# 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.
**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 321 Elements of Biochemistry
**Prerequisites:** CHEM 255 (preferred) or CHEM 251; BIOS 101 and BIOS 101L or LIFE 120 and LIFE 120L.
**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:** VBMS 410

## BIOC 321L Laboratory for Elements of Biochemistry
**Prerequisites:** Parallel BIOC 321.
**Credit Hours:** 1
**Max credits per semester:** 1
**Max credits per degree:** 1
**Format:** LAB

## BIOC 431 Structure and Metabolism
**Crosslisted with:** BIOC 831, BIOS 431, BIOS 831, CHEM 431, CHEM 831
**Prerequisites:** CHEM 252 or CHEM 262 with a grade of C or better.
**LIFE 120 and BIOS 206 are recommended.
**Notes:** First course of a two-semester, comprehensive biochemistry course sequence.
**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
**Prerequisite for:** VBMS 410

## 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.
**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
**Prerequisite for:** BIOC 435; BIOS 934, BIOS 934, CHEM 934

## BIOC 433 Biochemistry Laboratory
**Crosslisted with:** BIOC 833, BIOS 433, BIOS 833, CHEM 433, CHEM 833
**Prerequisites:** BIOC 431/831 (or concurrent enrollment) 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

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

## BIOC 437 Research Techniques in Biochemistry
**Crosslisted with:** BIOC 837, BIOS 437, BIOS 837
**Prerequisites:** BIOC/BIOS/CHEM 433/833, or permission.
**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
BIOC 439 Dynamics of Biochemical and Biological Networks  
Crosslisted with: BIOC 839, BIOS 439, BIOS 839  
Prerequisites: BIOS 206, BIOC 321 or BIOC 431 (or equivalent)  
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

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  
Crosslisted with: BIOC 886, BIOS 486, BIOS 886, CHEM 486, CHEM 886  
Prerequisites: CHEM 471/871 or 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  
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