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: Not eligible for 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; ASCII 820; ASCII 917; ASCII 925, NUTR 925; ASCII 926, NUTR 926; ASCII 927, NUTR 927; BIOC 305; BIOC 432, BIOC 832, BIOS 432, CHEM 432, CHEM 832, BIOS 832, CHEM 833, CHEM 879; BIOS 950, VBMS 950; FDST 470, FDST 870; NUTR 450; NUTR 455; NUTR 820; 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; 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, BIOS 834, CHEM 834
*Prerequisites:* BIOC/BIOS/CH 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/CH 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/CH 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 499, BIOC 499, BIOS 499, NUTR 499; 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