Biochemistry and Molecular Biology

Department Information

- **Department Web Site:**
  www.ndsu.edu/chemistry/ (http://www.ndsu.edu/chemistry/)
- **Credential Offered:**
  B.S.; B.A.; Minor
- **Official Program Curriculum:**
  catalog.ndsu.edu/undergraduate/program-curriculum/biochemistry-molecular-biology/ (http://catalog.ndsu.edu/undergraduate/program-curriculum/biochemistry-molecular-biology/)

Biochemistry is concerned with the chemistry of the materials fundamental to life and contributes toward the understanding of the structure and functioning of all organisms. Because of the rapid advances in the areas of biotechnology, molecular biology and genetic engineering, biochemistry is an exciting area for study and research.

Background Information

The undergraduate program in biochemistry at North Dakota State University is planned for students who are seeking careers in the life sciences, agriculture, medicine or health related fields. The program is also suited for students who are contemplating advanced graduate degrees in biochemistry, botany, zoology and microbiology, or professional degrees in dentistry and medicine.

The biochemistry program is offered by the Department of Chemistry and Biochemistry.

The Program

Students with an interest in biochemistry earn the Bachelor of Science degree in biochemistry and molecular biology. This provides flexibility in the selection of courses for those students who plan to seek employment in areas related to biochemistry, enter graduate or medical school, or teach in high schools or higher education institutions. The program provides training in biochemistry, botany, microbiology, zoology or in applied areas according to the student's interest. In addition to the courses in chemistry, physics and mathematics, an additional 16 credits in biological sciences, 18 credits of electives in the humanities and social sciences, nine credits in English, three credits in speech and two credits in wellness are required. The pre-medical student is encouraged to take a year of upper-level zoology.

All undergraduates in biochemistry and molecular biology receive assistance in planning and scheduling classes from faculty advisors. In addition to course work and laboratory courses, students also have the opportunity to learn by conducting research in various areas of biochemistry under faculty guidance.

Faculty and Facilities

The Department of Chemistry and Biochemistry is well staffed with 17 faculty members. All of the faculty have doctorate degrees from well-known universities. Most of them have considerable experience in postdoctoral or industrial research.

The research and teaching facilities for the department are housed in four buildings— A. Glenn Hill Center, Ladd Hall, Dunbar Laboratories, and the Quentin Burdick Building.

Advanced instruments and facilities are readily available. These include ultracentrifuges; gene synthesizer; nuclear magnetic, infrared, ultraviolet and mass spectrometers; gas and liquid chromatographs; computers; recombinant DNA and cell and tissue culture laboratories; and an advanced electron microscope facility.

Career Opportunities

Employment opportunities for biochemists are found at higher education institutions within the chemistry, biochemistry and biological sciences departments; in medical schools, hospitals, research institutes and government research laboratories; and in other health, energy, environment and agricultural research programs. Biochemists are employed at all levels in industries concerned with food processing, manufacturing, genetic engineering and marketing of drugs, cosmetics and pesticides, as well as in the petroleum and allied industrial complexes.

Earnings of persons trained in biochemistry vary, and the salary level depends largely upon the amount of formal training a person has received. Entry-level salaries for biochemists average $44,100 per year, based on 2016 data from www.payscale.com. For biochemists who have an advanced degree, salaries and opportunities are much greater.

High School Preparation

A strong high school background in English, mathematics (through trigonometry, if possible), biology, chemistry and physics is recommended.

Sample Program Guide

IMPORTANT DISCLAIMER: A Sample Program Guide provides an unofficial guide of program requirements and should be used by prospective students who are considering attending NDSU in the future. It is NOT an official curriculum and should NOT be used by current NDSU students for official degree planning purposes. Note that the official curriculum used by current NDSU students can vary from the Sample Program Guide due to a variety of factors such as, but not limited to, start year, education goals, transfer credit, and course availability.

To ensure proper program completion, enrolled students should utilize Degree Map (https://www.ndsu.edu/registrar/degreemap/) and Schedule Planner (https://www.ndsu.edu/onestop/degree-map-and-planning/) in Campus Connection and consult regularly with their academic advisor to ensure requirements are being met.

Freshman					
Fall	**Credits**		**Spring**	**Credits**	
BIOL 150 & 150L		4	MATH 166		4
CHEM 121 & CHEM 160		4	ENGL 120 (Communication Gen Ed)		3
ENGL 110 (Communication Gen Ed)		3	CHEM 122 & CHEM 161		4
MATH 165 (Quant. Reasoning Gen Ed)		4	BIOL 151		3
		15			**14**
Sophomore					
Fall	**Credits**		**Spring**	**Credits**	
COMM 110 (Communication Gen Ed)		3	PHYS 252 & 252L (Science & Tech Gen Ed)		5
CHEM 341		3	CHEM 342		3
CHEM 353		1	CHEM 354		2
BIOL 315		3	Humanities/Fine Arts and Global Perspectives Gen Ed		3
PHYS 251 & 251L (Science & Tech Gen Ed)		5	Social & Beh Sci and Cultural Diversity Gen Ed		3
		15			**16**
Junior					
Fall	**Credits**		**Spring**	**Credits**	
BIOC 460		3	CHEM 380		1
BIOC 460L		1	BIOC 461		3
CHEM 431		3	BIOC 474		3
MICR 350 & 350L		5	STAT 330		3
ENGL 321 or 324 (Communication Gen Ed)		3	300-400 Level Science Elective[1]		3
			300-400 Level Science Elective[1]		3
		15			**16**
Senior					
Fall	**Credits**		**Spring**	**Credits**	
BIOC 473		4	BIOC 487		3
BIOC 483		3	CHEM 491		2
CHEM 465		4	300-400 Level Science Electives[1]		3
Humanities or Social Science College Requirement[2]		3	Humanities or Social Science College Requirement[2]		6

	Wellness Gen Ed	2
	14	**16**

Total Credits: 121

1

Courses in BIOL, BOT, ZOO, CHEM, CSCI, MICR, PSCI, PHYS, PPTH, or STAT. No more than 6 credits from one prefix may apply. Research credits (CHEM 494/BIOC 494) may count towards 3 of these credits.

2

Humanities and Social Sciences may be fulfilled by any course having the following prefix: ADHM, ANTH, ARCH, ART, CJ, CLAS, COMM, ECON, ENGL, FREN, GEOG, GERM, HDFS, LA, LANG, MUSC, PHIL, POLS, PSYC, RELS, SOC, SPAN, THEA, WGS, or any course from the approved list of general education in the humanities & fine arts and the social & behavioral sciences categories (A & B). These credits must come from outside the department of the student's major.