999. Doctoral Dissertation Research
Fall, Spring, Summer. 2 to 12 credits in increments of 4 credits. May reenroll for a maximum of 98 credits. R: graduate level ASC
Faculty supervised dissertation research.
QA: ASC 999

BIOCHEMISTRY BCH

100. Current Issues in Biochemistry
Spring. 1(1 - 0).
Contemporary biochemistry: its impact on environmental, medical, and social sciences.
QA: BCH 100

200. Introduction to Biochemistry
Fall. 4(4 - 0).
P: CSM 143. R: Not open to students with credit in BCH 401 or BCH 461.
Basic structures of major classes of biologically important molecules and metabolic activities of major importance in living organisms.
QP: CSM 143 QA: BCH 200

401. Basic Biochemistry
Fall. Spring. 4(4 - 0).
P: CEM 252 or concurrently. R: Not open to students with majors in Biochemistry. Not open to students with credit in BCH 200 or BCH 461.
Structure and function of major biomolecules, metabolism, and regulation. Examples emphasize the mammalian organism.
QP: CSM 242 ORCEM 355 QA: BCH 401

461. Biochemistry I
Fall. Spring. 3(3 - 0).
P: BCH 461. R: Biochemistry majors or approval of department.
Modern biochemical techniques used in the study of enzymes (proteins), lipids, and cell organelles.
QP: BCH 461 ORBCM 401 MTH 113 QA: BCH 464

472. Biochemistry Laboratory
Fall, Spring. 2(2 - 0).
P: BCH 462. R: Biochemistry majors or approval of department.
Methods of molecular biology and the underlying principles on which these methods are based.
QP: BCH 453 QA: BCH 456

490. Research
Fall, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 8 credits. R: Approval of department.
Participation in laboratory or library research projects.

499. Senior Thesis
Fall, Spring, Summer. 1 to 8 credits. May reenroll for a maximum of 8 credits. R: Approval of department R: Senior 
Cumulative total credits in BCH 490 & 499 may not exceed 8
Laboratory research culminating in submission of a thesis.
QP: BCH 499

521. Medical Biochemistry
Fall. Spring. 5(5 - 0).
R: Graduate-professional students in colleges of Human and Osteopathic Medicine.
Basic biochemical principles and terminology: metabolism and function of biomolecules of importance in medical biology and processes pertinent to human pathophysiology.
QP: CSM 352 CEM 338 QA: BCH 242

581. Molecular Biology and Protein Structure
Fall. Spring. 4(4 - 0).
P: BCH 462, CEM 352, CEM 383
Organization of genes including recombination, regulation of gene expression, replication, and recombination. Protein structure and relationship of function to structure.
QP: BCH 453 CEM 353 CEM 384 QA: BCH 111 BCH 121

582. Metabolic Regulation and Molecular Endocrinology
Spring. 4(4 - 0).
P: BCH 481
Molecular basis for metabolic regulation, molecular signalling mechanisms, and mechanisms for allosteric and covalent protein modifications.
QP: CSM 352 CEM 384 BCH 811 BCH 812 QA: BCH 813

583. Biochemical Mechanisms and Structure
Spring. 3(3 - 0).
P: BCH 462, CEM 353, CEM 383 or concurrently
Structures, methods of structural analysis, synthesis, and reaction mechanisms of biological substances including proteins, carbohydrates, lipids, porphyrins, phosphate esters, enzymes, and coenzymes.
QP: CSM 353 BCH 453 CEM 384 QA: BCH 453

585. Cell Structure and Function
Spring. 3(3 - 0).
R: Interdepartmental with the Department(s) of Physiology, Microbiology and Public Health.
P: BCH 461 or BCH 401
Molecular basis of structure and function in cells. Fundamental properties of cells: reproduction, dynamic organization, integration, programmed and integrative information transfer considered through original investigations in all five kingdoms.
QP: BCH 451 ORCH 401 MTH 113 QA: BCH 464

589. Methods of Macromolecular Analysis and Synthesis
Fall. 4(4 - 0).
P: BCH 462
Techniques of isolation and characterization of macromolecules. Use of the computer in structure-function analysis of macromolecules.
QP: BCH 453 QA: BCH 829

583. Physiological Biochemistry
Spring. 4(4 - 0).
P: BCH 401 or BCH 462
Problem of the relation of biochemistry to physiology. Special emphasis on the role of the cell in the organism and the environment.
QP: BCH 401 QA: BCH 831

599. Special Problems
Fall, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 8 credits. R: graduate level ASC
Laboratory or library research on special problems in biochemistry.
QP: BCH 401 BOT 301 QA: BCH 864

688. Laboratory Rotation
Fall, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 12 credits. R: graduate biochemistry
Participation in research laboratories to learn biochemical techniques and research approaches, broaden research experience, and assess research interests prior to selecting a thesis adviser.
QP: BCH 401

690. Selected Topics in Biochemistry
Fall, Spring. 1 to 2 credits. May reenroll for a maximum of 7 credits. R: Biochemistry majors or approval of department
Topics from areas of biochemical genetics, biochemistry of development, biochemical evolution, complex proteins, lipid metabolism, or other areas of contemporary biochemical research interest.
QP: BCH 401

691. Selected Topics in Biochemistry
Fall, Spring. 1 to 2 credits. May reenroll for a maximum of 7 credits. R: Biochemistry majors or approval of department
Topics from areas of bioenergetics, bioinstrumentation, complex carbohydrates, mass spectrometry, biochemistry of isoprenoid compounds, or other areas of contemporary biochemical research interest.
QP: BCH 401

798. Seminar in Biochemistry
Fall, Spring. 1(1 - 0).
R: graduate biochemistry
Seminars on research topics in biochemistry, mainly by visiting scientists.

999. Doctoral Dissertation Research
Fall, Spring, Summer. 2 to 12 credits in increments of 4 credits. May reenroll for a maximum of 98 credits. R: Ph.D. level ASC
Faculty supervised dissertation research.
QA: ASC 999

BIOLOGICAL SCIENCE BS

110. Organisms and Populations
Fall, Spring. 4(3 - 3).
BIOMEDICAL ENGINEERING

BME

311*. Introduction to Biomedical Engineering
Fall. 3 (3-0) Interdepartmental with the Department(s) of Metallurgy, Mechanics, and Materials Science, Chemical Engineering, Mechanical Engineering, Electrical Engineering, Metallurgy, Mechanics, and Materials Science. P: MTH 235, PHY 184, BS 210

810*. Biokinematics
Spring. 3 (3-2) P: BIM 811

311. Introduction to Biomedical Engineering
Fall. 3 (3-0) Interdepartmental with the Department(s) of Metallurgy, Mechanics, and Materials Science, Chemical Engineering, Mechanical Engineering, Electrical Engineering, Metallurgy, Mechanics, and Materials Science. P: MTH 235, PHY 184, BS 210


Courses with an asterisk (*) have not been approved by the University Committee on Curriculum.

E-21