MAJOR REQUIREMENTS (108 Units) Grades of “C” or better required. Courses may not need to be completed in order listed.

Chemistry & Biochemistry Core curriculum (47 units)
CHEM 111 General Chemistry I (4) and CHEM 111L Laboratory (1) Prerequisite: MATH 121 or placement or CHEM 110
CHEM 112 General Chemistry II (4) and CHEM 112L Laboratory (1) Prerequisite: CHEM 111 and CHEM 111L Physical Science*
CHEM 113 General Chemistry III (4) and CHEM 113L Laboratory (1) Prerequisite: CHEM 112 and CHEM 112L Physical Science*
CHEM 224 Analytical Chemistry (4) Prerequisite: CHEM 113
CHEM 281 Organic Chemistry I (4) and CHEM 281L Laboratory (1) Prerequisite: CHEM 113 and CHEM 113L
CHEM 282 Organic Chemistry II (4) and CHEM 282L Laboratory (1) Prerequisite: CHEM 281 and CHEM 281L
CHEM 321 Molecular Science Research Literature Review (2) Prerequisite: CHEM 281 and CHEM 281L
CHEM 322 Molecular Science Research Lab (2) Prerequisite: CHEM 224, 282, 282L, 321 & consent
CHEM 351 Physical Chemistry: Thermodynamics (4) Prerequisite: CHEM 224, MATH 132, PHYS 233
CHEM 352 Physical Chemistry: Dynamics (4) Prerequisite: CHEM 351
CHEM 421 Writing for Molecular Science Research (1) Prerequisite: CHEM 321
CHEM 422 Molecular Science Research Presentation (1) Prerequisite: CHEM 421
Choose 1 from Below
CHEM 424 Instrumental Analysis I (3) and CHEM 424L Laboratory (1) Prerequisite: CHEM 224
CHEM 425 Instrumental Analysis II (3) and CHEM 425L Laboratory (1) Prerequisite: CHEM 224
CHEM 426 Instrumental Analysis III (3) and CHEM 426L Laboratory (1) Prerequisite: CHEM 224

Core Cognates (23 units)
MATH 131 Calculus I (4) Prerequisite: MATH 222 or applicable Math Placement Test score
MATH 132 Calculus II (4) Prerequisite: MATH 131
PHYS 231 General Physics I (4) and PHYS 231L Laboratory (1) Prerequisite: PHYS 231A and 231B
PHYS 232 General Physics II (4) and PHYS 232L Laboratory (1) Prerequisite: PHYS 211 and 231L
PHYS 233 General Physics III (4) and PHYS 233L Laboratory (1) Prerequisite: PHYS 232 and 233L

Biochemistry Courses (12 units)
CHEM 491 Biochemistry I (3) and CHEM 491L Laboratory (1) Prerequisite: CHEM 224 & 282
CHEM 492 Biochemistry II (3) and CHEM 492L Laboratory (1) Prerequisite: CHEM 491 and 491L
CHEM 493 Biochemistry III (3) and CHEM 493L Laboratory (1) Prerequisite: CHEM 492 and 492L

Additional Required Cognates (15 units)
BIOL 111 General Biology I (4) and BIOL 111L Laboratory (1) Prerequisite: MATH 121 or placement or CHEM 110
BIOL 112 General Biology II (4) and BIOL 112L Laboratory (1) Prerequisite: BIOL 111 and 111L
BIOL 113 General Biology III (4) and BIOL 113L Laboratory (1) Prerequisite: BIOL 112 and 112L

Remaining units, from courses applicable to biochemistry major, should be selected in consultation with advisor (11 units)

UNIVERSITY STUDIES FOUNDATIONAL STUDIES (20-33 UNITS) Grades of “C” or better required.

I FIRST-YEAR SEMINAR  
UNST 101A (1) and 101B (1) OR UNST 100A (3) and 100B (3)
II RHETORICAL SKILLS  
A. ENGL 111 (3), 112 (3), 113 (3) College Writing or ENGL 124 Freshman Seminar (4)
B. Upper Division Rhetoric: CHEM 405 (1), 408 (2), and CHEM 424/425/426 (3)
III MATHEMATICS  
One college-level Mathematics course in MATH 115/121/155/CPTG 117 (4) Major requires MATH 131, 132
IV WORLD LANGUAGES  
Level 3 proficiency (e.g. 153) in one non-English language (4-12)
V HEALTH AND FITNESS  
HLSC 120 Lifetime Fitness (2)

UNIVERSITY STUDIES GENERAL STUDIES (52 UNITS, 16 UPPER DIVISION) Grades of “D” or better required, unless courses are required by major.

THEME I. SOCIAL SCIENCES (SSCI) 8 units  
Globalization, Identity and Citizenship (4 units from SSCI 204/205/206/207/208) Prerequisite: ENGL 113/124
Social Science Breadth Courses (4 units)

THEME II. ARTS AND HUMANITIES (HUMN) 12 units  
Exploring Culture (4 units from HUMN 104/105/106/107) Prerequisite: ENGL 111/124
Arts and Humanities Breadth Courses (4 units)
Arts and Humanities Breadth Courses (4 units)

THEME III RELIGIOUS BELIEFS AND PRACTICES (RLGN) 16 units  
RLGN 304 Adventism in Global Perspective or RLGN 305 Religion in Three Cultures (4) Prerequisite: ENGL 113/124, Junior Status
A. Spiritual Experience and Expressions (0-4 units)
B. Beliefs and Heritage (4 units)
C. Scripture (4 units)
D. Religion and Society (0-4 units)

THEME IV NATURAL SCIENCES (NSCI) 12 units  
Scientific Foundations (4 units from NSCI 404/405/406/407/408)
Life Science (4 units) Either life science or physical science must include a laboratory
Physical Science (4 units) Either life science or physical science must include a laboratory

THEME V SENIOR SEMINAR  
UNST 404D Religion, Values, and Social Responsibility (4)
CAREER OPPORTUNITIES AND RELATED OCCUPATIONS: Biochemists and biophysicists use advanced technologies, such as lasers and fluorescent microscopes, to conduct scientific experiments and analysis. They also use x rays and computer modeling software to determine the three-dimensional structures of proteins and other molecules. Biochemists and biophysicists involved in biotechnology research use chemical enzymes to synthesize recombinant DNA. Career opportunities may also involve work as an oceanographer, soil conservationist, agricultural scientist, biological scientist, life science technician, in the fields of nutrition, dietetics, molecular biology, health science, microbiology and pharmacology.

EDUCATIONAL QUALIFICATIONS: A degree in Biochemistry is the entry level for technical positions in the industry. For more advanced research and management positions, Masters and Ph.D. degrees are eventually needed.

Chemists and materials scientists with advanced degrees, particularly those with a Ph.D. and work experience, are expected to experience better opportunities. Large pharmaceutical and biotechnology firms provide openings for these workers at research laboratories, and many others work in colleges and universities. Furthermore, chemists with advanced degrees will continue to fill most senior research and upper-management positions.

Students interested in secondary teaching must complete applicable licensure for the secondary teaching credential. For more information, contact the School of Education.

JOB OUTLOOK: Employment of biochemists and biophysicists is projected to grow 8 percent from 2014 to 2024, about as fast as the average for all occupations.

SALARY: The median annual wage for biochemists and biophysicists was $82,150 in May 2015. The lowest 10 percent earned less than $44,640, and the highest 10 percent earned more than $153,810.

In May 2015, the median annual wages for biochemists and biophysicists in the top industries in which they worked were as follows:

Management, scientific, and technical consulting services $105,430
Research and development in the physical, engineering, and life sciences $87,650
Pharmaceutical and medicine manufacturing $77,960
Basic chemical manufacturing $74,840
Colleges, universities, and professional schools; state, local, and private $55,560
