**BIOLOGICAL CHEMISTRY (BIOC)**

**BIOC 101 Career Opportunities in Biochemistry**  
**Prerequisites:** Interest in becoming a biochemistry major.  
**Description:** Introduction to the field of biochemistry and faculty research interests in the Center for Biochemistry. Exploration of careers in biochemistry.  
**Credit Hours:** 1  
**Max credits per semester:** 1  
**Max credits per degree:** 1  
**Format:** LEC

**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  
**Format:** LEC

**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  
**Format:** LEC  
**Offered:** SPRING

**BIOC 401 Elements of Biochemistry**  
**Crosslisted with:** BIOC 801  
**Prerequisites:** CHEM 255 (preferred) or CHEM 251; BIOS 101 and BIOS 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  
**Format:** LEC  
**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  
**Format:** LAB  
**Offered:** FALL/SPR

**BIOC 431 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  
**Format:** LEC  
**Offered:** FALL/SPR  
**Prerequisite for:** AGRO 434, BIOC 434, BIOS 434, CHEM 434, AGRO 834, BIOC 834, BIOS 834, CHEM 834; AGRO 810, BIOC 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, CHEM 432, CHEM 832, BIOS 832, CHEM 832, BIOS 433, BIOS 833, CHEM 433, CHEM 833; BIOS 839, BIOS 839; BIOS 879; BIOS 950, VBMS 950; FDST 470, FDST 870; NUTR 450; NUTR 455; NUTR 820; NUTR 821; VBMS 410; VBMS 805

**BIOC 432 Metabolism and Biological Information**  
**Crosslisted with:** BIOC 832, BIOS 432, CHEM 432, CHEM 832, BIOS 832  
**Prerequisites:** BIOC 431/831 with a grade of C or better; BIOS 206 or AGRO 215 with a grade of C or better.  
**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  
**Format:** LEC  
**Offered:** FALL/SPR  
**Prerequisites for:** ASCI 949, BIOC 949, BIOS 949, NUTR 949; BIOC 435; BIOC 322, BIOS 432, CHEM 322, CHEM 932, BIOS 932, CHEM 932, BIOS 934, CHEM 934; BIOC 935, BIOS 935, CHEM 935, BIOS 992K, CHEM 992K, BIOC 998; NUTR 950, VBMS 950; VBMS 919; VBMS 951
## Biological Chemistry (BIOC)

### 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  
**Format:** LEC  
**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  
**Format:** LAB  
**Offered:** FALL

### BIOC 434 Plant Biochemistry
**Crosslisted with:** AGRO 434, BIOS 434, CHEM 434, AGRO 834, BIOS 834, CHEM 834  
**Prerequisites:** BIOC/BIOS/CHRM 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  
**Format:** LEC

### BIOC 435 Advanced Topics in Biochemistry
**Prerequisites:** BIOC/BIOS/CHRM 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  
**Format:** LEC  
**ACE:** ACE 10 Integrated Product

### BIOC 437 Research Techniques in Biochemistry
**Crosslisted with:** BIOC 837, BIOS 437, BIOS 837  
**Prerequisites:** BIOC/BIOS/CHRM 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  
**Format:** LEC  
**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  
**Format:** LEC  
**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 992K, CHEM 992K; BIOC 998

### 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  
**Format:** LEC

### BIOC 486 Advanced Topics in Biophysical Chemistry
**Prerequisites:** BIOC 498, CHEM 486, CHEM 886  
**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  
**Format:** LEC

### 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  
**Format:** IND

### 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  
**Format:** IND