Molecular and Cell Biology

The Department of Molecular and Cell Biology offers a program of graduate study leading to the PhD in molecular and cell biology. This program provides advanced training in the research methods and concepts of the study of the molecular structures and processes of cellular life. The training is intellectually focused, but at the same time offers an unusually wide range of opportunities for varied disciplinary specialization.

The teaching and research activities of the Department of Molecular and Cell Biology (MCB) concern the molecular structures and processes of cellular life and their roles in the function, reproduction, and development of living organisms.

This agenda covers a broad range of specialized disciplines, including biochemistry, biophysics, molecular biology, structural biology, genetics, genomics, bioinformatics, cell biology, developmental biology, tumor biology, microbiology, immunology, molecular medicine, and neurobiology.

The types of living organisms from which the departmental faculty draws its working materials are as diverse as its disciplinary specializations, ranging from viruses and microbes through plants, roundworms, annelids, arthropods, and mollusks to fish, amphibia, and mammals.

The faculty is organized into five divisions: Biochemistry, Biophysics, and Structural Biology; Cell Biology, Development, and Physiology; Genetics, Genomics, Evolution, and Development; Immunology and Molecular Medicine; and Molecular Therapeutics.

Admission to the University

*GRE score submission is not required for application to the MCB program.

Applying for Graduate Admission

Thank you for considering UC Berkeley for graduate study! UC Berkeley offers more than 120 graduate programs representing the breadth and depth of interdisciplinary scholarship. The Graduate Division hosts a complete list (https://grad.berkeley.edu/admissions/choosing-your-program/list/) of graduate academic programs, departments, degrees offered, and application deadlines can be found on the Graduate Division website.

Prospective students must submit an online application to be considered for admission, in addition to any supplemental materials specific to the program for which they are applying. The online application and steps to take to apply can be found on the Graduate Division website (https://grad.berkeley.edu/admissions/steps-to-apply/).

Admission Requirements

The minimum graduate admission requirements are:

1. A bachelor's degree or recognized equivalent from an accredited institution;
2. A satisfactory scholastic average, usually a minimum grade-point average (GPA) of 3.0 (B) on a 4.0 scale; and
3. Enough undergraduate training to do graduate work in your chosen field.

For a list of requirements to complete your graduate application, please see the Graduate Division's Admissions Requirements page (https://grad.berkeley.edu/admissions/steps-to-apply/requirements/). It is also important to check with the program or department of interest, as they may have additional requirements specific to their program of study and degree. Department contact information can be found here (https://guide.berkeley.edu/archive/2024-25/graduate/degree-programs/).

Where to apply?

Visit the Berkeley Graduate Division application page (http://grad.berkeley.edu/admissions/apply/).

Normative Time Requirements

- Normative time to advancement is 2 years
- Normative time in candidacy is 3.5 years
- Total normative time is 5.5 years

Course Requirement by Year in Program

- 1st Year
  - MCB 200A & 200B
  - MCB 291 A & 291B
  - MCB 293A
  - MCB 293C & 293D
  - Two advanced topics courses
- 2nd Year
  - MCB 375
  - MCB 292
- 3rd Year
  - MCB 380
  - MCB 292
  - MCB 290
- 4th Year and Beyond
  - MCB 292
  - MCB 290
  - MCB 293R

Other Requirements

- 1st-author or co-1st-author publication
- Individual Development Plan (IDP) in 1st, 3rd, and 5th years
- Annual thesis committee meetings after advancement to candidacy (3rd year and beyond)

Curriculum

MCELLBI 200A	Fundamentals of Molecular and Cell Biology	3
MCELLBI 200B	Fundamentals of Molecular and Cell Biology	3
MCELLBI 291A	Introduction to Research	2-12
MCELLBI 291B	Introduction to Research	2-12
MCELLBI 293A	Research Seminar	2
MCELLBI 293C	Responsible Conduct in Research	1
MCELLBI 293D	Rigor and Reproducibility in Research	1
MCELLBI 293R	Responsible Conduct of Research Refresher	1
MCELLBI 375	Pedagogy for MCB Graduate Student Instructors	2

MCELLBI 380	Teaching of Molecular and Cell Biology (2 courses)	1-2
Two MCELLBI advanced topics electives		6-8
MCELLBI 290	Graduate Seminar (3)	1
MCELLBI 292	Research	3-12

Molecular and Cell Biology

MCELLBI 200A Fundamentals of Molecular and Cell Biology 3 Units

Terms offered: Fall 2025, Fall 2024, Fall 2023
The goal of this course is to provide graduate-level instruction on molecular and cellular biosciences from a highly-integrated systems perspective, rather than using a more classic, techniques-oriented format. A collection of approaches, and a focus on critical thinking and problem solving, will be used to show how fundamental, highly-significant biological problems are "cracked open." Reading will be assigned from a mix of classic and current peer-reviewed papers selected by the instructors.

Rules & Requirements

Prerequisites: 200A and 200B must be taken concurrently. Combined course required and restricted to all MCB first-year graduate students

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of lecture and 4 hours of discussion per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

MCELLBI 200B Fundamentals of Molecular and Cell Biology 3 Units

Terms offered: Fall 2025, Fall 2024, Fall 2023
The goal of this course is to provide graduate-level instruction on molecular and cellular biosciences from a highly-integrated systems perspective, rather than using a more classic, techniques-oriented format. A collection of approaches, and a focus on critical thinking and problem solving, will be used to show how fundamental, highly-significant biological problems are "cracked open." Reading will be assigned from a mix of classic and current peer-reviewed papers selected by the instructors.

Rules & Requirements

Prerequisites: Must be taken concurrently. Combined course required for all MCB first-year graduate students

Hours & Format

Fall and/or spring: 15 weeks - 6 hours of lecture per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Instructors: Marqusee, Rio, Drubin, Rine, Vance, Feller

MCELLBI 201A CRISPR Gene Editing, Stem Cell and Genomic Analysis 6 Units

Terms offered: Summer 2025 Second 6 Week Session, Summer 2024 Second 6 Week Session
This course seeks to develop students' foundation in critical lab skills and introduce them to the fundamental principles and technologies driving modern biomedical research. After completing MCELLBI 201A, students will have a firm understanding of CRISPR gene editing, cell culture, and genomic analysis. Students will learn the fundamentals of hypothesis-driven research, obtain critical thinking skills for data interpretation, and deliver effective written and oral reports of their results.

Rules & Requirements

Prerequisites: BIOLOGY 1A and MCELLBI 102 or equivalent courses

Credit Restrictions: Students will receive no credit for MCELLBI 201A after completing MCELLBI 201A. A deficient grade in MCELLBI 201A may be removed by taking MCELLBI 201A.

Hours & Format

Summer: 6 weeks - 4 hours of lecture and 18 hours of laboratory per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Instructors: He, Luo

MCELLBI 201B CRISPR Gene Editing, Stem Cell and Genomic Analysis 4 Units

Terms offered: Fall 2025, Fall 2024
This course seeks to build upon students' foundations set in MCELLBI 201A, in which they were introduced to the fundamental principles and technologies driving modern biomedical research. MCELLBI 201B aims to develop students' skills in bioinformatics and quantitative data analysis. After completing this course, students will understand the RNA-Seq and ChIP-Seq pipelines and carry out their own analyses. Students will continue to learn the fundamentals of experimental design, obtain critical thinking skills for data interpretation, and deliver effective presentations on their results.

Rules & Requirements

Prerequisites: MCELLBI 201A

Credit Restrictions: Students will receive no credit for MCELLBI 201B after completing MCELLBI 201B. A deficient grade in MCELLBI 201B may be removed by taking MCELLBI 201B.

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of lecture and 6 hours of laboratory per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Instructor: Ingolia

MCELLBI C205 Modern Optical Microscopy for the Modern Biologist 3 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024, Fall 2023
This course is intended for graduate students in the early stages of their thesis research who are contemplating using modern microscopy tools as part of their work. It endeavors to cut through the confusion of the wide array of new imaging methods, with a practical description of the pros and cons of each. In addition to providing an intuitive physical understanding how these microscopes work, the course will offer hands on experience with cutting-edge microscopes where students will be able to see firsthand how different imaging modalities perform on their own samples, and where they will be able to access computational tools for the visualization and analysis of their data.

Rules & Requirements

Credit Restrictions: Students will receive no credit for MCELLBI 205 after completing MCELLBI 205, or MCELLBI 205. A deficient grade in MCELLBI 205 may be removed by taking MCELLBI 205, or MCELLBI 205.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Instructors: Betzig, Ji

Formerly known as: Molecular and Cell Biology 205

Also listed as: NEU C272/PHYSICS C218

MCELLBI 206 Physical Biochemistry 3 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023
Application of modern physical concepts and experimental methods to the analysis of the structure, function, and interaction of large molecules of biological interest.

Rules & Requirements

Prerequisites: MCB C100A or equivalent. Admission to the course requires formal consent of instructors, except for MCB and Biophysics graduate students and graduate students in the laboratories of MCB faculty

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

MCELLBI 210 Advanced Biochemistry and Molecular Biology: Macromolecular Reactions and the Cell 4 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023
General course for first-year graduate students. Covers our current understanding of, methodological approaches for analyzing, and recent advances in the function of cellular macromolecules and macromolecular complexes in DNA replication, recombination, transposition and repair, gene expression and its regulation, mRNA splicing, genome organization, noncoding RNAs, signal transduction, protein synthesis, folding and degradation, growth control, and other life processes.

Rules & Requirements

Prerequisites: 110 or equivalent. Admission to the course requires formal consent of instructors, except for MCB graduate students and graduate students in the laboratories of MCB faculty

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Formerly known as: 200

MCELLBI C212A Chemical Biology I - Structure, Synthesis and Function of Biomolecules 1 Unit

Terms offered: Spring 2025, Spring 2024, Spring 2023
This course will present the structure of proteins, nucleic acids, and oligosaccharides from the perspective of organic chemistry. Modern methods for the synthesis and purification of these molecules will also be presented.

Hours & Format

Fall and/or spring: 5 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Also listed as: CHEM C271A

MCELLBI C212B Chemical Biology II - Enzyme Reaction Mechanisms 1 Unit

Terms offered: Spring 2025, Spring 2024, Spring 2023
This course will focus on the principles of enzyme catalysis. The course will begin with an introduction of the general concepts of enzyme catalysis which will be followed by detailed examples that will examine the chemistry behind the reactions and the three-dimensional structures that carry out the transformations.

Hours & Format

Fall and/or spring: 5 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Also listed as: CHEM C271B

MCELLBI C212C Chemical Biology III - Contemporary Topics in Chemical Biology 1 Unit

Terms offered: Spring 2025, Spring 2024, Spring 2023
This course will build on the principles discussed in Chemical Biology I and II. The focus will consist of case studies where rigorous chemical approaches have been brought to bear on biological questions. Potential subject areas will include signal transduction, photosynthesis, immunology, virology, and cancer. For each topic, the appropriate bioanalytical techniques will be emphasized.

Hours & Format

Fall and/or spring: 5 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Also listed as: CHEM C271C

MCELLBI C214 Protein Chemistry, Enzymology, and Bio-organic Chemistry 2 Units

Terms offered: Spring 2020, Spring 2015, Spring 2014, Spring 2013
The topics covered will be chosen from the following: protein structure; protein-protein interactions; enzyme kinetics and mechanism; enzyme design. Intended for graduate students in chemistry, biochemistry, and molecular and cell biology.

Rules & Requirements

Prerequisites: Graduate standing or consent of instructor

Hours & Format

Fall and/or spring:
10 weeks - 3 hours of lecture per week
15 weeks - 2 hours of lecture per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Also listed as: CHEM C230

MCELLBI C216 Microbial Diversity Workshop 1 Unit

Terms offered: Fall 2025, Fall 2024, Fall 2022
This workshop for graduate students will parallel C116, Microbial Diversity, which should be taken concurrently. Emphasis in the workshop will be on review of research literature and formulation of paper pertinent to research in microbial diversity.

Rules & Requirements

Prerequisites: Graduate standing; C112 or consent of instructor and organic chemistry (may be taken concurrently)

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of workshop and 1 hour of discussion per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Instructor: Coates

Formerly known as: Molecular and Cell Biology C216, Plant and Microbial Biology C216

Also listed as: PLANTBI C216

MCELLBI 218B Research Review in Biochemistry and Molecular Biology: Trace Elements in the Plant Lineage 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Biochemistry of Cu, Fe, Zn and Mn homeostasis and comparative genomics of algae, especially related to photosynthesis and chloroplast biology. Mechanisms of elemental
sparing, including responses to N, S, and P deficiency.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Merchant

MCELLBI 218C Research Review in Biochemistry and Molecular Biology: Synthetic Biology and Cellular Enzymology 2 Units

Terms offered: Spring 2025, Spring 2024, Fall 2023
Synthetic biology, metabolic engineering, systems biology, enzyme mechanism, and gene discovery.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor or consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Chang

MCELLBI 218F Research Review in Biochemistry and Molecular Biology: Energy-dependent Proteases and Molecular Machines 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Our goals are to decipher the fundamental principles that govern substrate engagement, de-ubiquitylation, unfolding, and translocation by the proteasome.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor or consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Martin

MCELLBI 218H Research Review in Biochemistry and Molecular Biology: Protein Synthesis in Bacteria and Mammals 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
The mechanism of protein synthesis in bacteria and human cells. Specific areas of interest include the structure and function of the ribosome and the regulation of protein synthesis.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Cate

MCELLBI 218I Research Review in Biochemistry and Molecular Biology: Chemical Biology and Inorganic Chemistry 2 Units

Terms offered: Spring 2025, Spring 2024, Fall 2023
Research and literature topics in chemical biology and inorganic chemistry relevant to human health and disease and energy science will be discussed.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Chris Chang

MCELLBI 218J Research Review in Biochemistry and Molecular Biology: Advanced 20th Century Perspectives on Cancer Cell Genetics 2 Units

Terms offered: Fall 2022, Fall 2021, Spring 2021
Transduction of cellular sequences and genetic regulation of transformation by oncogenic retroviruses as models for natural carcinogenesis, including a critical review of the current research.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Duesberg

MCELLBI 218M Research Review in Molecular Mechanisms of Membrane Transport 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
In our laboratory, we study mechanisms by which molecules are transported across lipid bilayer membranes. Current research efforts to understand mechanisms of protein translocation across intracellular organelles and transport of other biomolecules will be discussed.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Park

MCELLBI 218O Research Review in Biochemistry and Molecular Biology: Chemical Biology and Enzymology 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Topics at the interface of chemistry and biology with a particular focus on mechanisms of enzyme catalysis.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Marletta

MCELLBI 218P Research Review in Biochemistry and Molecular Biology: Chemical Biology and Neuroscience 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Molecular approaches to designing and deploying tools for voltage imaging and brain mapping.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructors: Miller, Evan

MCELLBI 218Q Research Review in Biochemistry and Molecular Biology: Single Molecular Imaging of Macromolecular Enzymes 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Yildiz laboratory combines molecular biology and single molecule biophysical techniques to understand mechanisms that underlie cellular organization and motility. Specific focuses of the lab are to dissect 1) the mechanism of cytoplasmic dynein motility, 2) the regulation of intraflagellar transport, and 3) the protection and maintenance of mammalian telomeres.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Yildiz

MCELLBI 218S Research Review in Biochemistry and Molecular Biology: Cryo-Electron Microscopy of Macromolecules 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Structure-function studies of the cytoskeleton and large molecular machines by cryo-electron microscopy and image reconstruction.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Nogales

MCELLBI 218T Electron Cryo-tomography of Macromolecular Complexes 2 Units

Terms offered: Spring 2023, Fall 2022, Spring 2022
Different methods for determining how the in situ structure and arrangement of macromolecular complexes influence cell morphology and
function will be discussed via literature review and implemented through lab-based research and discussions.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Davies

MCELLBI 218U Research Review in Biochemistry and Molecular Biology: Epigenetic Gene Regulation 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Discussion of recent advances in the mechanism of epigenetic modifications on mammalian gene regulation and developing tools for precision editing of epigenetic modifications for controlling gene expression.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Nunez

MCELLBI 218V Research Review in Biochemistry and Molecular Biology: Biophysics of Macromolecule Transport Across Membranes 2 Units

Terms offered: Fall 2014, Spring 2014, Fall 2013
Review of current literature and discussion of original research.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Krantz

MCELLBI 218X Research Review in Biochemistry and Molecular Biology: Chemical Reactions of Metabolism 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Define how metabolic reactions function in the context of the cellular system in order to elucidate the so-called design principles of metabolic function.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Savage

MCELLBI 219A Structural Membrane Biology 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
The mechanisms by which protein complexes use their structures to bud, bend, and sever membranes will be covered in research reports and reviews of the current literature and in discussion of current experiments in the field.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Hurley

MCELLBI 219B Regulation of Translation 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Understanding the molecular basis and physiological role of translational regulation in gene expression with an emphasis on global profiling and functional genomics.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Ingolia

MCELLBI 219H Research Review in Biochemistry and Molecular Biology: Molecular and Cell Biology of Listeria monocytogenes Pathogenesis 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Discussion of recent research on the genetics, cell biology, and immunology of the model facultative intracellular bacterical pathogen,

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Portnoy

MCELLBI 219K Research Review in Chemical Biology, Synthetic Biology, Organic Chemistry and Biophysics 2 Units

Terms offered: Spring 2021, Spring 2002, Fall 2001
Discussion of recent research on chemical biology, synthetic biology, organic chemistry and biophysics.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Schepartz

MCELLBI 219S Research Review in Biochemistry and Molecular Biology: Structural Biology of Signaling and Replication 2 Units

Terms offered: Spring 2024, Fall 2023, Spring 2023
Mechanisms and structure in DNA replication and eukaryotic cell signaling.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Kuriyan

MCELLBI 219U Research Review in Biochemistry and Molecular Biology: Single Molecule Biophysics 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Methods of single molecule manipulation and visualization that are used to characterize the structure and mechanochemical properties of translocating DNA binding protein such as RNA polymerase and to investigate the mechanical denaturation of single protein molecules will be covered in research reports and reviews of the current literature and in discussion of current experiments in the field.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Bustamante

MCELLBI 219Y Research Review in Biochemistry and Molecular Biology: Regulation of HIV Gene Expression 2 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023
Regulation of HIV gene expression by viral proteins and cellular cofactors will be covered in research reports and reviews of the current literature and in discussion of current experiments in the field.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Zhou

MCELLBI 219Z Research Review in Biochemistry and Molecular Biology: Polymerase and RNA Biochemistry and Biology 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Emphasizes eukaryotic retroelement reverse transcriptases and retroelement mobility.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Collins

MCELLBI 220 Therapeutic Modalities 4 Units

Terms offered: Spring 2025, Spring 2024
This class is designed to introduce graduate students to a range of therapeutic modalities that are in development or use. It will focus on small molecules, genomic therapies (including genome editing), and biologics. This class will present different applications of small molecules, RNA or DNA therapeutics, and biologics and discuss both advantages and challenges in their clinical use.
Rules & Requirements

Prerequisites: For MCB students, MCELLBI 200A and MCELLBI 200B are prerequisites for this class. Students outside of MCB should check with the head instructor whether they have the required background to follow this class most productively

Credit Restrictions: Students will receive no credit for MCELLBI 220 after completing MCELLBI 220. A deficient grade in MCELLBI 220 may be removed by taking MCELLBI 220.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Instructor: Olzmann

MCELLBI 227 Science Writing and Professional Development 2 Units

Terms offered: Fall 2025, Fall 2024
The overarching goal of this course is to provide students with professional skills in scientific reading, scientific writing, creating a CV or resume and cover letters and understanding the structures of academic institutions and biotech companies. In addition, the class will provide career advice for students entering the academic or biotech work places.
Rules & Requirements

Prerequisites: This course will be limited to students enrolled in the MCB Master of Biotechnology program

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of lecture per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Instructor: Beatty

MCELLBI 229A Research Review in Viruses as Models for Eukaryote Gene Expression and Replication 2 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023
Recent developments in eukaryote viral and cellular regulation. New concepts in transcription and RNA replication, with particular emphasis on virus-cell interactions.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor or consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Botchan

Formerly known as: Molecular and Cell Biology 218E

MCELLBI 229B Research Review in Molecular Therapeutics: Imaging Single Molecules: Fashion or Game Changer? 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Research review in genetics, genomics and development. We will explore how the detection of single particles
(DNA, RNA, proteins) can help with understanding cellular organization and
enzymatic processes dynamics and kinetics. Most of the experiments described will be drawn from the gene expression and nuclear organization
literature.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Darzacq

Formerly known as: Molecular and Cell Biology 249L

MCELLBI 229C Research Review in Molecular Therapeutics: Structure and Function of RNA 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
RNA structure, folding, and function. Specific topics include ribozyme mechanisms, RNA-mediated translation initiation, and protein targeting and secretion.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Doudna

Formerly known as: Molecular and Cell Biology 219J

MCELLBI 229D Research Review in Molecular Therapeutics: Diseases/Retina 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Evaluation of current research in molecular mechanisms underlying diseases of the retina.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Flannery

Formerly known as: Molecular and Cell Biology 269U

MCELLBI 229E Research Review in Molecular Therapeutics: The Protein Folding Problem 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Protein structure, stability, design, and the pathway of protein folding.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Marqusee

Formerly known as: Molecular and Cell Biology 218R

MCELLBI 229F Research Review in Molecular Therapeutics: Virus-Host Interactions 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Understanding the creative strategies viruses use to manipulate gene expression in host cells, with a focus on RNA-based regulation of gene expression.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Glaunsinger

Formerly known as: Molecular and Cell Biology 219G

MCELLBI 229G Mapping Metabolic Drivers of Disease using Chemoproteomic and Metabolomic Platforms 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
We will discuss current research in the following three areas: 1) mapping metabolic drivers of human diseases using
chemoproteomic and metabolomic platforms; 2) expanding the druggable proteome through mapping and pharmacologically interrogating proteome-wide
hyper-reactive and ligandable hotspots; 3) mapping proteome-wide targets of environmental and pharmaceutical chemicals towards understanding novel
toxicological mechanisms.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Nomura

Formerly known as: Molecular and Cell Biology 218A

MCELLBI 229H Research Review in Molecular Therapeutics: Mechanisms of lipid homeostasis and lipotoxicity 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Discussion of recent literature and original research. Current research examines the cell biology of lipid homeostasis, including the mechanisms that regulate lipid droplet biogenesis, oxidative lipid damage, and ferroptosis.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Olzmann

Formerly known as: Molecular and Cell Biology 239A

MCELLBI 229I Research Review in Molecular Therapeutics: Regulation of the Cell Cycle 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Review of current literature and discussion of original research.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Rape

Formerly known as: Molecular and Cell Biology 239B

MCELLBI 229J Research Review in Understanding and Exploiting Complex Biological Processes and Machines 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Covers aspects of ribosome engineering, organelle imaging and interactions, protein delivery, and cell signaling.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Schepartz

Formerly known as: Molecular and Cell Biology 218N

MCELLBI 229K Research Review in Molecular Therapeutics: Eukaryotic Gene Expression 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Protein-DNA interactions and the control of gene expression in eukaryotes.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Tjian

Formerly known as: Molecular and Cell Biology 219F

MCELLBI 229L Research Review in Molecular Therapeutics: Structure and Function of the Human Epigenome 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Research focuses on (i) understanding the interplay between regulatory information encoded in the primary sequence of the human genome and epigenomic information inscribed by the joint action of trans-acting factors, chromatin remodelers, modifiers, and readers that yields a particular functional state in primary cells of the immune and central nervous systems; (ii) leveraging this understanding to engineer novel architectures for targeted epigenome editors customized for use in these and other clinically relevant human cell types; (iii) establishing preclinical proof-of-concept for the use of the resulting epigenome-editing molecular therapeutics in ex vivo and in vivo models of autoimmune and neurologic disease.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Urnov

Formerly known as: Molecular and Cell Biology 249AA

MCELLBI 229M Research Review in Molecular Therapeutics: CRISPR Enzyme Delivery Technology 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
The molecular engineering of novel delivery technology to facilitate therapeutic genome editing. Delivery of pre-formed CRISPR ribonucleoprotein enzymes is a central focus, and progress in the field will be covered via research presentations as well as reviews of recent literature.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Wilson

Formerly known as: Molecular and Cell Biology 218G

MCELLBI 229N Research Review in Molecular Therapeutics: Molecular and Cellular Mechanisms of Nutrient Sensing 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
In our laboratory, we study the molecular mechanisms of nutrient sensing and growth control. Specific areas of interest include the mTOR pathway, energy sensing, lysosomal biology and translational control.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Zoncu

Formerly known as: Molecular and Cell Biology 218Z

MCELLBI 230 Advanced Cell and Developmental Biology 4 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023
This course will discuss modern concepts of cell and developmental biology, with a strong emphasis on regulatory mechanisms at different length-scales (intermolecular, intracellular and intercellular). It will cover methods of quantitative, single-cell, and organismal biology in cell lines, stem cells, and model organisms. A solid foundation of core cell biology concepts, such as the cell cycle, cytoskeleton, or vesicle transport, is strongly recommended.

Rules & Requirements

Prerequisites: 130. Formal consent of instructors required, except for MCB graduate students and graduate students in the laboratories of MCB faculty

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

MCELLBI 231 Advanced Developmental and Stem Cell Biology 4 Units

Terms offered: Spring 2018, Spring 2017, Spring 2015
Principles of animal development will be set forth from the classical and recent experimental analysis of induction, localization, patterning mutants, axis formation, regional gene expression, and cell interactions. Early development of selected vertebrates and invertebrates will be examined, and emerging topics in microRNA and stem cell biology will be highlighted. A weekly discussion section with readings from the research literature is required.

Rules & Requirements

Prerequisites: Previous course in development (131 or equivalent) or consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1-2 hours of discussion per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

MCELLBI 236 Advanced Mammalian Physiology 5 Units

Terms offered: Fall 2024, Fall 2023, Fall 2022
Principles of mammalian (primarily human) physiology emphasizing physical, chemical, molecular, and cellular bases of functional biology. The following topics will be covered: cellular and membrane ion and nonelectrolyte transport; cell and endocrine regulation; autonomic nervous system regulation; skeletal, smooth, and cardiac muscle; cardiovascular physiology; respiration; renal physiology; gastrointestinal physiology. Discussion section will study advanced physiological topics, including: presentations by the faculty; problem sets; discussion of the primary literature and of reviews; two presentations by each student on topics in current physiological research.

Rules & Requirements

Prerequisites: Consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of discussion per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

MCELLBI 237L Advanced Physical Biology of the Cell 4 Units

Terms offered: Spring 2025, Spring 2024, Spring 2022
Biology is being revolutionized by new experimental techniques that have made it possible to measure the inner workings of molecules, cells and multicellular organisms with unprecedented precision. The objective of this course is to explore this deluge of quantitative data through the use of biological numeracy. We will develop theoretical models that make precise predictions about biological phenomena. These predictions will be tested through the hands-on analysis of experimental data and by performing numerical simulations using Matlab. A laptop is required for this course, but no previous programming experience is required.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of laboratory per week

Summer: 8 weeks - 6 hours of lecture and 2 hours of laboratory per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Instructor: Garcia

MCELLBI C237 Stem Cells and Directed Organogenesis 3 Units

Terms offered: Spring 2015, Spring 2014, Spring 2013
This course will provide an overview of basic and applied embryonic stem cell (ESC) biology. Topics will include early embryonic development, ESC laboratory methods, biomaterials for directed differentiation and other stem cell manipulations, and clinical uses of stem cells.

Rules & Requirements

Prerequisites: Consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 6 hours of laboratory and 1 hour of lecture per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Instructor: Conboy

Also listed as: BIO ENG C218

MCELLBI 238 Stem Cell Research and Gene Therapy: Questions, Solutions and Current Frontiers 1 Unit

Terms offered: Fall 2023, Fall 2022
This lecture series will cover modern approaches to stem cell biology, regenerative medicine and gene therapy. Lectures will include a broad introduction to the day's topic, followed by in depth discussion of one specific recent example- preferably from the speaker's own laboratory- that addresses an imminent question in the field. Relevant research articles will be assigned as background reading. Students are expected to become thoroughly familiar with these materials prior to each class meeting.

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Hockemeyer

MCELLBI 239BB Research Review in Cell and Developmental Biology: Mechanics and Dynamics of Cell Movements 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Research in our laboratory is focused on the mechanics and dynamics of cell movements on the purified protein, single cell, and tissue levels. For these studies, we are developing new instruments to quantify cell and molecular mechanics bases on optical microscopy, force microscopy, and microfabrication.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Fletcher

MCELLBI 239C The Regulation of Meiotic Gene Expression and Cellular Morphogenesis 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
The mechanisms that link cellular differentiation programs and dynamic gene regulation in complex eukaryotic systems remain mysterious. Such programs drive diverse and central biological processes including organismal development, immune function, disease progression, and meiosis. This course is focused on the molecular basis for the cellular remodeling accompanying meiosis, the highly conserved process by which gametes are produced.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Brar

MCELLBI 239D Research Review in Cell and Developmental Biology: Glial Cell Biology 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Review of relevant literature and discussion of ongoing research: cytoskeletal regulation and mRNA transport in glia; organelle biogenesis and homeostasis, including of Golgi outposts; myelination in learning and behavior; gliovascular development; biophysics of liquid condensates; mechanisms of neurological disease.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Fu

MCELLBI 239EE Research Review in Cell and Developmental Biology: Cell Morphogenesis 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Review of current literature and discussion of original research.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Heald

MCELLBI 239F Research Review in Cell and Developmental Biology: Nucleocytoplasmic Transport 2 Units

Terms offered: Spring 2015, Fall 2014, Spring 2014
Review of current literature and discussion of original research.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Weis

MCELLBI 239FF Research Review in Cell and Developmental Biology: Signal Transduction and Tumor Suppressor Genes 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Review of current literature and discussion of original research.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Luo

MCELLBI 239G Research Review in Cell and Developmental Biology: Mitochondrial biology 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Review of relevant literature and discussion of current research: Mitochondrial dynamics, transport and inheritance; replication, segregation and distribution of mitochondrial genomes; underlying mechanisms of human mitochondrial disease.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Lewis

MCELLBI 239HH Research Review in Cell and Developmental Biology: Mechanisms of Control of Growth and Cell Proliferation 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Identifying pathways that restrict growth and cell proliferation in vivo.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Hariharan

MCELLBI 239I Research Review in Cell and Developmental Biology: Cytoskeleton and Cell Motility 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Review of current literature and discussion of original research.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Welch

MCELLBI 239J Research Review in Cell and Developmental Biology: Steroid Hormone and Growth Factor Action 2 Units

Terms offered: Fall 2023, Spring 2023, Fall 2022
Review of current literature and discussion of original research.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Firestone

MCELLBI 239K Research Review in Cell and Developmental Biology: Secretion and Cell Membrane Assembly 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Cell surface growth with emphasis on the unicellular eukaryote S. cerevisiae.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Schekman

MCELLBI 239KK Research Review in Cell and Developmental Biology: Assembly and Subcellular Organization of Bacterial Organelles 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Review of current literature and discussion of original research.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Komeili

MCELLBI 239M Research Review in Cell and Developmental Biology: MicroRNA Functions in Cancer Development, Mouse Tumor Models 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Malignant transformation represents the endpoint of successive genetic lesions that confer uncontrolled proliferation and survival, unlimited replicative potential, and invasive growth.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: He

MCELLBI 239O Research Review in Cell and Developmental Biology: Cancer Biology 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Inheritance, chromatin structure, gene expression, and the organization of chromosomes in the nucleus.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Karpen

MCELLBI 239P Research Review in Cell and Developmental Biology: Energy Metabolism and Aging 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Review of current literature and discussion of current research. Current research focuses on regulation of energy metabolism and the effect of changes in energy metabolism induced by diet and exercise on age-associated functional decline of organisms.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Titov

MCELLBI 239Q Research Review in Cell and Developmental Biology: Regulation of Cell Polarity in Drosophila 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Mechanisms underlying the establishment and maintenance of cellular organization in epithelia and other cell types.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Bilder

MCELLBI 239R Research Review in Cell and Developmental Biology: Telomere Biology of Human Stem Cells 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
The goal of our laboratory is to understand the key functions of telomeres and telomerase in tissue homeostasis, tumorigenesis, and aging. To this end, we generate genetically engineered human pluripotent and adult stem cell models to measure telomere and telomerase function during cellular differentiation and tumor formation.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Hockemeyer

MCELLBI 239S Research Review in Cell and Developmental Biology: Organ Formation and Function in Zebrafish 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Current research examines the control mechanisms of how cells behave, how cells talk to one another, and how cells sense, change, and maintain their space in the context of organogenesis.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Swinburne

MCELLBI 239T Research Review in Cell and Developmental Biology: The Cell Biology of Fertilization 2 Units

Terms offered: Fall 2023, Spring 2023, Fall 2022
Research in our lab is focused on the cell biology of mammalian fertilization. Our lab uses biophysical, biochemical, and molecular genetics methods to study sperm ion channels and transporters that regulate sperm motility, chemotaxis, and the acrosome reaction. A better understanding of these processes will eventually lead to the development of effective tools to control and preserve male fertility, improve the reproductive health of human population worldwide, and advance family planning.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Lishko

MCELLBI 239U Research Review in Cell and Developmental Biology: The Cytoskeleton and Morphogenesis 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Review of current literature and discussion of current research.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2-0 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Drubin

MCELLBI 239V Research Review in Cell and Developmental Biology: Molecular Mechanisms of Transduction in Touch and Pain Receptors 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Review of current literature and discussion of current research. Current research focuses on elucidating the molecular mechanisms of somatosensory mechanotransduction.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Bautista

MCELLBI 239W Research Review in Cell and Developmental Biology: Leech Embryology and Development 2 Units

Terms offered: Fall 2023, Spring 2023, Fall 2022
Review of current literature and discussion of original research.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Weisblat

MCELLBI 239Z Research Review in Cell and Developmental Biology: Chromosome Remodeling and Reorganization During Meiosis 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
How chromosomes are reorganized during melosis to accomplish the pairing, recombinatin, and segregation leading up to successful gamete production.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Dernburg

MCELLBI 240 Advanced Genetic Analysis 4 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023
Principles and practice of classical and modern genetic analysis as applied to eukaryotic organisms, including yeast, nematodes, , mice and humans; isolation and analysis of mutations; gene mapping; suppressor analysis; chromosome structure; control of gene expression; and developmental genetics.
Rules & Requirements

Prerequisites: Graduate standing with 110 or 140 or consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Instructors: Koshland, Meyer

MCELLBI C242 CTEG Evolution, Genetics, and Genomics Seminar 1 Unit

Terms offered: Fall 2025, Spring 2025, Fall 2024
This graduate seminar consists of weekly presentations from Berkeley graduate students as well as outside speakers on topics surrounding evolution, genetics, and genomics. Many labs spread across different departments have research programs focused on evolution, genetics, and genomics. However, it can be challenging to keep abreast of this research and to identify potential collaborations due to the dispersion of labs across different departments and specialties. The Center for Theoretical and Evolutionary Genetics (CTEG) is an informal group of labs that collectively work on genetics and genomics. The seminar seeks to provide a common space for graduate students to present their research and learn about the research of their colleagues.
Rules & Requirements

Prerequisites: Graduate standing

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructors: Sudmant, Moorjani

Also listed as: INTEGBI C242

MCELLBI C243 Seq: Methods and Applications 3 Units

Terms offered: Spring 2015, Spring 2014
A graduate seminar class in which a group of students will closely examine recent computational methods in high-throughput sequencing followed by directly examining interesting biological applications thereof.
Rules & Requirements

Prerequisites: Graduate standing in Math, MCB, and Computational Biology; or consent of the instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Instructor: Pachter

Also listed as: MATH C243

MCELLBI C244 Discrete Mathematics for the Life Sciences 4 Units

Terms offered: Spring 2013
Introduction to algebraic statistics and probability, optimization, phylogenetic combinatorics, graphs and networks, polyhedral and metric geometry.
Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Also listed as: MATH C239

MCELLBI 249A Research in Genetics and Development: From Sequence to Function in Transcription Factors 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
This course explores experimental and computational approaches to studying the sequence to function relationships of intrinsically disordered proteins. Emphasis on the activation domains of transcription factors. High-throughput experiments, machine learning, evolutionary comparisons, and all atom simulations will be discussed. Additional emphasis will be placed on characterizing the functional consequences of patient mutations in activation domains.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Staller

MCELLBI 249BB Research Review in Genetics and Development: Aging and Protein Homeostasis 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Central to the aging process is the unfolding of the proteome. Specific areas under study include cellular responses to protein misfolding and coordination of these responses across an organism.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Dillin

MCELLBI 249C Research Review in Genetics and Development: Nucleic Acid-Protein Interactions and Control of Gene Expression 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Biochemical and molecular genetic aspects of eukaryotic messenger RNA splicing and transposition, with an emphasis on as an experimental system.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Rio

MCELLBI 249D Research Review in Genetics and Development: Mechanisms of Genetic Regulation in Yeast 2 Units

Terms offered: Fall 2023, Spring 2023, Fall 2022
Genes, gene products and molecular mechanisms that control cell types in the unicellular eukaryote .
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Rine

MCELLBI 249F Research Review in Genetics and Development: Neuronal Development 2 Units

Terms offered: Spring 2025, Fall 2024, Spring 2024
Molecular and genetic approaches to the problem of how neurons develop, with emphasis on and .
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Garriga

MCELLBI 249G Research Review in Genetics and Development: Developmental and Evolutionary Genetics 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
We study how genes control pattern formation during development and pattern modification during evolution.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Miller

MCELLBI 249H Investigating Cellular Aging and Chromosome Segregation during Gametogenesis 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
This course focuses on understanding 1) how cellular aging is affected during gametogenesis, the developmental program that produces gametes for sexual reproduction and 2) how chromosome segregation is regulated during meiosis, the specialized cell division that generates gametes.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Unal

MCELLBI 249HH Research Review in Genetics and Development: Human Population Genetics and Evolutionary Biology 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Research focuses on use of statistical and computational approaches to study questions in human genetics and evolutionary biology. This includes, but is not limited to, studying (1) how different evolutionary processes such as mutation rate evolve across primates, (2) when key events (such as introgression and adaptations) occurred in human history, and (3) how we can leverage large-scale datasets to identify genetic variants related to human adaptation and disease.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Moorjani

MCELLBI 249I Research Review in Genetics and Development: RNA Systems Biology 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
How does the sequence of an RNA determine its post-transcriptional regulation? Genomic and systems biology investigations of alternative splicing, translation, and other post-transcriptional regulatory processes.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Lareau

MCELLBI 249J Research Review in Genetics and Development: Developmental and Molecular Genetics of C. elegans 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Molecular and genetical analysis of sex determination and dosage compensation in the nematode .
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Meyer

MCELLBI 249K Research Review in Genetics and Development: Animal Origins 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Evaluation of current research on choanoflagellates, sponges, and animal origins. Intended to complement ongoing research for graduate students.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: King

MCELLBI 249M Research Review in Genetics and Development: Saccharomyces Cerevisiae Microtubule Cytoskeleton 2 Units

Terms offered: Fall 2023, Spring 2023, Fall 2022
Review of current literature and discussion of current research.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Barnes

MCELLBI 249MM Physical Biology of Living Organisms 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Research review in genetics, genomics and development. In development a single cell goes through a series of repeated divisions and these cells read the program encoded in their DNA in order to become
familiar cell types such as those found in muscle, liver, or our brains. The

goal of our lab is to uncover the rules behind these decisions with the objective of predicting and manipulating developmental programs from just
looking at DNA sequence. In order to reach this predictive understanding we
combine physics, synthetic biology, and new technologies to query and control developmental decisions in real time at the single cell level in the fruit fly embryo.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Garcia

MCELLBI 249O Research Review in Genetics and Development: Genome Sequences 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Biochemistry, cancer biology and virology, cell biology, computational biology, genetics, microbiology, molecular and cell physiology.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Eisen

MCELLBI 249P Research Review in Genetics and Development: Evolution of Genome Structure and Cellular Diversity 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Review of current literature and discussion of original research in the evolution of genome structure, aging, and cellular and organismal diversity.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Sudmant

MCELLBI 249Q Research Review in Genetics and Development: Computational Genomics 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Recent developments in computational methods for genomics and their application for understanding the structure and function of genes encoded in completely sequenced genomes.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Brenner

MCELLBI 249R Research Review in Genetics and Development: Vertebrate development and tissue regeneration 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Topics on gene regulatory network control of neural crest cell differentiation during development, vertebrate evolution, and tissue regeneration will be discussed.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Martik

MCELLBI 249T Research Review in Genetics, Genomics and Development: Evolution of Genomes 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Comparative analysis of eukaryotic genomes to inform the origins and diversification of animals and plants.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Rokhsar

MCELLBI 249V Research Review in Genetics and Development: Induction in Vertebrate Development and ES Cell Differentiation 2 Units

Terms offered: Fall 2023, Spring 2023, Fall 2022
The Roelink laboratory is interested in the mechanisms of embryonic induction, the phenomenon in which a group of cells changes the developmental fate of neighboring cells via the release of inducers.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Roelink

MCELLBI 249W Research Review in Genetics and Development: Archaeal Genetics and Methane Metabolism 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Discussions pertaining to the development of new genetic tools for archaeal model organisms with a particular emphasis on methane metabolizing archaea in order to characterize their physiology, evolution and metabolism.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Nayak

MCELLBI 249Y Research Review in Genetics and Development: Mechanisms of Gene Control in Vertebrate Animals 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
This course will focus on mechanisms of gene control in vertebrate animals, particularly in the area of vertebrate development. Amphibian egg formation, mesoderm induction, neural induction, and patterning of the nervous system at the molecular level. Control of transcription, post-transcriptional control of gene expression (including control of RNA turnover and RNA localization).

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Harland

Formerly known as: 218Y

MCELLBI 249Z Research Review in Genetics and Development: Chromosome Structure and Integrity, Genome Evolution 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Use of genetic, cell biological, and biochemical approaches in budding yeast to understand genome integrity, genome evolution, and most recently desiccation tolerance.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Koshland

MCELLBI 250 Advanced Immunology 4 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023
Molecular and cellular analysis of the immune response emphasizing concepts and methodology. Innate immunity, pathogen sensors, antibodies and T cell receptors, lymphocyte activation, tolerance and selection. Antigen processing, T cell subtypes, and T regulatory cells. NK cells, tumor surveillance, and AIDS.

Rules & Requirements

Prerequisites: 100, 110, 140, 150 or consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

MCELLBI 251 The Regulation of Immune System Development and Function 1 Unit

Terms offered: Spring 2022, Spring 2021, Fall 2020
This is an advanced seminar course which will consider current research questions and experimental approaches in molecular and cellular immunology. Each registrant will present a 30-minute research talk describing the problems they are studying, the approach they are taking, their preliminary data, and technical problems. Other course participants (including basic immunology faculty) will provide criticism and suggestions.

Rules & Requirements

Prerequisites: 250 or consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of lecture per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Winoto

MCELLBI 259A Mycobacterium Tuberculosis (Mtb) 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
The TB field has entered a new era with the convergence of genetic tools, genome sequencing, bioinformatics, advanced imaging techniques, animal models of infection, and high-throughput assays that allow us to study this multi-faceted interaction between Mtb and its host. We use all of these tools to probe the molecular and cellular events that enable M. tuberculosis to evade host defense mechanisms.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Cox

MCELLBI 259C Research Review in Immunology and Pathogenesis: Nuclear Receptor-Mediated Regulation of Neuroinflammation 2 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023
In this course we will discuss our research as well as recent literatures focusing on understanding of 1) How is homeostasis in the CNS regulated by innate immune functions of microglia? 2) How can we intervene in dysfunction of microglia-mediated immune functions using NRs signaling and transcription?
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Saijo

MCELLBI 259D Research Review in Immunology and Pathogenesis: Mycobacterial Biology and Host-Pathogen Interactions 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
We will discuss macrophage biology and innate immunity in the context of infection with *Mycobacterium tuberculosis* through discussion of current research from the Stanley Lab and both cutting edge and classic literature in relevant fields.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Stanley

MCELLBI 259E Research Review in Immunology and Pathogenesis: Regulation of T Cell Receptor Genes Expression 2 Units

Terms offered: Spring 2024, Fall 2023, Spring 2023
Molecular biology of T cell receptor genes and their transcription controlling proteins/genes. Programmed cell death during thymocyte differentiation.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Winoto

MCELLBI 259F Research Review in Immunology and Pathogenesis: Natural Killer (NK) Cell and T Cell Receptors 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Molecular and biological basis for recognition by natural killer cells and T cells.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Raulet

MCELLBI 259G Research Review in Immunology and Pathogenesis: T Cell Development 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Molecular and cellular aspects of thymocyte differentiation.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Robey

MCELLBI 259H Research Review in Immunology and Pathogenesis: B Cell Differentiation 2 Units

Terms offered: Fall 2023, Fall 2022, Fall 2021
Molecular basis of terminal B cell differentiation. Role of transcription factors in B cell activation.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Sha

MCELLBI 259J Research Review in Immunology and Pathogenesis: Immune Evasion by Viruses 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
The mechanisms used by viruses to counteract the pressure of the immune system.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Coscoy

MCELLBI 259K Research Review in Immunology and Pathogenesis: Epigenetic Control for Regulatory T Cell Function in Cancer and Autoimmunity 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Intersecting the fields of cancer biology, immunology, and epigenetics to strengthen our own immune defense mechanisms against our own cancers by reprogramming T cell function specifically within the tumor microenvironment.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Dupage

MCELLBI 259M Research Review in Immunology and Pathogenesis: Innate Immunity and Innate Control of Adaptive Immunity 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Innate immunity and innate control of adaptive immunity.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Barton

MCELLBI 259N Research Review in Immunology and Pathogenesis: Immunology, Microbiology, and Genetics of Bacterial Pathogenesis 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Role of innate host responses in defense against intracellular bacterial pathogens.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Vance

MCELLBI 259O Research Review in Immunology and Pathogenesis: Circadian rhythms in Parasitic Diseases 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
We will discuss circadian rhythms research, at the behavioral, tissue and molecular scales. Our main focus is the circadian regulation of gene expression and its impact in host physiology. We will also focus on malaria and sleeping sickness infections, understanding the clinical aspects, the immune response to parasites and the vector transmission.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Rijo-Ferreira

MCELLBI 259P Research Review in Immunology and Pathogenesis: Cellular barriers to retroviral infection 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Cellular biology and genetics of retroviral infection and cellular antiviral mechanisms. Functional genomics approaches in key host/virus interactions.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: OhAinle

MCELLBI C260 Molecular and Cellular Neurobiology 3 Units

Terms offered: Fall 2025, Fall 2024, Fall 2015
This course covers molecular and cellular aspects of cellular excitability (including membrane potential, action potential generation, spike propagation, and ion channel structure and function), synaptic transmission and plasticity, and sensory systems. Primary reading material will be research papers. We will provide references to textbook chapters for background and review. This will be an interactive course in which you will be expected to be an active participant.
Rules & Requirements

Prerequisites: NEU 100A or equivalent undergraduate-level molecular and cellular neuroscience course

Credit Restrictions: Students will receive no credit for NEU C260 after completing MCELLBI 260, or MCELLBI C261.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Formerly known as: Molecular and Cell Biology C260/Neuroscience C260

Also listed as: NEU C260

MCELLBI 269C Research Review in Neurobiology: Molecular Mechanisms of Neuronal Plasticity 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Research in our laboratory focuses on understanding how neurons use biochemical pathways to integrate diverse types of information in order to adjust synaptic strength and modulate neuronal excitability, and how these interactions go awry in disease. To investigate this we are taking a multi-disciplinary approach incorporating molecular, biochemical, imaging, and electrophysiological analyses in mouse and human cells.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Bateup

MCELLBI 269D Research Review in Neurobiology: Signaling Within and Between Neurons 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Review of recent research in molecular mechanisms involved in intracellular and extracellular signaling in the nervous system.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Kramer

MCELLBI 269E Molecular and Biophysical Neuroscience 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Review of research in molecular and biophysical aspects of sensory transduction and electrical signaling in the nervous system.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of the instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Brohawn

MCELLBI 269F Optogenetic Dissection of Neural Circuits 2 Units

Terms offered: Spring 2025, Fall 2024, Spring 2024
Research review in neurobiology. Review of recent optogenetic strategies for dissecting neural connectivity, function, and dysfunction in the rodent and primate brain.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Lammel

MCELLBI 269G Research Review in Development and Application of Advanced Methods for In Vivo Imaging 2 Units

Terms offered: Spring 2025, Fall 2024, Spring 2024
Development and application of optical imaging methods for clearer, deeper, and faster imaging of biological tissue in vivo, including a critical review of the current research.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Ji

MCELLBI 269I Research Review in Neurobiology: Stem Cells and Gene Therapy in the Nervous System 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
The basic investigation of neural differentiation of stem cells, as well as the
use of stem cells and gene delivery for neuroregeneration.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Schaffer

MCELLBI 269J Research Review in Neurobiology: Taste Recognition in Drosophila 2 Units

Terms offered: Fall 2023, Spring 2023, Fall 2022
The molecular and cellular basis of taste perception in the model organism .

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Scott

MCELLBI 269K Research Review in Neurobiology: Instructive Cues for Neural Form and Function 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Molecular and circuit studies of the mechanisms that specify synaptic properties and how these properties bias the timescales of neuronal computation.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Gomez

MCELLBI 269M Research Review in Neurobiology: Insect Neurophysiology 2 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023
Drosophila mutants that have behavioral abnormalities to unravel new and basic features of nervous system structure and function.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Tanouye

MCELLBI 269N Research Review in Neurobiology: Synaptic and Circuit Mechanisms that Support Spatial Navigation 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Research in the Fisher laboratory focuses on spatial navigation in fruit flies in order to understand how nervous systems flexibly process information. Our research combines in vivo electrophysiology, 2-photon imaging, advanced genetic approaches and quantitative behavioral analysis to understand how the fly’s brain constructs and maintains a sense of direction under ever-changing conditions.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Fisher

MCELLBI 269O Research Review in Neurobiology: Neural Circuits for Sensory Processing and Behavior 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Microcircuitry of the cerebral cortex that underlies sensory processing and adaptive behavior.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Adesnik

MCELLBI 269P Research Review in Neurobiology: Visual Neuroscience 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Mechanisms for visual object representation including recognition, memory, segmentation, tracking, 3D representation, and embedding into meaningful scenes. Understanding the function of feedforward and feedback pathways in vision.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Tsao

MCELLBI 269Q Research Review in Neurobiology: Sensory Processing and Plasticity in Cerebral Cortex 2 Units

Terms offered: Spring 2025, Fall 2024, Spring 2024
How the cerebral cortex processes sensory input and stores information about the sensory world. We focus on the rat's primary somatosensory (S1) cortex.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Feldman

MCELLBI 269R Research Review in Neurobiology: Potassium Channels and Synaptic Plasticity 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Review of current literature and discussion of original research.

Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Isacoff

MCELLBI 269T Research Review in Neurobiology: Processing of Visual Information in the Mammalian Brain 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Review of current literature and discussion of original research.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Dan

MCELLBI 269W Research Review in Neurobiology: Neural Activity Affecting the Assembly of Neural Circuits 2 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
How neural activity affects the assembly of neural circuits.
Rules & Requirements

Prerequisites: Enrollment is restricted to students conducting research in the laboratory of the instructor, or requires consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Feller

MCELLBI 275 Therapeutics Development in Biotech: Financing, Regulation and Social Ethics 2 Units

Terms offered: Fall 2025, Fall 2024
This course offers an introduction to the field of biotechnology and will cover the history of the field, its impact on medicine and society, key methodologies, important therapeutic areas, and the range of career options available in the biopharmaceutical industry. Students will hear from lecturers with expertise ranging from molecular biology to clinical trial design and interpretation and be given an integrated overview of a complex area. Students will actively participate in experiential learning about relevant topics and presenting their findings in class, which will deepen understanding. There will be interactive elements, using a Socratic discussion format. Students are expected to participate actively.
Rules & Requirements

Prerequisites: Students must be enrolled in the Master of Biotechnology program

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of lecture per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Instructor: Schaletzky

MCELLBI 276 Sample Management, Drug Discovery and Lab Automation 3 Units

Terms offered: Spring 2025
Automation plays an increasing role in academic and biotech labs. High-Throughput Screening (HTS) leverages screening of large libraries for activity against biological targets for drug discovery, enabled by automation, miniaturized assays and large-scale data analysis. Students learn process automation and hands-on training on sample management and liquid handling robotics. Students conduct a primary screen and follow up hits through dose response, using LIMS/Sample Management/ Sample Tracking/Equipment Validation/QC and data analysis and interpretation. Students will understand what is required to run a HTS experiment, use robotics, data processing and control software, and learn how automation can help with accuracy and precision.
Rules & Requirements

Prerequisites: This course will be limited to students enrolled in the MCB Master of Biotechnology program

Hours & Format

Fall and/or spring: 11 weeks - 2 hours of lecture and 4 hours of laboratory per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

MCELLBI C277 Communicating Quantitative Information 2 Units

Terms offered: Fall 2021, Spring 2020, Spring 2019
This course will cover several aspects of communicating quantitative information, with a primary focus on visualizations for publications, presentations, and posters. Other topics include sharing of data and analyses, such as new publication models and interactive notebooks, as well as lifecycle data management and publication. Primary discussion will be on conceptual issues, and students will be expected to use various systems and resources as self-directed homestudy.

Hours & Format

Fall and/or spring: 15 weeks - 1.5 hours of seminar and 1.5 hours of discussion per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Instructor: Brenner

Also listed as: PLANTBI C277

MCELLBI 279 Master of Biotechnology Internship 4 - 8 Units

Terms offered: Spring 2025
This course synthesizes conceptual and technical knowledge students gained throughout the Master of Biotechnology program, challenging them to tackle an internship project under the supervision of their internship mentor and instructor. Abstract concepts are grounded in real-world problems that students address as part of their internship. MCB279 develops students' advanced research skills. They work with their mentor and the instructor to identify a question to address, devise a plan to interrogate it, and successfully execute their plan. The internship trains students to work collaboratively with others towards a shared mission and to think critically and creatively to apply their training to meet the needs of their host company or lab.

Rules & Requirements

Prerequisites: Students must be enrolled in the Master of Biotechnology program

Repeat rules: Course may be repeated for credit with advisor consent.

Hours & Format

Fall and/or spring: 15 weeks - 12-24 hours of internship per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

MCELLBI 280A Selected Topics in Molecular and Cell Biology 1 Unit

Terms offered: Spring 2022, Spring 2012, Spring 2011
The course will focus on fundamental principles, essential concepts, and recent advances in select topics in molecular and cell biology. Topics include genomics and computational biology, molecular evolution, neurons and synapses, microbi ology and immunology, macromolecular structure and function, and scientific writing. Courses are taught in tandem and maybe taken individually.

Rules & Requirements

Prerequisites: Graduate standing or consent of instructor

Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 5 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

MCELLBI 280B Selected Topics in Molecular and Cell Biology 1 Unit

Terms offered: Spring 2012, Spring 2011, Spring 2010
The course will focus on fundamental principles, essential concepts, and recent advances in select topics in molecular and cell biology. Topics include genomics and computational biology, molecular evolution, neurons and synapses, microbi ology and immunology, macromolecular structure and function, and scientific writing. Courses are taught in tandem and maybe taken individually.

Rules & Requirements

Prerequisites: Graduate standing and consent of instructor

Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 5 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

MCELLBI 280C Selected Topics in Molecular and Cell Biology 1 Unit

Terms offered: Spring 2022, Spring 2021, Spring 2016
The course will focus on fundamental principles, essential concepts, and recent advances in select topics in molecular and cell biology. Topics include genomics and computational biology, molecular evolution, neurons and synapses, microbi ology and immunology, macromolecular structure and function, and scientific writing. Courses are taught in tandem and maybe taken individually.

Rules & Requirements

Prerequisites: Graduate standing and consent of instructor

Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 5 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

MCELLBI 280D Selected Topics in Molecular and Cell Biology 1 Unit

Terms offered: Fall 2025, Fall 2024, Fall 2023
The course will focus on fundamental principles, essential concepts, and recent advances in select topics in molecular and cell biology. Topics include genomics and computational biology, molecular evolution, neurons and synapses, microbi ology and immunology, macromolecular structure and function, and scientific writing. Courses are taught in tandem and maybe taken individually.

Rules & Requirements

Prerequisites: Graduate standing or consent of instructor

Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 5 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

MCELLBI 280E Selected Topics in Molecular and Cell Biology 1 Unit

Terms offered: Spring 2012, Spring 2011, Spring 2010
The course will focus on fundamental principles, essential concepts, and recent advances in select topics in molecular and cell biology. Topics include genomics and computational biology, molecular evolution, neurons and synapses, microbi ology and immunology, macromolecular structure and function, and scientific writing. Courses are taught in tandem and maybe taken individually.

Rules & Requirements

Prerequisites: Graduate standing and consent of instructor

Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 5 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

MCELLBI 280F Selected Topics in Molecular and Cell Biology 1 Unit

Terms offered: Fall 2016, Spring 2012, Spring 2011
The course will focus on fundamental principles, essential concepts, and recent advances in select topics in molecular and cell biology. Topics include genomics and computational biology, molecular evolution, neurons and synapses, microbi ology and immunology, macromolecular structure and function, and scientific writing. Courses are taught in tandem and maybe taken individually.

Rules & Requirements

Prerequisites: Graduate standing and consent of instructor

Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 5 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

MCELLBI 288 Data Science for Molecular and Cell Biology 3 Units

Terms offered: Spring 2022, Spring 2021, Spring 2020
Data science is rapidly becoming a critical skill for molecular and cell biologists. This course provides a survey of data science concepts and methods, including practical statistical inference and modeling, data visualization and exploration, elementary machine learning, and simulation. The course is practically oriented. Diverse real-world datasets, along with simulated data, will be used to develop skills and intuition.
Rules & Requirements

Prerequisites: Graduate standing in the biological sciences or permission from instructors. Prior introductory exposure to programming is desired, e.g., through Data Science 8, MCB Python “boot camp,” or self taught from introductory programming tutorials. Please see http://python.berkeley.edu/resources/ for suggested resources. No prior statistics is assumed. The course is not suitable for students with advanced training in statistics or machine learning

Repeat rules: Course may be repeated for credit with instructor consent.

Hours & Format

Fall and/or spring: 15 weeks - 4 hours of lecture per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructors: Rokhsar, Eisen

MCELLBI 289 Master of Biotechnology Capstone Course 5 Units

Terms offered: Spring 2025
This capstone course fosters collaborative learning by bringing together students each week to discuss their internship project that they have been working on individually or in small groups under the supervision of their internship mentor. Students are encouraged to apply critical thinking skills to evaluate other projects and to provide constructive feedback. Students will work towards a final written report and oral presentation. They will identify and present a technology overview, explanation of unmet need, a central working hypothesis, a plan to test said hypothesis, execution of their plan, and a final research product. The final presentation will be in a poster presentation format.
Rules & Requirements

Prerequisites: MCELLBI 201A and MCELLBI 201B. Students must be enrolled in the Master of Biotechnology program

Hours & Format

Fall and/or spring: 15 weeks - 5 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Instructor: Luo

MCELLBI 290 Graduate Seminar 1 Unit

Terms offered: Fall 2025, Spring 2025, Fall 2024
Graduate student presentations on selected research topics in molecular and cell biology. Several sections covering different topics offered each semester. Concurrent enrollment in more than one section is permitted. List of topics to be announced before each semester.
Rules & Requirements

Prerequisites: Graduate standing in the department or consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1-2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

MCELLBI 291A Introduction to Research 2 - 12 Units

Terms offered: Fall 2025, Fall 2024, Fall 2023
Closely supervised experimental work under the direction of an individual faculty member; an introduction to experimental methods and research approaches in particular areas of molecular and cell biology.
Rules & Requirements

Prerequisites: Consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 2-12 hours of independent study per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade. This is part one of a year long series course. A provisional grade of IP (in progress) will be applied and later replaced with the final grade after completing part two of the series.

MCELLBI 291B Introduction to Research 2 - 12 Units

Terms offered: Spring 2025, Spring 2024, Spring 2023
Closely supervised experimental work under the direction of an individual faculty member; an introduction to experimental methods and research approaches in particular areas of molecular and cell biology.
Rules & Requirements

Prerequisites: Consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 2-12 hours of independent study per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade. This is part two of a year long series course. Upon completion, the final grade will be applied to both parts of the series.

MCELLBI 292 Research 3 - 12 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Individual research under the supervision of a faculty member.
Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 0 hours of independent study per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

MCELLBI N292 Research 3 - 6 Units

Terms offered: Summer 2009 10 Week Session, Summer 2008 10 Week Session, Summer 2006 10 Week Session
Individual research under the supervision of a staff member.
Rules & Requirements

Prerequisites: Consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Summer: 8 weeks - 3-6 hours of independent study per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

MCELLBI 293A Research Seminar 2 Units

Terms offered: Fall 2025, Fall 2024, Fall 2023
Seminar on presentation and evaluation of results in area of student's individual research interests.
Rules & Requirements

Prerequisites: Concurrent enrollment in 291A or 292

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

MCELLBI 293C Responsible Conduct in Research 1 Unit

Terms offered: Spring 2025, Spring 2024, Fall 2023
The purpose of this course is to ensure that research trainees receive ample training in Responsible Conduct in Research. Students also gain an understanding of federal, state, and UC Berkeley policies and resources available to further support their research endeavors.
Rules & Requirements

Prerequisites: Consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1.5 hours of lecture and 1.5 hours of discussion per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Sharma

MCELLBI 293D Rigor and Reproducibility in Research 1 Unit

Terms offered: Prior to 2007
The purpose of this course is to ensure that research trainees receive training in Rigor and Reproducibility in Research. Students also gain an understanding of federal, state, and UC Berkeley policies and resources available to further support their research endeavors.
Rules & Requirements

Prerequisites: Consent of Instructor

Hours & Format

Fall and/or spring: 15 weeks - 1.5 hours of lecture per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Sharma

MCELLBI 293R Responsible Conduct of Research Refresher 1 Unit

Terms offered: Prior to 2007

This refresher course will cover topics in responsible conduct in research drawing from case studies of the Association of American Medical Colleges and the NIH. Students will review case studies in preparation for class discussion. Required of all 4th year MCB graduate students funded on NIH training grants.

Objectives & Outcomes

Course Objectives: Collaborative research including collaborations with industry
Data acquisition and laboratory tools; management, sharing and ownership
Mentor/mentee responsibilities and relationships
Policies regarding human subjects, live vertebrate animal subjects in research, and safe laboratory
practices
Research misconduct and policies for handling misconduct
Responsible authorship and publication
The scientist as a responsible member of society, contemporary ethical issues in biomedical research, and
the environmental and societal impacts of scientific research

Rules & Requirements

Prerequisites: Consent of instructor. Must be a 4th year MCB graduate student

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructor: Sharma

MCELLBI 293S Foundations of Biostatistical Practice 1 Unit

Terms offered: Fall 2018, Spring 2018

This course is designed to introduce students to the foundations of statistics in the context of biological research. Rather than focusing on a catalog of specific methods (by essence non-exhaustive and rapidly outdated), the course emphasizes general concepts and approaches necessary for sound statistical practice. Topics covered include: exploratory data analysis (EDA); data visualization; inferential reasoning; models and assumptions; statistical computing; computationally reproducible research. The statistical methods and software are motivated by and illustrated on data structures that arise in current biological and medical research.

Rules & Requirements

Prerequisites: Consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

MCELLBI 294 Current Topics in Biomedical Sciences 1 Unit

Terms offered: Fall 2025, Fall 2022, Fall 2021

This course will discuss cutting-edge topics in biochemistry, structural biology, cell biology, developmental biology and genetics. Lectures will be given by internationally recognized biomedical scientists that visit the Molecular and Cell Biology Department and present work currently performed in their laboratories. The class will include topics ranging from structural analysis of important signaling molecules, live cell imaging and high resolution microscopy of critical cellular structures, to genetic dissection of essential signaling networks in cells and developmental pathways in multicellular organisms. It is the goal of this class to expose students to both the breadth and highest standards of current biomedical research.

Rules & Requirements

Prerequisites: Molecular and Cell Biology graduate students only

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of lecture per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

MCELLBI 295 Careers for Life Sciences Ph.D's 1 Unit

Terms offered: Spring 2025, Spring 2024, Spring 2023
This course is designed to assist graduate students in the biological sciences with planning their postgraduate careers. Weekly guest speakers will present their experiences on a variety of topics. Postdoctoral students are invited. Topics may include academia; job searches; setting up a laboratory; patent law/technology transfer; public policy/regulatory affairs; bioinformatics; science writing/technical support; forensic science; postdoctoral positions in industry; teaching, and other topics of interest.

Rules & Requirements

Prerequisites: Open to graduate and postdoctoral students

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

MCELLBI 296 Molecular and Cell Biology Colloquium 0.0 Units

Terms offered: Spring 2020, Spring 2019, Spring 2018
Meetings for the presentation of original work by faculty, visiting lecturers, and graduate students.

Hours & Format

Fall and/or spring: 15 weeks - 1.5 hours of colloquium per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

MCELLBI C296 Doctoral Seminar in Computational Biology 2 Units

Terms offered: Spring 2024, Fall 2022, Fall 2021
This interactive seminar builds skills, knowledge and community in computational biology for first year PhD and second year Designated Emphasis students. Topics covered include concepts in human genetics/genomics, microbiome data analysis, laboratory methodologies and data sources for computational biology, workshops/instruction on use of various bioinformatics tools, critical review of current research studies and computational methods, preparation for success in the PhD program and career development. Faculty members of the graduate program in computational biology and scientists from other institutions will participate. Topics will vary each semester.

Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate

Grading: Letter grade.

Instructors: Moorjani, Rokhsar

Also listed as: CMPBIO C293

MCELLBI 375 Pedagogy for MCB Graduate Student Instructors 2 Units

Terms offered: Prior to 2007
This course introduces new graduate student instructors to effective teaching methods that they can use in their MCB courses. Through readings, discussions and demonstrations, students will learn how to engage and motivate students, facilitate active participation, plan a class period, and write exam or practice problems. Emphasis will be placed on science education literature and proven practical techniques. We will also provide support and solutions for dealing with difficult situations that may come up during the semester.

Rules & Requirements

Prerequisites: Appointment as graduate student instructor or consent of instructor

Hours & Format

Fall and/or spring: 10 weeks - 1 hour of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Professional course for teachers or prospective teachers

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructors: Ball, Beatty, Barnes

MCELLBI 380 Teaching of Molecular and Cell Biology 1 - 2 Units

Terms offered: Fall 2022, Spring 2016, Fall 2015
Teaching laboratories and/or discussions for Molecular and Cell Biology courses: analysis of specific format and problems. Two units of credit for those with 50% teaching appointment; one unit of credit for those with 25% teaching appointment.
Rules & Requirements

Prerequisites: Appointment as graduate student instructor or consent of instructor

Repeat rules: Course may be repeated for credit up to a total of 4 units.

Hours & Format

Fall and/or spring: 15 weeks - 0-1 hours of seminar per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Professional course for teachers or prospective teachers

Grading: Offered for satisfactory/unsatisfactory grade only.

MCELLBI 481B Instrumentation in Molecular and Cell Biology: Transmission Electron Microscopy 1 - 4 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Individualized laboratory instruction.
Rules & Requirements

Prerequisites: Graduate standing; consent of instructor and sponsorship of a faculty member

Hours & Format

Fall and/or spring: 15 weeks - 1-4 hours of independent study per week

Summer:
6 weeks - 2.5-10 hours of independent study per week
8 weeks - 2-7.5 hours of independent study per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Other professional

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructors: Dernburg, Karpen

MCELLBI 481C Instrumentation in Molecular and Cell Biology: Scanning Electron Microscopy 1 - 4 Units

Terms offered: Fall 2025, Spring 2025, Fall 2024
Individualized laboratory instruction.
Rules & Requirements

Prerequisites: Graduate standing; consent of instructor and sponsorship of a faculty member

Hours & Format

Fall and/or spring: 15 weeks - 1-4 hours of independent study per week

Summer:
6 weeks - 2.5-10 hours of independent study per week
8 weeks - 2-7.5 hours of independent study per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Other professional

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructors: Dernburg, Karpen

MCELLBI 601 Individual Study for Master's Students 1 - 8 Units

Terms offered: Fall 2006, Spring 2005, Spring 2001
Individual study for the comprehensive or language examinations in consultation with the field adviser.
Rules & Requirements

Credit Restrictions: Course does not satisfy unit or residence requirements for master's degree.

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1-8 hours of independent study per week

Summer: 8 weeks - 1.5-15 hours of independent study per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate examination preparation

Grading: Offered for satisfactory/unsatisfactory grade only.

MCELLBI 602 Individual Study for Doctoral Students 1 - 8 Units

Terms offered: Spring 2006, Spring 2005, Fall 2004
Individual study in consultation with the major field adviser. Intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D.

Rules & Requirements

Prerequisites: Restricted to Ph.D. candidates

Credit Restrictions: Course does not satisfy unit or residence requirements for doctoral degree.

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 0 hours of independent study per week

Summer:
6 weeks - 1-8 hours of independent study per week
8 weeks - 1-8 hours of independent study per week

Additional Details

Subject/Course Level: Molecular and Cell Biology/Graduate examination preparation

Grading: Offered for satisfactory/unsatisfactory grade only.