

## ***COURSE LISTING***

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### **How to Read Catalog Course Descriptions**

Courses are listed by program/concentration, beginning with interdisciplinary GSBS course offerings. Not all courses listed in this catalog are offered every year. The university reserves the right to cancel any scheduled course or withdraw any program from the list of offerings when the best interests of the institution require such action.

### **Example GSBS 5101**

**5101.Responsible Conduct of Research (1:1:0:0).** This course will address the regulatory and ethical environment of today's biomedical research as well as such topics as authorship and data management. The class format is lectures and case discussions. Course is required for all GSBS students.

Subject Prefix – indicates course subject (GSBS = Interdisciplinary Graduate School of Biomedical Sciences)

First digit in course number – Indicates the academic level of the course. Graduate standing is a prerequisite for enrollment in all courses numbered in the 5000 series or above and are intended only for graduate students (except for seniors who are within 12 hours of graduation and whose enrollment has been authorized by the GSBS Dean). Although graduate students

Courses with more than one instructional method (e.g., F, IVC) indicates instructional method varies by course section.

## *Interdisciplinary*

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GSBS Courses:

**5000. Interprofessional Collaborative Practice (0:0:0:0).** An introduction to broad concepts related to four interprofessional core competencies for healthcare providers: understanding roles and responsibilities; interprofessional communication; interprofessional teams and teamwork; and values and ethics for interprofessional practice. A module on electronic health records is also included. Course is required for all new GSBS students matriculated in a degree-granting program. (O)

**5098. Techniques in Biomedical**

such as t tests, anova, correlation. There will be a small introduction to non-parametric analyses. (F)

~~**5311. Health Information Resources Management (2:2:0:0).** Hands-on experience focuses on learning advanced scientific and biomedical information seeking techniques based on current technology. Teaches the evaluation of sources, the management of data found and the primary ethics of presenting information in a paper or speech. Emphasis is to build life-long learning skills that can be applied to research and to patient care. (O)~~

~~**5319. Seminar in Current Topics of Information Sciences (3:3:0:0).** Prerequisite: Must be enrolled or accepted in a graduate program. Course varies each semester emphasizing information science topics and includes searching relevant scientific databases. (Writing Intensive.) (O)~~

**5350. Laboratory Methods in Biomedical Sciences (3:3:0:0).** Introduces the first-year graduate student to the fundamental principles and techniques in basic science research. Following a lecture and/or a laboratory demonstration, students conduct a well-defined laboratory exercise and provide a written report on the results. (F)

**5372. Core II: Cells (3:3:0:0).** The structure/function relationships that underlie basic cellular processes, including translation, protein trafficking, cytoskeletal organization and motility, cell adhesion, and cell division. **Required for first year students.** (F, IVC)

**5373. Core III: Genes (3:3:0:0).** Teaches essential scientific concepts underlying the field of Molecular Biology and Molecular Genetics. **Required for first year students.** (F, IVC)

**5399. Topics in Biomedical Sciences (3:0:0:0).** Specific areas in biomedical sciences or related research not normally included in other courses. May be repeated for credit. (F, IVC)

**5471. Core I: Molecules (4:4:0:0).** This course offers a broad coverage of biochemistry with an emphasis on structure and function of macromolecules, biosynthesis of small molecule precursors of macromolecules, and the GIDN(ah12 Tce:D.0001 Tc-.000IV)7.7(C) )TJs. May7 1j/TT7 19w( 1

- 6055.Laboratory Methods (V1-6).** Taken as (1) hands-on introduction to the laboratories in which a student may wish to do thesis or dissertation research, or (2) after a student is well established in his or her dissertation research, additional rotations can be done to gain expertise in techniques applicable to the student's research but not available in the faculty advisor's laboratory. Repeatable if different methods are covered for each registration. Prerequisite: Consent of instructor. (F)
- 6101.Biochemistry Conference (1:1:0:0).** Informal conferences between faculty and students considering topics of current interest in biochemistry not normally included in other courses. Literature search, evaluation, organization, writing, and oral presentation by the student are emphasized. Different topic each semester. May be repeated for credit. (F)
- 6135, 6235, 6335, 6535. Topics in Biochemistry (1:1:0:0, 2:2:0:0, 3:3:0:0, 5:5:0:0).** Lectures in specific areas of biochemistry not normally included in other courses. May be repeated for credit with change of content. Prerequisite: Consent of instructor. (F)
- 6320.Advanced Cell Biology (3:3:0:0).** This will cover advanced topics in cell biology and is designed for senior students who have completed introductory cell biology courses. The topics covered will include regulatory mechanisms that control the development of metazoan organisms, cell cycle regulation, cancer, and reproductive and stem cell biology. Prerequisite: GSBS core curriculum or consent of course director. (F)
- 6333.Advanced Protein Biochemistry (3:3:0:0).** 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. (F)
- 7000.Research (V1-12).** (F)
- 7101.Seminar (1:1:0:0).** Students will attend and participate in departmental seminars. (F)
- 8000.Doctoral Dissertation (V1-12).** (F)

## ***Biotechnology (GBTC)***

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### GBTC Courses:

- 5020.Biotechnology Laboratory Methods (V1-3:0:V3-9:0).** Introduces techniques fundamental to Biotechnology research. Successful mastery of

**5211.Biotechnology Innovation & Commercialization. (2:2:0:0).** Addresses the essentials for

- 5338. Biochemical Methods (3:1:6:0).** Provides an integrated approach to modern biochemical techniques and present methods used to manipulate a gene, purify and characterize the enzymatic properties of the encoded protein. Enrollment is only by permission of the instructor. (F)
- 5340. Biology of Cancer (3:3:0:0).** Teaches essential processes underlying the biology of cancer, from the molecular and cellular bases of cancer, to clinical manifestations, to therapy. Prerequisites: GSBS 5471, GSBS 5372, GSBS 5373, GSBS 5174 or consent of the course director(s). (F, IVC)
- 5350. Research and Molecular Pathology. (3:3:0:0).** This course provides expertise necessary to design and interpret research data obtained through the use of knowledge pertaining to pathology of human diseases and methods offered by modern pathology. Enrollment is only by permission of the instructor. (F)
- 6000. Master's Thesis (V1-6).** (F)
- 6001. Biotechnology Internship (V1-9).** Research and training in a private-sector or government biotechnology laboratory (by prior arrangement with program director). (F)
- 6101. Biotechnology Seminar (1:1:0:0).** Biotechnology Master's students attend, critique and present seminars of importance to the field of biotechnology. Required course for Biotechnology Master's students for Spring, Year 1. (F)
- 6202. Biomedical Informatics (2:0:2:0).** Provides a broad introduction to the field of bioinformatics in medical research. Emphasizes use of modern software packages and internet-based genomic and other databases to solve research problems. Personal laptop meeting the GSBS laptop guidelines is required. Prerequisite: GSBS 5373 or by permission of the instructor. Required course for Biotechnology Master's students for Spring, Year 1. (H)
- 6301. Introduction to Biotechnology (3:3:0:0).** Broad coverage will be given to topics with high current interest to the biotechnology industries. This course emphasizes application of technologies and is required for all Biotechnology Master's students in Year 1 Spring semester. (F, IVC)
- 7000. Research (V1-12).** (F)

## *Graduate Medical Sciences (GGMS)*

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### GGMS Courses:

- 5001. Graduate Human Anatomy (V1-9).** A highly integrated graduate course of human macroscopic anatomical study (including human dissection) which embodies the gross morphology of the body and coordinates it with clinical, developmental, and educational approaches to the human body. Course prerequisite: undergraduate degree with a strong science background. Enrollment limited to students admitted to the Graduate Medical Sciences concentration. (F)
- 5002. Graduate Cell and Tissue Biology (V1-9).** Graduate Cell and Tissue Biology is designed to provide students with fundamental information concerning the traditional areas of biochemistry, genetics, cell biology, and Tissue and Organ Histology. The principles presented in the course will proceed from molecules to cells and then to tissues and organs, integrating structure and function in a way that will impart a deeper understanding that will allow students

to achieve future success as either teacher or healthcare worker. Course prerequisite:  
acceptance into the Graduate Medical Sciences concentration. (F)

**5003. Graduate Systems Physiology (V1-9).**

**5115.Introduction to Functional Neuroanatomy (1:1:0:0).** Students will learn to identify external



including virus/host interactions, molecular path

by providing experiences in both written and oral communication, presentations, and critiques.

molecular biophysics, as well as an introduction to state-of-the art techniques and instrumentation. (F)

**7102. Readings in Molecular Biophysics (1:1:0:0).** This course is designed to complement the Molecular Biophysics Seminar Series and provide a forum for the students to become familiar with some of the speakers publications. The readings course will examine the hypothesis that was tested, the techniques employed, the most important results obtained, and the conclusions that were drawn from the study. The course requires that the students further develop skills for reading, analysis, integration of knowledge and oral presentation of original science articles and reviews. May be repeated for credit. (F)

**7103. Advanced Topics in Molecular Biophysics (1:1:0:0).** This course gives the student experience in organizing and presenting lectures. The overall objective is to assist the student in developing the skills required to teach in any area of cell physiology and molecular biophysics. (F)

**8000. Doctoral Dissertation (V1-12).** (F)

## *Pharmaceutical Sciences (GPSC)*

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GPSC Courses:

**5101. Topics in Pharmaceutical Sciences (1:1:0:0).** Special topics in pharmaceutical sciences that are not normally included in other courses. May be repeated for credit with change in content. (F, IVC)

**5112. Principles and Techniques in Structure Determination of Small Molecules (1:1:0:0).** This course covers the principles and techniques of X-ray crystallography, NMR spectroscopy, and mass spectrometry. (F, IVC)



- 5356. Advanced Principles of Disease (3:3:0:0).** Pathophysiological mechanisms at the molecular and cellular level. Lecture and discussion will cover the etiology, pathogenesis, functional changes, and clinical significance of general diseases. (F, IVC)
- 5362. Pharmaceutical Regulatory Affairs (3:3:0:0).** Basic regulatory and quality assurance concepts. (F, IVC)
- 5370. Biotechnology (3:3:0:0).** An introduction to the area of molecular biology, genomics, and protein chemistry. (F, IVC)
- 5375. Immunology (3:3:0:0).** The structural components of the human immune system; the cellular and molecular basis of immunological function; diagnostic tests using immunological reagents; mechanisms of resistance against microbial and neoplastic diseases; transplantation immunology; pathology of immune-mediated diseases; prevention of disease by vaccines; pharmacotherapeutic intervention in immunological processes; contemporary topics in immunology. (F, IVC)
- 5410. General Biochemistry (4:4:0:0).** Chemical and molecular aspects of biological processes, including the chemistry of biomolecules, enzymology, bioenergy, biochemical control mechanisms, and molecular biology. Discussion of metabolic diseases and fundamentals of human nutrition. (F, IVC)
- 5411. Graduate Pharmaceutics (4:4:0:0).** Covers the physical chemical principles for the development of safe and effective pharmaceutical dosage forms, fabrication of conventional liquid, solid and aerosolized dosage forms, fundamentals of various drug delivery systems, and the process of drug development, discovery and commercialization. Course prerequisite: admission to the Graduate Program of Pharmaceutical Sciences. (F, IVC)
- 5429. Pharmacokinetics (4:4:0:0).** Introduces the basic principles of pharmacokinetics, including compartmental and physiological analysis of the time courses of drug absorption, distribution, and elimination, with an emphasis on the pharmacokinetic-based dosage-regimen design. Course prerequisite: admission to the Graduate Program of Pharmaceutical Sciences. (F, IVC)
- 5435. Physiology-Based Pharmacology (4:4:0:0)** This is an integrated course of physiology and pharmacology, with an introduction to clinical pharmacology. The emphasis will be on understanding drug actions at the molecular, cellular, organ and whole organism level for select classes of drugs. (F, IVC)
- 5440. Biopharmaceutics (4:4:0:0).** Prerequisite: DDS3 and kinetics or equivalent. Advanced treatment of the influence of dosage forms, route of administration, and dosage regimen on drug availability and newer technologies for targeting drug delivery to specific organs and cell types. (F, IVC)
- 5504. Principles of Drug Action (5:5:0:0).** This introductory course is designed to facilitate understanding of fundamental con



**5305.Social and Behavioral Sciences (for SBS majors) (3:3:0:0).** This course is intended for students majoring in the area of Social and Behavioral Sciences. The focus of this course is on the use of behavioral science theories in the development of interventions to change individual or group behavior. We will briefly cover many aspects of the behavioral sciences, including individual, community,

practiced in the United States. This course covers the Foundational Knowledge in Public Health as required by our accrediting body. (F, O, H, IVC)

**5314.Planning and Development Health Promotion Interventions (3:3:0:0).** This course will take the student through the process of intervention development, beginning with the assessment needed to understand determinants of health and behavior through the mapping of determinants, development of strategies and methods, and preparing for evaluation. Students





practices. Students will review methods of improving quality, including but not limited to continuous Quality Improvement and Total Quality Management, and to the guidelines for implementing quality management and continuous quality improvement processes. Students will also be asked to think creatively to design novel ways of improving quality. (F, O, H, IVC)

**5333. Qualitative Research Methods (3:3:0:0).** This course will include sessions on: introduction to qualitative research, research design, ethnography, conducting a literature search, qualitative interviewing, recruitment and sampling, mixed methods, focus groups, thematic qualitative data analysis, ethics, and the quality of qualitative research. (F, O, H, IVC)

**5334. Community-Based Methods and Practice (3:3:0:0).** This class deals with public health practice at the community, organizational, and political levels and Community Based Participatory Research methods. We want you to feel comfortable with all of these levels, and would like you to be able to work on health issues at all levels. In this class you will learn how to select qualitative methods and how to do them (focus groups, photo voice, key informant interviews, nominal group process). In this class you will develop a community-based project, intervention, or program. (F, O, H, IVC)

**5335. Reproductive Epidemiology (3:3:0:0).** An introduction to maternal and child health (MCH) epidemiology. Readings from the textbook will be supplemented with several journal articles. Guest speakers from the discipline of MCH, obstetrics, and neonatology will deliver selected lectures. (Prerequisite: GSPH 5307). (F, O, H, IVC)

**5336. Digital Media in Public Health (3:3:0:0).** This class will explore the use of social and digital media as it is currently being used in the field of public health. Class will include discussions of innovative public health programming ideas, and evidence-based practices using social and digital media. (F, O, H, IVC)

**5340. Data Management and Analysis for the Health Sciences (3:3:0:0).** This is a three credit hour course for master's degree students in public health. This course covers practical issues related to public health design, data management, and data analysis using SPSS and SAS software packages. (F, O, H, IVC)

**5360. Comparative Effectiveness & Quality Improvement of Public Healthcare (3:3:0:0).** The course will provide the student with an in-depth understanding of public health delivery systems across the globe. Topics will include: historic development, organization and characteristics of the U.S. public health delivery system as compared to other countries' public health delivery systems. Comparative effectiveness research and quality improvement techniques will be used to draw comparisons about current payment and reimbursement systems; healthcare accrediting agencies; functions and organizations of providers; organization of health facilities; and health information management to optimize patient care in many different countries. Prerequisites: GSPH 5311 and GSPH 5310. (F, O, H, IVC)

**5388. Special Topics (3:3:0:0).** This three-credit hour course will cover topics of temporal or special interest which are not being offered as part of the Master of Public Health degree curriculum. Experimental courses may also be offered as special topic courses and subsequently proposed as a regular course. (F, O, H, IVC).

**5399. Integrated Learning Experience (3:0:0:3).** The Integrated Learning Experience requires the student to synthesize and integrate knowledge acquired in coursework and other learning experiences and to apply theory and principles in a situation thang



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**Introduction to Epidemiology (3:3:0:0).** This course will introduce students to the fundamental principles of epidemiology. Students will be introduced to quantitative data collection methods as well as being taught how to interpret results of data analysis for public health research, policy or practice. Ultimately, this course will equip students with the necessary information to apply epidemiological methods to the breadth of settings and situations in public health practice. (O)

**5309.Basic Environmental Health Sciences (3:3:0:0).** This course is an overview of the major areas of environmental health and provides students with an understanding of hazards in the environment, the effects of environmental contaminants on health, and various approaches to address major environmental health problems. Areas of emphasis are environmental epidemiology, toxicology, agents of environmental disease and policy and regulation. (O)

**5310.Public Health Policy (3:3:0:0).** This course presents competencies surrounding public health policy formulation. The main focus will be on the policy issues in the U.S. health care system, but some global health will be explored. The course will include application of principles of policy formulation, development budgeting, implementation, evaluation and analysis. An historical overview of seminal health policy events in U.S. history is also explored through competing stakeholder dynamics. (O)

**5311.Introduction to Biostatistics (3:3:0:0).** This course will introduce students to basic biostatistics as used in public health practice. Through the utilization of SPSS software, students will learn how to analyze quantitative data. Additionally, students will learn to interpret their statistical analysis results in order to describe, measure, and analyze public health problems. Applications of these interpretations will be useful in several avenues of public health including research and policy ma



methods to assess rural health issues such as ethical principles and environmental hazards. Students will be challenged to interpret results of data, assess population needs specific to rural communities, propose strategies to build coalitions using partnerships. During the course of study students will apply systems thinking tools to research public health issues, solving skills to identify interventions and present findings both in writing and using oral presentations. They will also look at public health program planning from a community-focused lens and focus on overcoming specific barriers that are driving disparities in rural areas. Prerequisites: GSPO 5304, GSPO 5307, GSPO 5311. (O).

**5330.Toxicology and Public Health (3:3:0:0).** This course is designed to cover basic concepts of toxicology, including an examination of major classes of pollutants, mechanisms of toxicity and the relationship between human disease and exposure to environmental chemicals. This course also applies these concepts to effects on general and susceptible populations, risk communication and public health practice (O)

**5331.Global Health Issues (3:3:0:0).** This course will explore issues of global health and public health responses to those needs. (O)

**5334.Community-Based Research Methods and Practice (3:3:0:0).** This class deals with public health practice at the community, organizational, and political levels and Community Based Participatory Research methods. We want you to feel comfortable with all of these levels, and would like you to be able to work on health issues at all levels. In this class you will learn how to select qualitative methods and how to do them (focus groups, photo voice, key informant interviews, nominal group process). In this class you will develop a community-based project, intervention, or program. (O)

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