

DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR BIOLOGY

Courses

Biochemistry and Molecular Biology (BC)

BC 192 Biochemistry Freshman Seminar Credits: 2 (1-0-1)

Course Description: Introduction to curriculum and career options for biochemistry majors.

Prerequisite: None.

Registration Information: Must register for lecture and recitation.

Term Offered: Fall.

Grade Mode: Traditional.

Special Course Fee: No.

BC 295 Introductory Independent Study Credits: Var[1-3] (0-0-0)

Course Description: Apply principles and knowledge being learned in first and second year life sciences and chemistry courses.

Prerequisite: LIFE 102 or CHEM 112, may be taken concurrently.

Terms Offered: Fall, Spring, Summer.

Grade Mode: Instructor Option.

Special Course Fee: No.

BC 351 Principles of Biochemistry Credits: 4 (4-0-0)

Course Description: Structure and function of biological molecules; biocatalysis; metabolism and energy transduction.

Prerequisite: (BZ 110 or BZ 120 or LIFE 102) and (CHEM 241 or CHEM 245 or CHEM 341 or CHEM 345).

Registration Information: For majors in biological sciences, engineering, and preprofessional students in the health sciences. Sections may be offered: Online.

Terms Offered: Fall, Spring, Summer.

Grade Mode: Traditional.

Special Course Fee: No.

BC 353 Pre-Health Genetics Credits: 4 (4-0-0)

Course Description: Applies and extends the biochemical concepts learned in BC 351 to macromolecules and molecular processes based on nucleic acids.

Prerequisite: BC 351.

Registration Information: Sections may be offered: Online.

Terms Offered: Fall, Spring, Summer.

Grade Mode: Traditional.

Special Course Fee: No.

BC 360 Responsible Conduct in Biochemical Research Credit: 1 (1-0-0)

Course Description: Research ethics and the responsible conduct of research.

Prerequisite: LIFE 212.

Registration Information: Sophomore standing. Biochemistry majors only. This is a partial semester course.

Terms Offered: Fall, Spring.

Grade Mode: Traditional.

Special Course Fee: No.

BC 401 Comprehensive Biochemistry I Credits: 3 (3-0-0)

Course Description: Macromolecular structure and dynamics; membranes; enzymes; bioenergetics.

Prerequisite: (CHEM 245 or CHEM 343, may be taken concurrently or CHEM 346, may be taken concurrently) and (MATH 155 or MATH 160).

Registration Information: Sophomore standing. Sections may be offered: Online.

Terms Offered: Fall, Spring.

Grade Mode: Traditional.

Special Course Fee: No.

BC 403 Comprehensive Biochemistry II Credits: 3 (3-0-0)

Course Description: Metabolic pathways and their regulation; cellular biochemistry.

Prerequisite: (BC 351 or BC 401) and (CHEM 245 or CHEM 341 or CHEM 345).

Restriction: Must not be a: Freshman.

Registration Information: Sophomore standing. Sections may be offered: Online.

Terms Offered: Fall, Spring.

Grade Mode: Traditional.

Special Course Fee: No.

BC 404 Comprehensive Biochemistry Laboratory Credits: 2 (0-6-0)

Course Description: Experimental approaches to studying macromolecules, metabolism, and gene expressions.

Prerequisite: (BC 401, may be taken concurrently) and (CHEM 246 or CHEM 344 or CHEM 346) and (LIFE 212 and LIFE 203).

Terms Offered: Fall, Spring.

Grade Mode: Traditional.

Special Course Fee: Yes.

BC 405 Comprehensive Biochemistry II--Honors Recitation Credit: 1 (0-0-1)

Course Description: Read and discuss current literature related to material presented in BC 403.

Prerequisite: None.

Registration Information: Must have concurrent registration in BC 403. For students participating in the Honors program.

Term Offered: Spring.

Grade Mode: Traditional.

Special Course Fee: No.

BC 406A Investigative Biochemistry: Protein Biochemistry Credits: 2 (0-4-0)

Course Description: Advanced inquiry-based protein chemistry and molecular biology lab.

Prerequisite: BC 404.

Registration Information: This is a partial semester course.

Terms Offered: Fall, Spring.

Grade Mode: Traditional.

Special Course Fee: Yes.

BC 406B Investigative Biochemistry: Molecular Genetics Credits: 2 (1-3-0)

Course Description: Advanced biochemical and molecular biological techniques and a problem-solving approach to molecular genetics.

Prerequisite: BC 404.

Registration Information: Must register for lecture and laboratory.

Terms Offered: Fall, Spring.

Grade Mode: Traditional.

Special Course Fee: Yes.

BC 406C Investigative Biochemistry: Cellular Biochemistry Credits: 2 (1-3-0)

Course Description: Advanced biochemical and molecular biological techniques and a problem-solving approach to cellular biochemistry.

Prerequisite: BC 404.

Registration Information: Must register for lecture and laboratory.

Terms Offered: Fall, Spring.

Grade Mode: Traditional.

Special Course Fee: Yes.

BC 411 Physical Biochemistry Credits: 4 (3-0-1)

Course Description: Thermodynamics; reaction rates; quantum chemistry; spectroscopy; macromolecular folding and interactions; ligand binding; enzyme kinetics; membranes.

Prerequisite: (BC 351 with a minimum grade of B or BC 401) and (CHEM 113) and (MATH 161 or MATH 255).

Term Offered: Fall.

Grade Mode: Traditional.

Special Course Fee: No.

BC 441 3D Molecular Models for Biochemistry Credit: 1 (0-1.5-.5)

Course Description: Computer instruction to construct 3D models of proteins and nucleic acids using leading software.

Prerequisite: BC 401, may be taken concurrently.

Registration Information: Must register for laboratory and recitation.

Term Offered: Fall.

Grade Mode: Traditional.

Special Course Fee: No.

BC 463 Molecular Genetics Credits: 3 (3-0-0)

Course Description: Molecular basis of gene structure, replication, repair, recombination, and expression.

Prerequisite: (BC 401 with a minimum grade of C, may be taken concurrently or BC 351 with a minimum grade of C) and (LIFE 201B with a minimum grade of C or BZ 350 with a minimum grade of C).

Registration Information: Credit not allowed for both BC 463 and BC 563.

Term Offered: Fall.

Grade Mode: Traditional.

Special Course Fee: No.

BC 464 Molecular Genetics Recitation Credit: 1 (0-0-1)

Course Description: Methods used to study the molecular basis of gene structure, replication, repair, recombination, and expression.

Prerequisite: (LIFE 201B) and (BC 351, may be taken concurrently or BC 401, may be taken concurrently).

Registration Information: Must have concurrent registration in BC 463.

Term Offered: Fall.

Grade Mode: Traditional.

Special Course Fee: No.

BC 465 Molecular Regulation of Cell Function Credits: 3 (3-0-0)

Course Description: Molecular regulation of cell organization, membrane formation, organelle biogenesis, cell communication, shape and motility, growth, aging, and death.

Prerequisite: (LIFE 210) and (BC 403, may be taken concurrently or BC 351).

Registration Information: Sections may be offered: Online. Credit not allowed for both BC 465 and BC 565.

Terms Offered: Spring, Summer.

Grade Mode: Traditional.

Special Course Fee: No.

BC 466 Molecular Regulation of Cell Function-Honors Credit: 1 (0-0-1)

Course Description: Discussions of current articles in cell biology including methods and molecular mechanisms that explain cell behavior in health and disease.

Prerequisite: None.

Registration Information: Must have concurrent registration in BC 465.

Term Offered: Spring.

Grade Mode: Traditional.

Special Course Fee: No.

BC 467 Biochemistry of Disease Credits: 3 (3-0-0)

Course Description: Biochemical basis of specific human diseases.

Prerequisite: BC 401.

Term Offered: Spring.

Grade Mode: Traditional.

Special Course Fee: No.

BC 475 Mentored Research Credits: 3 (0-6-1)

Course Description: Plan and conduct mentored research with weekly discussion of progress, presentation at all-university symposium, and submission of written report.

Prerequisite: BC 404.

Registration Information: Must register for laboratory and recitation.

Maximum of 9 credits allowed in course.

Terms Offered: Fall, Spring, Summer.

Grade Mode: Traditional.

Special Course Fee: No.

BC 484 Supervised College Teaching Credits: Var[1-18] (0-0-0)

Course Description: Assist in teaching selected courses in biochemistry and molecular biology.

Prerequisite: None.

Registration Information: A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Terms Offered: Fall, Spring, Summer.

Grade Mode: Instructor Option.

Special Course Fee: No.

BC 487A Internship Credits: Var[1-18] (0-0-0)

Course Description: Work experience with an approved preceptor outside of a university laboratory environment.

Prerequisite: BC 401 and BC 403 and BC 404.

Registration Information: Written consent of instructor. Minimum GPA of 2.0.

Terms Offered: Fall, Spring, Summer.

Grade Mode: Instructor Option.

Special Course Fee: No.

BC 487B Internship: International Credits: Var[1-18] (0-0-0)

Course Description: Research in foreign host laboratory in contact with CSU mentor.

Prerequisite: BC 401 and BC 463 and BC 495 - at least 1 credit.

Registration Information: Selection by departmental committee. BC 495 (one credit in lab of CSU mentor).

Terms Offered: Fall, Spring, Summer.

Grade Mode: Instructor Option.

Special Course Fee: No.

BC 493 Senior Seminar Credit: 1 (0-0-1)

Course Description: Critical analysis of selected literature in biochemistry and molecular biology.

Prerequisite: None.

Registration Information: BC 401 or concurrent registration.

Terms Offered: Fall, Spring.

Grade Mode: Instructor Option.

Special Course Fee: No.

BC 495 Independent Study Credits: Var[1-18] (0-0-0)

Course Description:

Prerequisite: None.

Registration Information: Minimum cumulative GPA of 3.0.

Terms Offered: Fall, Spring, Summer.

Grade Mode: Instructor Option.

Special Course Fee: No.

BC 496 Group Study Credits: Var[1-18] (0-0-0)

Course Description: Faculty-directed exploration of areas of special interest in biochemistry and molecular biology.

Prerequisite: None.

Terms Offered: Fall, Spring, Summer.

Grade Mode: Instructor Option.

Special Course Fee: No.

BC 498 Research Credits: Var[1-6] (0-0-0)

Course Description: Supervised laboratory research in biochemistry and molecular biology.

Prerequisite: None.

Terms Offered: Fall, Spring, Summer.

Grade Mode: Instructor Option.

Special Course Fee: No.

BC 499A Thesis: Laboratory Research-Based Credits: 3 (0-0-3)

Course Description: Laboratory-based research thesis.

Prerequisite: None.

Terms Offered: Fall, Spring, Summer.

Grade Mode: Traditional.

Special Course Fee: No.

BC 499B Thesis: Literature Based Credits: 3 (0-0-3)

Course Description: Thesis - Literature-based in Gen. Biochemistry.

Prerequisite: BC 493.

Terms Offered: Fall, Spring, Summer.

Grade Mode: Traditional.

Special Course Fee: No.

BC 499C Thesis: Literature-based in Health and Med Sci Credits: 3 (0-0-3)

Course Description: Thesis - Literature-based in Health and Med. Sci.

Prerequisite: BC 493.

Terms Offered: Fall, Spring, Summer.

Grade Mode: Traditional.

Special Course Fee: No.

BC 499D Thesis: Literature-based in Pre-Pharmacy Credits: 3 (0-0-3)

Course Description: Thesis - Literature-based in Pre-Pharmacy.

Prerequisite: BC 493.

Terms Offered: Fall, Spring, Summer.

Grade Mode: Traditional.

Special Course Fee: No.

BC 499E Thesis: Literature-based in Neurobiochemistry Credits: 3 (0-0-3)

Course Description: Thesis - Literature-based in Neurobiochemistry.

Prerequisite: BC 493, may be taken concurrently.

Terms Offered: Fall, Spring, Summer.

Grade Mode: Traditional.

Special Course Fee: No.

BC 499F Thesis: Literature-Based in Data Science Credits: 3 (0-0-3)

Course Description: Thesis - Literature-based in Data Science.

Prerequisite: BC 493.

Terms Offered: Fall, Spring, Summer.

Grade Mode: Traditional.

Special Course Fee: No.

BC 511 Structural Biology I Credits: 4 (3-0-1)

Course Description: Structural principles of biological macromolecules and techniques of structural analysis.

Prerequisite: BC 401, may be taken concurrently.

Registration Information: Must register for lecture and recitation.

Term Offered: Fall.

Grade Mode: Traditional.

Special Course Fee: No.

BC 512 Principles of Macromolecular Structure Credit: 1 (1-0-0)

Course Description: Physical interactions controlling folding and solution behavior of biological macromolecules, including proteins, nucleic acids, and membranes.

Prerequisite: BC 411, may be taken concurrently.

Term Offered: Fall.

Grade Mode: Traditional.

Special Course Fee: No.

BC 513 Enzymology Credit: 1 (1-0-0)

Course Description: Kinetic methods, mechanism, and regulation of enzyme catalysis.

Prerequisite: BC 403.

Term Offered: Spring.

Grade Mode: Traditional.

Special Course Fee: No.

BC 517 Metabolism Credits: 2 (2-0-0)

Course Description: Design and regulation of metabolic pathways.

Prerequisite: BC 351 and BC 403.

Terms Offered: Fall, Spring.

Grade Mode: Traditional.

Special Course Fee: No.

BC 521 Principles of Chemical Biology Credits: 3 (3-0-0)

Also Offered As: CHEM 521.

Course Description: Principles of chemical biology. Chemical methods for understanding and controlling the structure and function of biopolymers.

Prerequisite: CHEM 245 or CHEM 343 or CHEM 346.

Registration Information: Credit not allowed for both BC 521 and CHEM 521.

Term Offered: Fall.

Grade Mode: Traditional.

Special Course Fee: No.

BC 563 Molecular Genetics Credits: 4 (3-0-1)

Course Description: Mechanisms of replication, transcription, processing, translation, and packaging of genetic material, emphasizing original literature and methods.

Prerequisite: BC 401 and LIFE 201B.

Registration Information: Must register for lecture and recitation. Credit not allowed for both BC 563 and BC 463.

Term Offered: Fall.

Grade Mode: Traditional.

Special Course Fee: No.

BC 565 Molecular Regulation of Cell Function Credits: 4 (3-0-1)

Course Description: Molecular regulation of cell organization, membrane formation, organelle biogenesis, cell communication, shape and motility, growth, aging, and death.

Prerequisite: (LIFE 210) and (BC 351 or BC 403, may be taken concurrently).

Registration Information: Credit not allowed for both BC 565 and BC 465. Must register for lecture and recitation.

Term Offered: Spring.

Grade Mode: Traditional.

Special Course Fee: No.

BC 566 Advanced Topics in Mitotic Processes Credit: 1 (1-0-0)

Course Description: Mitotic spindle, microtubules, kinetochores, and molecular motors, specifically during cell division.

Prerequisite: BC 465 or BC 565.

Restriction: .

Registration Information: Written consent of instructor.

Terms Offered: Fall, Spring.

Grade Mode: Traditional.

Special Course Fee: No.

BC 571 Quantitative Biochemistry Credit: 1 (1-0-0)

Course Description: Introduction to statistics, error analysis, and curve fitting of biochemical data with a focus on practical examples.

Prerequisite: BC 511, may be taken concurrently.

Term Offered: Spring.

Grade Mode: Traditional.

Special Course Fee: No.

BC 589 Current Trends in Molecular Biosciences Credits: 2 (1-2-0)

Course Description: Biochemical and molecular biological foundations of molecular genetics/genetic engineering; molecular analysis of genes.

Prerequisite: None.

Registration Information: B.S. or B.A. in biology or chemistry; secondary school teaching certification required. Offered as an online course only.

Term Offered: Summer.

Grade Modes: S/U within Student Option, Trad within Student Option.

Special Course Fee: No.

BC 598 Research Credits: Var[1-9] (0-0-0)

Course Description: Biochemistry research in a research laboratory.

Prerequisite: BC 401.

Registration Information: Written consent of advisor.

Terms Offered: Fall, Spring, Summer.

Grade Mode: Traditional.

Special Course Fee: No.

BC 601 Responsible Conduct in Biochemistry Credit: 1 (1-0-0)

Course Description: Design of experiments; error and fraud, publishing/grant application submission, scientific misconduct, classic examples of fraud, case studies.

Prerequisite: None.

Restriction: Must be a: Graduate, Professional.

Term Offered: Spring. (even years).

Grade Mode: Traditional.

Special Course Fee: No.

BC 611 Structural Biology II Credits: 2 (2-0-0)

Course Description: Structure and interactions of biological macromolecules related to function.

Prerequisite: BC 511.

Restriction: Must be a: Graduate, Professional.

Term Offered: Spring.

Grade Mode: Traditional.

Special Course Fee: No.

BC 663 Gene Expression Credits: 2 (2-0-0)

Course Description: Eukaryotic transcription mechanisms with emphasis on methods of study and regulatory mechanisms.

Prerequisite: BC 563.

Restriction: Must be a: Graduate, Professional.

Term Offered: Spring.

Grade Mode: Traditional.

Special Course Fee: No.

BC 665A Advanced Topics in Cell Regulation: Microscopic Methods Credits: 2 (2-0-0)

Course Description: Analysis of cell behavior, function and regulation.

Prerequisite: BC 565.

Restriction: Must be a: Graduate, Professional.

Terms Offered: Fall, Spring.

Grade Mode: Traditional.

Special Course Fee: No.

BC 665B Advanced Topics in Cell Regulation: Modern Methods Credits: 2 (2-0-0)

Course Description: Modern methods in cell biology.

Prerequisite: BC 565.

Restriction: Must be a: Graduate, Professional.

Terms Offered: Fall, Spring.

Grade Mode: Traditional.

Special Course Fee: No.

BC 695 Independent Study Credits: Var[1-18] (0-0-0)

Course Description:

Prerequisite: None.

Restriction: Must be a: Graduate, Professional.

Terms Offered: Fall, Spring, Summer.

Grade Mode: S/U Sat/Unsat Only.

Special Course Fee: No.

BC 698 Research Credits: Var[1-18] (0-0-0)

Course Description:

Prerequisite: None.

Restriction: Must be a: Graduate, Professional.

Terms Offered: Fall, Spring, Summer.

Grade Mode: S/U Sat/Unsat Only.

Special Course Fee: No.

BC 699 Thesis Credits: Var[1-18] (0-0-0)**Course Description:****Prerequisite:** None.**Restriction:** Must be a: Graduate, Professional.**Terms Offered:** Fall, Spring, Summer.**Grade Mode:** S/U Sat/Unsat Only.**Special Course Fee:** No.**BC 701 Grant Proposal Writing and Reviewing Credit: 1 (1-0-0)****Course Description:** Didactic and hands-on experience with locating funding sources, writing effective grant proposals, and the review process in the bio-molecular sciences.**Prerequisite:** (BC 403) and (BC 511, may be taken concurrently) and (BC 563, may be taken concurrently).**Restriction:** Must be a: Graduate, Professional.**Term Offered:** Fall.**Grade Mode:** Instructor Option.**Special Course Fee:** No.**BC 711A Advanced Topics in Structural Biology: Protein Structure and Function Credit: 1 (1-0-0)****Course Description:****Prerequisite:** BC 511 and BC 611.**Restriction:** Must be a: Graduate, Professional.**Terms Offered:** Fall, Spring.**Grade Mode:** Traditional.**Special Course Fee:** No.**BC 711B Advanced Topics in Structural Biology: Membrane Proteins Credit: 1 (1-0-0)****Course Description:****Prerequisite:** BC 511 and BC 611.**Restriction:** Must be a: Graduate, Professional.**Terms Offered:** Fall, Spring.**Grade Mode:** Traditional.**Special Course Fee:** No.**BC 711C Advanced Topics in Structural Biology: Protein-DNA Interactions Credit: 1 (1-0-0)****Course Description:****Prerequisite:** BC 511 and BC 611.**Restriction:** Must be a: Graduate, Professional.**Terms Offered:** Fall, Spring.**Grade Mode:** Traditional.**Special Course Fee:** No.**BC 711D Advanced Topics in Structural Biology: Biomolecular Spectroscopy Credit: 1 (1-0-0)****Course Description:****Prerequisite:** BC 511 and BC 611.**Restriction:** Must be a: Graduate, Professional.**Terms Offered:** Fall, Spring.**Grade Mode:** Traditional.**Special Course Fee:** No.**BC 711E Advanced Topics in Structural Biology: Biomolecular NMR Credit: 1 (1-0-0)****Course Description:****Prerequisite:** BC 511 and BC 611.**Restriction:** Must be a: Graduate, Professional.**Terms Offered:** Fall, Spring.**Grade Mode:** Traditional.**Special Course Fee:** No.**BC 711F Advanced Topics in Structural Biology: Macromolecular X-ray Crystallography Credit: 1 (1-0-0)****Course Description:****Prerequisite:** BC 511 and BC 611.**Restriction:** Must be a: Graduate, Professional.**Terms Offered:** Fall, Spring.**Grade Mode:** Traditional.**Special Course Fee:** No.**BC 763A Advanced Molecular Genetics Topics: Chromatin and Transcription Credit: 1 (1-0-0)****Course Description:****Prerequisite:** BC 663, may be taken concurrently.**Restriction:** Must be a: Graduate, Professional.**Terms Offered:** Fall, Spring.**Grade Mode:** Traditional.**Special Course Fee:** No.**BC 763B Advanced Molecular Genetics Topics: Transcriptional Control - Co-Activators and Corepressors Credit: 1 (1-0-0)****Course Description:****Prerequisite:** BC 663, may be taken concurrently.**Restriction:** Must be a: Graduate, Professional.**Terms Offered:** Fall, Spring.**Grade Mode:** Traditional.**Special Course Fee:** No.**BC 763C Advanced Molecular Genetics Topics: Concepts and Techniques of Genetic Analysis Credit: 1 (1-0-0)****Course Description:****Prerequisite:** BC 663, may be taken concurrently.**Restriction:** Must be a: Graduate, Professional.**Terms Offered:** Fall, Spring.**Grade Mode:** Traditional.**Special Course Fee:** No.**BC 784 Supervised College Teaching Credits: Var[1-3] (0-0-0)****Course Description:****Prerequisite:** None.**Restriction:** Must be a: Graduate, Professional.**Terms Offered:** Fall, Spring, Summer.**Grade Mode:** Instructor Option.**Special Course Fee:** No.**BC 793 Seminar Credit: 1 (0-0-1)****Course Description:****Prerequisite:** None.**Restriction:** Must be a: Graduate, Professional.**Terms Offered:** Fall, Spring.**Grade Mode:** Instructor Option.**Special Course Fee:** No.**BC 795 Independent Study Credits: Var[1-18] (0-0-0)****Course Description:****Prerequisite:** None.**Restriction:** Must be a: Graduate, Professional.**Terms Offered:** Fall, Spring, Summer.**Grade Mode:** S/U Sat/Unsat Only.**Special Course Fee:** No.

BC 796 Group Study Credits: Var[1-5] (0-0-0)

Course Description:

Prerequisite: None.

Restriction: Must be a: Graduate, Professional.

Terms Offered: Fall, Spring, Summer.

Grade Mode: S/U Sat/Unsat Only.

Special Course Fee: No.

BC 798 Research Credits: Var[1-18] (0-0-0)

Course Description:

Prerequisite: None.

Restriction: Must be a: Graduate, Professional.

Terms Offered: Fall, Spring, Summer.

Grade Mode: S/U Sat/Unsat Only.

Special Course Fee: No.

BC 799 Dissertation Credits: Var[1-18] (0-0-0)

Course Description:

Prerequisite: None.

Restriction: Must be a: Graduate, Professional.

Terms Offered: Fall, Spring, Summer.

Grade Mode: S/U Sat/Unsat Only.

Special Course Fee: No.