Molecular Biology and Biochemistry (MOL BIO)

Courses

MOL BIO 200A. Research in Molecular Biology and Biochemistry. 2-12 Units.
Individual research with Molecular Biology and Biochemistry faculty.
Repeatability: Unlimited as topics vary.
Restriction: Graduate students only.

MOL BIO 200B. Research in Molecular Biology and Biochemistry. 2-12 Units.
Individual research with Molecular Biology and Biochemistry faculty.
Repeatability: Unlimited as topics vary.
Restriction: Graduate students only.

MOL BIO 200C. Research in Molecular Biology and Biochemistry. 2-12 Units.
Individual research with Molecular Biology and Biochemistry faculty.
Repeatability: Unlimited as topics vary.
Restriction: Graduate students only.

MOL BIO 200R. Research in Developmental & Cell Biology for First-year Students. 2-12 Units.
Independent research within the laboratories of graduate training faculty in the Department of Molecular Biology and Biochemistry for first-year Ph.D. students.
Grading Option: Satisfactory/unsatisfactory only.
Repeatability: May be taken for credit 3 times.

MOL BIO 201A. Seminars in Molecular Biology & Biochemistry. 2 Units.
Presentation of research from department laboratories or, when pertinent, of other recent developments.
Grading Option: Satisfactory/unsatisfactory only.
Repeatability: May be repeated for credit unlimited times.

MOL BIO 201B. Seminars in Molecular Biology & Biochemistry. 2 Units.
Presentation of research from department laboratories or, when pertinent, of other recent developments.
Grading Option: Satisfactory/unsatisfactory only.
Repeatability: May be repeated for credit unlimited times.

MOL BIO 201C. Seminars in Molecular Biology & Biochemistry. 2 Units.
Presentation of research from department laboratories or, when pertinent, of other recent developments.
Grading Option: Satisfactory/unsatisfactory only.
Repeatability: May be repeated for credit unlimited times.

MOL BIO 202A. Tutorial in Molecular Biology and Biochemistry. 2 Units.
Tutorials in the area of research of a particular professor which relate current research to the literature. May be conducted as journal clubs.
Repeatability: Unlimited as topics vary.

MOL BIO 202B. Tutorial in Molecular Biology and Biochemistry. 2 Units.
Tutorials in the area of research of a particular professor which relate current research to the literature. May be conducted as journal clubs.
Repeatability: Unlimited as topics vary.
MOL BIO 202C. Tutorial in Molecular Biology and Biochemistry. 2 Units.
Tutorials in the area of research of a particular professor which relate current research to the literature. May be conducted as journal clubs.

Repeatability: Unlimited as topics vary.

MOL BIO 203. Nucleic Acid Structure and Function. 4 Units.
Structure and chemistry of nucleic acids. Relationship between these properties and the mechanisms of fundamental processes such as replication and repair, RNA-mediated catalysis, formation and regulation of higher order chromatin structure and recombination.

Prerequisite: BIO SCI 98 and BIO SCI 99 and CHEM 51A and CHEM 51B and CHEM 51C.

MOL BIO 204. Protein Structure and Function. 4 Units.
The structure and properties of proteins, enzymes, and their kinetic properties.

Prerequisite: BIO SCI 98 and BIO SCI 99 and CHEM 51C.

MOL BIO 205. Molecular Virology. 4 Units.
Primary research data on the major DNA and RNA viruses emphasizing strategies of regulation of gene expression. Utilization of viruses as molecular biological tools. Graduate-level knowledge of the biochemistry and molecular biology of macromolecules is required.

Prerequisite: MOL BIO 203 and MOL BIO 204.

Restriction: Graduate students only.

MOL BIO 211. High-Resolution Structures: NMR and X-ray. 4 Units.
Basic principles of magnetic resonance and x-ray crystallography toward the determination of high-resolution biomolecular structures.

Prerequisite: MATH 2B.

Restriction: Graduate students only.

Concurrent with BIO SCI M133.

MOL BIO 213. Literature in Nucleic Acid Structure and Function. 2 Units.
Exploration and critical analysis of recent primary scientific literature in structure, properties, and biological mechanisms involving nucleic acids.

Corequisite: MOL BIO 203.

Grading Option: Satisfactory/unsatisfactory only.

MOL BIO 214. Literature in Protein Structure and Function. 2 Units.
Exploration and critical analysis of recent primary scientific literature in structure and properties of proteins, enzymes, and their kinetic properties.

Corequisite: MOL BIO 204.

Grading Option: Satisfactory/unsatisfactory only.

MOL BIO 215. Integrative Immunology. 4 Units.
Lectures and student presentations of primary literature. The main goal is to achieve a basic understanding of the cellular and molecular basis of innate and adaptive immunity, and how immune function is coordinated at a systems level.

Same as M&MG 215.

MOL BIO 217A. Principles of Cancer Biology I. 4 Units.
Oncogenes and tumor suppressor genes are studied from molecular viewpoints. Also studies their role in cancer; viral carcinogenesis. Designed for graduate students interested in cancer research. Format includes lectures and student-led discussions.

Prerequisite: MOL BIO 203 and MOL BIO 204.

Restriction: Graduate students only.

MOL BIO 217B. Principles of Cancer Biology II. 4 Units.
topics include cancer cell growth and metastasis, chemical carcinogenesis, and cancer genetics and epidemiology. Designed for graduate students interested in cancer research. Format includes lectures and student-led discussions.

Prerequisite: MOL BIO 203 and MOL BIO 204.

Restriction: Graduate students only.
MOL BIO 218. Clinical Cancer. 3 Units.
Designed to acquaint students in basic life science with clinical cancer.
Restriction: Graduate students and Postdocs only.

MOL BIO 220. Structure & Synthesis of Biological Macromolecules Journal Club. 2 Units.
Advanced topics in macromolecular structure and synthesis as related to biological problems.
Grading Option: Satisfactory/unsatisfactory only.
Repeatability: May be repeated for credit unlimited times.
Restriction: Graduate students only.

MOL BIO 221. Advanced Topics in Immunology. 4 Units.
Literature-based, interactive discussions focused on review of seminal historic and recent immunology literature. Student responsibilities include reading, critical evaluation, and discussion of manuscripts.
Prerequisite: M&MG 215.
Restriction: Graduate students only.

MOL BIO 221L. Advanced Immunology Laboratory. 4 Units.
An advanced course in immunology for graduate students enrolled in the Biotechnology master's program. Emphasis is placed on learning modern techniques in immunology such as ELISAs, western blotting, immunofluorescent staining assays.
Restriction: Graduate students only.
Concurrent with BIO SCI M121L.

MOL BIO 223. Introduction to Computational Biology. 4 Units.
Concurrent with BIO SCI M123.

MOL BIO 224. Virus Engineering Laboratory. 4 Units.
An advanced laboratory for graduate students enrolled in the Biotechnology master's program. Students learn to engineer recombinant eukaryotic viruses and express genes in mouse tissue.
Restriction: Graduate students only.

MOL BIO 227. Immunology Journal Club. 2 Units.
Advanced topics in immunology as related to an understanding of human disease.
Grading Option: Satisfactory/unsatisfactory only.
Repeatability: May be taken for credit 15 times.
Restriction: Graduate students only.

MOL BIO 227L. Virology and Immunology Laboratory. 5 Units.
Introductory laboratory course in virology and immunology designed for Biological Sciences graduate students. Curriculum includes plasmid preparation, plasmid characterization, microscopy, cell culture, transfection and infection of cells, cell counting, plaque assays, ELISA, Western blot, mixed lymphocyte reactions.
Restriction: Graduate students only.

MOL BIO 228. Genetic Engineering and Biotechnology. 4 Units.
An advanced course in genetic engineering and biotechnology for graduates enrolled in the Biotechnology Master's Program. Emphasis will be placed on learning advanced methods in assembling the gene for expression in bacteria, yeast and human cells.
Restriction: Graduate students only.
MOL BIO 229. Research-in-Progress Seminars. 1 Unit.
Two half-hour presentations by graduate students and postdoctorals to the department on their current research projects.

Grading Option: Satisfactory/unsatisfactory only.

Repeatability: May be taken for credit 15 times.

Restriction: Graduate students only.

MOL BIO 250. Advanced Topics in Biotechnology - Nucleic Acids. 2 Units.
Supplements laboratory curriculum with scientific background behind experimental methods. Format consists of lectures and the presentation and analysis of relevant papers from the scientific literature.

Corequisite: MOL BIO 250L.

Restriction: Biotechnology graduate students only.

MOL BIO 250L. Biotechnology Laboratory - Nucleic Acids. 8 Units.
Nucleic acid techniques and recombinant DNA technology. Extraction and purification of nucleic acids, cloning and subcloning, PCR, site-directed mutagenesis, nucleic acid hybridization, additional associated procedures. Students must demonstrate accurate documentation of data (laboratory notebook) detailing experience and results.

Corequisite: MOL BIO 250.

Restriction: Biotechnology graduate students only.

MOL BIO 251. Advanced Topics in Biotechnology - Protein Purification and Characterization. 2 Units.
Supplements laboratory curriculum with scientific background behind experimental methods. Format consists of lectures and the presentation and analysis of relevant papers from the scientific literature.

Corequisite: MOL BIO 251L.
Prerequisite: MOL BIO 250L and MOL BIO 250.

Restriction: Biotechnology graduate students only.

MOL BIO 251L. Biotechnology Laboratory - Protein Purification and Characterization. 8 Units.
Major techniques of handling proteins and antibodies. Protein engineering, expression and large-scale purification of recombinant proteins from bacteria, HPLC, antibody purification, western blotting, additional associated procedures. Students must demonstrate accurate documentation of data (laboratory notebook) detailing experience and results.

Corequisite: MOL BIO 251.
Prerequisite: MOL BIO 250L and MOL BIO 250.

Restriction: Biotechnology graduate students only.

MOL BIO 252L. Biotechnology Management Laboratory. 8 Units.
Overview of current methods in biotechnology, designed specifically for biotechnology graduate students. Organized into four distinct sections (nucleic acids, proteins, virology, and immunology). Students must demonstrate accurate documentation of data (laboratory notebooks) detailing experience and results.

Restriction: Biotechnology graduate students only.

MOL BIO 253. Biotech Management . 5 Units.
Taught jointly by Biological Sciences and Merage School faculty, the course addresses fundamental aspects within, and associated with, the biotechnology industry. Curriculum is focused largely on management issues, including finance, product development, pharmaceuticals, project management, regulatory affairs, and ethics.

Same as MGMTMBA 293.

Restriction: Master's Program in Biotechnology Management students only.
MOL BIO 253L. Stem Cell Laboratory. 4 Units.
Designed to prepare M.S. Biotechnology program students for a career in stem cell research. Laboratory training utilizes tissue culture, mouse and human embryonic stem cells, and is enhanced with didactic material and discussion.

Prerequisite: MOL BIO 250L and MOL BIO 251L.

Restriction: Biotechnology graduate students only.

MOL BIO 255. Structure-Function Relationships of Integral Membrane Proteins. 4 Units.
Integral membrane proteins such as voltage and ligand-gated ion channels, water channels, pumps, cotransporters, and receptors (e.g., GPCRs). The emphasis is on the relationship between atomic structure and the functional properties of these proteins.

Prerequisite: BIO SCI 98 and BIO SCI 99. BIO SCI 98 with a grade of B or better. BIO SCI 99 with a grade of B or better.

Concurrent with BIO SCI M160.

MOL BIO 280. Advanced Topics in Biochemistry and Molecular Biology. 3 Units.
Selected topics in specified areas of concentration, e.g., nucleic acids, protein biochemistry, genetic expression, biochemical genetics. Specific topics announced in advance.

Restriction: Graduate students only.

MOL BIO 291. Graduate School Fundamentals. 2 Units.
Lectures and discussions providing basic skills needed for success in Ph.D. graduate studies. Topics include formulating a hypothesis, experimental design, literature review, grant writing, oral communication, biostatistics, time management, and professional development.

Grading Option: Satisfactory/unsatisfactory only.

Restriction: First-year students in the Cellular and Molecular Biosciences gateway Ph.D. program.

MOL BIO 292A. Scientific Communication. 2 Units.
Small group meetings for graduate students to practice scientific writing, debate, and presentation skills.

Grading Option: Satisfactory/unsatisfactory only.

Repeatability: May be repeated for credit unlimited times.

MOL BIO 292B. Scientific Communication. 2 Units.
Small group meetings for graduate students to practice scientific writing, debate, and presentation skills.

Grading Option: Satisfactory/unsatisfactory only.

Repeatability: May be repeated for credit unlimited times.

MOL BIO 292C. Scientific Communication. 2 Units.
Small group meetings for graduate students to practice scientific writing, debate, and presentation skills.

Grading Option: Satisfactory/unsatisfactory only.

Repeatability: May be repeated for credit unlimited times.

MOL BIO 293A. Cancer Biology Journal Club. 1 Unit.
Focuses on molecular mechanisms that underlie the development and progression of cancers. Covers a variety of cancer-related research areas, such as cell cycle control, apoptosis, DNA repair, metastasis, angiogenesis, and others.

Grading Option: Satisfactory/unsatisfactory only.

Restriction: Graduate students only.

MOL BIO 293B. Cancer Biology Journal Club. 1 Unit.
Focuses on molecular mechanisms that underlie the development and progression of cancers. Covers a variety of cancer-related research areas, such as cell cycle control, apoptosis, DNA repair, metastasis, angiogenesis, and others.

Grading Option: Satisfactory/unsatisfactory only.

Restriction: Graduate students only.
MOL BIO 293C. Cancer Biology Journal Club. 1 Unit.
Focuses on molecular mechanisms that underlie the development and progression of cancers. Covers a variety of cancer-related research areas, such as cell cycle control, apoptosis, DNA repair, metastasis, angiogenesis, and others.

Grading Option: Satisfactory/unsatisfactory only.

Restriction: Graduate students only.

MOL BIO 399. University Teaching. 4 Units.
Limited to Teaching Assistants.

Restriction: Graduate students only.