Bachelor of Science with Major in Biology (Professional Health Sciences Emphasis)

This major is designed for students interested in medical professions (medicine, osteopathic medicine, dentistry, optometry, pharmacy, podiatry and veterinary), or allied medical professions (physician assistant, occupational therapy, physical therapy, or medical research). Health sciences students should consult with their Biology advisor and the Health Sciences advisor in the College of Arts and Sciences to develop an appropriate course of study.

Required 120 credits (36 of which must be numbered 300 or above, and 30 of which must be from UND), including:

I. Essential Studies requirements (see University ES listing, minimum 39 total credits). The following courses must be taken as part of the Essential Studies requirement:

Code	Title	Credits
ENGL 110	College Composition I	3
ENGL 130	Composition II: Writing for Public Audiences	3
COMM 110	Fundamentals of Public Speaking	3
Total Credits		**9**

II. 39 major hours including:

A. Core requirements (18 credit hours), all courses below:

Code	Title	Credits
BIOL 120	Orientation to the Biology Major	1
BIOL 150 & BIOL 151	General Biology I and General Biology II *	6
BIOL 150L & BIOL 151L	General Biology I Laboratory and General Biology II Laboratory	2
BIOL 315	Genetics	3
BIOL 341	Cell Biology	3
BIOL 480	Senior Capstone Seminar **	3
Total Credits		**18**

* Students who take BIOL 111 Concepts of Biology and BIOL 111L Concepts of Biology Laboratory and earn a grade of "B" or higher in both of those courses prior to becoming a Biology major may complete the General Biology sequence by taking BIOL 150 General Biology I and BIOL 150L General Biology I Laboratory.

** Three credits for an accepted BIOL 489 Senior Honors Thesis can be substituted for the BIOL 480 Senior Capstone Seminar with prior approval of the thesis topic by the Chair of Biology.

We strongly advise mastery of materials in all core courses except BIOL 480 Senior Capstone Seminar prior to enrolling in other 300 or 400 level Biology courses.

At least 15 of the total 39 credits required for the BS degree must be taken in the UND Biology department, exclusive of the credits earned in other departments and institutions.

B. Advanced requirements (minimum 21 credit hours of upper level Biology courses):*

Code	Title	Credits
1. Must include a minimum of 9 credits from the following health-related courses below: *		
BIOL 364	Parasitology	
BIOL 364L	Parasitology Laboratory	
BIOL 369	Histology	
BIOL 369L	Histology Lab	
BIOL 378	Developmental Biology	
BIOL 380	Disease Biology	
BIOL 390	Endocrinology	
BIOL 415	Genomics	
BIOL 418	Systems Biology	
BIOL 420	Neuroscience	
BIOL 442	Physiology of Organs and Systems	
BIOL 442L	Physiology of Organs and Systems Laboratory	
BIMD 220 & 220L	Human Anatomy Physiology I and Human Anatomy Physiology I Lab **	
or BIMD 221 & 221L	Human Anatomy Physiology II and Human Anatomy Physiology II Lab	
BIMD 302	General Microbiology Lecture	
BIMD 302L	General Microbiology Laboratory	
BIMD 328	Introduction to Immunology	
2.Additional 12 credits of upper level Biology electives. All 300 or 400 level Biology courses will count toward the elective credit hours needed. Certain science courses in other departments may also qualify as electives (see examples below). Only one 200 level course will count towards Biology elective credits.		
3. Laboratory Requirement. At least four upper-division Biology courses with laboratories must be included. The following labs or courses satisfy this requirement:		
BIOL 312L	Evolution Laboratory	
BIOL 332L	Gen Ecology Lab	
BIOL 336	Systematic Botany	
BIOL 341L	Cell Biol Lab	
BIOL 363	Entomology	
BIOL 364L	Parasitology Laboratory	
BIOL 369L	Histology Lab	
BIOL 376L	Animal Biology Laboratory	
BIOL 410	Molecular Biology Techniques	
BIOL 415	Genomics	
BIOL 416	Ecological Genomics	
BIOL 418	Systems Biology	
BIOL 425	Ichthyology	
BIOL 426	Birds Mammals	
BIOL 431	Wildlife Management	
BIOL 433	Aquatic Ecology	
BIOL 438	Fisheries Management	
BIOL 442L	Physiology of Organs and Systems Laboratory	
BIMD 302L	General Microbiology Laboratory	

- Up to three of the following courses from UND departments outside Biology can be applied toward the 39 credits required for a BS in Biology degree (lecture + lab = 1 course). Other courses will be considered on a case by case basis. To have a course considered, the student should provide a syllabus to the Department Chair.

Code	Title	Credits
BIMD 220 & 220L	Human Anatomy Physiology I and Human Anatomy Physiology I Lab **	4
or BIMD 221 & 221L	Human Anatomy Physiology II and Human Anatomy Physiology II Lab	
BIMD 302 & 302L	General Microbiology Lecture and General Microbiology Laboratory	4
BIMD 328	Introduction to Immunology	3
BIMD 401	Advanced Biochemistry	3

No more than 10 combined credit hours from BIOL 494 Directed Studies; BIOL 492 Research; BIOL 491 Seminar; and BIOL 489 Senior Honors Thesis, will count towards this 39 credit major.

Either BIMD 220/220L or BIMD 221/221L will count as an elective, but not both courses.

- BMB 301 Biochemistry will not be allowed to fulfill elective requirements.
- BIMD 202 Introduction to Medical Microbiology Lecture/BIMD 202L Introduction to Medical Microbiology Laboratory will only be allowed with special permission of the Biology department.

III. Cognate requirements in other departments (29-32 credit hours):

Code	Title	Credits
Mathematics *		
MATH 146	Applied Calculus I **	3-4
or MATH 165	Calculus I	
Chemistry		
General Chemistry		
CHEM 121	General Chemistry I	
& 121L	and General Chemistry I Laboratory	
& CHEM 122	and General Chemistry II	
& CHEM 122L	and General Chemistry II Laboratory	
OR		
CHEM 221	Fundamentals of Chemistry - Concepts	
& 221L	and Fundamentals of Chemistry Laboratory	
& CHEM 254	and Inorganic Chemistry I	
& CHEM 254L	and Inorganic Chemistry I Laboratory ***	
Organic Chemistry		
CHEM 340	Survey of Organic Chemistry	
& 340L	and Survey of Organic Chemistry Laboratory	
& BIMD 301	and Biochemistry	
OR		
CHEM 341	Organic Chemistry I	
& 341L	and Organic Chemistry I Laboratory	
& BIMD 301	and Biochemistry	
OR		
CHEM 341	Organic Chemistry I	
& 341L	and Organic Chemistry I Laboratory	
& CHEM 342	and Organic Chemistry II	
& CHEM 342L	and Organic Chemistry II Laboratory ****	
Physical Sciences		
PHYS 161	Introductory College Physics I	
& PHYS 162	and Introductory College Physics II (OR)	
OR		
PHYS 211	College Physics I	
& PHYS 212	and College Physics II (OR)	
OR		
PHYS 251	University Physics I	
& PHYS 252	and University Physics II	
Statistical Methods and Data Interpretation		
Select one of the following:		3
BIOL 470	Biostatistics #	
PSYC 241	Introduction to Statistics	
SOC 326	Sociological Statistics	
MATH 321	Applied Statistical Methods	

* Students with a particular aptitude for mathematics should consider taking both MATH 165 Calculus I and MATH 166 Calculus II and should consult with their adviser regarding this potential option.

** Prerequisites for either course are the responsibility of the student.

*** The chemistry sequence CHEM 221, CHEM 221L, CHEM 254, and CHEM 254L is intended for students with a strong background and interest in chemistry and presumes some exposure to calculus.

**** The sequence of CHEM 341 Organic Chemistry I and CHEM 342 [illegible] recommended for pre-medicine students because some medical schools require or prefer this combination.

Students may take BIOL 470 and have those credits count toward biology electives AND satisfy the statistics requirement.