

MOLECULAR & CELLULAR BIOLOGY (MCB)

MCB 501, RESEARCH AND SCHOLARSHIP, 1-16 Credits

This course is repeatable for 99 credits.

MCB 503, THESIS, 1-16 Credits

This course is repeatable for 999 credits.

MCB 505, READING AND CONFERENCE, 1-16 Credits

This course is repeatable for 99 credits.

MCB 507, SEMINAR, 1-16 Credits

This course is repeatable for 99 credits.

MCB 508, WORKSHOP, 1-16 Credits

This course is repeatable for 99 credits.

Available via Ecampus

MCB 509, PRACTICUM, 1-16 Credits

This course is repeatable for 99 credits.

MCB 510, INTERNSHIP, 1-16 Credits

This course is repeatable for 99 credits.

MCB 525, TECHNIQUES IN MOLECULAR AND CELLULAR BIOLOGY, 3 Credits

An intensive laboratory course introducing modern methods for the manipulation of cellular macromolecules. Recombinant DNA technology, protein chemistry, and in situ hybridization methods presented in a format that emphasizes experimental continuity. The course requires two weeks of intensive full-time involvement.

MCB 530, INTRODUCTION TO POPULATION GENETICS, 3 Credits

Genetic polymorphisms, inbreeding, genetic drift, population subdivision and gene flow, mutation and selection. Emphasis on applied rather than theoretical questions. Offered alternate years.

Equivalent to: GEN 530

Recommended: BI 311 and ST 351 and ST 352

MCB 535, GENES AND CHEMICALS IN AGRICULTURE: VALUE AND RISK, 3 Credits

A multidisciplinary course that examines the scientific, social, political, economic, environmental, and ethical controversies surrounding agricultural and natural resource biotechnologies. Lec/rec. CROSSLISTED as FES 435/TOX 435 and FES 535/MCB 535/TOX 535.

Equivalent to: BI 535, FES 535, FS 535, TOX 535

Recommended: One quarter each of biology and chemistry

Available via Ecampus

MCB 541, PLANT TISSUE CULTURE, 4 Credits

Principles, methods, and applications of plant tissue culture. Laboratory is important part of course. Topics include callus culture, regeneration, somaclonal variation, micropropagation, anther culture, somatic hybridization, and transformation. CROSSLISTED as PBG 441 and MCB 541/PBG 541.

Equivalent to: HORT 541, PBG 541

Recommended: (BI 311 and BOT 331) or PBG 430

MCB 554, GENOME ORGANIZATION, STRUCTURE, AND MAINTENANCE, 4 Credits

How diverse organisms store their individual sets of genetic information (genomes). Evolution of genomes and gene families. Structures of DNA and chromatin. Biochemical and regulatory pathways that protect cellular genomes against environmental and endogenous damage and ensure transmission of faithful copies to progeny. Remodeling of genomes by recombination and transposition.

Equivalent to: GEN 554, MB 554, TOX 554

Recommended: BI 311 (or genetics equivalent) and (BB 450 and BB 451 and BB 452) or (BB 490 and BB 491 and BB 492)

MCB 555, GENOME EXPRESSION AND REGULATION, 4 Credits

Prokaryotic and eukaryotic systems will be used to describe recent advances in understanding transcriptional and posttranscriptional control mechanisms. Topics include: microbial, yeast and mouse model systems; transcriptional control mechanisms; RNA processing, silencing and microRNAs; protein synthesis and posttranslational modification; microarray- and mass spectrometry-based expression genomics.

Equivalent to: GEN 555

Recommended: BB 451

MCB 557, SCIENTIFIC SKILLS AND ETHICS, 3 Credits

Offers instruction, guest lectures and case-study based discussions of ethical issues relevant to scientists on topics such as mentoring, best practices of conducting research, research misconduct and compliance, intellectual property, peer review, ethical use of animal and human subjects and managing conflicts of interest. Training in the preparation and presentation of scientific seminars and grant writing.

MCB 563, CANCER AND CHEMOPREVENTION, 2 Credits

A summary of mechanisms of cancer progression, how cancer is detected, and introduction to chemoprevention using targeted therapy and alternative medicine.

Recommended: BB 451 and BI 314 and BI 460

MCB 575, COMPARATIVE GENOMICS, 4 Credits

Explores principles of comparative genomics. Examines methods for genome assembly and annotation. Discusses genomic approaches for the study of structural change, whole genome duplication, gene family evolution, gene networks, gene regulation and epigenetics. Lab topics include the analysis of next generation sequencing data and conducting comparative genomic analyses. CROSSLISTED as BDS 475/BOT 475 and BDS 575/BOT 575/MCB 575.

Equivalent to: BDS 575, BOT 575

Recommended: BB 314 and (BI 311 or PBG 430) and basic working knowledge of cell and molecular biology and genetics

MCB 576, INTRODUCTION TO COMPUTING IN THE LIFE SCIENCES, 3 Credits

Introduction to management of large datasets (e.g., nucleic acids, protein), computer programming languages, application of basic mathematical functions, and assembly of computational pipelines pertinent to life sciences. CROSSLISTED as BOT 576/MCB 576.

Equivalent to: BOT 576

Recommended: Cell and molecular biology or genetics and familiarity with text editing software and unix/linux operating system

MCB 599, SPECIAL TOPICS, 1-16 Credits

This course is repeatable for 16 credits.

MCB 601, RESEARCH, 1-16 Credits

This course is repeatable for 16 credits.

MCB 603, THESIS, 1-16 Credits

This course is repeatable for 999 credits.

MCB 605, READING AND CONFERENCE, 1-16 Credits

This course is repeatable for 16 credits.

MCB 609, PRACTICUM, 1-16 Credits

This course is repeatable for 16 credits.

MCB 610, INTERNSHIP, 1-9 Credits

Laboratory rotation.

This course is repeatable for 16 credits.

MCB 620, INTRODUCTION TO MOLECULAR MARKERS, 2 Credits

Principles and methods for molecular marker discovery and analysis. Offered even years. CROSSLISTED as PBG 620/MCB 620.

Equivalent to: PBG 620

Recommended: BI 311 or PBG 430 or PBG 530 or HORT 430 or HORT 530

MCB 621, GENETIC MAPPING AND ASSOCIATION, 2 Credits

Principles and methods for genetic map construction and genome-wide association studies. Offered even years. CROSSLISTED as MCB 621/PBG 621.

Equivalent to: PBG 621

Recommended: BI 311 or PBG 430 or PBG 530 or HORT 430 or HORT 530

MCB 622, MAPPING QUANTITATIVE TRAIT LOCI, 1 Credit

Principles and methods for mapping genes underlying phenotypically complex traits. Offered alternate years. CROSSLISTED as MCB 622/PBG 622.

Equivalent to: CSS 622, GEN 622, PBG 622

Recommended: CSS 590 or ST 513

MCB 637, MOLECULAR HOST-MICROBE INTERACTIONS, 3 Credits

Lecture and discussion-based presentation of the molecular bases for interactions between organisms. Addresses bacterial, algal, and fungal symbionts of eukaryotes and considers pathogenesis, commensalism, and mutualism. A focus on the evolution of host-microbe interactions is included.

MCB 671, MOLECULAR TOOLS, 3 Credits

Intended for personnel with some scientific background who are seeking basic- and advanced-level molecular biology knowledge and who wish to become involved with molecular biology-related and biotechnological research. CROSSLISTED as MCB 671/VMB 671.

Equivalent to: VMB 671

MCB 699, SPECIAL TOPICS, 0-16 Credits

This course is repeatable for 16 credits.