**BIOLOGICAL CHEMISTRY (BIOC)**

**BIOC 95 Biochemistry Internship**  
**Prerequisites:** Biochemistry Major; Junior or Senior standing; Permission  
**Notes:** Permission to enroll will be granted upon review of the proposed internship by the supervising UNL faculty.  
**Description:** Provides an opportunity for a practical experience and career exploration/development in a selected business, industry, agency or educational institution. Activities must include a significant biochemistry and/or computational/systems biology component.  
**Credit Hours:** 0  
**Max credits per semester:** 2  
**Max credits per degree:** 2  
**Grading Option:** Pass No Pass

**BIOC 101 Foundational Concepts & Career Opportunities in Biochemistry**  
**Notes:** Interest in becoming a biochemistry major.  
**Description:** Introduction to the field of biochemistry and exploration of biochemistry related careers.  
**Credit Hours:** 1  
**Max credits per semester:** 1  
**Max credits per degree:** 1  
**Grading Option:** Graded with Option  
**Offered:** FALL/SPR

**BIOC 205 Scientific Analysis and Technical Writing**  
**Prerequisites:** Biochemistry major or minor; LIFE 120 and CHEM 109 or CHEM 113  
**Notes:** BIOC 101 and CHEM 110 suggested to be taken prior to this course or concurrent enrollment.  
**Description:** Data analysis and presentation, hypothesis-driven research execution and various types of scientific writing with detailed examination of high impact biochemistry research literature.  
**Credit Hours:** 2  
**Max credits per semester:** 2  
**Max credits per degree:** 2  
**Grading Option:** Graded with Option

**BIOC 305 Reflective Approach to Graduate/Professional School Application**  
**Prerequisites:** Biochemistry major; junior standing or senior standing; BIOC 431. Biochemistry minor, with permission.  
**Notes:** Letter grade only.  
**Description:** Focuses on preparing students for graduate/professional school application through reflective writing and application specific activities.  
**Credit Hours:** 1  
**Max credits per semester:** 1  
**Max credits per degree:** 1  
**Grading Option:** Graded  
**Offered:** SPRING

**BIOC 306 Reflective Approach to Graduate/Professional School Application (BIOC)**  
**Prerequisites:** Biochemistry Major; Senior standing; BIOC 305. Biochemistry minor, with permission.  
**Notes:** Letter grade only.  
**Description:** Focuses on preparing students for graduate/professional school application through reflective writing and application specific activities.  
**Credit Hours:** 1  
**Max credits per semester:** 1  
**Max credits per degree:** 1  
**Grading Option:** Graded  
**Offered:** SPRING

**BIOC 401 Elements of Biochemistry**  
**Crosslisted with:** BIOC 801  
**Prerequisites:** CHEM 255 (preferred) or CHEM 251; BIOC 101 and BIOC 101L or LIFE 120 and LIFE 120L  
**Notes:** Will not count towards a biochemistry major.  
**Description:** Structure and function of proteins, carbohydrates, lipids and nucleic acids; enzymes; principal metabolic pathways; and biochemical expression of genetic information.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option  
**Prerequisite for:** NUTR 450; NUTR 455; VBMS 410

**BIOC 401L Laboratory for Elements of Biochemistry**  
**Prerequisites:** Parallel BIOC 321  
**Description:** Laboratory exercises and experiments that complement material covered in BIOC 401.  
**Credit Hours:** 1  
**Max credits per semester:** 1  
**Max credits per degree:** 1  
**Grading Option:** Graded with Option  
**Offered:** FALL/SPR

**BIOC 431 Biochemistry I: Structure and Metabolism**  
**Crosslisted with:** BIOC 831, BIOS 431, BIOS 831, CHEM 431, CHEM 831  
**Prerequisites:** LIFE 120 with a grade of C or better; CHEM 252 or CHEM 262 with a grade of C or better.  
**Notes:** BIOS 206 or AGRO 215 is recommended.  
**Description:** Structure and function of proteins, nucleic acids, carbohydrates and lipids; nature of enzymes; major metabolic pathways of catabolism; and biochemical energy production.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option  
**Offered:** FALL/SPR

**BIOC 432 Biochemistry II: Metabolism and Biological Information**  
**Crosslisted with:** BIOC 832, BIOS 432, CHEM 432, CHEM 832, BIOS 432, BIOS 832, CHEM 432, CHEM 832, BIOS 832, CHEM 432, CHEM 832, BIOS 432, BIOS 832, CHEM 432, CHEM 832, BIOS 432, BIOS 832, CHEM 432, CHEM 832, BIOS 432, BIOS 832, CHEM 432, CHEM 832  
**Prerequisite for:** AGRO 434, BIOC 434, BIOS 434, CHEM 434, AGRO 834, BIOC 834, BIOS 834, CHEM 834, AGRO 810, BIOS 810, HORT 810; ASCI 820; ASCI 917; ASCI 925; NUTR 925; ASCI 926; NUTR 926; ASCI 927; NUTR 927; BIOC 305; BIOC 432, BIOC 832, BIOS 432, BIOS 832, CHEM 832, BIOS 832, CHEM 832, BIOS 433, BIOS 833, CHEM 433, CHEM 833, BIOS 440, BIOS 879; NUTR 950, VBMS 950; FDST 470, FDST 870; NUTR 450; NUTR 455; VBMS 950; VBMS 410; VBMS 805  
**Notes:** Continuation of BIOC 431/831.  
**Description:** Major metabolic pathways of anabolism, structural and biochemical aspects of biological information flow and use in biotechnology.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option  
**Offered:** FALL/SPR  
**Offered:**  BIOC 401L Laboratory for Elements of Biochemistry  
**Prerequisite for:** AGRO 434, BIOC 434, BIOS 434, CHEM 434, AGRO 834, BIOC 834, BIOS 834, CHEM 834, AGRO 810, BIOS 810, HORT 810; ASCI 820; ASCI 917; ASCI 925; NUTR 925; ASCI 926; NUTR 926; ASCI 927; NUTR 927; BIOC 305; BIOC 432, BIOC 832, BIOS 432, BIOS 832, CHEM 832, BIOS 832, CHEM 832, BIOS 433, BIOS 833, CHEM 433, CHEM 833, BIOS 440, BIOS 879; NUTR 950, VBMS 950; FDST 470, FDST 870; NUTR 450; NUTR 455; VBMS 950; VBMS 410; VBMS 805
BIOC 433 Biochemistry Laboratory
Crosslisted with: BIOC 833, BIOS 433, BIOS 833, CHEM 433, CHEM 833
Prerequisites: BIOC 431/831 or parallel; or CHEM 435/835.
Description: Introduction to techniques used in biochemical and biotechnology research, including measurement of pH, spectroscopy, analysis of enzymes, chromatography, fractionation of macromolecules, electrophoresis, and centrifugation.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded with Option
Offered: FALL/SPR
Prerequisite for: BIOC 437, BIOC 837, BIOS 437, BIOS 837; BIOC 898; CHEM 498

BIOC 433H Honors: Inquiry-based Biochemistry Laboratory
Prerequisites: BIOS 206, Parallel BIOC 431
Description: A course-based research experience. Hypothesis-driven design of experiments. Data collection and analysis employing techniques used in spectroscopy, bioinformatics, mutagenesis, recombinant DNA, chromatography, enzyme analysis
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: FALL

BIOC 434 Plant Biochemistry
Crosslisted with: AGRO 434, BIOS 434, CHEM 434, AGRO 834, BIOS 834, BIOS 834, CHEM 834
Prerequisites: BIOC/BIOS/CHM 431/831.
Description: Biochemical metabolism unique to plants. Relationships of topics previously acquired in general biochemistry to biochemical processes unique to plants. Biochemical mechanisms behind physiological processes discussed in plant or crop physiology.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

BIOC 435 Advanced Topics in Biochemistry
Prerequisites: BIOC/BIOS/CHM 432/832 with a grade of C or better
Description: Application of general biochemistry knowledge to current topics in the life sciences; literature research and seminar.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

BIOC 437 Research Techniques in Biochemistry
Crosslisted with: BIOC 837, BIOS 437, BIOS 837
Prerequisites: BIOC/BIOS/CHM 433/833.
Description: Methods approach to systems biology analysis. Molecular identification and quantification employing techniques such as mass spectrometry, chromatography, electrophoretic fractionation, transcriptomics, proteomics and metabolomics. Data and pathway analysis with computational methods.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Prerequisite for: VBMS 919

BIOC 439 Dynamics of Biochemical and Biological Networks
Crosslisted with: BIOC 839, BIOS 439, BIOS 839
Prerequisites: BIOS 206 or AGRO 215; BIOC 401 or BIOC 431
Notes: Letter grade only.
Description: To introduce and integrate, students in biochemistry and other life sciences, to the field of computational modeling of biochemical and biological network systems into a seamless curriculum.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: SPRING
Prerequisite for: ASCI 949, BIOC 949, BIOS 949, NUTR 949; BIOC 932, BIOS 932, CHEM 932; BIOC 933, BIOS 933, CHEM 933; BIOC 998

BIOC 440 Structural Biology and Biophysical Chemistry
Prerequisites: BIOC/BIOS/Chem 431; MATH 107; PHYS 142 or PHYS 212.
Description: Introduction and development of structural and physical ideas for students interested in addressing biological and biochemical questions through quantitative, analytical, and structure-based approaches.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL/SPR

BIOC 442 Computational Biology
Crosslisted with: BIOC 842, STAT 842, STAT 442
Prerequisites: Any introductory course in biology, or genetics, or statistics.
Description: Databases, high-throughput biology, literature mining, gene expression, next-generation sequencing, proteomics, metabolomics, system biology and biological networks.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

BIOC 486 Advanced Topics in Biophysical Chemistry
Crosslisted with: BIOC 886, BIOS 486, BIOS 886, CHEM 486, CHEM 886
Prerequisites: CHEM 471/871 or CHEM 481/881.
Description: Applications of thermodynamics to biochemical phenomena, optical properties of proteins and polynucleotides, and kinetics of rapid reactions.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

BIOC 498 Undergraduate Research
Prerequisites: Permission.
Description: Research on a specific biochemical project under the supervision of a biochemistry faculty member.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Graded with Option
BIOC 499H Honors Thesis

Prerequisites: Good standing in the University Honors Program or by invitation. AGRI 299H recommended.

Description: Conduct a scholarly research project and write a University Honors Program or undergraduate thesis.

Credit Hours: 1-6

Min credits per semester: 1

Max credits per semester: 6

Max credits per degree: 6

Grading Option: Graded