BIOLOGICAL CHEMISTRY (BIOC)

BIOC 810 Plant Molecular Biology
Crosslisted with: AGRO 810, HORT 810
Prerequisites: AGRO 215 or BIOS 206; BIOC 831 or permission
Description: Molecular genetic basis of biological function in higher plants. Genome organization, gene structure and function, regulation of gene expression, recombinant DNA, and genetic engineering principles. Material taken primarily from current literature.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

BIOC 818 Agricultural Biochemistry
Crosslisted with: AGRO 818
Prerequisites: Undergraduate major in life sciences or related area, and a course in biochemistry
Description: A Web-based course. Biochemical underpinnings of agricultural production and processing systems. Agricultural biotechnology; bioenergetics; kinetics and enzyme regulation; interaction of biomolecules with light, photosynthesis and the balance between anabolism and catabolism in microbes, plants and animals.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Format: IND

BIOC 831 Structure and Metabolism
Crosslisted with: BIOC 431, 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: BIOS 206 or AGRO 215 is recommended. 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: BIOC 305, BSEN 416, BSEN 816; VBMS 410

BIOC 832 Metabolism and Biological Information
Crosslisted with: BIOC 432, 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 434, BIOS 934, CHEM 934

BIOC 833 Biochemistry Laboratory
Crosslisted with: BIOC 433, 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 834 Plant Biochemistry
Crosslisted with: AGRO 434, BIOC 434, BIOS 434, CHEM 434, AGRO 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 836 Physical Basis of Macromolecular Function
Crosslisted with: CHEM 836
Description: Introduction to the theory and practice of biophysical characterization of macromolecules. The course will be based on primary research literature, although a supporting text will be used for in depth discussion of the methods.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

BIOC 837 Research Techniques in Biochemistry
Crosslisted with: BIOC 437, 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 839 Dynamics of Biochemical and Biological Networks
Crosslisted with: BIOC 439, BIOS 439, BIOS 839
Prerequisites: BIOS 206, BIOS 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 842 Computational Biology
Crosslisted with: STAT 842, STAT 442, BIOC 442
Prerequisites: Any introductory course in biology, or genetics, or
statistics.
Description: Databases, high-throughput biology, literature mining, gene
eexpression, 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 848 Redox Biochemistry
Crosslisted with: CHEM 848
Prerequisites: 3 hrs BIOC and 3 hrs inorganic chemistry
Description: Redox (oxidation and reduction)-based biochemical
processes (energy generation, oxygen transfer, enzyme catalysis,
signaling, gene regulation, and diseases). Recent progress in these
areas. Roles of metals in biochemical reactions, metal homeostasis,
and biosynthesis of metal cofactors and metal sites. Biochemistry
and pathophysiology of redoxactive species and radicals. Antioxidant
molecules and enzymes.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

BIOC 886 Advanced Topics in Biophysical Chemistry
Crosslisted with: BIOC 486, 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 898 Research in Biochemistry
Prerequisites: BIOC 833 and permission
Description: Laboratory research on a specific problem 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 899 Masters Thesis
Prerequisites: Admission to masters degree program and permission of
major adviser
Credit Hours: 1-10
Min credits per semester: 1
Max credits per semester: 10
Max credits per degree: 99
Format: IND

BIOC 932 Proteins
Crosslisted with: BIOS 932, CHEM 932
Prerequisites: CHEM 832 or BIOS 832 or BIOC 832 or CHEM 839 or
BIOS 839 or BIOC 839
Description: Protein structure and function.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Format: LEC

BIOC 933 Enzymes
Crosslisted with: BIOS 933, CHEM 933
Prerequisites: BIOC/BIOS/CHEM 432/832, or BIOC/BIOS/CHEM *839
Description: Kinetics regulation and reaction mechanisms of enzymes.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Format: LEC

BIOC 934 Genome Dynamics and Gene Expression
Crosslisted with: BIOS 934, CHEM 934
Prerequisites: BIOC/BIOS/CHEM 432/832 or permission
Description: Detailed examination of dynamic control mechanisms of
genome maintenance and gene regulation. Mechanisms of transcription,
translation, and replication based on analysis of current and seminal
literature.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

BIOC 935 Metabolic Function and Dysfunction
Crosslisted with: BIOS 935, CHEM 935
Prerequisites: BIOC/CHEM/BIOS 432/832 and permission
Description: Current metabolic research at the bioenergetic, metabolomic,
and molecular level. The normal metabolic processes that go awry in
cancer, obesity, and oxidative stress.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

BIOC 949 Biochemistry of Nutrition
Crosslisted with: ASCI 949, BIOS 949, NUTR 949
Prerequisites: BIOC 832 or 839, or permission
Notes: Offered odd-numbered calendar years.
Description: Interrelationships of nutrients, nutritional state and
metabolic processes. Energy metabolism, integration of nutrition and
metabolism and nutritional regulation of gene function.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

BIOC 992K Seminar in Biological Chemistry
Crosslisted with: CHEM 992K
Prerequisites: BIOC 832 or *839; and permission
Credit Hours: 1-2
Min credits per semester: 1
Max credits per semester: 2
Max credits per degree: 2
Format: LEC
BIOC 998 Advanced Topics in Biochemistry
Prerequisites: BIOC 832 and *839
Description: BIOC 998 is a special biochemistry topics when faculty and student needs cannot be met by other courses.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

BIOC 999 Doctoral Dissertation
Prerequisites: BIOC 832 and *839
Credit Hours: 1-24
Min credits per semester: 1
Max credits per semester: 24
Max credits per degree: 99
Format: IND