

BIOCHEMISTRY, MOLECULAR & CELLULAR BIOLOGY (BMCB)

Course numbers with the # symbol included (e.g. #400) have not been taught in the last 3 years.

BMCB 501 - Biological Chemistry

Credits: 4

Survey of the molecular basis of life with a focus on the mechanisms of biochemical reactions in metabolic pathways, beginning with an overview of functional groups and organic reactions relevant for living organisms. Bioenergetics of carbohydrate, lipid, and nitrogen metabolic pathways.

Prerequisite(s): (CHEM 403 with a minimum grade of D- and (CHEM 404 with a minimum grade of D- or CHEM 404H with a minimum grade of D-)) or CHEM 411 with a minimum grade of D-.

Mutual Exclusion: No credit for students who have taken BMCB 658, BMCB 751, BMCB 752.

Grade Mode: Letter Grading

BMCB 605 - Principles of Cell Biology

Credits: 4

Cell and developmental biology of multicellular eukaryotic organisms. Structure and function of major cellular compartments; mechanisms of cellular communication and dynamics; embryonic development. Special topics: subcellular organization and function; membrane biogenesis; signal transduction; mitogenesis; apoptosis; autophagy; tumor suppressors and cell cycle regulation; cytokinesis; cytoskeletal dynamics; cellular shape and motility; stem cell biology; organogenesis; morphogenesis and patterning.

Prerequisite(s): (BIOL 411 with a minimum grade of D- or BIOL 411H with a minimum grade of D- or BIOL 413 with a minimum grade of D-) and (BIOL 412 with a minimum grade of D- or BIOL 412H with a minimum grade of D- or BIOL 414 with a minimum grade of D-) and CHEM 403 with a minimum grade of D- and (CHEM 404 with a minimum grade of D- or CHEM 404H with a minimum grade of D-).

Equivalent(s): BIOL 605, BSCI 735

Grade Mode: Letter Grading

BMCB 658 - General Biochemistry

Credits: 3

Comprehensive, introductory course emphasizing the cellular metabolism and the structure and function of proteins, nucleic acids, carbohydrates, and lipids.

Co-requisite: BMCB 659

Prerequisite(s): (BIOL 411 with a minimum grade of D- or BIOL 411H with a minimum grade of D- or BIOL 413 with a minimum grade of D- or BMS 507 with a minimum grade of D-) and ((CHEM 545 with a minimum grade of D- and CHEM 546 with a minimum grade of D-) or (CHEM 547 with a minimum grade of D- and CHEM 548 with a minimum grade of D-) or (CHEM 651 with a minimum grade of D- and CHEM 652 with a minimum grade of D-)).

Equivalent(s): BMCB 658A

Mutual Exclusion: No credit for students who have taken BMCB 501.

Grade Mode: Letter Grading

BMCB 658A - General Biochemistry

Credits: 3

Comprehensive, introductory course emphasizing the cellular metabolism and the structure and function of proteins, nucleic acids, carbohydrates, and lipids. This course is intended for programs that do not require a biochemistry laboratory.

Prerequisite(s): (BIOL 411 with a minimum grade of D- or BIOL 411H with a minimum grade of D- or BIOL 413 with a minimum grade of D- or BMS 507 with a minimum grade of D-) and ((CHEM 545 with a minimum grade of D- and CHEM 546 with a minimum grade of D-) or (CHEM 547 with a minimum grade of D- and CHEM 548 with a minimum grade of D-) or (CHEM 651 with a minimum grade of D- and CHEM 652 with a minimum grade of D-)).

Equivalent(s): BMCB 658

Mutual Exclusion: No credit for students who have taken BMCB 501.

Grade Mode: Letter Grading

BMCB 659 - General Biochemistry Lab

Credits: 2

Structured laboratory experiments that provide training in analytical and preparative techniques fundamental to modern biochemistry and molecular biology.

Co-requisite: BMCB 658

Equivalent(s): BCHM 659, BMCB 659W

Grade Mode: Letter Grading

Special Fee: Yes

BMCB 659W - General Biochemistry Lab

Credits: 2

Structured laboratory experiments that provide training in analytical and preparative techniques fundamental to modern biochemistry and molecular biology.

Co-requisite: BMCB 658

Attributes: Writing Intensive Course

Equivalent(s): BCHM 659, BMCB 659

Grade Mode: Letter Grading

Special Fee: Yes

BMCB #750 - Physical Biochemistry

Credits: 3

Structure, interactions, and physical-chemical properties of biomolecules. Thermodynamic, kinetic, and spectroscopic methods for the study of proteins and nucleic acids.

Prerequisite(s): ((CHEM 545 with a minimum grade of D- and CHEM 546 with a minimum grade of D-) or (CHEM 547 with a minimum grade of D- and CHEM 548 with a minimum grade of D-) or (CHEM 651 with a minimum grade of D- and CHEM 652 with a minimum grade of D-)) and (MATH 424B with a minimum grade of D- or MATH 425 with a minimum grade of D-).

Equivalent(s): BCHM 750

Grade Mode: Letter Grading

BMCB 751 - Principles of Biochemistry I

Credits: 4

In-depth survey of biochemistry: macromolecular structure; structure and function of proteins, nucleic acids, carbohydrates, and lipids; introduction to metabolic pathways.

Prerequisite(s): (CHEM 547 with a minimum grade of D- and CHEM 548 with a minimum grade of D-) or (CHEM 651 with a minimum grade of D- and CHEM 652 with a minimum grade of D-).

Equivalent(s): BCHM 751

Mutual Exclusion: No credit for students who have taken BMCB 501.

Grade Mode: Letter Grading

BMCB 752 - Principles of Biochemistry II**Credits:** 4

In-depth survey of biochemistry: metabolism of amino acids, nucleotides, carbohydrates and lipids; synthesis and regulation of macromolecules; molecular biology of the eukaryotic cell.

Prerequisite(s): BMCB 751 with a minimum grade of D-.**Equivalent(s):** BCHM 752**Mutual Exclusion:** No credit for students who have taken BMCB 501.**Grade Mode:** Letter Grading**BMCB 753 - Cell Culture****Credits:** 5

Principles and technical skills fundamental to the culture of animal and plant cells, tissues, and organs. Introduction to the techniques of sub-culturing, establishing primary cultures, karyotyping, serum testing, cloning, growth curves, cryopreservation, hybridoma formation and monoclonal antibody production, and organ cultures. Application of cell culture to contemporary research in the biological sciences. Lab.

Prerequisite(s): BMS 503 with a minimum grade of D- and BMS 504 with a minimum grade of D-.**Equivalent(s):** ANSC 751, MICR 751, P BIO 751**Grade Mode:** Letter Grading**Special Fee:** Yes**BMCB 754 - Molecular Biology Research Methods****Credits:** 5

Theory and application of current technologies to manipulate DNA. Hands-on research experience that includes DNA isolation and quantitation methods, cloning, PCR, DNA sequencing, and analysis of gene products. Lab.

Attributes: Writing Intensive Course**Prerequisite(s):** GEN 604 with a minimum grade of D-.**Equivalent(s):** BCHM 754, BSCI 765, GEN 754, P BIO 754**Grade Mode:** Letter Grading**Special Fee:** Yes**BMCB 755 - Protein Biochemistry Laboratory****Credits:** 5

Application of modern approaches to the characterization and purification of proteins. Emphasis on recombinant protein production and purification, analytical techniques for characterization of proteins, enzyme kinetics, and molecular visualization of protein structure.

Attributes: Writing Intensive Course**Prerequisite(s):** BMCB 658 with a minimum grade of D- or BMCB 751 with a minimum grade of D-.**Grade Mode:** Letter Grading**Special Fee:** Yes**BMCB 760 - Pharmacology****Credits:** 4

Introduction to the basic principles and fundamental concepts of pharmacology, with a focus on molecular mechanisms and pathological basis of therapeutics and their curative effects. Topics include: foundations of pharmacology including pharmacodynamics and pharmacogenomics; drugs affecting other systems; chemotherapeutic drugs.

Prerequisite(s): BMCB 658 with a minimum grade of D- or BMCB 751 with a minimum grade of D-.**Mutual Exclusion:** No credit for students who have taken BSCI 680.**Grade Mode:** Letter Grading**BMCB 763 - Biochemistry of Cancer****Credits:** 4

Evaluation of the hallmarks of cancer, including molecular mechanisms of carcinogenesis, roles of oncogenes and dysregulated cell development, function and metabolism, tumor immunology, and the biological basis of cancer therapy.

Prerequisite(s): (BMCB 658 with a minimum grade of D- or BMCB 751 with a minimum grade of D-) and BMCB 605 with a minimum grade of D-.**Equivalent(s):** BCHM 763**Grade Mode:** Letter Grading**BMCB 790 - Undergraduate Teaching Experience****Credits:** 1-4

Provide academic support to graduate teaching assistants or faculty in preparing, presenting, and executing Biochemistry, Molecular and Cellular Biology lectures or labs.

Repeat Rule: May be repeated for a maximum of 4 credits.**Grade Mode:** Letter Grading**BMCB 794 - Protein Structure and Function****Credits:** 4

Analysis of how the three-dimensional architecture of soluble and membrane proteins contributes to their biochemical function; methods for determining the structure of proteins; protein folding; protein targeting; mechanisms of enzyme catalysis. Computer resources used for protein modeling and structural prediction.

Prerequisite(s): BMCB 658 with a minimum grade of D- or BMCB 751 with a minimum grade of D-.**Equivalent(s):** BCHM 794**Grade Mode:** Letter Grading**BMCB 795 - Investigations in Molecular and Cellular Biology****Credits:** 1-4

Advanced research or scholarly projects developed and conducted under the supervision of a faculty member. Provides the opportunity to apply advanced knowledge and techniques of the major to a specific problem or question.

Repeat Rule: May be repeated for a maximum of 8 credits.**Equivalent(s):** BCHM 795, BCHM 795W, BMCB 795W**Grade Mode:** Letter Grading**BMCB 795W - Investigations in Molecular and Cellular Biology****Credits:** 1-4

Advanced research or scholarly projects developed and conducted under the supervision of a faculty member. Provides the opportunity to apply advanced knowledge and techniques of the major to a specific problem or question.

Attributes: Writing Intensive Course**Repeat Rule:** May be repeated for a maximum of 8 credits.**Equivalent(s):** BCHM 795, BCHM 795W, BMCB 795**Grade Mode:** Letter Grading**BMCB 799 - Senior Thesis****Credits:** 1-4

Independent research project under the direction of a faculty sponsor for seniors in biochemistry, molecular and cellular biology. Final product is a written thesis. One or two semesters.

Attributes: Writing Intensive Course**Repeat Rule:** May be repeated for a maximum of 8 credits.**Equivalent(s):** BCHM 699, BCHM 799, BCHM 799H, BMCB 799H**Grade Mode:** Letter Grading

BMCB 799H - Honors Senior Thesis**Credits:** 1-4

Independent research project under the direction of a faculty sponsor for seniors in biochemistry, molecular and cellular biology and in the Honors Program. Final product is a written thesis. One or two semesters.

Attributes: Honors course; Writing Intensive Course**Repeat Rule:** May be repeated for a maximum of 8 credits.**Equivalent(s):** BCHM 799, BCHM 799H, BMCB 799**Grade Mode:** Letter Grading