

mental principles and techniques in basic biomedical research.

5303. Introduction to Clinical Research (3:2:3). Students will be involved in all aspects of preparation for and execution of prospective human studies and retrospective chart reviews. The didactic training deals with the regula-

- 6121. History of Biochemistry (1:1:0).** Discussion of highlights in the advancement of biochemical knowledge.
- 6135, 6235, 6335, 6535. Topics in Biochemistry (1:1:0, 2:2:0, 3:3:0, 5:5:0).** Prerequisite: Consent of instructor. Lectures in specific areas of biochemistry not normally included in other courses. May be repeated for credit with change of content.
- 6323. Advanced Molecular Genetics (3:3:0).** Based on readings and discussions of primary literature in the areas of molecular genetics and nucleic acid biology. This course will give the student a firm foundation in molecular genetics and prepare the student to read, discuss, and understand literature from the disciplines of DNA and RNA structure and function, gene expression, molecular biology, molecular genetics, and genomics, and cancer biology.
- 6333. Advanced Protein Biochemistry (3:3:0).** Teaches advanced concepts in the field of protein biochemistry with emphasis on the fundamentals of protein biosynthesis, structure, and folding; methods of characterizing protein structural properties and conformation; and techniques for purifying proteins with diverse properties. Prerequisite: Successful completion of the GSBS common first year curriculum or consent of the course director.
- 7000. Research (V1-12).**
- 7101. Biochemistry Seminar (1:1:0).**
- 8000. Doctor's Dissertation (V1-12).**
- 5103. Responsible Conduct of Research (1:1:0).** Addresses the regulatory and ethical environment of today's biomedical research as well as such topics as authorship and data management.
- 5104. Biomedical Sciences Seminar (1:1:0).** Students are required to attend all seminars sponsored by the Biomedical Studies Program. Students will present a seminar in their first year and a final seminar at the end of their internship (Spring semester) of the second year. Deviation from the yearly seminar presentation requirement requires approval of the Biomedical Studies graduate program committee.
- 5201. Laboratory Methods in Biomedical Science (2:0:2).** Introduces the first-year graduate students to the fundamental principles and techniques in basic science research.)
- 5202. CORE V: Introduction to Biomedical Research (2:2:0).** Introduces the first-year graduate student to the fundamental principles and techniques in basic biomedical research through laboratory rotations.
- 5220. Cancer Biology and Therapeutics (2:2:0).** This course offers an advanced level understanding of molecular and cellular basis of cancer. The principles of cancer biology from origin of cancer to therapeutic intervention are addressed.
- 5221. Microbial Genetics (2:2:0).** This course provides coverage of current techniques of genetic analysis, molecular biology, and gene regulation in microorganisms, with an emphasis on bacteria and bacteriophages.
- 5222. Advanced Human Genetics (2:2:0).** This course will cover detailed consideration of population genetics, cytogenetics, molecular biology, and biochemistry as related to human heredity and genetic disorders. Includes discussion of research papers from the current literature.
- 5223. The Cell Cycle and Human Diseases (2:2:0).** Advanced mechanisms of DNA replication repair, meiosis and recombination, and mitosis and the genetics of cell cycle control. Defects in DNA replication and repair and human diseases.
- 5224. Cellular and Molecular Neuroscience (2:2:0).** This course addresses molecular mechanisms of neurodegeneration associated with neurodegenerative disorders, including spinal muscular atrophy, Parkinson's disease, Alzheimer's disease, Amyotrophic Lateral Sclerosis and Huntington's disease. The course will consist of lectures and critical discussions of recent research papers.
- 5225. Immunology (2:2:0).** This course will cover basic and advanced concepts in immunology including a survey of immunology as a host response to foreign agents, covering the nature of antigens and antibodies, effector and memory T cell responses, innate and adaptive immunity to microbial infections, allergic reactions and tumor immunology.
- 5301. CORE I: BIOCHEMISTRY (3:3:0).** This course will teach structure, biosynthesis and functions of the major classes of organic compounds with particular reference to organic molecules and their relationship to polymers, such as carbohydrates, lipids, proteins, and nucleic acids.
- 5302. CORE II: CELL BIOLOGY (3:3:0).** This course will teach structural details and the molecular functions of the different parts of the cell. The course will also deal with signal transduction processes and cellular functions that are required for cell growth and death.
- 5303. CORE III: GENES and FUNCTION (3:3:0).** This course will teach the principles of molecular genetics. The main topics that will be covered by this course include gene structure and function at the molecular level, regulation of gene expression, organization of genetic information in prokaryotes and eukaryotes, genetic rearrangements and genetic engineering.
- 5306. Introduction to Biomedical Sciences (3:3:0).** This course will teach the basics of principles of biochemistry, cell biology and genetics. It will introduce the

Biomedical Studies - El Paso (GBSE)

Charles Miller, Ph.D., Director
Rajkumar Lakshmanaswamy, Ph.D., Graduate Advisor

Primary Faculty: Bryan, Gangwani, Garg, Joshi, Lakshmanaswamy, Miller, Nyakeriga, Perez, Shokar, Sundin, Tarwater, Trott, Watts, Wu, Zeng, Zu
Associate Faculty: Beale

About the Concentration

The Biomedical Studies MS program will provide foundational coursework and laboratory training in the areas of biochemistry, cell biology, and genetics in addition to elective courses that explore specialized topics, recent advances, and current literature within the field. The program is designed to provide a superior and competitive training environment in four state-of-the-art Center of Excellence research laboratory areas established at the Paul L. Foster School of Medicine / El Paso Health Sciences Center GSBS campus (Cancer, Diabetes and Obesity, Infectious Disease, and Neuroscience).

Students will be expected to engage in a mentored research project that culminates in the generation of a written thesis, as well as publication(s) within prominent peer-reviewed scientific journals. Students graduating from this program will be prepared for work at the forefront of biomedical research and will be highly competitive for positions in academia and industry that meet their individual interests.

GBSE Courses:

- 5101. Core IV: Biomedical Seminar (1:1:0).** This course will offer presentations, journal articles, etc in biomedical sciences presented by faculty and special guests for group discussion.
- 5102. Biochemical Methods (1:1:0).** Provides integrated approach to modern biochemical techniques biochemistry, cell and molecular biology, and genetics, including RNA interference and recombinant DNA techniques.
- 5103. Responsible Conduct of Research (1:1:0).** Addresses the regulatory and ethical environment of today's biomedical research as well as such topics as authorship and data management.
- 5104. Biomedical Sciences Seminar (1:1:0).** Students are required to attend all seminars sponsored by the Biomedical Studies Program. Students will present a seminar in their first year and a final seminar at the end of their internship (Spring semester) of the second year. Deviation from the yearly seminar presentation requirement requires approval of the Biomedical Studies graduate program committee.
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- 5306. Introduction to Biomedical Sciences (3:3:0).** This course will teach the basics of principles of biochemistry, cell biology and genetics. It will introduce the

students to the basic concepts about carbohydrates, lipids, proteins, nucleic acids, genes and cell structure and cellular components.

6000. Master's Thesis (V1-6).

7000. Research in Biomedical Studies (V1-9).

Biotechnology (GBTC)

Jon Weidanz, Ph.D., Associate Dean of the Graduate
School of Biomedical Sciences; Director



in surgical anatomy will provide students with a relevant correlation of anatomy to applied surgical procedures. Enrollment limited to students admitted to Pre-Medical Sciences M.S. concentration.

5130. Research Presentation Skills (1:0:0). A comprehensive coverage of the most widely used research presentation methods used at national and international

textbooks, review articles and original research papers.
Prerequisite: consent of the instructor. This course can
be taken together with GPHY 5220.

5350.



development, including antigen discovery, efficacy testing in animal models, process development, pre-clinical development and vaccination strategies. This course will combine classroom sessions by TTUHSC professors and expert vaccinologists with instructor-assigned self-reading.

6335. The Pathogenesis of Infectious Disease (3:3:0).
Prerequisite: Core curriculum, introduction courses in Immunology and Infectious Diseases or consent

- 5337. Neuropsychopharmacology (3:3:0).** Prerequisite: Consent of instructor. A structured in-depth study of specific topics concerning neurochemical pharmacology, behavioral pharmacology, and neuropsychopharmacology. Topics to be studied will vary each semester. The course will consist of lectures, discussions, and oral presentations of original papers by the class.
- 6000. Master's Thesis (V1-8).**
- 6331. Principles of Toxicology I (3:3:0).** Prerequisite: Graduate standing in the department or consent of instructor. First half of a two-semester course. Examines the foundations of toxicological sciences. Covers principles, disposition, and first half of toxicological mechanisms.
- 6332. Principles of Toxicology II (3:3:0).** Prerequisite: GPHM 6331. Second half of a two-semester course. Covers remaining toxicological mechanisms, toxic agents, and applied toxicology.
- 7000. Research (V1-12).**
- 7101. Pharmacology Seminar (1:1:0).** Prerequisite: Consent of instructor. This course will enhance student skills in scientific public speaking through a series of seminars that are critiqued by the Department of Pharmacology & Neuroscience faculty. Weekly seminars are designed to provide training in research data presentation and analysis or critical evaluation and presentation of a manuscript in press. A required course for pharmacology and neuroscience graduate students, it is taken during the fall and spring semesters. The course is designed such that students must interact by participating in the questions and answer component of all seminars as well as during lunch with invited speakers. Grades are determined by faculty evaluation of seminar presentation, and by participation during seminars.
- 8000. Doctoral Dissertation (V1-12).**