



**Bachelor of Science
BIOLOGY**

This program prepares you to pursue a graduate degree in biology or to go on to professional schools in the health sciences. Training in biology also prepares you for a wide variety of career choices, including careers in research in academic, government, and private research laboratories, science teaching, positions in the biomedical, biotechnology, and pharmaceutical industries, and other related fields. While many such position are open to those holding the B.S degree, some may only be open to those holding advanced graduate degrees.

Matriculation into this program is dependent upon: 1) your having been granted final regular admission to Northern; 2) your having a cumulative grade point average of at least 2.50 in all coursework attempted at Northern and/or other institutions; 3) your having completed 48 credits of college-level work, including the following required courses: BIOL 151/L, BIOL 201/L, BIOL 202/L, BIOL 203/L, and BIOL 204/L, CHEM 121/L, CHEM 122/L, and MATH 150; and 4) submission of a personal statement to the program director in which you outline your interest in biology and your career goals.

GENERAL EDUCATION REQUIREMENTS (35 crs)

COMPLETED

**Planned Timeline
(By Semester)**

Area I: Communications (9 crs)

ENG 111 English Composition I (3)

Pre-requisites: ENG 109 or adequate score on the Course Placement Evaluation

SPCH 130 Public Speaking (3)

Pre-requisite: ENG 109 or adequate score on the Course Placement Evaluation

Choose one of the following two courses:

ENG 112 English Composition II (3)

Pre-requisite: ENG 111

ENG 116 Technical Writing (3)

Pre-requisite: ENG 111

Area II: Mathematics (3 crs)

Choose one course from the following list.

MATH 145 Introduction to Probability & Statistics (3)

Pre-requisite: MATH 130

MATH 150 College Algebra (3)

Pre-requisite: MATH 130 or adequate score on the Course Placement Evaluation

MATH 151 Conceptual Mathematics*

MATH 155 Trigonometry (3)

Pre-requisite: MATH 150 or adequate score on the Course Placement Evaluation

MATH 162 Calculus I (4)

Pre-requisite: MATH 155 or MATH 160

MATH 163 Calculus II (4)

Pre-rerequisite: MATH 162 or adequate score on the Course Placement Evaluation

MATH 264 Calculus III (4)

Pre-requisite: MATH 163 or adequate score on the Course Placement Evaluation

* Conceptual mathematics will satisfy the mathematics requirement for all AA/BA/BBA/BM degrees

Area III: Laboratory Sciences (8 crs)

BIOL 201/L Introduction to Molecular and Cell Biology with lab (4)

Prerequisite/Co-requisite: CHEM 121/L;

BIOL 202/L Principles of Genetics with lab (4)

Pre-requisite: BIOL 201

Area IV: Social/Behavioral Sciences (6-9 crs)*

Pre-requisite: ENG 109 or adequate score on the Course Placement Evaluation

You must select courses from *at least two different discipline areas* from the following list:

ANTH 101/L Physical Anthropology w/Lab (4)

ANTH 102 Intro to Social & Cultural Anthropology (3) (Fall)

ANTH 111 Language and Culture (3)

ANTH 207 Cultures of New Mexico (3)

ANTH 110 Indian Culture of the Southwest

- ECON 200 Macroeconomics (3)
- ECON 201 Microeconomics (3)
- GEOG 111 World Geography (3)
- PSCI 110 The Political World (3)
- PSCI 120 Contemporary Political Issues (3)
- PSCI 200 American Politics (3)
- PSCI 210 State and Local Government (3)
- PSCI 212 The American Presidency (3)
- PSY 105 General Psychology (3)
- PSY 210 Theories of Personality (3)
- PSY 229 Adolescent Psychology (3)
- PSY 230 Psychology of Adjustment (3)
- PSY 232 Abnormal Behavior (3)
- PSY 270 Social Psychology (3)
- PSY 290 Developmental Psychology (3)
- SOC 101 Introduction to Sociology (3)
- SOC 213 Deviant Behavior (3)
- SOC 216 Ethnic and Intercultural Relations (3)
- SOC 220 Social Problems (3)
- SOC 225 Marriage and the Family (3)

* Plus, topic courses with student advisor's approval

Humanities and Fine Arts (6-9 crs) *

Pre-requisite: ENG 109 or adequate score on the Course Placement Evaluation

- PHIL 220 Ethics (3)

Elective (3-6). You must select courses from ***one other discipline area*** from below:

- ART 105 Introduction to Art (3)
- ART 107 History of Art I (3)
- ART 208 History of NM Art & Architecture (3)
- ART 211 History of Art II (3)
- DANC 240 Dance Appreciation (3)
- ENG 270 Children's Literature (3)

Pre-requisite ENG 111

- ENG 262 Literature of the Southwest (3)

Pre-requisite ENG 112

- ENG 265 Native American Literature 1 (3)

Pre-requisite ENG 111

- ENG 266 Native American Literature II (3)

Pre-requisite: ENG 111

- ENG 280 Readings in Literature (3)

Pre-requisite ENG 111

- ENG 290 Study of Literature

Pre-requisite ENG 111

- ENG 294 Mythology (3)

Pre-requisite ENG 111

- HIST 101 Western Civilization I (3)
- HIST 102 Western Civilization II (3)
- HIST 161 History of the U.S. to 1877 (3)
- HIST 162 History of the U.S. from 1877 (3)
- HIST 200 History of the World Religions (3)
- HIST 220 Southwestern Women's History (3)
- HIST 230 Chicano Experience in the US (3)
- HIST 250 American Indian History (3)
- HIST 260 History of New Mexico (3)
- HUM 105 Humanities of the Southwest (3)
- HUM 311 Why the Social Sciences Matter ** (3)
- HUM 414 Humanity and Creativity ** (3)
- HUM 421 History, Literature, Art & Philosophy ** (3)
- MUS 103 Music History & Literature I (3)
- MUS 105 Music Appreciation (3)
- MUS 218 Music History & Literature II (3)

- PHIL 110 Intro to Philosophical Problems (3)
- PHIL 111 History of Philosophy (3)
- PHIL 150 Critical Thinking (3)
- PIS 200 Introduction to Pueblo Indian Studies (3)
- THE 120 Introduction to Theatre I (3)
- THE 130 History of Theatre (3)
- Plus, topic courses with advisor's approval

* If your major is in the area of the Humanities/Fine Arts, unless otherwise regulated by a given department, you should select 9 hrs from Area V and 6 hrs. from Area IV; if in the Social/Behavioral Sciences, you should select 9 hrs from Area IV and 6 hrs from Area V. Consult your major advisor. In any case, you must complete a minimum spread of 15 hrs between Areas IV and V. .

** Students in associate degree programs are advised that upper-division courses are not covered under financial aid.

PROGRAM REQUIREMENTS (74 crs)

Biology Core Curriculum (12 crs)

- BIOL 151/L Science and Society (4) _____
- BIOL 203/L Ecology and Evolution (4) _____
Pre-requisite: BIOL 201/L-202/L, CHEM 121/L-122/L; Co-requisite: MATH 162
- BIOL 204/L Plant and Animal Form and Function (4) _____
Pre-requisite: BIOL 201/L-203/L, CHEM 121/L-122/L

Required Seminar, Research Experience (5 crs)

- BIOL 292 Undergraduate Research Experience (3) _____
Pre-requisite: BIOL 290
- or**
- BIOL 392 Undergraduate Research Experience (3) _____
- BIOL 472 Biology Seminar (1) _____
Pre-requisite: permission of the instructor
- BIOL 492 Biology Capstone Project (1) _____
Pre-requisite: BIOL 151/L and permission of the instructor

300 level courses to be chosen from the following list (8 crs)

- BIOL 329 Molecular Cell Biology (4) _____
Pre-requisite: BIOL 204/L
- BIOL 349/L Essentials of Anatomy and Physiology (3) _____
Pre-requisite: BIOL 204/L or BIOL 237/L-238/L
- BIOL 351/L General Microbiology (3) _____
Pre-requisite: BIOL 204/L
- BIOL 360/L Plant Biology (3) _____
Pre-requisite: BIOL 204/L
- BIOL 371/L Invertebrate Biology (3) _____
Pre-requisite: BIOL 204/L
- BIOL 386/L General Vertebrate Zoology (3) _____
Pre-requisite: BIOL 204/L; Co-requisite: BIOL 386L

400 level courses to be chosen from the following list (16 crs)

- BIOL 406 Stream Ecology and Field Methods (3) _____
Pre-requisite: BIOL 203/L or ES 112/L or ES 125
- BIOL 410 Bioinformatics (3) _____
Pre-requisite: BIOL 203/L
- BIOL 412/L Developmental Biology with lab (3) _____
Pre-requisite: BIOL 204/L and BIOL 329
- BIOL 416/L Cells and Tissues and lab (3) _____
Pre-requisite: BIOL 204/L and BIOL 249
- BIOL 418 Conservation Biology _____
- BIOL 422/L Comparative Vertebrate Anatomy with lab (3) _____
Pre-requisite: BIOL 204/L and BIOL 249
- BIOL 425 Molecular Genetics (4) _____
Pre-requisite: BIOL 329
- BIOL 426/L Neurobiology with lab(3) _____
Pre-requisite: BIOL 204/L and BIOL 349/L or BIOL 237/L and 238/L
- BIOL 431 Drugs and Their Actions (3) _____
Pre-requisite: BIOL 329/L and BIOL 349/L

BIOL 435/L Comparative Animal Physiology with lab (3)	_____	_____
<i>Pre-requisite: BIOL 349/L</i>		
BIOL 451/L General Ecology with lab (3)	_____	_____
<i>Pre-requisite: 204/L</i>		
BIOL 456 Immunology (4)	_____	_____
<i>Pre-requisite: BIOL 329</i>		
BIOL 467 Evolutionary Plant Ecology (3)		
<i>Pre-requisite: BIOL 151/L</i>		

Required Supportive Courses in Math, Physics and Chemistry (33 crs)

Mathematics (10 crs)

MATH 145 Introduction to Probability and Statistics (3)	_____	_____
<i>Pre-requisite: MATH 130</i>		
MATH 155 Trigonometry (3)	_____	_____
<i>Pre-requisite: MATH 130</i>		
MATH 162 Calculus I (4)	_____	_____
<i>Pre-requisite: MATH 155</i>		

Chemistry (11 crs; CHEM 121/L is taken under Gen Ed requirements)

CHEM 121/L General Chemistry I with lab (4)	_____	_____
<i>Pre-requisite: MATH 130</i>		
CHEM 122/L General Chemistry II with lab (3)	_____	_____
<i>Pre-requisite: CHEM 121/L</i>		
CHEM 301/L Organic Chemistry I with lab (4)	_____	_____
CHEM 341 Survey of Biochemistry (3)	_____	_____
<i>Pre-requisite: CHEM 210/L</i>		

Physics (8 crs)

PHYS 121/L Applied Physics I (3)	_____	_____
<i>Pre-requisite: MATH 130;</i>		
PHYS 122/L Applied Physics II (3)	_____	_____
<i>Pre-requisite: PHYS 121/L</i>		

MINOR Concentrations of Elective Credits (20 crs)

Minors concentrations are not required, but you **may** choose one of the following minor concentrations (20 crs)

Mathematics (20 crs)

MATH 163 Calculus I1 (4)	_____	_____
<i>Pre-requisite: MATH 162</i>		
MATH 264 Calculus III (4)	_____	_____
Choose any four additional upper-division (300-400) mathematics courses.	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Chemistry and Physics (20 crs)

CHEM 302/L Organic Chemistry II with lab (3)	_____	_____
<i>Pre-requisite: CHEM 301/L</i>		
CHEM 311/L Physical Chemistry with lab(3)	_____	_____
<i>Pre-requisites: CHEM 122/L, 221/L, MATH 163, and PHYS 122/L</i>		
PHYS 262/L General Physics with lab (3)	_____	_____
<i>Pre-requisite: PHYS 122/L or PHYS 216/L</i>		
Choose any 3 of the following:		
PHYS 302 Optics (3)	_____	_____
PHYS 330 Introduction to Modern Physics (3)	_____	_____
<i>Pre-requisite: PHYS 262/L</i>		
PHYS 331 Thermodynamics and Statistical Mechanics (3)	_____	_____
<i>Pre-requisite: MATH 311 and 314</i>		
PHYS 405 Electricity and Magnetism (3)	_____	_____
<i>Pre-requisite: MATH 311 and 312</i>		

If you do not choose a minor concentration, you must choose 20 additional credit hours of elective coursework in biology, chemistry, mathematics, physics, humanities, or the social and behavioral sciences. If you took BIOL 292, then at least 7 of these elective credits must be at the upper-division level; if you took BIOL 392, then at least 4 of these elective credits must be at the upper-division level

_____	_____	_____
_____	_____	_____

TOTAL CREDIT HOURS 130

Educational Planning Form (Semester)

Fall Semester	Spring Semester	Summer
Total Units	Total Units	Total Units
Fall Semester	Spring Semester	Summer
Total Units	Total Units	Total Units
Fall Semester	Spring Semester	Summer
Total Units	Total Units	Total Units
Fall Semester	Spring Semester	Summer
Total Units	Total Units	Total Units