be complete by the time the student has 60 semester hours.

² This is a 4 credit course. 3 credits apply to the Essential Learning requirements and 1 credit applies to elective credit. Also, professional schools (medical, veterinary, dental) may require one or two semesters of calculus. MATH 151 and MATH 152 may be used to fulfill the Mathematics requirement.

³ 7 semester hours, one course must include a lab.

Other Lower Division Requirements

Code	Title	Semester Credit Hours
Wellness Requirement		
KINE 100	Health and Wellness	1
Select one Activity course		1
Essential Learning Capstone		
ESSL 290	Maverick Milestone	3
ESSL 200	Essential Speech	1
Total Semester Credit Hours		6

Foundation Courses

(17 semester hours, must pass all courses with a grade of "C" or higher. Foundation courses should be completed by the end of the sophomore year.)

Code	Title	Semester Credit Hours
BIOL 105	Attributes of Living Systems-GTSC1	3
BIOL 105L	Attributes of Living Systems Laboratory-GTSC1	1
CHEM 131	General Chemistry I-GTSC1 ¹	4
CHEM 131L	General Chemistry Laboratory I-GTSC1 ¹	1
CHEM 132	General Chemistry II-GTSC1 ¹	4
CHEM 132L	General Chemistry Laboratory II-GTSC1 ¹	1
Select one of the following:		3-5
STAT 200	Probability and Statistics-GTMA1	
MATH 146	Calculus for Biological Sciences ²	
Total Semester Credit Hours		17-19

¹ A higher-level subject may be taken in the same category with advisor approval.

² If MATH 146 is taken, 3 credits apply to Foundation and 2 credits apply to electives.

Program Specific Degree Requirements

(48 semester hours, must pass all courses with a grade of "C" or higher.)

- Topics courses (BIOL 196/BIOL 296/BIOL 396/BIOL 496) may not be used as Additional Biology Courses but must be used for elective credit.

Code	Title	Semester Credit Hours
Core Courses		
BIOL 208	Fundamentals of Ecology and Evolution	3

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

Required Related Study Area

BIOL 106	Principles of Animal Biology	3
BIOL 106L	Principles of Animal Biology Laboratory	1
BIOL 107	Principles of Plant Biology	3
BIOL 107L	Principles of Plant Biology Laboratory	1
PHYS 111	General Physics-GTSC1 ¹	4
PHYS 111L	General Physics Laboratory-GTSC1 ¹	1
PHYS 112	General Physics-GTSC1 ¹	4
PHYS 112L	General Physics Laboratory-GTSC1 ¹	1

Additional Biology Courses

Select 20 semester hours from at least three of the following four categories. ²

Category 1: Cellular, Developmental, and Molecular

BIOL 302	Cellular Biology	
BIOL 310 & 310L	Developmental Biology and Developmental Biology Laboratory	
BIOL 343	Immunology	
BIOL 344 & 344L	Forensic Molecular Biology and Forensic Molecular Biology Laboratory	
BIOL 371L	Laboratory Investigations in Cellular and Molecular Biology	
BIOL 425	Molecular Genetics	
BIOL 442	Pharmacology	
CHEM 315 & 315L	Biochemistry and Biochemistry Laboratory	

Category 2: Organismal

BIOL 250 & 250L	Introduction to Microbiology-GTSC1 and Introduction to Microbiology Laboratory-GTSC1	
BIOL 316 & 316L	Animal Behavior and Animal Behavior Laboratory	
BIOL 322 & 322L	Plant Identification and Plant Identification Laboratory	
BIOL 331 & 331L	Insect Biology and Insect Biology Laboratory	
BIOL 333	Marine Biology	
BIOL 335 & 335L	Invertebrate Zoology and Invertebrate Zoology Laboratory	
BIOL 336 & 336L	Fish Biology and Fish Biology Laboratory	
BIOL 350 & 350L	Microbiology and Microbiology Laboratory	
BIOL 411 & 411L	Mammalogy and Mammalogy Laboratory	
BIOL 412 & 412L	Ornithology and Ornithology Laboratory	
BIOL 413 & 413L	Herpetology and Herpetology Laboratory	
BIOL 431 & 431L	Animal Parasitology and Animal Parasitology Laboratory	

BIOL 433	Marine Invertebrate Communities
BIOL 450 & 450L	Mycology and Mycology Laboratory
Category 3: Anatomical and Physiological	
BIOL 209 & 209L	Human Anatomy and Physiology and Human Anatomy and Physiology Laboratory
BIOL 210 & 210L	Human Anatomy and Physiology II and Human Anatomy and Physiology II Laboratory
BIOL 241	Pathophysiology
BIOL 341 & 341L	General Physiology and General Physiology Laboratory
BIOL 409 & 409L	Gross and Developmental Human Anatomy and Gross and Developmental Human Anatomy Laboratory
BIOL 410 & 410L	Human Osteology and Human Osteology Laboratory
BIOL 421 & 421L	Plant Physiology and Plant Physiology Laboratory
BIOL 423 & 423L	Plant Anatomy and Plant Anatomy Laboratory
BIOL 441	Endocrinology
Category 4: Ecology, Evolution, and Systematics	
BIOL 211 & 211L	Ecosystem Biology and Ecosystem Biology Laboratory
BIOL 315	Epidemiology
BIOL 320	Plant Systematics
BIOL 321 & 321L	Taxonomy of Grasses and Taxonomy of Grasses Laboratory
BIOL 403	Evolution
BIOL 405 & 405L	Advanced Ecological Methods and Advanced Ecological Methods Laboratory
BIOL 406	Plant-Animal Interactions
BIOL 407	Tropical Field Biology
BIOL 408	Desert Ecology
BIOL 414 & 414L	Freshwater Ecology and Freshwater Ecology Laboratory
BIOL 415	Tropical Ecosystems
BIOL 418 & 418L	Wildlife Management and Wildlife Field Techniques
Total Semester Credit Hours	48

¹ A higher-level subject may be taken in the same category with advisor approval.

² At least 50% must be at the 300-Level or above. At least one of the following must be included: BIOL 302, BIOL 341/BIOL 341L, or BIOL 421/BIOL 421L.

General Electives

All college level courses appearing on your final transcript, not listed above that will bring your total semester hours to 120 hours, including 40 upper-division credit hours. 18 semester hours; up to 24 hours of upper-division may be needed. It is strongly recommended that all electives be upper-division. Professional schools (medical, veterinary, dental) may require one or two semesters of organic chemistry, which may be taken to fulfill part of electives.

Code	Title	Semester Credit Hours
MATH 113	College Algebra-GTMA1	1
Select additional electives ¹		17
Total Semester Credit Hours		18

¹ May need additional elective hours to meet the minimum upper-level credit hours for degree. Meet with advisor to plan general elective hour needs.

Course	Title	Semester Credit Hours
First Year		
Fall Semester		
BIOL 105 & 105L	Attributes of Living Systems-GTSC1 and Attributes of Living Systems Laboratory-GTSC1	4
CHEM 131 & 131L	General Chemistry I-GTSC1 and General Chemistry Laboratory I-GTSC1	5
MATH 113	College Algebra-GTMA1	4
KINE 100	Health and Wellness	1
KINA Activity		1
Semester Credit Hours		15
Spring Semester		
BIOL 106 & 106L	Principles of Animal Biology and Principles of Animal Biology Laboratory	4
CHEM 132 & 132L	General Chemistry II-GTSC1 and General Chemistry Laboratory II-GTSC1	5
STAT 200 or MATH 146	Probability and Statistics-GTMA1 or Calculus for Biological Sciences	3-5
Essential Learning - Fine Arts		3
Semester Credit Hours		15-17
Second Year		
Fall Semester		
BIOL 107 & 107L	Principles of Plant Biology and Principles of Plant Biology Laboratory	4
PHYS 111 & 111L	General Physics-GTSC1 and General Physics Laboratory-GTSC1	5
ENGL 111	English Composition-GTCO1	3
Essential Learning - Social and Behavioral Sciences		3
Semester Credit Hours		15
Spring Semester		
BIOL 208 & 208L	Fundamentals of Ecology and Evolution and Fundamentals of Ecology and Evolution Laboratory	4
PHYS 112 & 112L	General Physics-GTSC1 and General Physics Laboratory-GTSC1	5
ENGL 112	English Composition-GTCO2	3
Essential Learning - History		3
Semester Credit Hours		15
Third Year		
Fall Semester		
ESSL 290	Maverick Milestone	3
ESSL 200	Essential Speech	1
BIOL 301 & 301L	Principles of Genetics and Principles of Genetics Laboratory	4
Additional Biology Courses (2 courses)		7
Semester Credit Hours		15
Spring Semester		
Essential Learning - Social and Behavioral Sciences		3
Essential Learning - Humanities		3
Additional Biology Courses (2 courses)		7

Elective		3
Semester Credit Hours		16
Fourth Year		
Fall Semester		
Essential Learning - Natural Science		3
Additional Biology Courses (2 courses)		6
Electives (2 courses)		6
Semester Credit Hours		15
Spring Semester		
BIOL 483	Senior Thesis	2
Essential Learning - Natural Science with Lab		4
Electives (2-3 courses)		6-8
Semester Credit Hours		12-14
Total Semester Credit Hours		118-122

Advising Process and DegreeWorks

Documentation on the pages related to this program is intended for informational purposes to help determine what courses and associated requirements are needed to earn a degree. The suggested course sequencing outlines how students could finish degree requirements. Some courses are critical to complete in specific semesters, while others may be moved around. Meeting with an academic advisor is essential in planning courses and altering the suggested course sequencing. It is ultimately the student's responsibility to understand and fulfill the requirements for her/his intended degree(s).

DegreeWorks is an online degree audit tool available in MAVzone. It is the official record used by the Registrar's Office to evaluate progress towards a degree and determine eligibility for graduation. Students are responsible for reviewing their DegreeWorks audit on a regular basis and should discuss questions or concerns with their advisor or academic department head. Discrepancies in requirements should be reported to the Registrar's Office.

Graduation Process

Students must complete the following in the first two months of the semester prior to completing their degree requirements:

- Review their DegreeWorks audit and create a plan that outlines how unmet requirements will be met in the final semester.
- Meet with their advisor and modify their plan as needed. The advisor must approve the final plan.
- Submit the "Intent to Graduate" form to the Registrar's Office to officially declare the intended graduation date and commencement ceremony plans.
- Register for all needed courses and complete all requirements for each degree sought.

Submission deadlines and commencement details can be found at <http://www.coloradomesa.edu/registrar/graduation.html>.

If a student's petition for graduation is denied, it will be her/his responsibility to consult the Registrar's Office regarding next steps.