

# BIOLOGICAL CHEMISTRY (BIOC)

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## **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 831, 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; BIOC 433, BIOC 833, BIOS 433, BIOS 833, CHEM 433, CHEM 833; BIOC 439, BIOC 839, BIOS 439, 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

**Prerequisite for:** ASCI 949, BIOC 949, BIOS 949, NUTR 949; BIOC 435; BIOC 932, BIOS 932, CHEM 932; BIOC 933, BIOS 933, CHEM 933; BIOC 934, BIOS 934, CHEM 934; BIOC 935, BIOS 935, CHEM 935; BIOC 992K, CHEM 992K; BIOC 998; BIOS 950, VBMS 950; VBMS 919; VBMS 951

**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, 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**ACE:** ACE 10 Integrated Product**BIOC 437 Research Techniques in Biochemistry****Crosslisted with:** BIOC 837, BIOS 437, BIOS 837**Prerequisites:** BIOC/BIOS/CHEM 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 321 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****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**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