

Biology Major

The Biology program of study prepares students to understand the fundamental concepts and methodologies of the biological sciences, to engage in scientific research, and to investigate the relationships between biology and other fields of study, including social and environmental sciences. The biology program prepares students for numerous careers in specific areas of applied biology such as medical (including pre-medicine and pre-veterinary), agricultural, and environmental fields. In addition, the program includes components that target a student's preparation for successful graduate studies.

The Biology Discipline

Defined simply, biology is the study of life. The 21st century world will have to find solutions for many biological and environmental issues. Those biologists most capable of devising these solutions will understand the connections between biological knowledge and other scientific disciplines such as chemistry, geology, physics, meteorology, and climatology.

Why Study Biology at Montreat College?

At Montreat College, the biology major is uniquely developed with a Christ-centered approach and small, intimate classes. Within the department, the faculty is highly accessible and genuine in their approach to students. The faculty works directly with students in developing research projects and career opportunities that are congruent with the student's goals, while additionally providing connections with the Au Sable Environmental Institute, the Council for Christian Colleges and Universities, and the Appalachian College Association.

Set in the Southern Appalachian Mountains, adjacent to the Pisgah National Forest, Montreat College is equally adept at immersing the student into the subject matter. Students have the opportunity to learn experientially, whether inside the classroom or in the outdoors. Yet, those trained in biology must have more than a solid understanding of basic principles. They must possess an understanding of the ethical and worldview implications involved in the application of biological knowledge. Montreat College students are challenged to understand these implications through discussions and inquiry.

The biology major allows much room for individualization. Possible academic choices are the Pre-Professional Biology Concentration, which can be augmented by the honors track or professional honors track, the Environmental Biology Concentration, and the Special Emphasis (self-designed) Concentration. These options ensure a well-tailored education for any student.

After Graduation

With a comprehensive education in biology, students are prepared to enter such fields as field biology, ecology, applied research, teaching, environmental biology, and many other possible career paths. The biology program also equips student for graduate school in a variety of disciplines, including physical therapy, veterinary medicine, biology, ecology, and medicine.

Requirements for a Major in Biology

- ✓ Degree Component
- ___ Completion of the General Education Core (56 credits)
 - BL 101 or 103 and BL 102 or 104 required in the Gen-Ed
 - MT 121 College Algebra or higher required in the Gen-Ed
- ___ Completion of the General Education Competencies
- ___ Completion of the Biology Major Core (40.5-43.5 credits)
- ___ Completion of a Biology Concentration (20-26 credits)
- ___ Completion of required electives to bring total up to 120 credits (~0-5.5 credits)
- ___ Completion of 27 credits at the 300-level or above
- ___ Completion of the Major Field Test
- ___ Completion of 120-125.5 credit hours with a minimum GPA of 2.0 (two terms and 32 credit hours must be completed at Montreat College)

Biology Major Core (39.5-43.5 Credits)

- BL 205 Animal Diversity and Ecology (4)
- BL 206 Human Anatomy & Physiology I (4)
- BL 215 Plant Diversity and Ecology (4)
- BL 301 Biometrics (3) [MT 114 Statistics required for IPABSN]
- BL 311 Plant Physiology (3)
- BL 315 Cell Biology (4)
- BL 410 Genetics (4)
- CH 101 General Chemistry II (4)
- CH 102 General Chemistry II (4)
- ES 206 Ecology (4)
- ES 230 Sophomore Science Seminar I (0.5)
- ES 445 Senior Science Seminar (1)
- MT 191 Applied Calculus I (4) [Not required for IPABSN]

Choose from five Biology Concentrations:

- Pre-Professional (25-26 credits)
- Applied Biochemical Technology (26 credits)
- Environmental Biology (20-23 credits)
- Integrated Preparation for Accelerated Baccalaureate of Science in Nursing [IPABSN] (20 credits)
- Special Emphasis (22 credits)

Pre-Professional Concentration (25-26 credits)

The Pre-professional concentration offers a wide range of courses designed to prepare students for entrance into *medical school, veterinary school, dental school, physical therapy* programs, and other professional or graduate schools.

Pre-Professional Concentration Courses

- BL 340 Research Methods (3)
- BL 421 Contemporary Biological Investigations (3)
- CH 220 Organic Chemistry I (4)
- CH 221 Organic Chemistry II (4)
- MT 192 Applied Calculus II (4)
- PC 131 College Physics I (4)
- Plus *one* of the following courses:
 - BL 405 Microbiology (4)
 - BL 406 Conservation Biology (3)
 - BL 420 Biochemistry (3)
 - CH 315 Chemistry of the Environment I (3)
 - ES 315 Freshwater Ecosystems (4)

Honors Option

Honors recognition will be indicated on the student's transcript. Students pursuing this option must meet the following requirements in addition to those listed above:

- Complete an acceptable research proposal by the end of the fall semester of the junior year.
- Complete six semester hours of independent research (ES/BL 340 and ES/BL 440).
- Orally present research findings prior to graduation.
- Complete an additional nine semester hours of courses specific to the concentration.

Professional Honors Option

This option is designed to challenge students of an advanced academic ability by providing a program of study involving a unique set of courses and distinguished research. Completion of this program will be indicated as "Professional Honors" on the transcript. Those pursuing this option must complete all the requirements for the honors option (including the selection of BL 405, BL 420, CH 316, and PC 132 for the fourth requirement in the honors option) plus submit a publication-quality research manuscript based on their independent research project.

Applied Biochemical Technology Concentration (26 credits)

The Applied Biochemistry Technology track is a customized investigation of technologies in Biology and Chemistry that are designed around the interests of the student. The student develops a research project that will make a significant contribution in addressing an issue in our world.

The unique student research within our Biology program initiates in the sophomore year when the student enters the program and continues as a component of many classes through their senior year. This broad based, extensive research project brings distinction to our biology students. The student directing their interests towards technology can extend this project work into our technology track and develop significant research contributions in responsible Biochemical technologies.

Applied Biochemical Technology Concentration Courses

- BL 340 Research Methods (3)
- BL 405 Microbiology (4)
- BL 420 Biochemistry (3)
- BL 420L Biochemistry Lab (1)
- BL 421 Contemporary Biological Investigations (3)
- CH 220 Organic Chemistry I (4)
- CH 221 Organic Chemistry II (4)
- PC 131 College Physics I (4)
- Recommended:
 - MT 192 Applied Calculus II (4)
 - PC 132 College Physics II (4)
 - CH 315 Environmental Chemistry I (3)
 - CH 316 Environmental Chemistry II (3)

By the completion of Junior Year and Summer: Official Entrance into the Biology Applied Biochemical Technology Program is earned by completing the following:

1. Biotechnology Research Project is approved and included within a grant that is either successfully funded or monies are available to continue the student's work in the track program.
2. Meet with a faculty member during the sophomore or junior year to journal and develop the following topics: Ethics/Faith, Development/Project Development/Grant Writing/Required Grant Funding
3. Summer Biotechnology Certificate or Specified Training Established

Note: If any component of the junior year requirements is not fulfilled, the student is not allowed to continue and must meet with an advisor and make plans to enter another Biology track program.

Four Year Plan: Bachelor of Science in Biology			
Pre-Professional Concentration & Applied Biochemical Technology Concentration			
Freshman Year			
Fall Semester		Spring Semester	
IS 102 Foundations of Faith and Learning	2	CS 102 Computer Applications and Concepts	3
BB 101 Survey of Old Testament	3	BB 102 Survey of New Testament	3
EN 101 English Composition	3	EN 102 English Composition II	3
CH 101 General Chemistry I	4	CH 102 General Chemistry II	4
BL 103 Advanced Survey of Biological Prin. I	4	BL 104 Advanced Survey of Biological Prin. II	4
	16		17
Sophomore Year			
Fall Semester		Spring Semester	
ES 230 Sophomore Science Seminar	0.5	BL 315 Cell Biology	4
BL 206 Human Anatomy and Physiology I	4	BL 205 Animal Diversity and Ecology	4
HS 101 History of World Civilization I	3	MT 191 Applied Calculus I	4
ES 206 Ecology or PC 131 College Physics	4	Gen-Ed Oral Competency	3
MT 121 College Algebra or higher	3	Gen-Ed Literature	3
	14.5		18
Junior Year			
Fall Semester		Spring Semester	
BL 215 Plant Diversity and Ecology	4	BL 311 Plant Physiology or BL 301 Biometrics	3
BL 410 Genetics	4	CH 221 Organic Chemistry II	4
CH 220 Organic Chemistry I	4	Gen-Ed Humanities	3
MT 192 Applied Calculus II (Pre-Prof) or BL 405 Microbiology (Biochem)	4	HS 102 History of World Civ II	3
Physical Education Course	1	Physical Education Course	1
	17		14
<i>Completion of the General Education competencies by the end of the junior year.</i>			
Junior Summer			
Internship or partnership opportunity (required for Biochem; optional for Pre-Prof)			
Senior Year			
Fall Semester		Spring Semester	
Major elective (Pre-Prof) or BL 420 Biochemistry (Biochem)	3/4	BL 301 Biometrics or BL 311 Plant Physiology	3
ES 445 Senior Science Seminar I	1	BL 421 Contemporary Biological Investigations	3
Gen-Ed Humanities	3	Gen-Ed Humanities	3
BL 340 Research Methods	3	Gen-Ed Social Science	3
PC 131 College Physics or ES 206 Ecology	4	IS 461 Seminar on Faith and Life	2
BL/CH/ES/MT elective recommended			
	14/15		14
<i>Completion of 27 credits at the 300-level or above.</i>			
<i>Completion of the Major Field Test by the end of the Senior Year.</i>			
Total hours required for degree: 124.5/125.5			

*See General Education for optional course offerings

Environmental Biology Concentration (20-23 credits)

The Environmental Biology concentration offers a wide range of courses designed to prepare students for entrance into such fields as biology, ecology, field research, and many other possible career paths. The concentration also equips students for graduate school in a variety of disciplines, including biology, ecology, and botany.

Environmental Biology Concentration Courses

CH 220 Organic Chemistry I (4)

BL 340 Research Methods (3)

PC 131 College Physics I (4)

Plus 9-12 hours selected from courses in Biology, Environmental Science, Math, Chemistry, and Physics, in consultation with the advisor.

Four Year Plan: Bachelor of Science in Biology Environmental Biology Concentration			
Freshman Year			
Fall Semester		Spring Semester	
IS 102 Foundations of Faith and Learning	2	CS 102 Computer Applications and Concepts	3
BB 101 Survey of Old Testament	3	BB 102 Survey of New Testament	3
EN 101 English Composition	3	EN 102 English Composition II	3
CH 101 General Chemistry I	4	CH 102 General Chemistry II	4
BL 103 Advanced Survey of Biological Prin. I	4	BL 104 Advanced Survey of Biological Prin. II	4
	16		17
Sophomore Year			
Fall Semester		Spring Semester	
ES 230 Sophomore Science Seminar	0.5	BL 315 Cell Biology	4
BL 206 Human Anatomy and Physiology I	4	BL 205 Animal Diversity and Ecology	4
HS 101 History of World Civilization I	3	MT 191 Applied Calculus I	4
ES 206 Ecology or PC 131 College Physics	4	Gen-Ed Literature	3
MT 121 College Algebra or higher	3		
	14.5		15
Junior Year			
Fall Semester		Spring Semester	
BL 215 Plant Diversity and Ecology	4	BL 311 Plant Physiology or BL 301 Biometrics	3
BL 410 Genetics	4	Concentration Requirement	4
CH 220 Organic Chemistry I	4	Gen-Ed Humanities	
Gen-Ed Social Science	3	HS 102 History of World Civilization II	3
Physical Education Course	1	Physical Education Course	3
			1
	16		14
<i>Completion of the General Education competencies by the end of the junior year.</i>			
Junior Summer			
Optional internship or partnership opportunity			
Senior Year			
Fall Semester		Spring Semester	
ES 445 Senior Science Seminar I	1	BL 301 Biometrics or BL 311 Plant Physiology	3
Gen-Ed Humanities	3	Concentration Requirement	3
BL 340 Research Methods	3	Gen-Ed Oral Competency	3
ES 206 Ecology or PC 131 College Physics	4	Gen-Ed Humanities	3
Concentration Requirement	3	IS 461 Seminar on Faith and Life	2
	14		14
<i>Completion of 27 credits at the 300-level or above.</i>			
<i>Completion of the Major Field Test by the end of the Senior Year.</i>			
Total hours required for degree:			120.5

IP for ABSN [Integrated Preparation for Accelerated Baccalaureate of Science in Nursing] Concentration (20 credits)

The IP for ABSN [Pre-Nursing] track is a customized to provide entrance to an Accelerated Baccalaureate of Science in Nursing [ASBN] program so that the student interested in nursing can receive a Biology degree that has integrated the prerequisite courses required by most ABSN or second degree programs around the country. The student is allowed to customize their Biology track to suit the admission requirements of the ABSN program with which the student wishes to link their Montreat College Biology degree, as there may be slight variance in prerequisite courses for different ABSN programs. Most ABSN programs require a 12 month period to meet the requirements of this second undergraduate degree. Some of the Pre-Nursing track courses are taken at community colleges or online through other institutions, as approved by a Montreat College faculty advisor and specific to the student's ABSN program selection.

IP for ABSN Concentration Courses

IP/ABSN Core (14)

BL 207 Human Anatomy & Physiology II (4)

BL 405 Microbiology (4)

HL 201 Human Nutrition (3)

PY 202 General Psychology (3) **OR** PY 201 (3)

IP/ABSN Required Electives (6)

Choose at least 6 credit hours from the courses below in consultation with faculty advisor and specific to your ABSN program selection:

BL 420 Biochemistry (3)

CH 221 Organic Chemistry (4)

PY 300[†] Child and Adolescent Development (3)

PY 305[†] Adult Development and Aging (3)

Pathophysiology [Fulfilled at another institution with prerequisite qualifications]

Global Health Care Issues [Fulfilled at another institution with prerequisite qualifications]

[†] Students may only take one psychology class to fulfill the concentration elective requirement.

Four Year Plan: Bachelor of Science in Biology Integrated Preparation for Accelerated Bachelor of Science in Nursing Concentration			
Freshman Year			
Fall Semester		Spring Semester	
IS 102 Foundations of Faith and Learning	2	MT 121 College Algebra or higher	3
BB 101 Survey of Old Testament	3	BB 102 Survey of New Testament	3
EN 101 English Composition	3	EN 102 English Composition II	3
CH 101 General Chemistry I	4	CH 102 General Chemistry II	4
BL 103 Advanced Survey of Biological Prin. I	4	BL 104 Advanced Survey of Biological Prin. II	4
	16		17
*MT 121 College Algebra must be taken if student does not have the prerequisite for MT 191 Applied Calculus			
Sophomore Year			
Fall Semester		Spring Semester	
ES 230 Sophomore Science Seminar	0.5	BL 315 Cell Biology	4
BL 206 Human Anatomy and Physiology I	4	BL 207 Human Anatomy & Phys. II	4
HS 101 History of World Civilization I	3	CS 102 Computer Applications and Concepts	3
ES 206 Ecology or PC 131 College Physics	4	CM 220 Public Speech and Rhetorical Analysis	3
HL 201 Human Nutrition	3	Gen-Ed Literature	3
	14.5		17
Junior Year			
Fall Semester		Spring Semester	
BL 215 Plant Diversity and Ecology	4	MT 114 Probability and Statistics	3
BL 410 Genetics	4	BL 205 Animal Diversity & Ecology	4
Concentration Elective	3	Concentration Elective	3
PY 202 General Psychology or PY 201 Psychology Applied to Modern Life	3	Gen-Ed Humanities	3
Physical Education Course	1	HS 102 History of World Civ II	3
	15		16
<i>Completion of the General Education competencies by the end of the junior year.</i>			
Junior Summer			
Optional internship or partnership opportunity			
Senior Year			
Fall Semester		Spring Semester	
BL 405 Microbiology	4	BL 311 Plant Physiology	3
ES 445 Senior Science Seminar I	1	BL 421 Contemporary Biological Investigations	3
Gen-Ed Humanities	3	Gen-Ed Humanities	3
Elective	3	IS 461 Seminar on Faith and Life	2
Physical Education Course	1	Elective	2
	12		13
<i>Completion of 27 credits at the 300-level or above.</i>			
<i>Completion of the Major Field Test by the end of the Senior Year.</i>			
Total hours required for degree:			120.5

*See General Education for optional course offerings

Special Emphasis Concentration (22 credits)

Students may transfer a set of courses from other institutions, study abroad and certification programs (e.g., Au Sable Institute), or complete courses in other departments at Montreat College to fulfill the requirements of this emphasis. Students develop the special emphasis curriculum in consultation with the faculty advisor. The advisor and the Biology Review Committee must approve a formal proposal of emphasis requirements by the end of the student's sophomore year.

Special Emphasis Concentration

Minimum of six (6) courses totaling at least 22 credit hours, selected in consultation with faculty advisor.

In addition to the student developing their own program, below are a few pre-approved Special Emphasis programs:

Pre-Approved Special Emphasis Programs of Study with Au Sable Institute

Au Sable Institute of Environmental Studies' Certificate Program [<http://www.ausable.org>] is pre-approved as Special Emphasis Concentration plans of study. The student selecting an Au Sable certificate program must adhere to the Au Sable certification guidelines and fulfill all components of the certification program and Special Emphasis requirements. The student must be awarded the certificate by Au Sable. All six courses can be pursued at Au Sable, but if a certification program does not provide the full complement of 6 courses, the additional courses can be pursued at Montreat College or other approved institution. Final plans of how all components of the Special Emphasis are to be fulfilled are prepared with you department advisor and submitted to the department faculty for approval.

Pre-Approved Certification Programs:

- Certified Naturalist
- Certified Land Resources Analyst
- Certified Water Resources Analyst
- Certified Environmental Analyst

[Full list of courses offered through Au Sable for Montreat College can be found on the Au Sable website.]

Biology Minor

Requirements for a Minor in Biology (20 credits)

BL 101 Survey of Biological Principles I (4)

BL 102 Survey of Biological Principles II (4)

Choose an additional 4 hours from Biology

Choose an additional 8 hours from Biology, Chemistry, and/or
Environmental Science.