

Department of Molecular Biology and Genetics graduate courses

Code of the course	Name of the course	Credit	Context
MBG 500	Thesis Studies	(0+1) Non-credit	Program of research leading to M.S. degree arranged between student and a faculty member. Students register to this course in all semesters starting from the beginning of their second semester.
MBG 501	Microbial Genetics	(3+0)3	Genetic phenomena, gene transfer, recombination, gene fusion and modern concepts in the genetics of microorganisms.
MBG 503	Microbial Physiology	(3+0)3	Modern concepts in physiology and structure of microorganisms.
MBG 504	Molecular Pathogenesis	(3+0)3	This course includes the subjects of general molecular principles of microbial pathogenesis, adhesion and invasion strategies, intracellular survival strategies, epidemiology, virulence factors, antibiotic resistance, bacterial toxins, fungal pathogenesis, parasite pathogenesis, biofilms, and quorum sensing. Most of the emphasis will be on bacterial pathogens of mammals and plants, but there will be some discussion of viral and protozoan pathogens.
MBG 506	Mammalian Cell Culture	(3+0)3	An overview of animal cell culture methodology. Recent research in quantitative cell biology as studies with tissues and cells of higher organisms cultured in vitro.
MBG 507	Advanced Cell Biology	(3+0)3	The main objective of this course is to introduce all the components of the animal eukaryotic cells including plasma membrane structure and functions, nucleus, protein sorting and transport, energy conversion, cell cycle and apoptosis.
MBG 513	Seminar in Molecular Biology	(3+0)3	Seminars that are given by the Department must be participated by students and a seminar about specific subjects will be given by the student.
MBG 514	Plant Cell Culture	(3+0)3	An overview of plant cell culture, principles and techniques for the genetic manipulation of cultured plant cells.
MBG 515	Advanced Immunology	(3+0)3	Discussion of the modern concepts in immunology. Emphasis on areas of current interest.
MBG 516	Eukaryotic Gene Regulation	(3+0)3	Structure, synthesis and biochemical properties of nucleic acids. Protein biosynthesis. Control of gene expression, molecular genetics.
MBG 519	Biological Macromolecules	(3+0)3	Physical/ chemical theory and techniques with emphasis on proteins and nucleic acids, solutions, chromatography, electrophoresis, viscosity, diffusion, sedimentation, spectroscopy, isotopes.
MBG 522	Genes and Development	(3+0)3	Introducing knowledge of genetics and developmental biology of model organism such as <i>C. elegans</i> , <i>D. melanogaster</i> , <i>Mus musculus</i> .
MBG 525	Proteins And Enzymes	(3+0)3	Properties of proteins and polypeptides. Structural analysis and molecular interactions. Enzyme structure, kinetic mechanisms and control.
MBG 533	Current Topics in Molecular Biology	(3+0)3	Special topics in molecular and cell biology.

MBG 537	Genome Organization and Structure	(3+0)3	The class will cover the structure and variation of nuclear genomics including changes in genome size, centromere and telomere structure, DNA packaging, trasposable elements, DNA methylation, mutations (point, translocations, inversions, deletions, duplications), genomic sequencing, and comparativeand functional genomics.
MBG 545	Molecular Biology of Cancer	(3+0)3	Studies on cellular and molecular mechanisms of cancers with emphasis on current literature in cancer research.
MBG 547	Plant Biotechnology	(3+0)3	Discussion of genetic transformation methodologies, gene expression systems and analysis techniques will provide a foundation for study of current research in the area of plant genetic engineering and biotechnology. The uses of genetic engineering including strategies for obtaining transgenic plants that are resistant to insects, diseases and herbicides, that produce useful products or have improved health, nutritional or food processing characteristics will be discussed. Regulatory and social issues related to plant biotechnology will also be addressed.
MBG 550	Advanced Biochemistry	(3+0)3	Chemistry of carbohydrates, lipids and membranes. Biosynthesis and metabolism of nucleic acids. Protein function and evolution.
MBG 556	Molecular Genetics of Plant Development	(3+0)3	Topics will include cell lineages and positional information, embryogenesis, seedling, shoot, leaf, root, flower, fruit and seed development, the transition to flowering and pollination.
MBG 557	Applied Microbiology	(3+0)3	The first section aims to explain why development of the new strains is necessary in the exploitation of biodiversity , and relevant strategies. In section II, construction and the use of environmental DNA libraries are covered. In the final section laboratory evolution studies are introduced.
MBG 560	DNA Mutagenesis and Repair	(3+0)3	Action of physical and chemical environmental agents on genetic material. DNA repair. Mutagenic and carcinogenic consequences.
MBG 565	Advanced Virology	(3+0)3	A general vief of the multiplication strategies of viruses, their interactions with the host and immune response to viruses.
MBG 566	Gene Therapy	(3+0)3	The course covers the fundamentals of using gene delivery for treating human diseases, and details the viral vectors that are used for gene delivery including their generation and use, the non-viral approaches that can be used to deliver therapeutic genes, and the methods that are used for controlling therapeutic gene expression.
MBG 567	Genome Analysis in Plants	(3+0)3	The application of DNA markers to the identification, manipulation and isolation of genes important to plant productivity will be discussed.
MBG 572	Yeast Genetics	(3+0)3	Yeast cell biology, metabolism, genome and genomics, gene manipulations, complementations and mutagenesis.

MBG 575	Redox Biology	(3+0)3	Free radicals, antioxidants, oxidative damage to biomolecules, repair mechanisms, redox control of gene expression, redox signaling.
MBG 580	Genomics	(3+0)3	Genome structure and organization, sequencing genomes, micro array and chip technology, genome-wide genotyping, functional genomics, arrays, metabolomics and proteomics topics will be included.
MBG 585	Immunogenomics	(3+0)3	The main objective of this graduate level course is to teach students genome-wide approaches on immune system, immune response and molecular mechanisms of diseases.
MBG 8XX	Special Studies	(4-0)0	M.S. students choose and study a topic under the guidance of a faculty member normally his/her advisor.
MBG 9XX	Special Topics	(4-0)0	Graduate students as a group or a PhD student choose and study advanced topics under the guidance of a faculty member normally his /her advisor.