

BIOCHEMISTRY, MOLECULAR, CELLULAR & DEVELOPMENTAL BIOLOGY (GRADUATE GROUP)

Graduate Studies

Ben Montpetit, Ph.D., Chairperson of the Group;
benmontpetit@ucdavis.edu

Group Office

227D Green Hall, formerly Life Sciences; 530-752-9091; Biochemistry,
Molecular, Cellular & Developmental Biology (<http://bmcd.b.ucdavis.edu/>);
Faculty (<http://bmcd.b.ucdavis.edu/faculty/>)

- Biochemistry, Molecular, Cellular & Developmental Biology, Master of Science (<https://catalog.ucdavis.edu/departments-programs-degrees/biochemistry-molecular-cellular-developmental-biology/biochemistry-molecular-cellular-developmental-biology-ms/>)
- Biochemistry, Molecular, Cellular & Developmental Biology, Doctor of Philosophy (<https://catalog.ucdavis.edu/departments-programs-degrees/biochemistry-molecular-cellular-developmental-biology/biochemistry-molecular-cellular-developmental-biology-doctor-phd/>)

Biochemistry, Molecular, Cellular, & Developmental Biology (BCB)

BCB 210 – Molecular Genetics & Genomics (3 units)

Course Description: Emphasizes molecular genetic and genomic approaches to address fundamental biological questions. Introduces and emphasizes the strengths of prokaryotic and eukaryotic model systems and serves as building block for the BMCDB core courses, which use model systems to develop their themes.

Prerequisite(s): BIS 101; MCB 121; or equivalent courses.

Learning Activities: Lecture/Discussion 3 hour(s).

Enrollment Restriction(s): Pass One restricted to graduate students.

Grade Mode: Letter.

BCB 211 – Macromolecular Structure & Interactions (3 units)

Course Description: Conceptual and quantitative basis for macromolecular structure-function relationships. Investigation of the paradigm form follows function. Review of key elements of protein, nucleic acid, and membrane structure. Exploration of specific macromolecular associations by analyzing chemical structure and physical-chemical behavior.

Prerequisite(s): BIS 102; or the equivalent, or consent of instructor.

Learning Activities: Lecture 3 hour(s).

Enrollment Restriction(s): Pass One restricted to graduate students.

Grade Mode: Letter.

BCB 212 – Cell Biology (3 units)

Course Description: Analysis of basic processes governing cell organization, division, and transport. Study of the integration and regulation of cell behavior in response to changes in cellular environment.

Prerequisite(s): BIS 104; or the equivalent, or consent of instructor.

Learning Activities: Lecture 3 hour(s).

Enrollment Restriction(s): Pass One restricted to graduate students.

Grade Mode: Letter.

BCB 213 – Developmental Biology (3 units)

Course Description: Fundamental principles in embryonic development that guide application of modern cellular and genetic approaches to understand developmental mechanisms. Emphasis on experimental approaches used to critically address scientific questions.

Prerequisite(s): Undergraduate biology course or consent of instructor.

Learning Activities: Lecture 3 hour(s).

Enrollment Restriction(s): Pass One restricted to graduate students.

Grade Mode: Letter.

BCB 214 – Molecular Biology (3 units)

Course Description: Investigation of the basic cellular processes in prokaryotes and eukaryotes that govern the central dogma of molecular biology (DNA-RNA-protein).

Prerequisite(s): BCB 211; or the equivalent, or consent of instructor.

Learning Activities: Lecture 3 hour(s).

Enrollment Restriction(s): Pass One restricted to graduate students.

Grade Mode: Letter.

BCB 215 – Graduate Reading Course (2 units)

Course Description: Development of critical reading skills through study of major paradigm advances in specialized fields of biochemistry, molecular, cell, and developmental biology. Emphasis on active learning and student participation. Guided analysis of literature and major advances in field of study.

Prerequisite(s): Graduate standing or consent of instructor.

Learning Activities: Discussion 10 hour(s).

Enrollment Restriction(s): Restricted to graduate students.

Repeat Credit: May be repeated 2 time(s) when topic differs.

Grade Mode: Letter.

BCB 220L – Advanced Biochemistry Laboratory Rotations (5 units)

Course Description: Two five-week assignments in BMCDB research laboratories. Individual research problems with emphasis on methodological/procedural experience, experimental design, proposal writing and oral communication of results.

Prerequisite(s): BCB 210; BCB 211 (can be concurrent); BCB 120L or the equivalent.

Learning Activities: Laboratory 15 hour(s).

Enrollment Restriction(s): Open to graduate students.

Repeat Credit: May be repeated 2 time(s).

Grade Mode: Letter.

BCB 251 – Molecular Mechanisms in Early Development (3 units)

Course Description: Analysis of the early events of development including: germ cells and other stem cells, gametogenesis, meiosis, imprinting, fertilization, genetically-engineered organisms, egg activation and establishment of embryonic polarity with focus on cellular events including gene regulation and cell signaling.

Prerequisite(s): Graduate standing or consent of instructor; introductory background in developmental biology and/or cell biology recommended.

Learning Activities: Lecture 3 hour(s).

Grade Mode: Letter.

BCB 255 – Molecular Mechanisms in Pattern Formation & Development (3 units)

Course Description: Genetic and molecular analysis of mechanisms that control animal development after fertilization. Establishment of embryonic axes, cell fate and embryonic pattern; induction, apoptosis, tissue patterning. Critical reading of current literature in *C.elegans*, *Drosophila*, and mouse genetic model systems.

Prerequisite(s): Graduate standing or consent of instructor; introductory background in developmental biology and/or genetics recommended.

Learning Activities: Lecture 3 hour(s).

Grade Mode: Letter.

BCB 256 – Cell & Molecular Biology of Cancer (3 units)

Course Description: Analysis of the pathologic alterations of cancer cells and therapeutic opportunities; with emphasis on animal models, tumor immunotherapy, stress response, metabolism, epigenetics, microRNAs and non-coding RNAs, and microbiota and inflammation.

Prerequisite(s): BCB 210; BCB 212; BCB 213; BCB 214.

Learning Activities: Lecture 1.50 hour(s), Seminar 1.50 hour(s).

Grade Mode: Letter.

BCB 257 – Cell Proliferation & Cancer Genes (3 units)

Course Description: Genetic and molecular alterations underlying the conversion of normal cells to cancers, emphasizing regulatory mechanisms and pathways. Critical reading of the current literature and development of experimental approaches.

Prerequisite(s): BCB 221C BCB 221D or equivalent courses.

Learning Activities: Lecture 1.50 hour(s), Seminar 1.50 hour(s).

Grade Mode: Letter.

BCB 290 – Seminar (1 unit)

Course Description: Presentation and discussion of faculty and graduate-student research.

Prerequisite(s): Consent of instructor and/or graduate standing.

Learning Activities: Seminar 1 hour(s).

Grade Mode: Satisfactory/Unsatisfactory only.

BCB 298 – Group Study (1-5 units)

Course Description: Group study.

Prerequisite(s): Consent of instructor.

Learning Activities: Variable 1-5 hour(s).

Grade Mode: Satisfactory/Unsatisfactory only.

BCB 299 – Research (1-12 units)

Course Description: Research.

Prerequisite(s): Consent of instructor.

Learning Activities: Variable.

Grade Mode: Satisfactory/Unsatisfactory only.