

BIOLOGICAL CHEMISTRY (BIOC)

BIOC 801 Elements of Biochemistry

Crosslisted with: BIOC 401

Prerequisites: CHEM 251 or CHEM 261; 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

Grading Option: Grade Pass/No Pass Option

Prerequisite for: BIOC 401L; FDST 867; FORS 415; NUTR 450; NUTR 455; VBMS 410

BIOC 810 Plant Molecular Biology

Crosslisted with: AGRO 810, HORT 810, BIOC 410, PLAS 410

Prerequisites: BIOS 201 or PLAS 215

Notes: LIFE 120 and BIOC 401 are suggested

Description: This course covers the molecular genetic basis of biological function in plants. Emphasis is on genetics (genome organization, gene structure and function, regulation of gene expression and genetic engineering) and molecular biology of the plant cell (cell compartments, cell reproduction, energy flow, reproductive development). The course uses published research articles in plant biology as primary learning resources.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Grade Pass/No Pass Option

Offered: SPRING

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

Grading Option: Grade Pass/No Pass Option

Prerequisite for: VBMS 919

BIOC 831 Biochemistry I: Structure and Metabolism

Crosslisted with: BIOC 431, 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 201 or PLAS 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

Grading Option: Grade Pass/No Pass Option

Offered: FALL/SPR

Prerequisite for: ASCI 820; ASCI 917; ASCI 925, NUTR 925; ASCI 926, NUTR 926; ASCI 927, NUTR 927; BIOC 305; BIOC 390; 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 433H; BIOC 440; FDST 470, FDST 870; NUTR 450; NUTR 455; NUTR 820, NUTR 420; NUTR 821; PLAS 434, BIOC 434, BIOS 434, CHEM 434, AGRO 834, BIOC 834, BIOS 834, CHEM 834; VBMS 410; VBMS 805; VBMS 950

BIOC 832 Biochemistry II: 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 201 or PLAS 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

Grading Option: Grade Pass/No Pass Option

Offered: FALL/SPR

Prerequisite for: ASCI 949, BIOC 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 998; VBMS 919; VBMS 950; VBMS 951

BIOC 833 Biochemistry Laboratory

Crosslisted with: BIOC 433, 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

Grading Option: Grade Pass/No Pass Option

Offered: FALL/SPR

Prerequisite for: BIOC 437, BIOC 837, BIOS 437, BIOS 837; BIOC 898

Course and Laboratory Fee: \$50

BIOC 834 Plant Biochemistry

Crosslisted with: PLAS 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

Grading Option: Grade Pass/No Pass Option

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

Grading Option: Grade Pass/No Pass Option

BIOC 837 Research Techniques in Biochemistry

Crosslisted with: BIOC 437, 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

Grading Option: Grade Pass/No Pass Option

Prerequisite for: VBMS 919

Course and Laboratory Fee: \$50

BIOC 839 Dynamics of Biochemical and Biological Networks

Crosslisted with: BIOC 439, BIOS 439, BIOS 839

Prerequisites: BIOS 201 or PLAS 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

Grading Option: Graded

Offered: SPRING

Prerequisite for: ASCI 949, BIOC 949, NUTR 949; BIOC 932, BIOS 932, CHEM 932; BIOC 933, BIOS 933, CHEM 933; BIOC 998

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 expression, next-generation sequencing, proteomics, metabolomics, system biology and biological networks.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Grade Pass/No Pass Option

BIOC 848 Redox Biochemistry

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

Grading Option: Grade Pass/No Pass Option

BIOC 886 Advanced Topics in Biophysical Chemistry

Crosslisted with: BIOC 486, 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

Grading Option: Grade Pass/No Pass Option

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

Grading Option: Grade Pass/No Pass Option

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

Grading Option: Grade Pass/No Pass Option

BIOC 932 Proteins

Crosslisted with: BIOS 932, CHEM 932

Prerequisites: BIOC/BIOS/CHEM 832 or BIOC/BIOS/CHEM 839

Description: Protein structure and function.

Credit Hours: 2

Max credits per semester: 2

Max credits per degree: 2

Grading Option: Grade Pass/No Pass Option

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

Grading Option: Grade Pass/No Pass Option

BIOC 934 Genome Dynamics and Gene Expression

Crosslisted with: BIOS 934, CHEM 934

Prerequisites: BIOC/BIOS/CHEM 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

Grading Option: Grade Pass/No Pass Option

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

Grading Option: Grade Pass/No Pass Option

BIOC 949 Biochemistry of Nutrition

Crosslisted with: ASCI 949, NUTR 949

Prerequisites: BIOC 832 or 839

Notes: Offered odd-numbered calendar years.

Description: Offered odd-numbered calendar years. 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

Grading Option: Grade Pass/No Pass Option

Offered: FALL

BIOC 992K Seminar in Biological Chemistry

Notes: This course is required for Center for Biological Chemistry (CBC) graduate students.

Description: Presentations of current and original Biochemistry research.

Credit Hours: 1

Max credits per semester: 1

Max credits per degree: 8

Grading Option: Graded

Offered: FALL/SPR

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

Grading Option: Grade Pass/No Pass Option

BIOC 999 Doctoral Dissertation

Prerequisites: Admission to doctoral degree program and permission of supervisory committee chair

Credit Hours: 1-24

Min credits per semester: 1

Max credits per semester: 24

Max credits per degree: 99

Grading Option: Grade Pass/No Pass Option