OTHER COURSE OFFERINGS (GS21)

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GS21 1014 Design and Management of Clinical Trials (4 Credits)
Prerequisite: Consent of instructor. This course will include 21 hours of lecture. The lectures will teach the basic research concepts and principles that underlie the design and actual day-to-day conduct of clinical trials using examples primarily from cancer trials. Topics include the nature of disease and its impact on research protocol design, appropriate statistics to use, and medical terminology frequently encountered in clinical research; methods to monitor human subjects' response to treatment, monitoring of clinical research laboratories; rules and regulations (including (including the Office of Human Research Protections, the Federal Drug Administration, and the state), and ethical concerns related to clinical trials. Three practicums, 24 hours each, will be available to students. Each student must complete two. The practicums include: (1) Topics in Regulatory and Ethical Concepts in Human Subjects Research within the Office of Protocol/Institutional Review Board (IRB) Office. Students will work in conjunction with the Office of Protocol Research/IRB Office staff at MD Anderson Cancer Center to study the operational processes utilized by this office to allow for application of informed consent process and compliance with regulatory guidelines. Students will be given a primer in the ethical evolution and application of human subjects research. Students will apply these principles and regulations to experiences, helping to ensure their comprehensive understanding by following the scientific and ethical review processes of a research protocol involving human subjects from conception to termination by following a protocol from scientific review to IRB review process. (2) Topics in Compliance and Auditing of Responsible Conduct of Research within the Office of Research Education and Regulatory Management. Students will receive advanced instruction in the principle areas of monitoring and auditing clinical trials to ensure compliance with Responsible Conduct of Research as defined by the US Public Health Service that specifically apply to clinical trials and human research. Students will conduct a project within this office where they will follow an investigational new drug (IND) application. (3) Topics in Data Management in Cancer Clinical Trials within the Phase I Program. Students will be taught methods of collecting and interpreting data in clinical trials, and the requirements and methods to insure data security and patient confidentiality. Students will learn how to supervise/coordinate the actual data collection and monitoring aspects of clinical trials. Students will participate as a member of a clinical trials project team under the direction of the course director and directors/coordinators of ongoing studies at MD Anderson. Pass/Fail

GS21 1017 Foundations of Biomedical Research (7 Credits)
Prerequisite: Consent of Instructor. This course is for first-year GSBS students only (others by permission of instructor). It provides incoming graduate students with a broad overview of modern biomedical sciences, spanning historical perspectives to cutting-edge approaches. The course combines traditional didactic lectures and interactive critical thinking and problem-solving exercises to provide students with a strong background in fundamental graduate-level topics including genetics, molecular and cellular biology, biochemistry, physiology, developmental biology, and biostatistics. This is the GSBS Core Course which fulfills the GSBS breadth requirement. Letter Graded

GS21 1018 Foundations of Biomedical Research for Quantitative Students (7 Credits)
Prerequisite: Consent of Instructor. Enrollment in this course is limited to GSBS first-year and second-year students who will pursue the quantitative degree track. This course will provide incoming graduate students with a broad overview of modern biomedical sciences, spanning historical perspectives to cutting edge approaches. The course combines traditional didactic lectures and interactive critical thinking and problem solving exercises to provide students with a strong background in fundamental graduate-level topics including genetics, molecular and cellular biology, biochemistry, physiology, developmental biology and biostatistics. This is the GSBS Core Course which will be graded pass/fail and together with Introduction to Biostatistics and Bioinformatics (GS01 1033) fulfills the GSBS breadth requirement for quantitative-track students. Pass/Fail

GS21 1051 Ethical Dimensions Biomedical Sciences (1 Credit)
Prerequisite: None. This course is a systematic overview of the ethical concepts and traditions that are the foundation of biomedical science. The aim of the course is to provide students of the biomedical sciences with a framework to recognize, examine, and resolve ethical issues that may arise in their professional lives. These concepts will be examined through facilitated small group discussions of cases and exercises that involve ethical issues in the responsible conduct of biomedical research. Students will prepare to participate in these small group discussions by completing required reading assignments. Pass/Fail

GS21 1111 Statistical Genetics Journal Club (1 Credit)
Prerequisite: Recommended concurrent graduate course in statistics and genetics. The aim of the journal club is to facilitate students' awareness of the field of statistical genetics. Topics include the following: methods for mapping genes, analyzing genome-wide association studies, the design and analysis of sequencing studies, gene-gene and gene-environment interactions, and statistical methods for emerging and high throughput data types. Particular emphasis is given to presentation skills, critical reading of articles, and asking questions. A strong interest in gaining practical experience in statistical and computational genetics is more important than specific background, although some graduate study in statistics or genetics will be helpful. Pass/Fail

GS21 1112 Bio-behavioral Research Methods in Cancer Prevention and Addiction (2 Credits)
Prerequisite: None. Bio-behavioral research methods in cancer prevention and addiction addresses the growing demand for multi-disciplinary research in disease prevention. Going beyond traditional behavioral research, the bio-behavioral approach investigates the biological mechanisms underlying risk-related behaviors such as tobacco use, unhealthy diet, sedentary lifestyle, chronic stress, and social isolation and aims at understanding their role in determining cancer risk. The primary objective of this survey course will be to provide students with a greater understanding of the basic mechanisms involved in the complex interplay of genetic, neurobiological, psychological, and environmental factors in the initiation of smoking, dietary practices, exercise habits, and other healthful behaviors as well as the methodological approaches used in cancer prevention research. Other objectives include developing students' appreciation of how different disciplines can contribute to cancer prevention as well as their awareness of the promise and potential pitfalls of multidisciplinary approaches. Topics include: (1) risk modeling; (2) bio-behavioral basis of nicotine dependence; (3) neurophysiological mechanisms of addiction; (4) psychophysiological response to exercise; (5) genetics of risk-taking behaviors; (6) psychological influences on immune function, subsequent cancer risk, and risk reduction techniques; (7) genetic determinants of behavior; and (8) psychophysiological, cognitive, and motivational mechanisms underlying persuasion in response to cancer prevention messages. Emerging areas of future research will be identified and discussed. Pass/Fail

GS21 1142 Writing Scientific Research Articles for Publication (2 Credits)
Prerequisite: Permission of instructor. This course presents the fundamentals of writing scientific research articles for publication and includes the basic structure of the research article, writing strategies, and ethical issues. Participants will improve scientific hypothesis-driven writing skills through discussion, readings, and numerous graded writings assignments; and they will go through the writing process, including revisions, of producing a draft of a scientific article. Pass/Fail

GS21 1152 Scientific Writing (2 Credits)
Prerequisite: 2nd year/pre-candidacy students. The objectives of the course are to teach critical thinking and the fundamentals of proposal writing that will help students write candidacy exam proposals, grants, papers, meeting abstracts, and theses/dissertations. Students will develop a research plan and write a 6-page grant proposal. Students will also learn to edit and critique their fellow students' proposals, which will help prepare the students for writing and editing their candidacy exam. Weekly meetings will consist of lectures from faculty/experts addressing how to compose grant proposal sections. In addition, students will meet weekly with faculty in small groups to critique/discuss research assignments during which students will be given feedback on their proposal content/style by faculty and fellow students. This course fulfills the GSBS Scientific Writing requirement and is limited to the first 20 registrants. Pass/Fail

GS21 1171 NIH Fellowship Proposal Development (1 Credit)
Prerequisite: Scientific Writing (GS21 1152), Scientific Writing for Grant Proposals (GS03 1111), Topics in Microbiology and Infectious Diseases (GS07 1092) or an equivalent course. This course is designed for students who intend to submit an NIH fellowship application (F30,or F31) at the end of the course. Participants will learn about the components of a fellowship application, how to develop an effective training plan and the peer review process. By the end of the course, participants will have developed a complete draft of their application. Participants are expected to have completed the GSBS Scientific Writing course, or equivalent, as the Research Strategy and Specific Aims sections will not be covered. Pass/Fail

GS21 1181 Biomedical Ethics for the Genetic Counselor (1 Credit)
Prerequisite: Open only to Genetic Counseling MS students. This course provides a foundation for navigating biomedical ethics topics likely to be encountered during genetic counseling training and practice, including issues relevant to clinical, research and industry based genetic counselors. The course is case based and primarily student led. This course will be coordinated and primarily facilitated by the course directors. Genetic counseling faculty and outside guest speakers will also participate on occasion. Enrollment required of all Genetic Counseling MS students. Pass/Fail

GS21 1191 Effective Career Planning (1 Credit)
Prerequisite: None. This interactive and discussion-based course teaches career planning through a lens of personal and professional leadership. We explore modern leadership concepts and apply them to career planning to best equip course participants with the information, resources, confidence, and self-awareness necessary to find success in career inside and beyond academia. Course activities include self-assessment exercises, career and leadership related discussions, informational interviewing/networking, and other activities to increase students' leadership skills. The course culminates with a "Leadership Development Plan" presentation where each student presents their career vision and their short- and long-term career goals. This course is open to all GSBS students, but highly recommended for post-candidacy PhD students and MS students in their final year of study. Pass/Fail

GS21 1221 Seminar Presentation Skills Training (1 Credit)
Prerequisites: MS students in the Biomedical Sciences program only. Consent of instructor. Students who register for this course are required to attend official seminars and submit a brief report for each of the talks they attend (10 seminars must be attended during the Fall/Spring and 6 seminars must be attended during Summer). Seminars are considered to be official if they are hosted by any biomedical science department at the Texas Medical Center or Rice University and presented by 1) a faculty member from any university/college or 2) a scientist holding a doctoral degree who is applying for an open faculty position. This course will meet on the first Friday of each month (3:00 pm - 4:00 pm) except in January where the meeting will be on the second Friday (3:00 pm - 4:00 pm). There are four meetings in the Fall, five meetings in the Spring and three meetings in the Summer. During each of these meetings, two second- and third-year MS students will present their research work to their peers. Each presentation will be moderated by another second- or third-year MS student. First year MS students are only required to attend and participate in the discussion, but are not required to present nor moderate. After each of these meetings, all MS students are expected to submit a peer feedback form to give an insight of what they thought about the talks. The goal of this course is to (1) expose MS students to a broad range of current research topics in biomedical sciences and related fields, (2) give them a chance to learn how to present their research and results to their peers, (3) give them a place to practice presentations, provide feedback, and exchange ideas among their peer MS students, (4) and strengthen our MS community by creating a space where all MS students can come together to hear a research presentation from senior MS trainees, and be able to network with other students in the program. This is a required course for MS students in the Biomedical Sciences program. Pass/Fail

GS21 1232 Translational Sciences: Bedside to Bench and Back (2 Credits)
Prerequisite: None. This is an integrated, multidisciplinary course designed to provide students the necessary tools to devise, fund, implement, and publish exemplary research involving patients or materials obtained from a human source. Students participating in this course will gain an understanding of the depth, complexity, and limitations of integrating laboratory and clinical research into investigations of human disease. After completion of the course, students will understand the importance of translational research: using laboratory findings to benefit human patients (bench to bedside) and investigating clinical observations in the laboratory (bedside to bench). This course is distinct from Human Protocol Research (GS211132); this course focuses on the interrelationship between laboratory-based and clinical research. A culture that fosters translational research of the highest quality requires laboratory and clinical investigators appreciate the scientific complexity of patient-oriented translational research. Letter Graded

GS21 1301 Clinical Perspectives for a Basic Scientist (1 Credit)
Prerequisite: None. Impacting clinical practice is a major driver for research in the academic setting and even more so in industry. Understanding of clinical questions/needs is key in order to find the right research focus, or to identify a suitable clinical counterpart to perform research that will translate into clinical practice. In this newly created nanocourse, emphasis is on clinical aspects in cancer, and how research in general can accelerate and contribute to answer clinical questions in this field. Therefore, many of our speakers are clinicians or have a strong clinical background, e.g., in pathology, surgery, therapy modalities, or clinical trials. The students will hear firsthand what the urgent clinical questions/challenges are and participants will have the opportunity to discuss these themes with the clinicians. Additionally, we want to highlight clinical aspects in cancer prevention and survivorship to expose students to research opportunities existing in these fields. The nanocourse lectures will close with the testimony of a cancer survivor. At the end of this nanocourse, students will have gained insight into different clinical specialties and their research questions. Auditing this course is permitted with course directors' consent. Pass/Fail

GS21 1341 Nano course in Lymphatics in Health and Disease (1 Credit)
Prerequisite: None. This nanocourse will familiarize students with the "other" circulatory system, the lymphatics. This system works to promote fluid homeostasis, immune cell trafficking, cellular waste cleanup, metastasis, and plays important roles in disease states such as Alzheimer's, lymphedema, and hypertension. The goal is to enable budding and established researchers to suitably incorporate lymphatics into research proposals that will answer questions important to relevant pathologies. Objectives are to be able to recount the basics of lymphatics anatomy and biology, to be able to describe imaging and bench methods for visualizing lymphatics and to recognize pathological conditions for which lymphatic roles should be investigated. Pass/Fail

GS21 1351 Nano course in Cardio-oncology (1 Credit)
Prerequisite: None. Cardio-oncology is a medical subspecialty concerned with the diagnosis and treatment of cardiovascular diseases (CVDs) and organ failure mediated by macro- and micro-circulatory defects in cancer patients. The goal of cardio-oncology is for cancer patients to receive maximum and uninterrupted treatment for cancer while protecting them from cardiovascular complications mediated by the treatment. For this, we must understand both pathophysiology of CVDs and mechanisms of anti-cancer treatments. The course is designed to provide an overview of the cardiovascular system in both normal and pathological states, of various cancer treatments, and the way (and how) cancer treatments affect the cardiovascular system and other organ functions. There will be 15 lectures, each 1 hour long. Students will be evaluated based on their class participation, attendance, and a review paper on subjects suggested by the lecturers. Class size will be 4-20 inclusive of the students who audit the course. There is no required textbook (materials and literature will be electronically provided). Letter Graded

GS21 1361 Introduction to Circadian Biology (1 Credit)
Prerequisite: None. This is a nanocourse aimed at students who would like to familiarize themselves with the concept of circadian timing. The course will introduce the students to the anatomical, biochemical, and molecular bases of circadian clocks, with an emphasis on the mammalian circadian system. The course will bring an understanding of how circadian rhythms are a fundamental property of living begins. Events underlying dysregulated clock function and subsequent impact on health will also be covered. The course will alternate lectures and student presentations of significant articles in the field. Active involvement of the students in class is expected. Letter Graded

GS21 1611 Topics in Molecular Medicine (1 Credit)
Prerequisite: MD/PhD students only; permission of instructor. The seminar will use selected topics in molecular medicine as a vehicle to introduce students to basic ideas of biomedical research, to the skills involved in evaluating the research literature and presenting data, and to the interplay between the research laboratory and the problems of clinical medicine. Students will be expected to conduct literature reviews, make oral presentations of research papers, and participate in the discussions of each topic. The course is offered in the Fall, Spring, and Summer semester, and MD/PhD students are required to register for the course throughout their tenure in the Program except during the third and fourth years of Medical School when schedules for clinical rotations conflict with the weekly seminar. Pass/Fail

GS21 1613 Translational Cancer Research (3 Credits)
Prerequisite: GS04 1063: Cancer Biology (preferred). This course will provide a primer for translational cancer research and will review concisely the current understanding of human cancer biology that is driving interest in targeted therapy and personalized management for prevention, detection and treatment of cancer. Techniques used to characterize human cancers at a cellular and molecular level will be described. Concepts, examples and alternative strategies to achieve individualized targeted therapy will be presented. Processes for developing drugs and biomarkers will be reviewed. Translation from bench to bedside and back will be outlined for surgical oncology, radiation oncology, medical oncology and cancer imaging. Challenges for translation in cancer prevention will be considered. Infrastructure required for translational research will be reviewed, including tissue banks, biopsies, interventional radiology, molecular pathology, molecular imaging, bioinformatics, biostatistics, novel trial design and interactive databases. Objectives and paths for training and career development will be outlined as well as the sociology of team science. Interactions between Academe, Pharma, the NCI, FDA and Foundations will be explored. Finally, the course will analyze barriers to more rapid translation of cancer research to the clinic and community. This course consists of a two hour lecture and one hour seminar, weekly. Letter Graded

GS21 1622 Topics in Cancer Prevention (2 Credits)
Prerequisite: None. Given the projected shortage in 2020 of medical oncologists to care for cancer patients and survivors, the need for cancer prevention and control is urgent. Research and discovery of new and improved strategies for preventing cancer will be discussed, as well as the application of proven cancer prevention strategies in the clinic and community, and the ethical implications surrounding all of these efforts in cancer prevention and control. The objectives of this course are to provide students in the basic, behavioral, and population sciences with a strong foundation in conceptual models used for cancer prevention research and practice, the principal approaches used in promising areas of research, and new challenges and opportunities for future cancer prevention and control activities. The course will be taught by a team of MD Anderson faculty from various basic science, population science, and clinical disciplines. Pass/Fail

GS21 1723 Cancer Research Administration and Management, Pre-Award (3 Credits)
Prerequisite: Permission of instructor; must be enrolled/admitted to the CRAM certificate program. This course is intended for students pursuing a career in Cancer Research Administration and for working professionals with aspirations of working as a research administrator in a research institution specializing in oncology, or the like. This course provides an overview and introduction to the broad field of research administration and management. Elements of the curriculum include understanding the environment and context within which research administration is conducted, fiscal management, regulatory compliance, sponsored program administration, grant proposal and budget development and a specific emphasis on pre-award management. This course is designed to benefit students who are preparing to sit for the National Certified Administrator® Licensing Exam. Letter Graded

GS21 1733 Cancer Research Administration and Management, Post-Award (3 Credits)
Prerequisites: GS21 1723: CRAM, Pre-Award, and Permission of instructor, must be enrolled/admitted to the CRAM certificate program. This course is intended for students pursuing a career in Cancer Research Administration and for working professionals with aspirations of working as a research administrator in a research institution specializing in oncology, or the like. This course provides an overview of the post-award components of effective and compliant research administration. Elements of the curriculum include the principles of post-award research administration, fiscal management, regulatory compliance, and leadership with a specific emphasis on post-award management. This course is designed to benefit students who are preparing to sit for the National Certified Research Administrator® Licensing Exam. Letter Graded

GS21 1743 Cancer Research Administration and Management, Lab/Practicum (3 Credits)
Prerequisite: Permission of Instructor. This course is intended for students pursuing a career in Cancer Research Administration and for working professionals with aspirations of working as a research administrator in a research institution specializing in oncology, or the like. The Lab/Practicum requires independent completion of a project related to research administration with Central Office and mentor involvement. This course is designed to benefit students who are preparing to sit for the National Certified Research Administrator® Licensing exam. Letter Graded