

BIOCHEM + MOLE BIOLOGY- BC (BC)

Courses

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.

Restriction: Must not be a: Freshman, Sophomore.

Registration Information: Junior 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 241 or CHEM 245 or CHEM 343, may be taken concurrently) and (MATH 155 or MATH 160) and (LIFE 201B, may be taken concurrently or BZ 350, may be taken concurrently or SOCR 330, may be taken concurrently).

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

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

Prerequisite: BC 351 or BC 401.

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 242 or CHEM 246 or CHEM 344) and (LIFE 212 and LIFE 203).

Restriction: Must not be a: Freshman.

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 523 Visual Communication in Science Credits: 2 (2-0-0)

Course Description: Training in visual design principles and tools to help scientists tell visual stories about their research and to effectively collaborate with graphic design professionals.

Prerequisite: None.

Restriction: Must be a: Graduate.

Registration Information: Written consent of instructor. Credit not allowed for both BC 523 and BC 580A3.

Term Offered: Spring.

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.