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. The Cellular, Molecular, and Developmental Biology Concentration will provide a solid background in cell and molecular biology, genetics, and biochemistry. The concentration prepares graduates of this program for careers in the medical field, cell biology, and biotechnology, which are just a few of the career options available.

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)
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.

<table>
<thead>
<tr>
<th>Course No</th>
<th>Title</th>
<th>Sem.hrs</th>
<th>Grade</th>
<th>Term/Tms</th>
</tr>
</thead>
</table>

**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*
  *3 credits apply to the Essential Learning requirements and 2 credits apply to electives

**Humanities** (3 semester hours)

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

**Natural Sciences** (7 semester hours, one course must include a lab.)
- CHEM 131L and CHEM 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.

**History** (3 semester hours)
- HIST

**Fine Arts** (3 semester hours)

WELLNESS REQUIREMENT (2 semester hours)
- KINE 100 Health and Wellness 1
- KINA 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
- CHEM 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

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<tr>
<th>Course No</th>
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<th>Sem.hrs</th>
<th>Grade</th>
<th>Term/Trns</th>
</tr>
</thead>
</table>

**Additional Biology Courses** (12 semester hours chosen from the lists below)

<table>
<thead>
<tr>
<th>Course No</th>
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<th>Sem.hrs</th>
<th>Grade</th>
<th>Term/Trns</th>
</tr>
</thead>
</table>

**Electives** (11-13 semester hours) (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 hours.) Up to 7 upper division hours may be needed. Research courses are recommended.

<table>
<thead>
<tr>
<th>Course No</th>
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</thead>
</table>

**Category 1: Cellular, Molecular, and Developmental**

BIOL 343 Immunology (3)

BIOL 344/344L Forensic Molecular Biology and Lab (3) / (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

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Hours</th>
<th>Spring Semester</th>
<th>Hours</th>
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<tbody>
<tr>
<td>BIOL 105 Attributes of Living Systems</td>
<td>3</td>
<td>BIOL 102 Plant and Animal Biodiversity</td>
<td>3</td>
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<tr>
<td>BIOL 105L Attributes of Living Systems Lab</td>
<td>1</td>
<td><strong>OR</strong> BIOL 108 Diversity of Organisms</td>
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<tr>
<td>ESSL Natural Science with Lab</td>
<td>1</td>
<td>BIOL 102L Plant and Animal Biodiversity Lab</td>
<td>1</td>
</tr>
<tr>
<td>(CHEM 131 General Chemistry I)</td>
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<td><strong>OR</strong> BIOL 108L Diversity of Organisms Lab</td>
<td>1</td>
</tr>
<tr>
<td>(CHEM 131L General Chemistry I Lab)</td>
<td>1</td>
<td>ESSL Natural Science</td>
<td>1</td>
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<tr>
<td>MATH 151* Calculus I</td>
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<td>(CHEM 132 General Chemistry II)</td>
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<td>KINE 100 Health and Wellness</td>
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<td>(CHEM 132L General Chemistry II Lab)</td>
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<td>STAT 200 Probability and Statistics (3)</td>
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<td><strong>OR</strong> MATH 152 Calculus II (5)</td>
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<td>ENGL 111 English Composition</td>
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*Professional schools (medical, veterinary, dental) may require one or two semesters of calculus. Math 151 and 152 will fulfill the MATH requirement.

### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Hours</th>
<th>Spring Semester</th>
<th>Hours</th>
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<tbody>
<tr>
<td>BIOL 208 Fundamentals of Ecology and Evolution</td>
<td>3</td>
<td>BIOL 301 Principles of Genetics</td>
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<tr>
<td>BIOL 208L Fundamentals of Ecology and Evolution Lab</td>
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<td>BIOL 301L Principles of Genetics Lab</td>
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<tr>
<td>CHEM 311 Organic Chemistry I</td>
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<td>CHEM 312 Organic Chemistry II</td>
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<td>CHEM 311L Organic Chemistry I Lab</td>
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<td>CHEM 312L Organic Chemistry II Lab</td>
<td>1</td>
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<td>ENGL 112 English Composition</td>
<td>3</td>
<td>ESSL Humanities</td>
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<tr>
<td>ESSL Social/Behavioral Science</td>
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<td>ESSL History</td>
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### JUNIOR YEAR

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<th>Fall Semester</th>
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<th>Spring Semester</th>
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<tbody>
<tr>
<td>BIOL 302 Cellular Biology</td>
<td>3</td>
<td>BIOL 310 Developmental Biology</td>
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<td>PHYS 111 General Physics I</td>
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<td>BIOL 310L Developmental Biology Lab</td>
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<td>PHYS 111L General Physics I Lab</td>
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<td>PHYS 112 General Physics II</td>
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<td>CHEM 315 Biochemistry I</td>
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<td>PHYS 112L General Physics II Lab</td>
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<td>ESSL 290 Maverick Milestone</td>
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<td>ESSL Social/Behavioral Science</td>
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<tr>
<td>ESSL 200 Essential Speech</td>
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<td>KINA Activity</td>
<td>14</td>
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</tbody>
</table>

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

### SENIOR YEAR

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Hours</th>
<th>Spring Semester</th>
<th>Hours</th>
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<tbody>
<tr>
<td>BIOL 371L Lab Investigations in Cell &amp; Molecular Biology</td>
<td>3</td>
<td>BIOL 425 Molecular Genetics</td>
<td>3</td>
</tr>
<tr>
<td>ESSL Fine Arts</td>
<td>3</td>
<td>BIOL 483 Senior Thesis</td>
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</tr>
<tr>
<td>BIOL XXX (selected from list)</td>
<td>4</td>
<td>BIOL XXX (selected from list)</td>
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<tr>
<td>Electives*</td>
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<td>Electives*</td>
<td>1-3</td>
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|                               |       |                                 | 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).