FALL
BIO6000
Credits: 1
Capstone I MS Biostatistics
Offered: Fall
The Capstone is a required three-semester course for students in the MS in Biostatistics Program. It provides experience in the art of consulting and in the proper application of statistical techniques to clinical and translational research. Students will bring together the skills they have acquired in previous coursework and apply them to the consulting experience. Learning will take place by doing. In the Fall term, the capstone-related lectures and project will engage students in important discourse regarding data management and research ethics. Prerequisites: Must be enrolled in the MS in Biostatistics program.

BIO6100
Credits: 3
Fundamentals of Epidemiology
Offered: Fall
This course provides a rigorous introduction to epidemiology for students in the first trimester of the MS in Biostatistics program. Topics covered include: an introductory overview of epidemiology, common measures of health outcome frequencies and associations, appropriate construction of an epidemiologic hypothesis, causal inferences, common epidemiologic study designs, error and bias in epidemiologic studies, confounding and effect modification, critique review and evaluation of published studies, ethics and reproducibility in epidemiologic research.

BIO6300
Credits: 2
Introduction to R Programming
Offered: Fall
In this course, students will gain a comprehensive, hands-on, introduction to statistical computing for data management and statistical analysis in R, a free, open source, statistical software. This course is geared towards students interested in becoming skilled and efficient data analysts in the biomedical, public health, or clinical and translational sectors. This course presumes prior or concurrent enrollment in a graduate-level introductory biostatistics course. Topics covered in this course include: basic commands, functions, and operations for vectors, matrices, and data frames, debugging, loops, data management, data visualization, and univariate and bivariate analyses. Pre-requisites Students must have significant, minimum scripting-level, programming experience with demonstrated productivity in one or more programming languages (python preferred, but R and Matlab acceptable). Students with only toy-model programming experience will find the course immediately overwhelming. Specific mathematical or statistical expertise is not required, but college-level mastery of basic mathematical and statistical knowledge of fundamental concepts should be obtained prior to starting class. Such concepts include basic calculus, linear algebra and probability distributions. If none of these pre-requisites are available, attending one or more of the following courses is required: Course: BMI1005-1007 (all modules) Computer Systems Course: BSR1803 Systems Biology: Biomedical Modeling Course: BMI2005 Introduction to Algorithms Course: BIO6300 Introduction to R programming ++
BIO6400  
Credits: 3  
Biostatistics for Biomedical Research  
Offered: Fall

This course covers the basic tools for the collection, analysis, and presentation of data in all areas of basics, clinical and translational research. Central to these skills is assessing the impact of chance and variability on the interpretation of research findings and subsequent implications on the understanding of disease mechanisms, drug discovery and development, and applications to clinical practice. Topics covered include: general principles of study design including internal and external validity; probability and sampling distributions, theory of confidence intervals and hypothesis testing; review of methods for comparison of discrete and continuous data including one-sample and two-sample tests, correlation analysis, linear regression, sample size and power. Additionally, students will learn to apply their statistical knowledge to complex real-world challenges, while gaining introductory statistical computing proficiency in R and SAS. Prerequisites: Algebra Required for MS in Biostatistics, students. All other students must take a placement test.

BIO6500  
Credits: 3  
Probability and Inference I  
Offered: Fall

This course covers basic material in Probability Theory, which is necessary for all work in Biostatistics, especially as a foundation for Statistical Inference. We will introduce the basic terminology and concepts of probability theory, including sample and outcome spaces, random variables, discrete distributions and probability density functions. Students will also learn fundamental properties of the most important discrete and continuous probability distributions, expectations, moment generating functions, conditional probability and conditional expectations, multivariate distributions, laws of large numbers, and the central limit theorem. This course is a prerequisite for the Probability and Inference II course. Strong analytical and quantitative skills are required to successfully master the material covered in this course.
SPRING 1
**BIO8000**

Credits: 1

Capstone II MS Biostatistics

Offered: Spring 1

The Capstone is a required three-semester course for students in the MS in Biostatistics Program. It provides experience in the art of consulting and in the proper application of statistical techniques to clinical and translational research. Students will bring together the skills they have acquired in previous coursework and apply them to the consulting experience. Learning will take place by doing. In the Spring I term, students will start participating in real-life consultations and reporting in class about their progress. Prerequisites: Must be enrolled in the MS in Biostatistics program.

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**BIO8700**

Credits: 3

Theory of Linear & Generalized Linear Models

Offered: Spring 1

This course provides a comprehensive overview of regression methods for analysis of continuous (normally distributed) and categorical (binary and count) data. The aim of this course is to provide a systematic training in both the theoretical foundations and the model building strategies of generalized linear models for MS/MPH and PhD students who have already had some data analysis experience. The course covers the theoretical background underlying regression techniques. Topics discussed include simple linear regression, multiple linear regression and Analysis of Variance (ANOVA) techniques for normally distributed data, as well as Poisson regression, log linear models and negative binomial regression for categorical data. Also regression diagnostics and Power and Sample size determination applied to these models. Prerequisites: BIO6400, BIO6500 as well as coding skills in either SAS or R.

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**BIO8500**

Credits: 3

Probability and Inference II

Offered: Spring 1

This course is the second part of a two course sequence in Probability and Inference which follows Probability and Inference I. Statistical inference is the theoretical foundation for statistical methods used in the biological sciences. Essential topics covered in this course include: point estimation, confidence sets, the likelihood function, and statistical hypothesis testing. Optimality criteria for estimation and testing are developed. Other topics to be discussed include basic notions from Bayesian inference and Decision Theory as well as the theory of linear models. Nonparametric inference and other areas may be included as time permits. Prerequisites: BIO6400 and BIO6500.
BIO8200

Analysis of Categorical Data

This course provides a comprehensive overview of methods of analysis for binary and other discrete response data, with applications to epidemiological and clinical studies. It is a second level course that presumes some knowledge of applied statistics and epidemiology. Topics discussed include $2 \times 2$ tables, $m \times 2$ tables, tests of independence, measures of association, power and sample size determination, stratification and matching in design and analysis, inter-rater agreement, logistic regression analysis. Prerequisites: BIO6400 or MPH0300 and BIO6100 or MPH0400
SPRING 2
BIO9001

Applied Analysis of Healthcare Databases

“Applied Analysis of Healthcare Databases provides a comprehensive overview of healthcare databases that are commonly used for research. The overall course objective is to provide students with working knowledge of available healthcare databases, research questions that can be addressed using these databases and methods used for analysis of large scale databases. This course will prepare students to identify and use national and local healthcare databases in their own research. Students will evaluate published database studies, complete programming exercises with SAS statistical software and hands-on access to a large database, and prepare a proposal for analyzing a specific research question using a large healthcare database.

Pre-Requisites: (BIO6400 or MPH0300) AND (BIO6100 or MPH0400)”

BIO9000

Capstone III MS Biostatistics

“The Capstone is a required three-semester course for students in the MS in Biostatistics Program. It provides experience in the art of consulting and in the proper application of statistical techniques to clinical and translational research. Students will bring together the skills they have acquired in previous coursework and apply them to the consulting experience. Learning will take place by doing.

In the Fall term, the capstone-related lectures and project will engage students in important discourse regarding data management and research ethics.

In the Spring I term, the capstone-related lectures and project will challenge students to operationalize conceptual research questions into testable hypotheses. Additionally students will demonstrate their ability to determine the appropriate analytic method to test their hypotheses and discuss analytic alternatives when important statistical assumptions are violated.

In the Spring II term, students will meet the capstone requirements by shadowing Biostatistics faculty in the Center for Biostatistics consultation service. By shadowing the Biostatistics faculty, students will learn how to: 1) successfully collaborate with non-statisticians (primarily clinical faculty) at the Icahn School of Medicine at Mount Sinai, 2) provide appropriate study design-related and methodologic approaches to cutting edge research questions, 3) successfully conduct advanced preliminary analyses, and 4) communicate their findings to an institution-wide audience at an MS in Biostatistics capstone symposium at the end of the Spring II term.”
BIO9100  
Survival Analysis  
Credits: 3
Offered: Spring 2
The aim of this course is to provide a systematic training in both the theoretical foundations and the model building strategies of longitudinal analysis for MS/MPH and PhD students who have already had some data analysis experience. The course presents modern approaches to the analysis of longitudinal data with topics that include linear mixed effects models, generalized linear models for correlated data (including generalized estimating equations), computational issues in using these methods, and missing data assumptions and methods.

Prerequisites:
-BIO6400, BIO6500, BIO8500, and BIO8700

BIO9200  
Analysis of Longitudinal Data  
Credits: 3
Offered: Spring 2
The aim of this course is to provide a systematic training in both the theoretical foundations and the model building strategies of linear regression models for students who have already had some data analysis experience. The course presents modern approaches to the analysis of longitudinal data. Topics include linear mixed effects models, generalized linear models for correlated data (including generalized estimating equations), computational issues and methods for fitting models, and dropout or other missing data.

Prerequisites:
-BIO6400, BIO6500, BIO8500, and BIO8700
-Intermediate programming proficiency in R
BMI
BIOMEDICAL DATA SCIENCE
FALL
BMI1005  
Computer Systems - UNIX/Linux Fundamentals  
Credits: 1  
Offered: Fall  
This course provides an introduction to computer systems and scientific computing environments to enable effective use of computational and data resources. The course assumes no prior computing experience and is broken into 3 component modules. These are:

1. UNIX/Linux fundamentals with a focus on operating systems (file systems, navigation, communication, multi-user environments, permissions, file sharing, UNIX shells, POSIX architecture), beginning and intermediate shell scripting, and Linux environment applications commonly encountered in scientific computing (e.g., awk, sed).
2. Computer system architectures and applications in scientific computing, topics including the history of scientific computing, HPC architecture and application design (Von Neumann architecture, parallel processing, shared and distributed memory, vector processing, MIMD/SIMD, accelerator computing, parallel numerical libraries), HPC batch processing systems (e.g., scheduling) and finally modern distributed data-parallel approaches (e.g., Hadoop-style and ecosystem, Spark, MapReduce as a paradigm and implementation).
3. Introduction to scientific programming in Python 3, with relevant comparison/contrast to other important languages commonly encountered in scientific computing (e.g., perl, R, C/C++). Variables, operators, data structures, control flow, decisions, file I/O, exception handling, and modern python libraries encountered in HPC, scientific computing, and data science (e.g., scipy, numpy, pandas, scikit-learn).

Emphasis will be placed on real-world practicality by motivating study with examples and tasks relevant to bioinformatics, structural biology, imaging, and data science. The student will develop both a solid conceptual foundation and experience solving real problems by the end of the class.

BMI1006  
Computer Systems: Architectures & Applications in Scientific Computing  
Credits: 1  
Offered: Fall  
This course provides an introduction to computer systems and scientific computing environments to enable effective use of computational and data resources. The course assumes no prior computing experience and is broken into 3 component modules. These are: 1. UNIX/Linux fundamentals with a focus on operating systems (file systems, navigation, communication, multi-user environments, permissions, file sharing, UNIX shells, POSIX architecture), beginning and intermediate shell scripting, and Linux environment applications commonly encountered in scientific computing (e.g., awk, sed). 2. Computer system architectures and applications in scientific computing, topics including the history of scientific computing, HPC architecture and application design (Von Neumann architecture, parallel processing, shared and distributed memory, vector processing, MIMD/SIMD, accelerator computing, parallel numerical libraries), HPC batch processing systems (e.g., scheduling) and finally modern distributed data-parallel approaches (e.g., Hadoop-style and ecosystem, Spark, MapReduce as a paradigm and implementation). 3. Introduction to scientific programming in Python 3, with relevant comparison/contrast to other important languages commonly encountered in scientific computing (e.g., perl, R, C/C++). Variables, operators, data structures, control flow, decisions, file I/O, exception handling, and modern python libraries encountered in HPC, scientific computing, and data science (e.g., scipy, numpy, pandas, scikit-learn). Emphasis will be placed on real-world practicality by motivating study with examples and tasks relevant to bioinformatics, structural biology, imaging, and data science. The student will develop both a solid conceptual foundation and experience solving real problems by the end of the class.
BMI1007

Computer Systems: Introduction to Scientific Programming in Python 3

Credits: 1

Offered: Fall

This course provides an introduction to computer systems and scientific computing environments to enable effective use of computational and data resources. The course assumes no prior computing experience and is broken into 3 component modules. These are: 1. UNIX/Linux fundamentals with a focus on operating systems (file systems, navigation, communication, multi-user environments, permissions, file sharing, UNIX shells, POSIX architecture), beginning and intermediate shell scripting, and Linux environment applications commonly encountered in scientific computing (e.g., awk, sed). 2. Computer system architectures and applications in scientific computing, topics including the history of scientific computing, HPC architecture and application design (Von Neumann architecture, parallel processing, shared and distributed memory, vector processing, MIMD/SIMD, accelerator computing, parallel numerical libraries), HPC batch processing systems (e.g., scheduling) and finally modern distributed data-parallel approaches (e.g., Hadoop-style and ecosystem, Spark, MapReduce as a paradigm and implementation). 3. Introduction to scientific programming in Python 3, with relevant comparison/contrast to other important languages commonly encountered in scientific computing (e.g., perl, R, C/C++). Variables, operators, data structures, control flow, decisions, file I/O, exception handling, and modern python libraries encountered in HPC, scientific computing, and data science (e.g., scipy, numpy, pandas, scikit-learn). Emphasis will be placed on real-world practicality by motivating study with examples and tasks relevant to bioinformatics, structural biology, imaging, and data science. The student will develop both a solid conceptual foundation and experience solving real problems by the end of the class.

BMI12005

Introduction to Algorithms

Credits: 3

Offered: Fall

This course is a computer-science intensive program intended as a survey of algorithms - that is, computational methods used to solve appropriately defined problems, and their implementation on modern scientific computing hardware. Core to any modern discussion of algorithms is competency in one or more object-oriented programming languages, in addition to a deep dive into data structures, without which the discussion of practical algorithm implementation is not useful. We complete the course with a survey of mathematical optimization techniques typically not encountered in an ordinary course on algorithms, but which form the mathematical basis for many problems in computational biology, biochemistry, genomics, and data science. In this course, we use Python 3 as the core programming tool. The class is structured as 1.5 hours of lecture each week with a 1.5 hour lab component, for 12 total weeks. The course can be logically broken up into 3 modular topics, with the bulk of the time discussing fundamental algorithms and data structures; however, each module builds on the previous and therefore the course should be taken as a whole.

BMI9001

Biomedical Data Science Capstone Project

Credits: 3-9

Offered: Fall

This course represents the culmination of the Master in Biomedical Data Science (MBDS) Curriculum. In a semester-long, active learning project, students will work with a mentor to devise a potential solution to a contemporary problem in biomedical data science. The process of researching current unsolved problems, outlining potential solutions, and writing a final report will require students to integrate and synthesize concepts learned in the program's core coursework, thus providing a demonstration that trainees have mastered and can apply pertinent ideas and approaches. The course is 9 credits where students will complete intensive, full-time research under the direct guidance of a mentor. Pre-requisites: Students will take this course after having completed the full sequence of core courses for the MBDS program. This will require them to have developed significant, minimum scripting-level, programming experience with demonstrated productivity in one or more programming languages. To develop the expertise necessary for a strong capstone project, students in the program will have taken the following courses: BMI1005-1007(all modules) Computer Systems
BMI12005 Introduction to Algorithms
BMI3002 Machine Learning for Biomedical Data Science
SPRING
BMI9001

Biomedical Data Science Capstone Project

This course represents the culmination of the Master in Biomedical Data Science (MBDS) Curriculum. In a semester-long, active learning project, students will work with a mentor to devise a potential solution to a contemporary problem in biomedical data science. The process of researching current unsolved problems, outlining potential solutions, and writing a final report will require students to integrate and synthesize concepts learned in the program's core coursework, thus providing a demonstration that trainees have mastered and can apply pertinent ideas and approaches. The course is 9 credits where students will complete intensive, full-time research under the direct guidance of a mentor. Pre-requisites: Students will take this course after having completed the full sequence of core courses for the MBDS program. This will require them to have developed significant, minimum scripting-level, programming experience with demonstrated productivity in one or more programming languages. To develop the expertise necessary for a strong capstone project, students in the program will have taken the following courses: BMI1005=1007(all modules) Computer Systems BMI2005 Introduction to Algorithms BMI3002 Machine Learning for Biomedical Data Science

BMI2002

Biomedical Software Engineering I

Software plays a vital and increasingly significant role in all aspects of biomedical research, translation of successful research findings, and patient care. How is this software created? What best practices should biomedical software professionals follow to design, create, and deploy such software? Many of these practices are widely used by software engineers. How should biomedical computing adapt them to address our unique challenges? We teach software engineering best practices that will enable students to efficiently and consistently design and create quality biomedical software. We focus on a comprehensive set of practical, well-regarded methods and tools that students can apply immediately. These include requirements analysis, modular and object-oriented design, complexity hiding, coding standards, software reuse, version control, unit and regression testing, and logging and debugging. We employ both traditional classroom and experiential pedagogy. In addition to completing simple programming assignments, all students must be a working on a biomedical software project. Each student's project provides a context for exploring the ideas and practicing skills taught in the classroom. Students in the MS in Biomedical Informatics Program must take this course concurrently with the program's required Capstone Project course. Other students must identify or create a suitable project in which they participate.
BSR0901
Medical School 1st Year - Fall

All First Year MD/PhD students should register for this course

BSR0903
Medical School 2nd Year - Fall

All Second Year MD/PhD students should register for this course

BSR1006
Laboratory Rotation - Fall

Laboratory rotations are an important part of the first year of the Graduate Program at Mount Sinai. They give students the opportunity to experience different research projects, different laboratory and mentoring styles, and allow the faculty to assess the interests and aptitude of the students. In general, all PhD and MD/PhD students will complete three laboratory rotations (a minimum of two, in two different laboratories, is recommended) before declaring a research preceptor and a Multidisciplinary Training Area.
BSR1017

Biomedical Science for MDPhD - Fall

Biomedical Science - Fall for MDPhD students. 1st year MD/PhD students should register for this course.

BSR1012

Biomedical Science - Fall

Biomedical Science - Fall is part 1 of a year long six unit course that surveys a broad and comprehensive study of basic Molecular Cellular and Developmental Biology. The topics covered prepare students for both a career in Biomedical Research and for the Advanced studies within the CAB, DSCB, GGS, IMM, and MIC MTAs. Biomedical Science is a required course for all first year students that intend to be members of these MTAs. The course is structured as a series of lectures; grade assessment is based on a mixture of in-class and take home quizzes as well as one formal examination per unit.

BSR1021

Responsible Conduct of Research

This course is required for all first-year graduate students, following NIH mandates. Specific topics for the eight 1 hour sessions: (i) Research Misconduct (ii) Experimental design and data management practices (iii) Mentor and Trainee Responsibilities; Collaborative Research (iv) Conflicts of Interest; Intellectual property (v) The Protection of Human Subjects (vi) The Welfare of Laboratory Animals (vii) Publication, authorship, and peer review (viii) Peer Review, the Grant Process, and Fiduciary Responsibility. Each Session is a 45 minute lecture with 15 minutes of discussion.
BSR1501  
Fundamentals of Immunology  
Credits: 3  
Offered: Fall

The Immunology Core III was developed to provide the students with an in-depth study of the fundamental concepts in Immunology. This is a 45-hour course that it is intended to introduce students to the organization of the immune system and function of the immune response as it relates to health and disease. The different topics and sections will be presented and discussed by faculty members who have expertise in the subject matter. The grades will be based on in-class quizzes and midterm and final exams as well as on class participation. The aim of the course is that students will develop a solid understanding of immunological concepts, develop the skills to help them appreciate immunological research so that they will be prepared to undertake more advanced studies and be able to carry out original research in this field. Reading assignments will be based on Janeway's Immunobiology textbook (8th edition) and supplementary reading materials suggested by the lecturers. Biomedical Science I and II courses are prerequisites for this course.

BSR1705  
Prin of Neural Sci, Beh & Brain Pathophys: Cell & Molec Neu  
Credits: 3  
Offered: Fall

This is a year-long, introductory Core course divided into 4 separate Units. Overall, the course will provide students with a rigorous foundation in the molecules, cells and circuits upon which nervous system function is based, how different brain systems are engaged to drive different behaviors and the nature of brain disorders that affect identified synapses, cells, circuits and systems. Unit 1 covers Cellular and Molecular Neuroscience.

BSR1706  
Prin of Neural Sci, Beh & Brain Pathophys: Systems Neuro  
Credits: 4  
Offered: Fall

This is a year-long, introductory Core course divided into 4 separate Units. Overall, the course will provide students with a rigorous foundation in the molecules, cells and circuits upon which nervous system function is based, how different brain systems are engaged to drive different behaviors and the nature of brain disorders that affect identified synapses, cells, circuits and systems. Unit 2 covers Systems Neuroscience.
BSR1800
Credits: 8.5
Systems Biomedicine
Offered: Fall
Presents core molecular, cellular, and biochemical material within the context of physiology and pathophysiology of disease. There are five modules that make up the course: Introduction, Diabetes, Cancer, Renal Disease and Drug Abuse.

BSR2301
Credits: 3
Embryos Genes and Development
Offered: Fall
This course will provide a thorough introduction to invertebrate and vertebrate development emphasizing cellular, genetic and molecular mechanisms. The course will focus primarily on development of fruit flies, nematodes, Xenopus, zebrafish, and mice. Emphasis will be on understanding fundamental embryological processes such as induction, determination, and pattern formation. Current technologies such as transgenic animals, genetics, mosaic analysis, homologous recombination, somatic cell genetics, and classical embryonic manipulations will be analyzed. Selected topics include developmental genetics of regulatory hierarchies, lateral inhibition, regeneration and development, cell lineage analysis, X-chromosome inactivation, imprinting, and sex determination. Following introductory lectures, the course will focus on primary literature detailing the current state of the field using journal club presentation (by students). The final exam will consist of grant proposals by the students to be reviewed by other students in a study section type arrangement. Offered Every other Fall (Offered again 2021FA).

BSR2700
Credits: 1.5
Neuropharmacology
Offered: Fall
This course focuses on the major neurotransmitter-receptor systems in the brain and the detailed mechanistic underpinnings by which psychotropic drugs (including antipsychotics, antidepressants, anxiolytics, anticonvulsants, drugs of abuse, and others) affect the nervous system. It is designed for students who already have basic knowledge of neuroscience. Each class will involve a student-led discussion of a recent research paper, which illustrates important advanced principles of neuropharmacology and state-of-the-art methods used in the field. Course offered every 2 years. Not offered 2020FA.
BSR2703  
Credits: 3  
Drug Discovery: Successful vs Usual  
Offered: Fall

The purpose of this course is to develop skills to enhance discovery of medically useful drugs. The course uses a case-study approach describing the discovery of the most valuable drugs currently in use, with an emphasis on phenotypic screening, combined with exposure to cutting-edge bioinformatics tools. Some of the drugs to be addressed are penicillin, insulin, the small pox vaccine, ether, morphine, aspirin, salvarsan, thorazine/Haldol, norethindrone, and digoxin. Of particular interest will be assessment of what is, or more generally what is not, known about mechanisms by which drugs exert their therapeutic effects, and how the development of drugs have elucidated mechanisms of disease. Course is offered every 2 years.

BSR2707  
Credits: 1  
Techniques and Approaches in Neuroscience  
Offered: Fall

With the accelerated development of new technologies and approaches, research at the cutting-edge of neuroscience is fast-evolving. The purpose of this course is to introduce students to current techniques and methodologies used in research labs in the Neuroscience department in order to prepare them for successful rotations in diverse lab settings. Topics covered will include using electrophysiology, viral approaches for cell type-specific manipulations, calcium-based imaging and analysis, modeling ‘disease-in-a-dish’ using stem cells, TRAP and single-nuclei sequencing, and human neuroimaging and large-scale data analysis. The course features didactic, discussion, and written components that will facilitate a deep conceptual understanding to enable practical application of popular approaches.

BSR2931  
Credits: 3.5  
Commercialization of Biomedical Innovation: Entrepreneurship & Business  
Offered: Fall

Fundamentals

This course will allow participants to learn about entrepreneurship and business fundamentals with an aim to understanding the process of commercializing biomedical innovation. This course may be taken in sequence with the course on Intellectual Property (BSR 2930: Protecting Your Innovation) or just as one course experience (no Pre-requisites are required). In particular, the course will introduce students to the underlying concepts of entrepreneurship - both tangible and intangible. It will help the student better understand some of the “subsectors” of the health industry relevant to entrepreneurship in commercializing scientific discovery of new drugs, medical technology, diagnostics, clinical advancement, and digital health. The course will also aid participants to understand better the importance to commercialization of protecting the intellectual properties of innovation. Students will also have the opportunity to review some of the key regulatory approval processes of the FDA and reimbursement approval processes under Medicare and private health insurance. The course will also teach students relevant fundamentals of organizational leadership, governance and management. It will allow the students to understand the range of legal entities that can be used to start a business. It will discuss the market intelligence that is needed for entrepreneurs to understand if a particular innovation has potential for commercialization, the market context in terms of supply, demand, competition and potential profits. Furthermore, the course will examine he different funding modalities, starting at the seed funding stage, progressing through the different phases of private equity and finally public offerings and mergers & acquisitions. This will include understanding a company's macro financial position and valuation.
BSR3101

Computer-Aided Drug Design

Credits: 1.5
Offered: Fall

Please note - Attendance in this course is mandatory. NO MORE THAN ONE CLASS MAY BE MISSED. COMPUTER-AIDED DRUG DESIGN (CADD) is a hands-on course that provides an introduction to computer-aided drug design/discovery technology, including both ligand-based and structure-based rational drug design strategies. Both theoretical and practical aspects of chemoinformatics, virtual screening, and in silico design approaches are presented with the goal of teaching students how to accelerate the discovery of novel molecules with improved therapeutic profiles using modern technologies. To this end, lectures will be integrated with hands-on sessions and at least one 'serious game' (a.k.a. simulation of a real-world structure-based drug discovery problem). This course is not only designed to provide students with a solid foundation in computational structural biology, but also to help them become proficient in the use of modern drug discovery solutions available at Mount Sinai (e.g., the Schrödinger’s Small Molecule Drug Discovery Suite). Students will also acquire an understanding of how to protect their own intellectual property on discoveries in preclinical stages and how to eventually move these discoveries to commercialization. Offered every other year on the odd year. Will be offered again 2021 Fall.

BSR3102

Principles of Scientific Proposals

Credits: 0.5
Offered: Fall

This semesterly-offered course will aim to inform and instruct students on the process of applying for a predoctoral fellowship. Students will learn the different funding mechanisms available to them for a fellowship and will ultimately prepare several components of the NRSA application with the intent of submission. The subject matter will include strategies for building a highly competitive application by thoroughly analyzing the scored review criteria: Fellowship Applicant; Sponsors, Collaborators, and Consultants; Training Potential; Institutional Environment and Commitment to Training; and Research Training Plan. It will also include strategies for converting a completed Thesis Proposal into the analogous documents for fellowship applications. The course will primarily focus on the application for an NRSA F30/31 award but will be applicable for students targeting other granting mechanisms that have the same components. Homework assignments will aid in the preparation of a fellowship application and will, therefore, keep students on pace for the current submission cycle. Prerequisites: Successfully having passed your Thesis Proposal Exam with the intention to submit a fellowship application by the end of the semester. Grading Policy: Pass/Fail

BSR4201

Journal Club in Cancer Biology

Credits: 1
Offered: Fall

The JC in Cancer Biology critically discusses recent literature in the context of each student’s research project. Open to PhD, MDPhD and MSBS students.
BSR4301

Journal Club in Developmental & Stem Cell Biology

This is a Journal Club in Developmental and Stem Cell Biology (DSCB JC). Students will present once a year a paper from the recent literature that is relevant to stem cell biology in developing or adult tissues.++

BSR4401

Journal Club in Genetics & Data Science

This course is mandatory for 2nd year and above GGS students, and open only to Ph.D. and M.D./Ph.D. students in the GGS MTA. Each week one student will present a paper selected as representing an interesting concept or advance in genetics and genomics. The presenter describes the topic of the paper, summarizing the strengths and weaknesses, followed by an open discussion and critique of the research. For the final 20 minutes, a second presenter gives a progress report about their own work.

BSR4501

Journal Club in Immunobiology

This course follows an intensive small group discussion format that critically evaluates original research articles in the area of immunology. The articles are selected by the student in consultation with the presiding faculty member, and include recent important advances in immunology or investigations that provide conceptual advances relating to long-standing problems. The analysis will include background to the research, the hypothesis tested, the experimental methods used, as well as interpretation and discussion of results. This is a discussion class and participation is required. Students are also expected to discuss the implications of the research, the new questions it raises, and how it relates to the rest of the field. Grading will be based on class participation and extent of preparation. This class is required for students beginning in their second year until they complete their Ph.D. First year students interested in immunology are encouraged to attend. Attendance is required for all classes.
BSR4601  
Journal Club in Microbiology  
Offered: Fall  
Credits: 1  
This course uses a journal club format to discuss important papers along the interests of the students enrolled. Each student is instructed to carefully select a high impact paper that motivates the work in the lab and lead the discussion of the paper with the group. Active participation from all students is expected. The course meets weekly. All MIC Training Area Graduate students who have not yet completed their thesis proposal are required to take this course.

BSR4603  
Journal Club in Virus-Host Interactions  
Offered: Fall  
Credits: 1  
This one credit journal club course aims to communicate the most exciting ongoing research involving viruses and their molecular interactions with the host, as well as to train students and postdoctoral fellows in the skills of scientific presentation. The course is regularly attended by twenty to thirty research personnel from 10 laboratories, including faculty, postdoctoral fellows, medical students, and graduate students, both from within and outside the MSM Training Area. The course serves as a forum for interdisciplinary communication and discussion of the latest research in the fields of virology, cell biology and immunology. Informed introduction, concise presentation and critical discussion are the themes of the journal club.

BSR4702  
Selected Topics in Neuroscience  
Offered: Fall  
Credits: 1  
Students will present work in progress and are strongly encouraged to have their advisory committee present. Alternatively, students can present a paper with relevance to their lab work. This course meets weekly.
BSR4801
Journal Club in Pharmacological Sciences

Journal Club in Pharmacological Sciences serves as the main journal club for the Systems Biology of Disease and Therapeutics MTA. The group meets weekly. At each meeting, a student presents a manuscript closely related to his/her dissertation project, and he/she may also present original data, although this is not required. Each paper is chosen by the student presenting that week and is usually related, in a broad sense, to Pharmacology. Topics discussed in the past year have included analysis of data in The Cancer Genome Atlas, identification of targets for treating Marfan Syndrome, and mechanisms underlying the initiation of ventricular arrhythmias.

BSR5006
Medical Scientist Grand Rounds - Fall

Medical Scientist Grand Rounds is a series of joint clinical/scientific presentations that highlight the doctoral work of our senior MD/PhD students. A senior MD/PhD in their clinical training phase presents the clinical case as an introduction to a scientific topic with the guidance of a clinician expert. The doctoral research presentation focuses the discussion on specific research questions from their dissertation. A panel discussion concludes the session allowing students to simultaneously inquire about the science and medicine. Dates of course are: October 14, 2020, November 18, 2020, December 9, 2020.

BSR5201
Seminar Series in Oncological Sciences

The seminar series in Cancer Biology brings leading researchers to MSSM to discuss their recent research. Open to PhD, MSTP and MSBS students.
BSR5202  
Credits: 1  
Seminar in Cancer Biology: Works in Progress  
Offered: Fall  
Presentations of research by students provide each the opportunity to present their research at least once during the academic year.

BSR5301  
Credits: 1  
Seminar in DRS: Works in Progress  
Offered: Fall  
Presentation of research by students; each student to present at least once per year

BSR5302  
Credits: 1  
Seminar Series in Dev & Regen Biology & Black Family Stem Cell Institute  
Offered: Fall  
All DSCB students who have not yet passed the Thesis Proposal are required to register for this course.
BSR5401
Seminar in Genetics & Data Science
Credits: 1
Offered: Fall

This is a CME accredited Seminar Series offered by the Department of Genetics and Genomic Sciences and the Institute for Genomics and Multiscale Biology at the Mount Sinai Medical Center. It is open to the entire department and institute, including faculty and trainees. The audience is diverse, with medical geneticists, basic scientists and computational biologists. All GGS students who have not yet passed the Thesis Proposal are required to register for this course.

BSR5402
Works in Progress: Gen and Data Science
Credits: 1
Offered: Fall

This forum provides an opportunity for Graduate Students, Postdocs and junior Faculty in the Department of Genetics and Genomic Sciences to present ongoing work to other members of the Department, and gain experience presenting their work publically. After completing their first year rotation projects, each Graduate student is required to give at least one presentation per year. This is a required course for Graduate Students in the GGS MTA from second year until graduation.

BSR5501
Seminar in Immunobiology
Credits: 1
Offered: Fall

This course combines two seminar series hosted by the Immunology Institute at the Icahn School of Medicine at Mount Sinai. The first series features a monthly seminar given by an invited speaker who is a prominent scientist in immunology. Students are expected to familiarize themselves with the speaker's research areas. Students are expected to attend a luncheon with the speaker which provides them with an opportunity to meet with the speaker and ask questions or engage in discussions. The second series is a weekly work-in-progress seminar presented by students and post-docs on their research. Students will be required to present in this seminar series starting in their 3rd year.
BSR5601  
Seminar in Microbiology  
Credits: 1  
Offered: Fall  
Because of the diverse interests of our faculty, topics for this seminar series range from immunology, virology, bacteriology, oncogenesis, and signal transduction, to molecular biology. Speakers come from all over the United States, Europe, Australia, and Asia. They are from both academic institutions and from industry. The seminar series is attended by faculty from basic science, as well as from clinical departments.

BSR5701  
Seminar in Neuroscience  
Credits: 1  
Offered: Fall  
This is the Friedman Brain Institute Translational Neuroscience seminar series. Students in the Neuroscience MTA are required to attend. The seminar provides weekly lectures by outstanding neuroscientists, encompassing all domains of neurobiology, with an emphasis on discovery and translational neuroscience. The seminars will be advertised by e-mail and will be posted on bulletin boards throughout the institution. The seminars are also posted on the FBI website: consult http://icahn.mssm.edu/research/institutes/brain-institute/events

BSR5803  
Seminar in Biophysics and Systems Pharmacology  
Credits: 1  
Offered: Fall  
A series of seminars broadly related to pathophysiology, drug development, and/or systems-level computational analyses.
BSR6202  
Advanced Topics in Tumor Biology  
Offered: Fall  
Advanced topics in tumor biology is a participatory lecture-based course focusing on cancer diagnosis, therapeutics, genetics, behavioral medicine and ethics. Open to PhD, MSTP and MSBS students.

BSR6402  
Practical Analysis of a Personal Genome  
Offered: Fall  
Students in this course will analyze a human genome sequence starting with raw sequence reads through identifying a list of sequence variants. Using public databases, literature and other resources students will formulate hypotheses about the phenotypic significance of these variants. This is a hands-on, laboratory course in which students will choose to analyze either their own genome or a reference genome after lectures and counseling to make the consequences of personal genome analysis clear. Fall Term: Classes will run Thursdays 10:30AM-12:30, November 5th-December 17th, skipping 26th for Thanksgiving. These will be online ONLY. Spring Term: Thursdays 10:30AM-12:30, Jan 7th- March 18th

BSR6601  
Advanced Virology  
Offered: Fall  
Description: The goal of this course is to provide a broad-based systematic approach to the problem of virus-host interactions. The course is designed to be coordinated with the bi-annual New York Academy of Sciences Symposium on Virus-Host Interactions. All first year and second year PhD students as well as MD/PhD students doing their research projects in virology, cell biology, immunology, and/or molecular genetics/gene therapy are encouraged to participate. This non-modular course will begin with an introduction to host immune defense mechanisms and will explore the strategies that viruses have developed in order to evade them. While all viruses enter cells, replicate their genomes, and exit the infected cell, the specific tactics employed differ dramatically among the virus groups. Specifically, we will discuss (i) the basic life cycle of relevant viruses and (ii) the ways in which they interact with their host cells and evade immune detection. Will next be offered Fall 2021.
BSR6704  
Advanced Topics in Synapses  
Offered: Fall

The course will cover development, composition, plasticity, and disease related vulnerability of synapses in the central nervous system. The format will be one of discussion and debate surrounding papers in the current literature. Prerequisites: Neuroscience Core or strong neuroscience background

BSR6709  
Consciousness: How the Hard Problem can Inform Exper Studies  
Offered: Fall

The term hard problem articulates the difficulty of explaining the transition between physical (e.g., neurons) and phenomenal entities (e.g., colors). Thus, why is any merely neural dynamic the basis for any phenomenal experience at all? Alternatively, if we induce some neural dynamic, why does the inductee not merely experience neurons firing, rather than, e.g., seeing phosphenes? I will begin with a brief philosophical overview and move to computational and neurally oriented efforts to address this most central issue of the problem of consciousness.

BSR6716  
Advanced Topics in Social Neuroscience  
Offered: Fall

This course will give students a chance to have detailed discussion of current topics in social neuroscience. We will cover research on social neuroscience in human, non-human primates and rodents, as well as covering both psychological and neurobiological aspects.
BSR7701
Career Enhancement Training I

The objective of this elective is to provide students with advanced training in an area of interest to them in support of dissertation research and their long-term career development. As part of this elective, students are required to participate in an internship of their choosing and that has prior approval by the student’s dissertation advisor and the course directors. Students are required to provide periodic oral update reports of their progress in the internship (the frequency of these will be determined by the length of the internship) and a final paper summarizing the internship.

BSR7704
Career Enhancement Training IV

The objective of this elective is to provide students with advanced training in an area of interest to them in support of dissertation research and their long-term career development. As part of this elective, students are required to participate in an internship of their choosing and that has prior approval by the student’s dissertation advisor and the course directors. Students are required to provide periodic oral update reports of their progress in the internship (the frequency of these will be determined by the length of the internship) and a final paper summarizing the internship.

BSR8000
Independent Research for Basic Science Research

Research Credit for Independent Research. Only PhD and MD/PhD in Biomedical Science or Neuroscience, who have NOT passed the Thesis Proposal should register for this course.
BSR8002

Independent Research: MS Biomed Sci: I - Fall

Offered: Fall

Research Credit for Independent Research. 1st year Masters in Biomedical Science students should register for this course.

BSR8004

Independent Research: MS Biomed Science Fall

Offered: Fall

Course holder for MSBS students doing 3rd AY for Research only. Research Credit for Independent Research. 2nd year Masters in Biomedical Science students should register for this course for the Fall term. 2nd year MSBS students should register for 8 credits of Research, if they plan on completing the degree requirements by December.
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<th>Course Code</th>
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<th>Course Title</th>
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<tbody>
<tr>
<td>BSR8006</td>
<td>4.5</td>
<td>MSBS Independent Research III - Fall</td>
<td>Fall</td>
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This course is open to 3rd year MSBS students who are working full-time in a lab during the Fall semester to complete their master's thesis. The course is graded Pass/Fail and is 4.5 credits. Tuition is not charged for this course.

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<tr>
<td>BSR8900</td>
<td>3</td>
<td>Thesis: MS Biomedical Science</td>
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Thesis Credit for MS Biomedical Science. 2nd yr MSBS students should register for this course, only if they are planning to defend and deposit their MS thesis in the upcoming semester.

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<tr>
<td>BSR9000</td>
<td>7-10</td>
<td>Doctoral Dissertation Research</td>
<td>Fall</td>
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Research Credit for Doctoral Dissertation Research. Only PhD and MD/PhD in Biomedical Science or Neuroscience, who have passed the Thesis Proposal should register for this course.
SPRING
BSR0902
Medical School 1st Year - Spring
All First Year MD/PhD students should register for this course

BSR0904
Medical School 2nd Year - Spring
All Second Year MD/PhD students should register for this course

BSR1007
Laboratory Rotation - Spring
Laboratory rotations are an important part of the first year of the Graduate Program at Mount Sinai. They give students the opportunity to experience different research projects, different laboratory and mentoring styles, and allow the faculty to assess the interests and aptitude of the students. In general, all PhD and MD/PhD students will complete one-three laboratory rotations (a minimum of two, in two different laboratories, is recommended) before declaring a research preceptor and a Multidisciplinary Training Area. The rotation facilitates the choice of preceptor and also offers students an exposure to problems and techniques of interest to them. For each semester, the student should submit the name of the rotation preceptor and start date of the rotation no later than the beginning of the semester. This is done via the submission of the Rotation Agreement Form.
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<tbody>
<tr>
<td>BSR1013</td>
<td>6</td>
<td>Biomedical Science - Spring</td>
<td>Spring</td>
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Biomedical Science - Spring, is part 2 of a year long, six unit course that surveys a broad and comprehensive study of basic Molecular, Cellular and Developmental Biology. The topics covered prepare students for both a career in Biomedical Research, and for the Advanced studies within the CAB, DSCB, GGS, IMM, and MIC MTAs. Biomedical Science is a required course for all first year students that intend to be members of these MTAs. The course is structured as a series of lectures; grade assessment is based on a mixture of in-class and take home quizzes as well as one formal examination per unit. Prerequisite: BSR1012 Biomedical Science - Fall

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<tr>
<td>BSR1018</td>
<td>4</td>
<td>Biomedical Science for MDPhD - Spring</td>
<td>Spring</td>
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Biomedical Science - Spring for MDPhD students. 1st year MD/PhD students should register for this course.

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<tr>
<td>BSR1022</td>
<td>0.5</td>
<td>Rigor &amp; Reproducibility</td>
<td>Spring</td>
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Rigor and reproducibility is front and center in modern biomedical research. This is a new half credit course to address these issues and enhance training in responsible conduct in research.
BSR1026

Credits: 3

Applied Biostatistics for Biomedical Research
Offered: Spring

This course covers the foundational elements for the collection, analysis, and presentation of data in biomedical research. This course will cover the following topics: general principles of study design including internal and external validity; probability and sampling distributions, theory of confidence intervals and hypothesis testing; review of methods for comparison of discrete and continuous data including one-sample and two-sample tests, correlation analysis, and linear regression. Upon completion of this course, students should have introductory proficiency in statistics to apply their expertise to current biomedical challenges. This course will additionally facilitate important discourse around rigor and reproducibility and introduce students to innovative applications of biostatistics and data science to complex, real-world biomedical research ranging from building predictive algorithms for complex diseases to genetic analysis in ancestrally diverse populations. Diversity and Inclusion Statement: While science is assumed to be objective, the reality is that science is extremely subjective. Science does not exist in a vacuum. Our lived experiences, imbued with varying levels of power and privilege and exclusion and vulnerability over our life course, inform the biomedical problems we choose to explore, our conceptual framework, our methods, and our interpretations of our findings. We are a product of our society as is and as it was in the past. In this course, we must be respectful of others’ identities (i.e., race, gender, class, sexuality, religion, ability, etc.) and perspectives even if they differ from ours. We will address everyone by their preferred names and preferred pronouns. In this course, we will not make assumptions about what someone knows and does not know. We will make knowledge accessible to everyone. In this class, we will grow as scientists and, most importantly, as human beings.

BSR1023

Credits: 0.5

Responsible Conduct of Research Refresher
Offered: Spring

This course is required for all first-year graduate students, following NIH mandates. Specific topics for the eight 1 hour sessions: (i) Research Misconduct (ii) Experimental design and data management practices (iii) Mentor and Trainee Responsibilities; Collaborative Research (iv) Conflicts of Interest; Intellectual property (v) The Protection of Human Subjects (vi) The Welfare of Laboratory Animals (vii) Publication, authorship, and peer review (viii) Peer Review, the Grant Process, and Fiduciary Responsibility. Each Session is 45 minute lecture with 15 minutes of discussion.

BSR1707

Credits: 3

Prin of Neural Sci, Beh & Brain Pathophys: Behav & Cognitive Neurosci
Offered: Spring

This course surveys topics in behavioral and cognitive neuroscience including the structure of brain systems for learning and memory, executive function, emotional regulation, and reward processing. A consistent focus is the integration of research findings across levels of analysis and evaluation of the quality of experimental findings. The course format is seminar-style presentation of key research articles.
BSR1803

Systems Biology: Biomedical Modeling

We take a case-based approach to teach contemporary mathematical modeling techniques to graduate students. Lectures provide biological background and describe the development of both classical mathematical models and more recent representations of biological processes. Students are taught how to analyze the models and use computation to generate predictions that may be experimentally tested.

BSR1802

Quantitative Graduate Physiology

This course will provide students with a deep understanding of cardiovascular and renal physiology. Lectures will both describe both the general functioning of these organ systems and cover selected topics in greater detail. Paper discussion forums and problem sets will complement the material discussed in the lectures. Emphasis will be placed on describing quantitatively the functioning of the heart and kidney, and on illustrating underlying principles that are shared by the two organ systems. Both classical systems-level and contemporary cellular-level issues will be discussed. Topics will include: 1) ionic balance in cardiac cells, 2) multidimensional electrical propagation in heart, 3) systemic control of cardiac output; 4) cotransport of ions and metabolites in renal epithelial cells, and 5) a mathematical description of nephron function.

BSR1708

Prin of Neural Sci, Beh & Brain Pathophys: Neurological & Psychiatric Disorders

This and the concurrent Topics in Clinical Neuroscience are an integrated set of courses covering the most recent highlights in molecular pathogenesis and clinical features of the major neurologic and psychiatric disorders. The goal is to offer Ph.D. candidates an opportunity to learn more about the disorders they study in laboratory animals, which will improve the translational potential of their work and better prepare them for a future as an NIH-funded investigator. A key feature of this novel class is that students will be exposed each week to the molecular pathogenesis of psychiatric and neurological disorders together with a clinical presentation.
BSR2108  
Credits: 3
Structural & Chemical Approaches to Pharmacology and Drug Discovery  
Offered: Spring

This course attempts to recreate in a teaching environment the fundamental approaches of rational small molecule drug discovery research, and teach the fundamental molecular and physico-chemical principles that govern the capacity of small molecules to affect or regulate biological functions of macromolecules. The course consists of three themes, covering topics ranging from lead discovery to drug candidate selection, and to mechanism of action of drugs for both validated and emerging drug target families, as listed below: Theme #1. Structure-based Drug Discovery - lead discovery and optimization, and drug candidate selection Theme #2. New Advances on Validated Drug Target Families - drugs and mechanism of action on kinases, GPCRs and others Theme #3. Emerging Drug Targets - Identification and characterization of drug targets relevant to epigenetics, neurodegenerative diseases and cancer. Theme #1 teaches the principles of discovery of biological targets and active compounds by hypothesis-driven and high-throughput approaches with both experimental and computational methods. This is followed by characterization of biological target interactions with lead compounds (i.e., structure, energy and dynamics). The inferred molecular mechanisms provide the basis for lead optimization through rational design and medicinal chemistry, and drug candidate selection through evaluation of drug toxicity and efficacy, as well as drug pharmacokinetic/pharmacodynamic properties. Themes #2 and #3 review the latest advancements in drug discovery for both validated and emerging drug target families consisting of proteins involved in enzymatic catalysis, gene transcription and translation, protein-protein or protein-nucleic acid interactions.

BSR2930  
Credits: 2
Protecting and Commercializing Your Innovation  
Offered: Spring

This lecture course, developed jointly between Icahn School of Medicine at Mount Sinai (ISMMS) and Rensselaer Polytechnic Institute (RPI), explores the relationship between academic research, intellectual property, and commercialization. You will learn about the nuances of intellectual property, with a focus on biomedical applications, and how the products of academic research and related innovations can be protected and commercialized. The course will cover experimental design, patent strategy, interaction with regulatory agencies, and the process of starting a company or licensing an invention. Lectures will be given at both RPI and ISMMS by instructors from patent law firms, successful biotech entrepreneurs, and Mount Sinai Innovation Partners.

BSR3102  
Credits: 0.5
Principles of Scientific Proposals  
Offered: Spring

This semesterly-offered course will aim to inform and instruct students on the process of applying for a predoctoral fellowship. Students will learn the different funding mechanisms available to them for a fellowship and will ultimately prepare several components of the NRSA application with the intent of submission. The subject matter will include strategies for building a highly competitive application by thoroughly analyzing the scored review criteria: Fellowship Applicant; Sponsors, Collaborators, and Consultants; Training Potential; Institutional Environment and Commitment to Training; and Research Training Plan. It will also include strategies for converting a completed Thesis Proposal into the analogous documents for fellowship applications. The course will primarily focus on the application for an NRSA F30/31 award but will be applicable for students targeting other granting mechanisms that have the same components. Homework assignments will aid in the preparation of a fellowship application and will, therefore, keep students on pace for the current submission cycle. Prerequisites: Successfully having passed your Thesis Proposal Exam with the intention to submit a fellowship application by the end of the semester. Grading Policy: Pass/Fail
BSR3510  
Credits: 2  
International Course of Immunotherapy  
Offered: Spring

The International Immunotherapy course is a joint initiative between Mount Sinai, Sorbonne Universités (Paris, FRANCE) and University of Sao Paolo (Sao Paolo, BRAZIL) that recruits leading global experts in the field of immunology and immunotherapies to lecture graduate students and research and clinical fellows. The goal of this class is to provide students with the means to understand the relevance of immunology and immunotherapy strategies in the treatment of human disease. We have gathered an exceptional number of immunotherapy experts throughout the world to teach basic immunology principles and discuss the development and success of different immunotherapies in the treatment of inflammatory diseases, autoimmunity, cancer, and infectious diseases. The course is scheduled over five days and is conducted in real-time via satellite with Brazil and France. Lectures will be provided locally either in France (Sorbonne Universités/Institut Curie, Paris), in Brazil (University of Sao Paulo) or New York (Mount Sinai) and transmitted live through a videoconference to all three locations. Students and lecturers will have the opportunity to discuss in an open forum. The course is organized in a 1-week module (5hrs/day), and evaluation is based on attendance and participation (2 credits).

BSR4201  
Credits: 1  
Journal Club in Cancer Biology  
Offered: Spring

The JC in Cancer Biology critically discusses recent literature in the context of each student’s research project. Open to PhD, MDPhD and MSBS students.

BSR4301  
Credits: 1  
Journal Club in Developmental & Stem Cell Biology  
Offered: Spring

This is a Journal Club in Developmental and Stem Cell Biology (DSCB JC). Students will present once a year a paper from the recent literature that is relevant to stem cell biology in developing or adult tissues.
BSR4401

Journal Club in Genetics & Genomic Sciences

Credits: 1
Offered: Spring

This course is mandatory for 2nd year and above GGS students, and open only to Ph.D. and M.D./Ph.D. students in the GGS MTA. Each week one student will present a paper selected as representing an interesting concept or advance in genetics and genomics. The presenter describes the topic of the paper, summarizing the strengths and weaknesses, followed by an open discussion and critique of the research. For the final 20 minutes, a second presenter gives a progress report about their own work.

BSR4501

Journal Club in Immunobiology

Credits: 1
Offered: Spring

This course follows an intensive small group discussion format that critically evaluates original research articles in the area of immunology. The articles are selected by the student in consultation with the presiding faculty member, and include recent important advances in immunology or investigations that provide conceptual advances relating to long-standing problems. The analysis will include background to the research, the hypothesis tested, the experimental methods used, as well as interpretation and discussion of results. This is a discussion class and participation is required. Students are also expected to discuss the implications of the research, the new questions it raises, and how it relates to the rest of the field. Grading will be based on class participation and extent of preparation. This class is required for students beginning in their second year until they complete their Ph.D. First year students interested in immunology are encouraged to attend. Attendance is required for all classes.

BSR4601

Journal Club in Microbiology

Credits: 1
Offered: Spring

This course uses a journal club format to discuss important papers along the interests of the students enrolled. Each student is instructed to carefully select a high impact paper that motivates the work in the lab and lead the discussion of the paper with the group. Active participation from all students is expected. The course meets weekly. All MIC Training Area Graduate students who have not yet completed their thesis proposal are required to take this course.
BSR4603

Journal Club in Virus-Host Interactions

Offered: Spring

This one credit journal club course aims to communicate the most exciting ongoing research involving viruses and their molecular interactions with the host, as well as to train students and postdoctoral fellows in the skills of scientific presentation. The course is regularly attended by twenty to thirty research personnel from 10 laboratories, including faculty, postdoctoral fellows, medical students, and graduate students, both from within and outside the MSM Training Area. The course serves as a forum for interdisciplinary communication and discussion of the latest research in the fields of virology, cell biology and immunology. Informed introduction, concise presentation and critical discussion are the themes of the journal club.

BSR4702

Selected Topics in Neuroscience

Offered: Spring

Students will present work in progress and are strongly encouraged to have their advisory committee present. Alternatively, students can present a paper with relevance to their lab work. This course meets weekly.

BSR4801

Journal Club in Pharmacological Sciences

Offered: Spring

Journal Club in Pharmacological Sciences serves as the main journal club for the Systems Biology of Disease and Therapeutics MTA. The group meets weekly. At each meeting, a student presents a manuscript closely related to his/her dissertation project, and he/she may also present original data, although this is not required. Each paper is chosen by the student presenting that week and is usually related, in a broad sense, to Pharmacology. Topics discussed in the past year have included analysis of data in The Cancer Genome Atlas, identification of targets for treating Marfan Syndrome, and mechanisms underlying the initiation of ventricular arrhythmias.
Medical Scientist Grand Rounds is a series of joint clinical/scientific presentations that highlight the doctoral work of our senior MD/PhD students. A senior MD/PhD in their clinical training phase presents the clinical case as an introduction to a scientific topic with the guidance of a clinician expert. The doctoral research presentation focuses the discussion on specific research questions from their dissertation. A panel discussion concludes the session allowing students to simultaneously inquire about the science and medicine.

The seminar series in Cancer Biology brings leading researchers to MSSM to discuss their recent research. Open to PhD, MSTP and MSBS students.

Presentations of research by students provide each the opportunity to present their research at least once during the academic year.
BSR5301  Credits: 1  
Seminar in DSCB: Works in Progress  Offered: Spring  
Presentation of research by students; each student to present at least once per year

BSR5302  Credits: 1  
Seminar Series in Dev & Regen Biology & Black Family Stem Cell Institute  Offered: Spring  
All DSCB students who have not yet passed the Thesis Proposal are required to register for this course.

BSR5401  Credits: 1  
Seminar in Genetics & Genomic Sciences  Offered: Spring  
This is a CME accredited Seminar Series offered by the Department of Genetics and Genomic Sciences and the Institute for Genomics and Multiscale Biology at the Mount Sinai Medical Center. It is open to the entire department and institute, including faculty and trainees. The audience is diverse, with medical geneticists, basic scientists and computational biologists. All GGS students who have not yet passed the Thesis Proposal are required to register for this course.
BSR5402
Credits: 1
Works in Progress: Gen and Genomic Sciences
Offered: Spring

This forum provides an opportunity for Graduate Students, Postdocs and junior Faculty in the Department of Genetics and Genomic Sciences to present ongoing work to other members of the Department, and gain experience presenting their work publicly. After completing their first year rotation projects, each Graduate student is required to give at least one presentation per year. This is a required course for Graduate Students in the GGS MTA from second year until graduation.

BSR5501
Credits: 1
Seminar in Immunobiology
Offered: Spring

This course combines two seminar series hosted by the Immunology Institute at the Icahn School of Medicine at Mount Sinai. The first series features a monthly seminar given by an invited speaker who is a prominent scientist in immunology. Students are expected to familiarize themselves with the speaker's research areas. Students are expected to attend a luncheon with the speaker which provides them with an opportunity to meet with the speaker and ask questions or engage in discussions. The second series is a weekly work-in-progress seminar presented by students and post-docs on their research. Students will be required to present in this seminar series starting in their 3rd year.

BSR5601
Credits: 1
Seminar in Microbiology
Offered: Spring

Because of the diverse interests of our faculty, topics for this seminar series range from immunology, virology, bacteriology, oncogenesis, and signal transduction, to molecular biology. Speakers come from all over the United States, Europe, Australia, and Asia. They are from both academic institutions and from industry. The seminar series is attended by faculty from basic science, as well as from clinical departments.
BSR5701  
Seminar in Neuroscience  
Credits: 1  
Offered: Spring

This is the Friedman Brain Institute Translational Neuroscience seminar series. Students in the Neuroscience MTA are required to attend. The seminar provides weekly lectures by outstanding neuroscientists, encompassing all domains of neuroscience, with an emphasis on discovery and translational neuroscience. The seminars will be advertised by e-mail and will be posted on bulletin boards throughout the institution. The seminars are also posted on the FBI website: consult http://icahn.mssm.edu/research/institutes/brain-institute/events

BSR5803  
Seminar in Biophysics and Systems Pharmacology  
Credits: 1  
Offered: Spring

A series of seminars broadly related to pathophysiology, drug development, and/or systems-level computational analyses.

BSR6201  
Advanced Topics in Cancer Biology  
Credits: 3  
Offered: Spring

Advanced Topics in Cancer Biology will be offered in the Spring semester, 2014. Three modules will be offered. Students may take either one, two, or all three modules for credit. Each module is 1 credit. This is a journal article-based class in which students take turns leading discussion of assigned journal articles centered on a specific topic and chosen by faculty module leaders. For general information and topics for the coming semester students should contact James Manfredi (8-5495).
BSR6701  
Credits: 3  
Offered: Spring  
Neuroanatomy  
The goal of the course is to provide students with a basic understanding of the structural organization and connectivity of the human central and peripheral nervous system. In general, a systems approach is used to review the major sensory, motor and integrated neural systems. Student performance is evaluated by four exams; all students attending the course are expected to take the exams, and the course is open to all interested students.

BSR6705  
Credits: 1  
Offered: Spring  
Topics in Clinical Neuroscience  
This course covers clinical features of major neurologic and psychiatric disorders, including diagnostics, clinical pathology (where appropriate), course of illness, and treatment. The goal is to offer Ph.D. candidates an opportunity to learn more about the disorders they study in laboratory animals, which will improve the translational potential of their work and better prepare them for a future as an NIH-funded investigator. (only available for 1st year Neuroscience MTA PhD students)

BSR6717  
Credits: 3  
Offered: Spring  
Neural Data Science.  
Discussion of issues related to experimental design, and analysis of behavioral and neurophysiological data that are common in systems and behavioral neuroscience studies; with a focus on multilevel modeling and time series analyses. The goals of this course are to: 1) Discuss issues related in experimental design and structure of statistical analysis that tend to occur in the context of behavioral and neurophysiological studies, with specific reference to issues that are likely to be encountered in preparing fellowship applications 2) Get exposure to statistical analysis approaches that are not part of an introductory biostatistics course, including time series analysis 3) Increase fluency with good data analysis practices to generate reproducible data analyses and shareable code This course is designed for students in the Neuroscience PhD program who have already begun to design experiments and collect data. We also will be talking about issues that tend to be encountered in preparing fellowship applications, including how to compose a power analysis that will pass muster in the context of NIH “rigor and transparency” criteria. It is required for Neuroscience PhD students. This course may also be useful for students in other programs (for example, biostatistics) that want an exposure to the types of problems encountered in designing and analyzing experiments in neuroscience. Prerequisites: BSR 1707, 1708 (Neuro Core units 3 and 4) Either: BIO 6400 (Intro to Advanced Biostatistics) OR BSR 1026 (Applied Biostatistics for Biomedical Research) BIO 6300 (Intro to R) highly recommended
BSR8000  
Independent Research for Basic Science Research  
Offered: Spring  
Credits: 10  
Research Credit for Independent Research. Only PhD and MD/PhD in Biomedical Science or Neuroscience, who have NOT passed the Thesis Proposal should register for this course.

BSR8003  
Independent Research: MS Biomed Sci: I - Spring  
Offered: Spring  
Credits: 4  
Research Credit for Independent Research. 1st year Masters in Biomedical Science students should register for this course.

BSR8005  
Independent Research: MS Biomed Sci: II - Spring  
Offered: Spring  
Credits: 4  
Research Credit for Independent Research. 2nd year Masters in Biomedical Science students should register for this course for the Spring term.
BSR8900

: MS Biomedical Science

Credits: 3

Offered: Spring

Thesis Credit for MS Biomedical Science. 2nd yr MSBS students should register for this course, only if they are planning to defend and deposit their MS thesis in the upcoming semester.

BSR9000

Doctoral Dissertation Research

Credits: 7-10

Offered: Spring

Research Credit for Doctoral Dissertation Research. Only PhD and MD/PhD in Biomedical Science or Neuroscience, who have passed the Thesis Proposal should register for this course.
SPRING 2
BSR3102
Principles of Scientific Proposals

This semesterly-offered course will aim to inform and instruct students on the process of applying for a predoctoral fellowship. Students will learn the different funding mechanisms available to them for a fellowship and will ultimately prepare several components of the NRSA application with the intent of submission. The subject matter will include strategies for building a highly competitive application by thoroughly analyzing the scored review criteria: Fellowship Applicant; Sponsors, Collaborators, and Consultants; Training Potential; Institutional Environment and Commitment to Training; and Research Training Plan. It will also include strategies for converting a completed Thesis Proposal into the analogous documents for fellowship applications. The course will primarily focus on the application for an NRSA F30/31 award but will be applicable for students targeting other granting mechanisms that have the same components. Homework assignments will aid in the preparation of a fellowship application and will, therefore, keep students on pace for the current submission cycle.

Prerequisites: Successfully having passed your Thesis Proposal Exam with the intention to submit a fellowship application by the end of the semester.

Grading Policy: Pass/Fall

BSR6602
Emerging & Re-emerging Viral Threats

Emerging Zika and Ebola viruses caused the two most recent crises in global public health. More and more novel viral threats are discovered and old viral threats are re-emerging. This course will discuss important emerging and re-emerging viruses and their biology, pathogenicity and prevalence. We will also focus on novel prophylactic (vaccines) and therapeutic technologies that are under development to combat these viruses. The course will cover orthomyxoviruses (influenza), paramyxoviruses (Nipah, Hendra etc.), flaviviruses (dengue, Zika etc.), alphaviruses (Chikungunya etc.), bunyaviruses (hantaviruses, CCHFV etc.), filoviruses (Marburg virus, ebolaviruses), coronaviruses (SARS-CoV, MERS-CoV) and others.

BSR7703
Career Enhancement Training

The objective of this elective is to provide students with advanced training in an area of interest to them in support of dissertation research and their long-term career development. As part of this elective, students are required to participate in an internship of their choosing and that has prior approval by the student’s dissertation advisor and the course directors. Students are required to provide periodic oral update reports of their progress in the internship (the frequency of these will be determined by the length of the internship) and a final paper summarizing the internship.
BSR8000

Independent Research for Basic Science Research

Research Credit for Independent Research. Only PhD and MD/PhD in Biomedical Science or Neuroscience, who have NOT passed the Thesis Proposal should register for this course

BSR8900

Thesis: MS Biomedical Science

Thesis Credit for MS Biomedical Science.

2nd yr MSBS students should register for this course, only if they are planning to defend and deposit their MS thesis in the upcoming semester.
CLR
CLINICAL RESEARCH
FALL
CLR0006  
Spectrum of Methods in Clinical Research I  
Offered: Fall  
Credits: 3  
This first term covers fundamental concepts of relevance to the formulation of meaningful questions in clinical investigation and provides an overview of non-experimental, quasi-experimental and experimental study designs utilized in the conduct of clinical investigation. The course is divided into 4 sections: 1) The Research Question & Stating the Hypothesis; 2) Finding the evidence & discerning the burden of disease; 3) Measurement Science & Sampling; and 4) Study Design.

CLR0012  
Integrative Prob Solving in Clin & Trans Res  
Offered: Fall  
Credits: 1  
This course is designed to prepare PhD in Clinical Research candidates for the mandatory written comprehensive examination. The course is comprised of problem sets reflective of foundational course work and the integration of methodology and experimental design highlighted throughout the common required course work. Students will be ask to practice their ability to critically analyze and appraise clinical / translational research data in an effort to integrate important concepts and tools learned across during required coursework.

CLR0001  
Masters Thesis for Clinical Research  
Offered: Fall  
Credits: 1-8  
Students should register for their Master's Thesis credits (5 credits) during the Spring 1 or Spring 2 term of their second year while preparing to submit their Thesis. Students may be able to register for additional Master's Thesis credits (1-3), instead of elective credits, with permission of the Program Director. Please refer to the Guide to Completing the Masters Thesis as a resource for the steps that need to be taken in fulfilling the Masters Thesis requirement.
Independent Study for Clinical Research

An Independent Study is an elective option providing the student with an opportunity to delve more thoroughly into an area of specific interest to him/her.

Please note that an Independent Study Proposal should be submitted at least three weeks prior to the anticipated start of the proposed project/course of study. The proposal will be reviewed to ensure that the goals of the project meet the overall objectives of the Clinical Research Program. Approval of a form submitted less than three weeks prior to the anticipated start of the project/course of study will not be guaranteed. The student assumes any risk that missing appropriate deadlines may entail. Approval, when granted, is conditional upon the student completing all of the outlined requirements. The student must submit a Postscript Report and request that the faculty sponsoring the Independent Study submit an Evaluation Form.

Three credits are the maximum number of credits that may be awarded to any Independent Study. Please note that while the total hours committed to the pursuit of the Independent Study may be sufficient for more than three credits or more than one elective, students will not receive any more than three credits for one project/course of study. Each student may complete no more than two independent study projects. An Independent Study must be a unique experience. Material covered during an independent study project should be highly targeted and not simply a review of the regularly offered coursework. It is important to note that generally speaking independent study projects should not be attempts to take courses offered routinely during the academic year. Students should not expect independent study projects to exempt them from core course requirements without approval by the Track Academic Advisor and the Program Director.

Steps towards formalizing an Independent Study:
1. Meet with the Program Director to discuss your plans for your Independent Study at least 6 weeks prior to the start of the Independent Study.
2. Meet with the faculty sponsoring your Independent Study to discuss and plan the Independent Study at least 6 weeks before the start of the Independent Study.
3. Complete the Independent Study Proposal Form and submit it to the Program Office with the appropriate signatures at least 3 weeks before the start of the independent study.
4. Register for the Independent Study credits through the registration system before starting the Independent Study.
5. Complete the project/course of study once approved.
6. Complete the Independent Study Postscript Report and submit to the Program Office with appropriate signatures no later than 3 weeks after your project has been completed.
7. Request that your Faculty Sponsor complete the Independent Study Faculty Sponsor Form and submit it to the Program Office no later than 3 weeks after the study has been completed, Independent Study Faculty Sponsor Form.
9. Complete the Independent Study Student Evaluation of Faculty Form no later than 3 weeks after the study has been completed.
CLR0017

Credits: 1

Clin & Translational Resrch JC & Seminar-Fall

Offered: Fall

This class will meet weekly and will consist of a Journal Club alternating with a Seminar Series/Works in Progress. The Journal Club will provide a forum for the development of critical thinking and fosters real time utilization of recently learned analytical tools and methodology. A structured format focused on dissecting and discerning the specific research question and hypothesis posed; the appropriateness of the experimental design and the nature of the statistical methods employed in a given article, is employed so as to facilitate the emergence of astute and critical readers of the scientific literature & to reinforce relevant issues being discussed in other didactic courses. The Seminar Series/Works in Progress classes will include presentations by trainees & faulty, covering ongoing clinical research projects to facilitate constructive debate and discussion of specific research approaches and conceptual models under development. In addition, this forum will be used to cover specific additional topics of importance to clinical research, including: human subjects' research compliance; scientific presentation skills; team science; study design; statistical methods.

CLR0020

Credits: 3-6

Doctoral Thesis for Clinical Research

Offered: Fall

Student should register for Doctoral Thesis credits during the Fall, Spring 1 and Spring 2 of year 3. Number of credits to register each term will depend on the student's track. Please refer to the curriculum guide or track checklist for details.
Tools in Qualitative Research in Clinical and Translational Science

Clinical and translational researchers frequently face a number of challenges in their work when traditional statistical approaches are used exclusively to plan clinical studies. These include low clinical trial participation, failed interventions due to low engagement of stakeholders or misunderstanding of causal mechanisms affecting outcomes, low engagement of trainees due to lack of understanding of their experience. This course will provide tools to address these and other challenges. This is an applied introductory course in qualitative and community-based research intended for graduate students and researchers in clinical and translational science with minimal or no experience in qualitative methodologies.

Computational Tools & Information Sources for Clinical Research.

The course provides the researcher with a working knowledge of essential tools for the acquisition, management, and reporting of data. The data acquisition section of the course reviews the various methods for collecting primary data in the setting of clinical trials and registries. The course will review relational database designs, direct collection of data from electronic health records and primary data entry via electronic data capture systems, both local and web-based. It will cover principles of case report form design and compliance with good clinical practice standards. It will review specialized software for managing multicenter studies, which address a variety of functions, including trial registration, randomization, tracking, site communication and performance measures. Security, privacy and data integrity issues will also be addressed.

Also provided is an introduction to the SAS language with practical examples. It covers the process of importing data and manipulating data files, writing SAS code i.e., coding techniques such as creating new variables, and constructing complex equations, merging and appending files, generating reports that summarize and analyze data. No prior knowledge of SAS is required or expected.

Clinical Trials Management

In this course students will learn the essentials of coordinating and managing the day-to-day operations of a clinical research study, from the inception, to planning site logistics and constructing timelines for study initiation visit to closing out a study. Students will learn about the roles and responsibilities of the Principal Investigator; critical members of the Research Team; distributed roles in the context of clinical trials. Data Management Plans, and Data and Safety Management Plans including the use of Data and Safety Monitoring Boards. Students will become familiar with principles governing best practices in the generation of Case Report Forms (CRFs) and database development and selection. Students will also become familiar with principles of regulatory compliance, as well as reasons and preparation for internal and external audits. In addition, students will become familiar with the concept of Medicare Cost Analysis and budgetary requirements for Clinical Trials.
SPRING 1
Students should register for their Master's Thesis credits (5 credits) during the Spring 1 or Spring 2 term of their second year while preparing to submit their Thesis. Students may be able to register for additional Master's Thesis credits (1-3), instead of elective credits, with permission of the Program Director. Please refer to the Guide to Completing the Master's Thesis as a resource for the steps that need to be taken in fulfilling the Master's Thesis requirement.

Part II of CLR0012: This course is designed to prepare PhD in Clinical Research candidates for the mandatory written comprehensive examination. The course is comprised of problem sets reflective of foundational course work and the integration of methodology and experimental design highlighted throughout the common required course work. Students will be asked to practice their ability to critically analyze and appraise clinical / translational research data in an effort to integrate important concepts and tools learned across during required coursework.

This course builds upon the preceding course CLR0006 in a curriculum mapped fashion and explores the domain of interventional studies including quasi experimental and experimental designs, from first in man approaches to Phase IV studies including principles of pharmacovigilence. The course format consists of didactic lectures, case based discussions and Team based problem exercises. The learning objectives for this course include the following: Describe the characteristics of a quasi experimental design; Distinguish quasi experimental as compared to a true experimental design; Describe & explain the different types and essential components of Early Developmental Trials; Delineate the rationale for randomization; Describe the types of randomization; Describe the advantages and disadvantage of cluster based randomized studies; Discern the difference between adaptive and rule based designs; Describe specific considerations, advantages and disadvantages of N-of-1 and other types of small clinical trials; Define the objectives of Phase IIa and Phase IIb and delineate the differences between these two types of Phase II trials; Describe from a conceptual perspective, a bayesian vs frequentist theory; Discern between frequentist verses bayesian approaches; Delineate the specific characteristics and advantages of specific phase II “staged” designs including Gehran and Simon 2 stage designs; Delineate the specific characteristics and advantages of non inferiority studies and equivalence trials; Discuss the specific trial features employed in comparative effectiveness research; Describe the merits and disadvantages of trials employing historical controls; Outline the characteristics, utility and rationale for pragmatic trials; and Delineate the rationale and components of the CONSORT statement and diagram as well as its utility in randomized clinical trials. Similarly describe the components and import of the STROBE, TREND and SPIRIT guidelines.
CLR0020  
Credits: 3-6  
Doctoral Thesis for Clinical Research  
Offered: Spring 1

Student should register for Doctoral Thesis credits during the Fall, Spring 1 and Spring 2 of year 3. Number of credits to register each term will depend on the student’s track. Please refer to the curriculum guide or track checklist for details.

CLR0018  
Credits: 1  
Clin & Translational Resrch JC & Seminar-Spring I  
Offered: Spring 1

This class will meet weekly and will consist of a Journal Club alternating with a Seminar Series/Works in Progress. The Journal Club will provide a forum for the development of critical thinking and fosters real time utilization of recently learned analytical tools and methodology. A structured format focused on dissecting and discerning the specific research question and hypothesis posed; the appropriateness of the experimental design and the nature of the statistical methods employed in a given article, is employed so as to facilitate the emergence of astute and critical readers of the scientific literature & to reinforce relevant issues being discussed in other didactic courses. The Seminar Series/Works in Progress classes will include presentations by trainees & faculty, covering ongoing clinical research projects to facilitate constructive debate and discussion of specific research approaches and conceptual models under development. In addition, this forum will be used to cover specific additional topics of importance to clinical research, including: human subjects’ research compliance; scientific presentation skills; team science; study design; statistical methods.
Independent Study for Clinical Research

An Independent Study is an elective option providing the student with an opportunity to delve more thoroughly into an area of specific interest to him/her. Please note that an Independent Study Proposal should be submitted at least three weeks prior to the anticipated start of the proposed project/course of study. The proposal will be reviewed to ensure that the goals of the project meet the overall objectives of the Clinical Research Program. Approval of a form submitted less than three weeks prior to the anticipated start of the project/course of study will not be guaranteed. The student assumes any risk that missing appropriate deadlines may entail. Approval, when granted, is conditional upon the student completing all of the outlined requirements. The student must submit a Postscript Report and request that the faculty sponsoring the Independent Study submit an Evaluation Form. Three credits are the maximum number of credits that may be awarded to any Independent Study. Please note that while the total hours committed to the pursuit of the Independent Study may be sufficient for more than three credits or more than one elective, students will not receive any more than three credits for one project/course of study. Each student may complete no more than two independent study projects. An Independent Study must be a unique experience. Material covered during an independent study project should be highly targeted and not simply a review of the regularly offered coursework. It is important to note that generally speaking independent study projects should not be attempts to take courses offered routinely during the academic year. Students should not expect independent study projects to exempt them from core course requirements without approval by the Track Academic Advisor and the Program Director.

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6. Complete the Independent Study Postscript Report and submit to the Program Office with appropriate signatures no later than 3 weeks after your project has been completed.
7. Request that your Faculty Sponsor complete the Independent Study Faculty Sponsor Form and submit it to the Program Office no later than 3 weeks after the study has been completed, Independent Study Faculty Sponsor Form.
9. Complete the Independent Study Student Evaluation of Faculty Form no later than 3 weeks after the study has been completed.
CLR0320

Applied Biostatistics in Clinical Trials

This course will present the fundamental methods for the design and implementation of analysis for clinical trials. The course will emphasize randomized comparative studies, including protocol preparation, randomization, intention-to-treat, sample size, interim monitoring, adaptive designs, endpoints and reporting. The relationship between protocol design and analytic plan will be highlighted. The course has two broad aims: (1) to develop the skills necessary to be a more critical reader of medical literature and (2) to provide the basic statistical tools to aid in the design of clinical trial protocols. CLR-0320 Elective course for MSCR or PhD in CR; required for those students in MSCR/PhD who are concentrating on Clinical Trials research.

CLR0700

Professionalism & Ethical Issues in Clinical Research

This seminar will explore the complex issues raised by human subject research. The seminar will begin with a review of some of the landmark cases of unethical use of human subjects in research, the policies that shape our current understanding of the ethical conduct of research, and the mechanisms for research oversight that have been instituted. Then, through reading a broad selection of seminal articles and papers from the recent literature, seminar presentations and discussions, we shall engage in a conceptual analysis of a number of controversial and pressing issues. We shall discuss the moral and public policy aspects of topics such as research design, risk-benefit assessment, informed consent, the use of “vulnerable” subjects, research without consent, confidentiality, inducements, conflicts of interests, disclosure of research findings, tissue use, vaccine development, and international research. In addition to exploring the moral landscape of this rich and provocative domain, the seminar will clarify and inform participants’ understanding of basic moral concepts such as autonomy and justice. It will also serve as a model for approaching other issues in applied ethics.

CLR0810

Genetic Epidemiology

This course is designed to introduce students to the theory and practice of genetic epidemiology. The goal of genetic epidemiology is to identify genetic mechanisms and gene-environment interactions involved in the etiology of complex diseases and related traits. An in-depth discussion of designs and methodologies involved in conducting population-based genetic epidemiologic studies will be offered. An overview and practical of the currently available software for genetic epidemiologic analyses will be given. The lecture material will be supplemented with discussions of published studies and computer labs using real and simulated data. Students will be exposed to tools needed to critically review literature in genetic epidemiology & human genetics. Prerequisites: MPH0400 Epidemiology I MPH0300 Intro to Biostatistics or MPH0800 Intro to Advanced Biostatistics MPH0311 Multivariable Methods or MPH0812 Applied Linear Models I Suggested course but not required: MPH0802 Introduction to SAS systems
Spring 2
CLR0002

Independent Study for Clinical Research

An Independent Study is an elective option providing the student with an opportunity to delve more thoroughly into an area of specific interest to him/her.

Please note that an Independent Study Proposal should be submitted at least three weeks prior to the anticipated start of the proposed project/course of study. The proposal will be reviewed to ensure that the goals of the project meet the overall objectives of the Clinical Research Program. Approval of a form submitted less than three weeks prior to the anticipated start of the project/course of study will not be guaranteed. The student assumes any risk that missing appropriate deadlines may entail. Approval, when granted, is conditional upon the student completing all of the outlined requirements. The student must submit a Postscript Report and request that the faculty sponsoring the Independent Study submit an Evaluation Form. Three credits are the maximum number of credits that may be awarded to any Independent Study. Please note that while the total hours committed to the pursuit of the Independent Study may be sufficient for more than three credits or more than one elective, students will not receive any more than three credits for one project/course of study. Each student may complete no more than two independent study projects. An Independent Study must be a unique experience. Material covered during an independent study project should be highly targeted and not simply a review of the regularly offered coursework. It is important to note that generally speaking independent study projects should not be attempts to take courses offered routinely during the academic year. Students should not expect independent study projects to exempt them from core course requirements without approval by the Track Academic Advisor and the Program Director.

Steps towards formalizing an Independent Study:
1. Meet with the Program Director to discuss your plans for your Independent Study at least 6 weeks prior to the start of the Independent Study.
2. Meet with the faculty sponsoring your Independent Study to discuss and plan the Independent Study at least 6 weeks before the start of the Independent Study.
3. Complete the Independent Study Proposal Form and submit it to the Program Office with the appropriate signatures at least 3 weeks before the start of the independent study.
4. Register for the Independent Study credits through the registration system before starting the Independent Study.
5. Complete the project/course of study once approved.
6. Complete the Independent Study Postscript Report and submit to the Program Office with appropriate signatures no later than 3 weeks after your project has been completed.
7. Request that your Faculty Sponsor complete the Independent Study Faculty Sponsor Form and submit it to the Program Office no later than 3 weeks after the study has been completed, Independent Study Faculty Sponsor Form.
9. Complete the Independent Study Student Evaluation of Faculty Form no later than 3 weeks after the study has been completed.
CLR0014

Integrative Prob Solving in Clin and Trans Research II

Part II of CLR0012:
This course is designed to prepare PhD in Clinical Research candidates for the mandatory written comprehensive examination. The course is comprised of problem sets reflective of foundational course work and the integration of methodology and experimental design highlighted throughout the common required course work. Students will be asked to practice their ability to critically analyze and appraise clinical/translational research data in an effort to integrate important concepts and tools learned across during required coursework.

CLR0011

Research Grant Writing Course

This course will familiarize students with the basic elements and approach to writing grants, from initial concept through institutional routing to agency submission and review. Students will select a research topic, identify a potentially fundable research problem, develop a research plan, and draft a grant application in the appropriate format of the PHS 398 form for submission to a funding agency. Each draft will be presented to the class by the students for critique and discussion. Student evaluation is based on class presentations and draft submissions; drafts produced for the course can be further revised to serve as the student’s thesis proposal. The course will include extensive discussion of the grant review process in general and NIH review. Grant applications for both investigator-initiated research projects (e.g., NIH R01, R03, R21) and mentored career-development awards (e.g., K12, K23) will be covered. The course also will consider the development of writing skills for publication and competitive grants and explore principles of research strategy in the context of requirements of funding agencies.

CLR0007

Spectrum of Methods in Clinical Research III

Methods in Clinical & Population Based Research: Part III is divided into four sections.
The first focuses on the use of specific databases & analytical programs in the conduct of clinical research. The format for this section of the course includes lecture and laboratory sessions.
The second section of the course focuses on Omics & clinical research and covers genomics, proteomics, microarray technologies, methylation arrays, and bioinformatics principles. Also covered are the clinical and genomic databases that are essential for conducting omics clinical investigations and the resources and tools for personalized medicine research. Review of the Biobank and access to the de-identified database will be provided to the student to demonstrate the use of this unique resource for conducting novel clinical investigation.
The third section of the course will provide an initial introduction to health services research, including topics concerning health care disparities, community engagement & participatory research; and comparative effectiveness research.
Finally, the last segment of the course will focus on practical aspects of clinical research including, graphic presentation of data and scientific writing as well as an overview of the nuts and bolts of securing peer review funding as well as opportunities for new clinical investigators, in particular.
The Journal Club will provide a forum for the development of critical thinking and fosters real time utilization of recently learned analytical tools and methodology. A structured format focused on dissecting and discerning the specific research question and hypothesis posed; the appropriateness of the experimental design and the nature of the statistical methods employed in a given article, is employed so as to facilitate the emergence of astute and critical readers of the scientific literature & to reinforce relevant issues being discussed in other didactic courses.

Student should register for Doctoral Thesis credits during the Fall, Spring 1 and Spring 2 of year 3. Number of credits to register each term will depend on the student’s track. Please refer to the curriculum guide or track checklist for details.

This course considers Franz Boas’ definition of culture as culture is everything but natural science.[1] Any interaction or encounter with another individual or group of individuals is in fact a cultural experience which occurs within a cultural context. Broadly, this course aims to demonstrate how culture is conceptualized, considered, and explored in a broad range of issues in the basic, clinical, and community arenas around health and illness and to distinguish the cultural context in each session. The course utilizes class room lecture and small group discussion sessions and a small group project to enable participants to integrate culturally effective approaches into the design and implementation of research across the translational spectrum that improve patient and community health outcomes and reduce health care disparities.

Course Objectives:
At the end of this course the student should be able to:
- Demonstrate an understanding of one’s own cultural context and its impact on patients, communities and on health care outcomes
- Analyze evidence of health care disparities from available resources
- Integrate culturally effective approaches into the design and implementation of research across the translational spectrum that improve patient and community health and reduce health care disparities
CLR1114

Translational Oncology: Drug Development From Discovery to Commercialization

Offered: Spring 2

This course provides a comprehensive overview of the regulatory, methodological and scientific pathways for drug development within the field of oncology. The cycle of drug development will be discussed and cover stages from drug discovery, screening, regulatory considerations and compliance, manufacturing and drug delivery, to clinical deployment. Woven into these themes are aspects related to intellectual property and commercialization.

Aside from the scientific and practical aspects of the cycle, a wider perspective on drug discovery is also illuminated. Experts in the fields of economics will share their findings on the fiscal impact of new medicines, and specialists in ethics will discuss the compassionate use of investigational new drugs.

Learning objectives:
1. To delineate the regulatory steps in drug development.
2. To understand how translational research principles can be applied to speed up the implementation of diagnostic and therapeutic interventions
3. To discuss the future trends in drug development and novel approaches for anti-cancer target discovery

CLR0610

Meta-Analysis and Systematic Reviews for Clinical Research

Offered: Spring 2

The goals of this course are to provide students with a theoretical understanding and hands-on experience in literature synthesis methods. Areas to be covered include literature searching, study selection, data extraction and synthesis. The course will provide a review of each method within an interactive computing environment. Students will have opportunities to learn how to develop an appropriate question and to use software for assignments on each topic. There will be weekly lectures plus small group sessions. Students should come to the first class prepared to propose a possible topic for systematic review or meta-analysis.
HCD
HEALTH CARE DELIVERY LEADERSHIP
FALL
HCD0730

Health Care Delivery Economics
Offered: Fall
Credits: 3

ONLY OPEN to students in the MS Health Care Delivery Leadership Program. This course provides an overview of the economics of health care delivery for industry leaders. It begins with an in-depth analysis of the structure and dynamics of the US health care system and trends in health care expenditures. We address economic perspectives and theory related to the production of health care and the supply and demand of health care services, the health insurance market, the structure of health care systems and industries through the continuum of care (medical practices, hospitals, and post-acute care providers), and health care system reform.

HCD0602

Seminar 2: Transforming/Leading Health Care: Quality Management
Offered: Fall
Credits: 2

ONLY OPEN to students in the MS Health Care Delivery Leadership Program. This intensive seminar focuses on the central elements that ensure quality throughout health care delivery systems and organizations. These elements include: An examination of patient safety management, quality improvement concepts and innovations, the clinical micro-systems approach to value and quality improvement. The seminar will allow course colleagues, faculty, and prominent guest speakers to network and collaborate. There will also be another interactive session on personal leadership development.

HCD0601

Seminar: Leading Teams
Offered: Fall
Credits: 2

ONLY OPEN to students in the MS Health Care Delivery Leadership Program. This intensive gateway seminar introduces you to key program themes and course materials. It helps frame initial themes of the program content that will follow in the online portion of the experience. The seminar will allow for ample networking and collaborative opportunities among course colleagues, faculty, and prominent guest speakers. Key themes to be explored are: leading in a disrupted health care delivery sector, understanding broad system influencers, quality improvement and evidence-based decisions in health care delivery, reform basis of the Affordable Care Act, and managing critical urban health issues. There will also be a highly interactive session on personal leadership development. Meets Full-Day Fridays: Sept, Oct, Nov/Dec. Specific dates TBD.
HCD0901

Capstone: Health Care Delivery Leadership

Offered: Fall

ONLY OPEN to students in the MS Health Care Delivery Leadership Program You will have the opportunity to work on a project that directly addresses a strategic problem in your institution, or carefully examine one of a host institution. This action learning project will enable the application and integration of course material into a coherent response and potential solution(s) to an actual health care delivery issue. These projects will form a repository of knowledge that program cohort peers can use to learn from and share.

HCD0850

Finance Essentials for Health Care Delivery

Offered: Fall

ONLY OPEN to students in the MS Health Care Delivery Leadership Program This course provides an intensive examination of financial decision-making concepts and tools critical to ensuring accountable, effective, and efficient health care delivery. Topics will intersect the domains of resource allocation, managerial accounting, and corporate finance that are most relevant to health care delivery. No previous advanced knowledge of finance is required for the course. Course topics and materials are delivered from the standpoint of equipping you with critical frameworks to support leadership-level decisions involving finance or issues with critical financial dimensions.

HCD0830

Strategy Creation for Health Care

Offered: Fall

ONLY OPEN to students in the MS Health Care Delivery Leadership Program Designed for experienced managers in a health care or related organizations, this course is an opportunity to learn how to transform organizational knowledge into a strategic management system. We will examine the uses of external environmental analysis, organizational assessment, practical research, data collection and leadership principles as the basis for the creation of strategic management and leadership tools. We will focus on the analytical dimensions of strategic thinking and planning to ensure you are exposed to the technical and conceptual elements of strategy.

HCD0830

Population Health

Offered: Fall

ONLY OPEN to students in the MS Health Care Delivery Leadership Program This course will enable you to probe the Public Health and Community/Population-Based Approach and address the core principles and functions of public health, including how this approach differs from acute care medicine, and how public functions are institutionalized in the US health care system. The course will focus upon arguments and evidence that the health status of populations is shaped not by medical care and health care policy but rather by basic social conditions that often correlate closely with class, race, and ethnicity. Interrelated topics include: status and stress; social isolation and community engagement; complex socio-clinical conditions (mental illness, HIV, substance abuse, homelessness); promotion of healthy behaviors; and the role of the ACA in advancing public health.

HCD0901

Capstone: Health Care Delivery Leadership

Offered: Fall

ONLY OPEN to students in the MS Health Care Delivery Leadership Program You will have the opportunity to work on a project that directly addresses a strategic problem in your institution, or carefully examine one of a host institution. This action learning project will enable the application and integration of course material into a coherent response and potential solution(s) to an actual health care delivery issue. These projects will form a repository of knowledge that program cohort peers can use to learn from and share.
HCD0760
Leading and Managing Health Care

Credits: 3
Offered: Spring 1

ONLY OPEN to students in the MS Health Care Delivery Leadership Program This course is designed to increase the critical leadership competencies that are essential for the leaders of the most complex health care organizations. In order for organizations to flourish in the current environment, leaders must be aware of their own idiosyncrasies, as well as their strengths, weaknesses, values, and ways they resolve conflicts. They also must excel at building and leading teams, interdependent functions, and large scale systems. Successful leaders of tomorrow must be experts in change management, labor-management relations, and strategic organizational leadership. The course will enhance what you have learned from experience through frameworks and models that will prepare you to understand the relationship between senior leadership and the health care organization's attainment of competitive advantage.

HCD0820
Health Information Systems

Credits: 3
Offered: Spring 1

ONLY OPEN to students in the MS Health Care Delivery Leadership Program The health care field is one of the most information-intensive sectors in the US economy and avoidance of the rapid advances in information technology is no longer an option. Consequently, the study of health care information technology and systems has become central to health care delivery effectiveness. This course covers the modern application of information technology that is critical to supporting the vision and operational knowledge of health care leaders. Health care decision makers must meet head-on the dynamic challenges of health care delivery, quality, cost, access, and regulatory control. In addition, this course integrates the Healthcare Information System as integral to the Quality Assurance Tracking Programs. This includes measurement of systems inputs, processes, and outputs with special emphasis on systems outcomes research and organizational accountability to its various stakeholders, notably government regulators.

HCD0860
Transformations and Innovations

Credits: 2
Offered: Spring 1

ONLY OPEN to students in the MS Health Care Delivery Leadership Program This course immerses you in best-in-class microsystems methods that organize front-line health care delivery to maximize quality, value, and flexibility for innovation. The Microsystem approaches provide defined processes and techniques which serve as an effective vehicle for implementing organizational change at the point of care. The course will focus on planning processes, tools and techniques that can be applied immediately in clinical settings. Several Mount Sinai and other hospital-based clinical microsystem innovations will be examined as detailed case studies.
Navigating Healthcare Policy Reform

ONLY OPEN to students in the MS Health Care Delivery Leadership Program. For current and aspiring health care managers, this course seeks to illuminate central components of health care policy, a critically important area. The course also examines the political forces that have created the different types of public intervention that constitute current US health care policy. It explores how the government (especially the federal government) has influenced the voluntary and private institutions in the health care system, and how public policy intervention has built up steadily since World War II. You will gain a better understanding of the policy constraints and opportunities you confront in your work. You will gain a greater ability to position yourself and your organization to influence political dynamics and policy outcomes.
SPRING 2
HCD0750
Strategic Communications in Health Care

Credits: 3
Offered: Spring 2

ONLY OPEN to students in the MS Health Care Delivery Leadership Program

Communications and marketing strategy must keep pace with rapid changes in the new health care landscape. Health care leaders and managers must understand the fundamentals of communications, marketing, and digital strategy to ensure effective delivery of health care services. The new competitive landscape requires focused attention on brand, perception of quality, and the ways to advance core functions in order for businesses to remain viable. Similarly, the use of digital and social media in personal, professional, and institutional marketing and branding are key drivers of leadership success. This course will explore these new realities and focus on critical topics.

HCD0770
Leveraging Big Data for Evidence-Based Decision Making I

Credits: 3
Offered: Spring 2

ONLY OPEN to students in the MS Health Care Delivery Leadership Program

This course is designed to provide an understanding of the analytical methods health care managers and executives need to critically interpret the findings of comparative effectiveness studies and to use hospital-derived data for assessing and improving quality of care and process performance. The course structure contains four overarching topics:

- Biostatistical and epidemiological methods for comparative effectiveness research
- Statistical process control
- The scope and limits of evidence-based medicine
- Hospital-based and public sources of health care data

Through selected readings, case studies, problem-solving assignments, on-line self-study components, and lecture presentations and discussions, you will develop a conceptual understanding of the principles and analytical tools necessary to become a critical reader of health services research literature. This will enable you to identify and adopt best practices for your institution. Moreover, it will give you the analytical skills needed for guiding quality improvement projects effectively.

HCD0840
Operations Management (Process Improvement) in Health Care

Credits: 3
Offered: Spring 2

ONLY OPEN to students in the MS Health Care Delivery Leadership Program

This course provides a solid foundation in the role of production and operations management in the health care industry. You will review the integration of human, economic and technological factors in accomplishing the operations management mission and executing the related strategies. Among the many important topics are: evidence-based medicine, balanced scorecard, statistics, forecasting, simulation, capacity planning, scheduling, location analysis for clinics, process strategy involving patient flow, supply chain management, project management, and quality control management. We will also examine the role of ethics within the framework of the operations management’s sub-functions.
HCD0901

Capstone: Health Care Delivery Leadership

Credits: 2

Offered: Spring 2

ONLY OPEN to students in the MS Health Care Delivery Leadership Program

You will have the opportunity to work on a project that directly addresses a strategic problem in your institution, or carefully examine one of a host institution. This action learning project will enable the application and integration of course material into a coherent response and potential solution(s) to an actual health care delivery issue. These projects will form a repository of knowledge that program cohort peers can use to learn from and share.
MGC
GENETIC COUNSELING
FALL
MGC3200  
Credits: 6  
Clinical Rotations  
Offered: Fall  
Only open to Genetic Counseling students.

MGC3301  
Credits: 2  
Topics in Genetic Counseling - I  
Offered: Fall  
This course is only open to Master of Genetic Counseling students. This course will provide a didactic and psychosocial approach to genetic counseling. Topics to be addressed include prenatal diagnosis and reproductive, pediatric and adult genetic counseling, population screening, ethnocultural issues, impact of genetic diseases on family systems, grief and bereavement and ethical and legal issues in genetic counseling. As the course progress, professional issues related to genetic counselors will be discussed.

MGC3303  
Credits: 2  
Topics in Genetic Counseling - III  
Offered: Fall  
This course is only open to Master of Genetic Counseling students. This course will provide a didactic and psychosocial approach to genetic counseling. Topics to be addressed include prenatal diagnosis and reproductive, pediatric and adult genetic counseling, population screening, ethnocultural issues, impact of genetic diseases on family systems, grief and bereavement and ethical and legal issues in genetic counseling. As the course progress, professional issues related to genetic counselors will be discussed.
MGC3305  
Deconstructing Inequity in Genetic Counseling  
Offered: Fall

This course examines the relationships between various personal and social identities, worldviews, cultural context in genetics and genomics research and clinical care. Students will explore differences between biology and social constructs and develop an understanding of the utility and limitations of each. They will consider the history of medical genetics and genetic counseling and unpack what norms may contribute to inequity, both in clinical care and clinical research. Students will develop an understanding of the general views of a variety of groups as they relate to genetic counseling practice as a framework from which to build cultural humility.

MGC8300  
Thesis in Genetic Counseling  
Offered: Fall

Thesis Credit for Genetic Counseling Students.

MSN5026  
Structures of Embryology  
Offered: Fall

Embryology Module of Structures Medical School Course. ONLY open to MS Genetic Counseling students
SPRING
MGC1100  
Intro to Interview & Counsel Methodology  
Offered: Spring

The course will introduce the genetic counseling students to fundamental interviewing skills and the counseling methodologies to provide the foundation for which they will build their experience. Content from this module will be applied throughout the three semesters of Topics in Genetic Counseling.

MGC1105  
Clin. Research Ethics in Gen. Counseling  
Offered: Spring

This seminar will explore the complex issues raised by human subject research. The seminar will begin with a review of some of the history of eugenics. In that light, we shall examine the policies that shape our current understanding of the ethical conduct of research and the mechanisms for research oversight that have been instituted. Through reading a broad selection of seminal articles and papers from the recent literature, we shall engage in a conceptual analysis of a number of controversial and pressing issues. We shall be discussing the moral and public policy aspects of topics such as research design, risk-benefit assessment, informed consent, research with “vulnerable” subjects, research without consent, confidentiality, inducements, conflicts of interests, disclosure of research findings, and biobank research.

MGC1400  
Medical Genetics  
Offered: Spring

This course is designed to provide students an introduction to medical genetics with an emphasis on molecular genetics, pedigree analysis, population genetics, clinical genetics, cytogenetics, and biochemical genetics. Throughout the course selected hereditary disorders will be presented, and the pertinent clinical presentation, diagnostic evaluation, pathophysiology, treatment, and counseling issues for each disorder will be discussed.
MGC3200
Clinical Rotations
Credits: 6
Offered: Spring
Only open to Genetic Counseling students. 2nd Year Genetic Counseling Students must register for this course.

MGC3302
Topics in Genetic Counseling - II
Credits: 2
Offered: Spring
This semester will continue to explore practical, didactic and psychosocial issues related to providing genetic counseling throughout the lifecycle with a specific focus on clinical pediatric and adult genetic counseling.

MGC3304
Practical Skills in Genetic Counseling
Credits: 1
Offered: Spring
This course covers a wide range of essential skills for a genetic counseling encounter through case vignettes and hands on activities prior to clinical internships. The intention is to give the exposure and the tools needed to successfully transition from a primarily didactic environment to a primarily clinic-based environment and apply knowledge to clinical training. Topics covered include: researching a variety of genetic conditions and indication types, developing a differential diagnosis, taking a medical and family history, coordination of genetic testing, case management, health literacy and risk communication. Upon completion of this course, students should have introductory proficiency in case preparation, communication, and case management. This course will additionally introduce concepts in cultural literacy and sensitivity.

MGC8300
Thesis in Genetic Counseling
Credits: 4
Offered: Spring
Thesis Credit for Genetic Counseling Students.
MHA
HEALTH ADMINISTRATION
FALL
MHA1001

Intro to the US Health Care System

This course will explore the roles and structures of medical centers, physicians, patients, insurance companies, pharmaceutical companies, device manufacturers, Medicare/Medicaid and accountable care organizations. The history and future directions of health systems will be discussed as well as legal and ethical issues and national policies and procedures such as the HIPAA and the IRB. Advantages and limitations of this system including a comparison of its quality, cost and accessibility with other systems worldwide will be explored.

MHA1002

Strategic Planning for Health Care Delivery

Designed for experienced managers in a health care or related organizations, this course is an opportunity to learn how to transform organizational knowledge into a strategic management system. We will examine the uses of external environmental analysis, organizational assessment, practical research, data collection and leadership principles as the basis for the creation of strategic management and leadership tools. We will focus on the analytical dimensions of strategic thinking and planning to ensure you are exposed to the technical and conceptual elements of strategy.

MHA1005

Health Care Delivery Economics

The intent of this course is to train future public health practitioners on the economic and political questions that emerge in the process of developing health systems. The various sessions during the course will review core economic principles applied to the role of governments, the private sector and the competitive marketplace. The course will provide an overview of traditional microeconomic theory and practice as applied to demand, supply, competition, monopoly, and social welfare. It will drill down on topics such as role of governments, private sector, market competition, government failure and market failure. Special sessions will be devoted to topics on clinical services, non-clinical services, the health care workforce, health financing, the health related manufacturing sectors (pharmaceuticals, medical technology and information technology) and leadership/health management. Students who successfully complete this course will be able to: Analyze the key policy and public health challenges faced by the US and other health care systems using economic principles, market analysis and health policy formulation. Design key policy recommendations to address some of the public health challenges faced by vulnerable population groups that are consistent with underlying economic principles economic principles, market analysis and health policy formulation. Apply the principles of economic evaluation to selected problems in the health sector and health industry verticals. The major course output will be guided, semester-long exercises in analyzing and developing strategic development plans from a public health professional’s perspective to guide political and economic decision making. The focus on health systems is a concrete means to understand the more general competencies involved in the application of economic analysis, which include political, financial, technical and organizational skills.
MHA1009  
Credits: 2  
Seminar 1: Process Improvement and Project Management Tools and Methods  
Offered: Fall  
(Lean Greenbelt)  
This active workshop-styled course will showcase effective methods to measure, analyze and improve project management and process controls in health care delivery using Project Management (PM), Process Improvement (PI) and LEAN principles. This course goes into great detail about the core methodologies of PM and PI tools and LEAN and its application to various health care scenarios. Students will be expected to actively participate in case studies and apply the PM, PI and LEAN tools and methods to achieve gains in effectiveness and efficiency in processes leading to greater optimization. Topic areas include Kaizen and Teams, Process Mapping, Flow and Pull Systems, Deployment, and measurement and control. The course meets 5 times over the course of a semester. Each meeting is schedule for 6-7 hours. 4 All-Day (9AM-5PM) Sessions on the following Fridays; September 25 and October 2 (Project Management) October 16 and 23 (Process Improvement Tools)  
*In-person options subject to COVID restrictions; may also require shifts to Zoom and/or additional dates

MHA1007  
Credits: 3  
Budgeting and Finance Essentials  
Offered: Fall  
Financial statements enable managers to evaluate the performance of an organization and assess its financial position. Budgets, based on forecasts, take the form of projected statements and serve as an important managerial tool for planning and control purposes. This course provides an introduction the accounting, budgeting and financial reporting techniques commonly used in the health care and not-for-profit environment. Emphasis is placed on enabling students to become comfortable with financial analysis, budgets and commonly-used financial terminology so that they can effectively address financial matters they will encounter in leadership roles in health care and not-for-profit organizations.
MHA2003
Seminar 2: Transforming Health Care: Quality Management
Offered: Fall

ONLY OPEN to students in the Masters Health Care Administration Program. This intensive seminar focuses on the central elements that ensure quality throughout health care delivery systems and organizations. These elements include: 1) An examination of patient safety management 2) Quality improvement concepts and innovations 3) The clinical microsystems approach to value and quality improvement. The seminar will allow course colleagues, faculty, and prominent guest speakers to network and collaborate. There will also be another interactive session on personal leadership development.

MHA2005
Population Health and Managed Care
Offered: Fall

This course will enable you to probe the Public Health and Community/Population-Based Approach and address the core principles and functions of public health, including how this approach differs from acute care medicine, and how public functions are institutionalized in the US health care system. The course will focus upon arguments and evidence that the health status of populations is shaped not by medical care and health care policy but rather by basic social conditions that often correlate closely with class, race, and ethnicity. Interrelated topics include: status and stress; social isolation and community engagement; complex socio-clinical conditions (mental illness, HIV, substance abuse, homelessness); promotion of healthy behaviors; and the role of the ACA in advancing public health.

MHA2006
Marketing for Health Care Delivery
Offered: Fall

At a strategic level, this interactive course will enable participants to: Learn the pillars of effective communication and marketing for health care delivery systems; Understand how digital tools are affecting communication and marketing across the health care sector and related industries; Recognize and understand the connections between effective communication and strategic management of health care delivery; Enhance communication and marketing strategies to improve branding, core functions, and health care quality; and Define and build elements of strategic communication and marketing plans.
MHA5001
Credits: 0.5
DiSC: Finding Your Teamwork Style
Offered: Fall

This semester skills building workshops will focus on Effective Teams. These intensive short training courses will immerse students in additional skill set areas necessary to become highly functioning and effective managers. The 5 areas of training focus will complement the substantive curriculum of the program and focus on: project management methods, Excel and SAS essentials for managers, giving professional presentations, effective time management, and creating and managing functional teams (collaboration). Students will receive expert instruction on best methods/practices related to health care delivery, practice those methods in active small group settings, and share lessons learned in each of these areas. Students will be expected to actively participate in case studies and complete a project for each short course/module.

MHA5003
Credits: 0.5
Creating Effective (High Performing) Teams
Offered: Fall

This semester skills building workshops will focus on Effective Teams. These intensive short training courses will immerse students in additional skill set areas necessary to become highly functioning and effective managers. The 5 areas of training focus will complement the substantive curriculum of the program and focus on: project management methods, Excel and SAS essentials for managers, giving professional presentations, effective time management, and creating and managing functional teams (collaboration). Students will receive expert instruction on best methods/practices related to health care delivery, practice those methods in active small group settings, and share lessons learned in each of these areas. Students will be expected to actively participate in case studies and complete a project for each short course/module.

MHA5009
Credits: 0.5
Lean Process Improvement Methods
Offered: Fall

This semester skills building workshops will focus on Effective Teams. These intensive short training courses will immerse students in additional skill set areas necessary to become highly functioning and effective managers. The areas of training focus will complement the substantive curriculum of the program and focus on: project management methods, Excel and SAS essentials for managers, giving professional presentations, effective time management, and creating and managing functional teams (collaboration). Students will receive expert instruction on best methods/practices related to health care delivery, practice those methods in active small group settings, and share lessons learned in each of these areas. Students will be expected to actively participate in case studies and complete a project for each short course/module.
MHA5010
Credits: 0.5
MS Project for Health Care Managers
Offered: Fall
This course addresses the features of Microsoft’s Project application, which is specifically designed to address the needs of project managers in professional environments. This course is intended for students who have at least some prior knowledge of project management procedures and practices. It is intended to support you in applying this knowledge through the use of Microsoft Project as a project management tool. The primary course topics include: Fundamentals, New Project Schedules, Task Types, Effort-Driven Scheduling, & Task Constraints, Working with Resources, Managing the Project Schedule, Reporting.

MHA8000
Credits: 2
Capstone
Offered: Fall
Participants will have the opportunity to work on a health care improvement project addressing an important management problem faced in either their employer's organization or in another host institution. This action learning project will enable the application and integration of Lean principles and course material into a coherent response and potential solution(s) to an actual healthcare delivery issue. These projects will form a repository of knowledge that program cohort peers can use to learn from and share. Must have 36 or more credit completed.

MHA8001
Credits: 1-3
Administrative Internship
Offered: Fall
The MHA administrative internship consists of collaboration between the student, a site supervisor/preceptor, faculty advisor and Program Director. The internship provides students the opportunity to demonstrate mastery of lessons learned in coursework and apply to an administrative fieldwork setting relevant to a student’s area of interest in health care delivery management.
SPRING
MHA1004  Credits: 3
Organizational Behavior & Human Resources  Offered: Spring

Human resource management in health organizations and the relationship between HR, organizational strategy, and organizational behavior is the focus of this course. We will analyze human work behavior at the individual, interpersonal, team, and organizational levels. Included are topics such as motivation, communication, group and team dynamics, leadership, decision-making, job and organization design, conflict management, organizational culture and identity, and organizational change. We will apply organizational behavior theory and explore the factors that affect behavior, performance, and job satisfaction of people working in organizations. The objectives of the course will be to understand the characteristics and processes of work organizations; to successfully develop management skills; to apply the skills of management and impact organizational behavior and performance.

MHA1005  Credits: 3
Health Economics  Offered: Spring

The intent of this course is to train future public health practitioners on the economic and political questions that emerge in the process of developing health systems. The various sessions during the course will review core economic principles applied to the role of governments, the private sector, and the competitive marketplace. The course will provide an overview of traditional microeconomic theory and practice as applied to demand, supply, competition, monopoly, and social welfare. It will drill down on topics such as role of governments, private sector, market competition, government failure, and market failure. Special sessions will be devoted to topics on clinical services, non-clinical services, the health care workforce, health financing, the health related manufacturing sectors (pharmaceuticals, medical technology and information technology) and leadership/health management. Students who successfully complete this course will be able to:  Analyze the key policy and public health challenges faced by the US and other health care systems using economic principles, market analysis and health policy formulation. Design key policy recommendations to address some of the public health challenges faced by vulnerable population groups that are consistent with underlying economic principles. Market analysis and health policy formulation. Apply the principles of economic evaluation to selected problems in the health sector and health industry verticals. The major course output will be guided, semester-long exercises in analyzing and developing strategic development plans from a public health professional’s perspective to guide political and economic decision making. The focus on health systems is a concrete means to understand the more general competencies involved in the application of economic analysis, which include political, financial, technical, and organizational skills.

MHA1006  Credits: 3
Health Care Informatics and Technology  Offered: Spring

This course covers the modern application of information technology that is critical to supporting operational knowledge in managing health care delivery organizations. Health care decision-makers have to meet head-on the dynamic challenges of health care delivery quality, cost, access, and regulatory control. This course integrates healthcare information systems as integral to quality initiatives including measurement of systems inputs, processes, and outputs with special emphasis on systems outcomes research and organizational accountability to various stakeholders, not the least of which is government regulators.
MHA1008  
Health Care Policy  
Credits: 3  
Offered: Spring

This course examines the intersection of healthcare and policy in private and public sectors and how they shape the structure of US institutions. Students will be exposed to the process of policymaking and learn how laws are implemented to address various aspects of healthcare including but not limited to current and future implications of the ACA, insurance and managed care and addressing the health of diverse populations.

MHA2005  
Population Health and Managed Care  
Credits: 3  
Offered: Spring

This course will enable you to probe the Public Health and Community/Population-Based Approach and address the core principles and functions of public health, including how this approach differs from acute care medicine, and how public functions are institutionalized in the US health care system. The course will focus upon arguments and evidence that the health status of populations is shaped not by medical care and health care policy but rather by basic social conditions that often correlate closely with class, race, and ethnicity. Interrelated topics include: status and stress; social isolation and community engagement; complex socio-clinical conditions (mental illness, HIV, substance abuse, homelessness); promotion of healthy behaviors; and the role of the ACA in advancing public health.

MHA5005  
Foundations of Managerial Skills: Change Management  
Credits: 0.5  
Offered: Spring

This semester skills building workshops will focus on Effective Teams. These intensive short training courses will immerse students in additional skill set areas necessary to become highly functioning and effective managers. The 5 areas of training focus will complement the substantive curriculum of the program and focus on: project management methods, Excel and SAS essentials for managers, giving professional presentations, effective time management, and creating and managing functional teams (collaboration). Students will receive expert instruction on best methods/practices related to health care delivery, practice those methods in active small group settings, and share lessons learned in each of these areas. Students will be expected to actively participate in case studies and complete a project for each short course/module.
MHA5006  
Foundations of Managerial Skills: Improving Interpersonal Communication  
Offered: Spring

Effectiveness
This semester skills building workshops will focus on Effective Teams. These intensive short training courses will immerse students in additional skill set areas necessary to become highly functioning and effective managers. The 5 areas of training focus will complement the substantive curriculum of the program and focus on: project management methods, Excel and SAS essentials for managers, giving professional presentations, effective time management, and creating and managing functional teams (collaboration). Students will receive expert instruction on best methods/practices related to health care delivery, practice those methods in active small group settings, and share lessons learned in each of these areas. Students will be expected to actively participate in case studies and complete a project for each short course/module.
SPRING 2
MHA1003
Health System Operations and Program Management
Credits: 3
Offered: Spring 2
This course is an introduction to understanding the competencies, roles, and responsibilities of public health and health managers. Health organizations, which are complex and changing in response to community needs and changing environments. The skills required to establish and maintain organizational culture and organizational change, talent and team management. Through readings, class discussion, and analysis of case studies, you will explore and identify key management and leadership challenges affecting public health and health; formulate and evaluate alternative solutions to problems; and learn to present your analysis of managerial plans and proposals, orally and in writing. The course will emphasize skill development in the management of mission, strategy, operations, and the business aspects of health organizations.

MHA1007
Budgeting and Finance Essentials
Credits: 3
Offered: Spring 2
Financial statements enable managers to evaluate the performance of an organization and assess its financial position. Budgets, based on forecasts, take the form of projected statements and serve as an important managerial tool for planning and control purposes. This course provides an introduction the accounting, budgeting and financial reporting techniques commonly used in the health care and not-for-profit environment. Emphasis is placed on enabling students to become comfortable with financial analysis, budgets and commonly-used financial terminology so that they can effectively address financial matters they will encounter in leadership roles in health care and not-for-profit organizations.

MHA1008
Health Care Policy
Credits: 3
Offered: Spring 2
Why did U.S. health reform pass in 2010 when historically large scale reform of this magnitude has been blocked? How will the states implement health reform and will it be defeated through a constitutional challenge? Why is HIV prioritized over other health areas even though the global burden is lower than other diseases? How are new public-private partnerships transforming the financing of health systems? This course aims to assist students in understanding how political processes shape health policy and health outcomes both domestically and internationally.

Through an introduction to theoretical and applied concepts in public policy and political science, students will learn how to assess the political feasibility of different health policy options and how to craft persuasive policy briefs targeting decision makers at all levels of government. In addition to theoretical material, the course will draw on insights from a concrete set of case studies across a variety of health policy topics including: the politics of health reform in the U.S., global health agenda setting, and health system strengthening in developing countries among other topics.
MHA2002 Credits: 3
Leadership, Ethics, and Professionalism in Health Care Offered: Spring 2

This course provides students with an understanding of what makes an exceptional leader. This course explores and builds competencies in leadership, management, ethical behavior and professionalism in health care. Over the 12-weeks, students will be exposed to leadership and management theories, critical leadership behaviors which shape culture and the key skills required for leadership and management development. Students will also explore the intersection of leadership authenticity and ethical behavior as well as professionalism in health care. Students will learn from real world case studies and experiences faced by health care leaders every day.

MHA2001 Credits: 3
Quant Methods/Data for Decision Making Offered: Spring 2

While health care innovations offer unprecedented opportunities to improve health and reduce suffering, they also disrupt traditional care processes and put stresses on the health care delivery system. With the increasing use of electronic medical record for patient care and availability of administrative databases at national, state, and local levels, data used for decision-making in healthcare are abundant. Using these data sources, there have been numerous studies documenting unexplained variations in practice and patient outcomes, with unacceptable rates of medical errors and inefficiencies in health care delivery. These challenges require major changes in the way we measure the value of health care delivery and subsequently use this information to improve its effectiveness and efficiency. To meet these challenges, this course trains students in developing, analyzing, and disseminating evidence that can guide clinical and organizational decision-making toward improvements in the quality, safety, infection control, ‘appropriate’ use, outcomes and efficiency of care delivered in the health care delivery systems.

MHA2006 Credits: 3
Marketing for Health Care Delivery Offered: Spring 2

This course examines the role of marketing in various healthcare settings. With an emphasis on the perspective of the consumer, students will gain the tools to effectively complete tasks such as market research, understand the role of segmentation in the current market, and master a number of marketing-communications strategies. Additional core topics will include, but not be limited to, Branding (and creative implementation), PR and Crisis Management, Advertising, Digital Marketing, Social Media, Content Marketing, Physician Marketing.
MHA5007  
Credits: 0.5  
Offered: Spring 2

Excel for Healthcare Administrators

This course will primarily cover the following intermediate-level excel topics: Data Consolidation/Cleanup, Shift-Payroll-Scheduling, Revenue, Expense, and Loss Analysis (+pivot tables), Quality Improvement (QI) Initiatives, Creating Dashboards (and reports for clinical decisions), and Inventory Management. As a pre-requisite to this course, you would need to have a good working knowledge of the basics of Excel functions. If you do not have this level of familiarity, then contact the program director to discuss options.

MHA5008  
Credits: 0.5  
Offered: Spring 2

Project Management Part 2

This course will provide a comprehensive explanation of the methods, structure, tools and techniques of project management. It will be organized around the most recent categorization of a project: beginning with the formulation of a project team and ending with delivery of the project outcome to the organization.

- Selecting the project from alternatives
- Roughing out project implementation
- Planning in detail
- Using and modifying the plan
- Ending the project with delivery of value

Participants are expected to have some project management experience.

Topics and tools will include: the project charter, the work breakdown structure, network diagram, schedule, risk plan, delivery of the project outcome and close out of the project. An introduction to Agile and to the assessment tools aimed at selecting the methodologies best suited to a specific project will be covered. Participants will have the opportunity to apply the project processes to their own projects.

Typical project problem areas will also be discussed. Ways to avoid and deal with them will be reviewed and practiced. The instructor will analyze factors such as urgency, lack of definition and changing requirements and with the participants develop counter measures.

MHA8001  
Credits: 1-3  
Offered: Spring 2

Administrative Internship

The MHA administrative internship consists of collaboration between the student, a site supervisor/preceptor, faculty advisor and Program Director. The internship provides students the opportunity to demonstrate mastery of lessons learned in coursework and apply to an administrative fieldwork setting relevant to a student's area of interest in health care delivery management.
FALL
MPH0001
Credits: 1
Introduction to Public Health
Offered: Fall
This introductory course will provide a broad overview of public health - its history, triumphs and challenges, as well as its prospects for the future. We cover fundamental public health concepts to guide your studies and careers. A principal goal of the course is to give students an understanding of the function of public health as a powerful set of tools to improve the health and achievement of populations. Guest speakers include a diverse array of professionals from various disciplines to provide students with a sense of the breadth and depth of public health as well as a sense of the extraordinary range of career opportunities that exist in this dynamic field.

MPH0007
Credits: 3
Social Justice in Public Health and Medicine
Offered: Fall
Justice is a major concern in theoretical ethics and political philosophy and a huge literature is devoted to trying to explain just what it entails. In this course our aim will be to examine a broad spectrum of issues in medicine, medical research, and public health that raise questions about justice. In light of these critical examples, we shall review and critique an array of philosophical views on justice. Throughout the seminar we shall be engaged in two activities: (1) using clinical dilemmas and health policies as touchstones for developing a clear understanding of justice, and (2) developing an understanding of how theories of justice apply in different public health and medical contexts. By going from practice to theory and from theory back again to practice we shall advance our understanding of the theoretical literature as well as the requirements of justice in public health, medicine and other areas of the social world. This course will begin with an examination of the allocation of medical resources that raise questions about justice. It will then move on to examine contemporary work on justice and review of some theoretical work by authors who focus their attention on justice in medicine (e.g., Norman Daniels and Paul Menzel). As the seminar progresses, we shall develop an understanding of how the U.S. happens to have developed the mechanisms that we now have for the delivery of health care. We shall examine how medical resources are actually distributed here, elsewhere, and globally, and in various contexts. We shall consider ways in which those allocations do and do not express justice. We shall also explore some of the problems that become apparent when you attend to the special needs of social groups (e.g., the poor, children, women, the elderly, African-Americans) and examine dilemmas and conflicts that are raised by issues such as the treatment of premature and compromised neonates and resource allocations during the COVID-19 pandemic.

MPH0012
Credits: 3
Advocacy in Action: How to Solve Problems in Public Health
Offered: Fall
How do we turn public health theory into meaningful change in the world? How can you do the most good for the problem you care about? The answer exists! This course will review fundamental concepts in public health practice and translation into successful actions. These concepts and practices can guide program and policy developments in the service of helping populations, and they accommodate variables including the scope of the efforts, the level of involvement of the population, the utilization of other stakeholders and the sustainability of the efforts. Students will develop their own advocacy project proposals. Empowering other people starts with empowering oneself. Pre-requisite: Completion of 1-2 terms in the Program.
MPH0014
Program Planning
Credits: 3
Offered: Fall
Students will learn to design an evidence-based and culturally appropriate public health program, in both US and developing country contexts. Specifically, students will gain competence in analyzing local needs and resources; developing an evidence-based and technically and programmatically sound causal pathway; articulating program objectives; designing relevant program partnerships and technical components; and designing the program’s monitoring and evaluation plan, implementation plan and budget. Pre-requisite: Completion of 1-2 terms in the Program.

MPH0018
Current Topics in Public Health
Credits: 3
Offered: Fall
This course focuses on how mathematical models can be used to help inform public health decisions. Over the course of the semester, we will examine how the SAR-CoV-2 spread around the world. We will also explore what happened in the US, how our current disease monitoring structure is set up, and how it shapes our policies and decisions making on the local, state and federal in US. This is will be done with a goal of developing a mathematical model to make inference in high uncertainty situations. Prerequisite: MPH 0300 Introduction to Biostatistics

MPH0021
Seminar in Applied Preventive Medicine
Credits: 3
Offered: Fall
This weekly seminar focuses on current local, national, and international issues in public health and preventive medicine. Discussions center on critical review of new published literature in public health and include topics related to health policy, economic and legal issues, and the impact of these issues on the health of populations. There will be didactics on public health ethics, risk communications and preventive medicine research as well as critical review of enrolled student research or theses. On a rotating basis, each student is responsible for setting the agenda and chairing seminar discussions. Pre-requisites: MPH0400 Introduction to Epidemiology MPH0300 Introduction to Biostatistics Students who are not Residents in the Department of Preventive Medicine must receive permission from Course Director prior to enrolling in this course.

MPH0023
Culminating Experience Seminar
Credits: 1
Offered: Fall
Students must have their Culminating Experience Statement of Support and Project Outline submitted to the Program Office before starting this course. This seminar is designed for second year students who will be completing a Culminating Experience (thesis, manuscript or capstone). These words are more than a paper - They are major independent projects that requires you to design, implement, and present professional work of public health significance. This course will help you design your Culminating Experience, start writing, and give and receive feedback from peers. The course is heavily interactive. We will work with materials provided primarily by the students. By the end of the term, you should be ready to complete your Culminating Experience. Pre-requisites: MPH0320 Research Methods
MPH0029  
Leadership & Professionalism in Public Health  
Offered: Fall  
The training explores key concepts and principles of public health leadership, teamwork, and professionalism, including but not limited to effective communication, working effectively in interprofessional teams, cultural competency, problem solving, negotiation, and mediation skills. The purpose of the training is to practice the skills necessary to be effective leaders and advocates for public health solutions to complex problems in varying organizations and settings.

MPH0095  
Independent Study for Public Health  
Offered: Fall  
An Independent Study is an elective option, providing the student with an opportunity to delve more thoroughly into an area of public health of specific interest to him/her. An Independent Study Proposal should be submitted at least six weeks prior to the anticipated start of the proposed project/course of study. This is to ensure that the goals meet the overall objectives of the Master of Public Health Program before a student commits any time and energy. Approval, when granted, is conditional upon the student completing all of the outlined requirements. The student must submit a Postscript Report and request that the faculty sponsoring the Independent Study complete the Evaluation Form. Final credits are awarded at the end of the project by approval of the Program Director. Three credits are the maximum number of credits that may be awarded to any Independent Study. One credit represents approximately 45 hours of work. Please note that students will not receive any more than three credits for one project/course of study. Each student may complete no more than two independent study projects. An Independent Study must be a unique experience. Material covered during an independent study project should be highly targeted and not simply a review of the regularly offered coursework. Independent study projects should not be attempts to take MPH courses that are offered routinely during the academic year. Students should not expect an Independent Study project to exempt them from required courses without approval by the Specialty Track Advisor and the Program Director. Please see the Student Handbook for the full policy and procedures associated with the Independent Study option.

MPH0092  
Applied Practice Experience  
Offered: Fall  
For students who matriculated in or after Fall 2017. The Applied Practice Experience provides the student with an opportunity to translate theory into practice within a public health setting. The Applied Practice Experience Proposal must be submitted to the Office of Public Health Practice for approval prior to the beginning of the experience. Students who matriculated in the Fall 2017 term or later will register for MPH0092 to satisfy the fieldwork requirement. Pre-requisites:  Applied Practice Experience Proposal Students should complete at least 15 credits of MPH coursework before starting the Applied Practice Experience.
Comparative Health Systems

The recent introduction of the Affordable Health Care Act and further proposed reforms under the American Health Care Act has had and will continue to have a major impact on the delivery of healthcare in the USA. The course will review major trends in health care in the US and use a comparative health systems approach to explore reform options based on what has worked well and not so well in both the USA and other OECD countries like the UK, France, Germany, Canada, and Australia. The course will explore each country’s geography and culture, the history of its health system, followed by a detailed analysis of evaluation of cost, quality, access and innovation. The course is designed to be accessible by students of health administration, public health, nursing and other allied health professions. A major course output will be a guided, semester-long exercises in analyzing a health system. Students select a term project for expanding coverage for poor and vulnerable populations in a sample country of their choice. The course will use a health systems approach to strengthen more general competencies in the application of systems analysis, using political, financial, technical and organizational skills. The course will be particularly useful for students that may want to transition to a high level policy career or executive leadership and management role within health system.

Thesis: Masters in Public Health

Students who are completing a Master’s Thesis should register for MPH 0099 in their last term before degree conferral, while preparing to submit their Thesis. Please refer to the MPH Culminating Experience Guide as a resource for the steps that need to be taken to fulfill the Culminating Experience requirement.

Culminating Experience

Students who are completing a First Author Manuscript or Capstone should register for MPH0097 Culminating Experience (students who are completing a Master’s Thesis should register for MPH0099 only). Students register for their Culminating Experience in their last term before degree conferral, while preparing to submit their First Author Manuscript or Capstone. Please refer to the MPH Culminating Experience Guide as a resource for the steps that need to be taken to fulfill the Culminating Experience requirement.
### MPH0215

**Credits: 2**

Emerging Iss. Women Sex & Reproductive Health and Rights

Offered: Fall

Sexual and Reproductive Health and Rights (SRHR) of women are integral to their overall health and wellbeing. According to the United Nations Population Fund (2021), “a woman who has control over her body is more likely to be empowered in other spheres of her life. A woman, an adolescent girl, with little bodily autonomy is less likely to have control over her home life, her health and her future, and less likely to enjoy her rights.” Multiple theoretical frameworks will be presented to explore pertinent SRHR issues including body autonomy, gender identity and gender roles, LGBTQ health, women and Covid-19, gender-based violence and abortion. Special emphasis will be placed on discussing the impact of poverty, ethnicity, class and institutional racism experienced by many marginalized populations which may deprive them from seeking and obtaining adequate health information, access to quality health services and free to fully participate in the expression of their sexuality.

### MPH0201

**Credits: 3**

Introduction to Socio-Behavioral Health

Offered: Fall

This core course provides an overview of the social and behavioral sciences and their importance in the interdisciplinary field of public health. A primary emphasis is on the social determinants of health, the social ecological model, its application to public health issues, and its use in the development of policies, strategies, interventions and programs. The course content will introduce students to several relevant social and behavioral theories as well as a range of community health assessment and planning models used by public health professionals in both domestic and international venues. In addition, some lectures will focus on social networks, social support and community capacity building. Finally, a few lectures are reserved to provide students with insight into public health policy and health outcomes. Through a series of assignments, students will enhance their knowledge and awareness of the role of social and behavioral sciences in public health and its relevance to their specific discipline.

### MPH0121

**Credits: 1**

Capstone Seminar in Health Care Management

Offered: Fall

This course is will assist students in designing and implementing their capstone project. Students will examine the formulation and implementation of business strategies in health organizations, models of strategic management and change, and the role of stakeholders in the strategic management process. They will also review specific analytical tools used in strategy formulation and presentation. Pre-requisite: Completion of first year in the Health Care Management track. This course is limited to students entering their second year in the Health Care Management track.
MPH0411
Credits: 1
Journal Club for Health Professionals
Offered: Fall
This intermediate level Journal Club builds upon the Introductory Journal Club, training students in the presentation of articles relevant to the public health specialties of environmental, occupational and preventive medicine. Each student will be assigned a week to be responsible for selecting and presenting an article relevant to their area of specialization. The student may decide to invite a Mount Sinai faculty expert in the particular topic to provide additional commentary on the article. Prior to class, all students are required to read the article and complete a short critique form. All students are expected to participate in class discussions. Pre-requisites: MPH0400 Introduction to Epidemiology MPH0300 Introduction to Biostatistics Students must be currently licensed health professionals, however if they are not currently licensed they must obtain the approval of the Course Director to enroll. The Club meets once a month for the academic year. This course is graded on a Pass/Fail basis.

MPH0400
Credits: 3
Introduction to Epidemiology
Offered: Fall
This course meets on both Tuesdays and Thursdays. This introductory course focuses on the fundamental concepts of epidemiology and its application to the field of public health. The course will provide students with an insight to epidemiologic methods and how they can be used to study health outcomes in human populations. Students will learn the elements of epidemiology, such as causation, study design, measures of effect, and potential biases. Practical and theoretical training will include lectures, small group discussions, and readings.

MPH0300
Credits: 3
Introduction to Biostatistics
Offered: Fall
This course provides an introduction to the principles underlying biostatistical methods and their application to problems in epidemiology, public health and clinical research. Students will learn about basic probability distributions, descriptive statistics, presentation of data, hypothesis testing principles, and the specific hypothesis tests and analytic methods for a variety of data types. These analytic methods will include t tests, chi-square tests, nonparametric tests, correlation, regression, and basic survival analysis methods. Students will have the opportunity to apply these methods to sample data both via direct calculation and using SAS statistical software. Each week, a one-hour laboratory session will reinforce material from lecture with additional examples and instruction in use of the SAS software. Methods for determining sample size and power for a variety of commonly used study designs will also be presented, as will measures of the accuracy of diagnostic and screening tests.
MPH0425  
Credits: 3  
Epidemiology IV  
Offered: Fall

The course will cover substantive and methodological issues in the epidemiology of cancer. Students will be presented with examples of descriptive and analytical epidemiology studies of the main types of cancer; aspects such as cancer registration and its contribution to epidemiology research, estimates of attributable fractions, the global burden of cancer, and preventive strategies will be also addressed. The course will complement the series of methodological courses offered within the epidemiology track, by providing an introduction to research in cancer epidemiology and control. Pre-requisite: MPH 0400 Introduction to Epidemiology Pre-requisite/co-requisite: MPH0412 Epidemiology II

MPH0421  
Credits: 2  
Research Seminar in Epidemiology  
Offered: Fall

This course is designed for second year MPH students in the Epidemiology track to provide direction and support for the development of their research proposal in preparation for the submission of the capstone project. To participate in this course, students must have identified a capstone advisor and a general area for their capstone project. Class activities will include: student-directed discussions of peer-reviewed journal articles in their capstone-related area of interest; presentations by MPH program graduates on his or her experience completing the capstone process; and student-prepared presentations of their capstone research proposal. Discussions about how to lead a productive journal club, issues related to preparing a good research proposal, and how to prepare effective PowerPoint presentations and other data-reporting formats will be part of the course experience. Outside readings will be assigned as appropriate for the in-class discussions/presentations. This course meets in the Fall and Spring I term. Fall registration only. Pre-requisite: This course is restricted to second-year students in the Epidemiology Track.

MPH0416  
Credits: 3  
Cancer Epidemiology  
Offered: Fall

The course will cover substantive and methodological issues in the epidemiology of cancer. Students will be presented with examples of descriptive and analytical epidemiology studies of the main types of cancer; aspects such as cancer registration and its contribution to epidemiology research, estimates of attributable fractions, the global burden of cancer, and preventive strategies will be also addressed. The course will complement the series of methodological courses offered within the epidemiology track, by providing an introduction to research in cancer epidemiology and control. Pre-requisite: MPH0400 Introduction to Epidemiology Pre-requisite/co-requisite: MPH0412 Epidemiology II
Humans come into contact with chemicals every day. The computer on which you're reading this contains phthalates and brominated flame retardants - chemicals associated with endocrine disruption that are potentially carcinogenic. The fruits and vegetables we consume hold residual pesticides. Does this make them dangerous? How do public health professionals determine risk and how to best manage risk? Further, how do public health professionals communicate these risks in an evidence-based way to not falsely reassure or unnecessarily alarm people? This course introduces the major concepts in environmental exposure assessment and risk assessment - key topics for public health practitioners. Students will learn how common environmental exposures at home and in the workplace are identified and measured in different media (air, water, soil, consumer products) and how those data are used to characterize and quantify risk. The course will also cover basic risk management and communication, as well as strategies of effective risk communication with various stakeholders. The course will have traditional lectures, coupled with class discussions and activities to enhance learning of the topic and build practical skills for public health practice. Public health practitioners will be invited as guest lecturers to discuss how they conduct exposure assessments and/or risk assessments in their work as public health professionals. Students will complete several short assignments that integrate topics discussed in class through hands-on learning and online resources. The course will also include a final exam. Pre-requisites: MPH0500 Introduction to Environmental Health or MPH0522 Clinical Occupational & Environmental Medicine Recommended Co-requisites (optional): MPH0515 Toxicology

Environmental and occupational exposures known to cause human disease are examined from the public health framework of exposures and etiology, clinical diagnosis, and prevention. Regulatory and other approaches to prevent and reduce exposure will be discussed. Important public health and policy implications of workplace and environmental exposures will be examined. This course can fulfill the MPH 0500 Introduction to Environmental Health course requirement. The course is targeted toward those training or working in health care, and is limited to residents, physicians and medical students, except with the permission of the Course Director.

This course provides an introduction to the major concepts and principles of global health with particular emphasis on neglected populations. The course provides students with an understanding of the principles of health within the context of development, human rights, and globalization, and provides an appreciation of the varied challenges and controversies. Students will learn about the establishment of global health priorities, developing an appreciation for issues related to underserved populations. Students will learn about the major players in the global arena and challenges of financing. A multidisciplinary approach is used to discuss the major determinants of health and disease with particular emphasis on the relationship between health and socioeconomic development. At the end of the course, students will be introduced to the most important challenges and variables of global health and their interactions. They will be prepared to advance to more specific and in-depth courses of the Global Health Track. A high level of classroom participation with active contributions to classroom discussion and debate will be expected.
MPH0703  
Credits: 3  
Global Mental Health  
Offered: Fall

“There is no health without mental health.” While millions of people struggle with mental disorders, sufferers in resource-limited areas receive little or no treatment. This course will describe how to strategically approach global mental health planning and implementation for scaling up mental health services within a public health framework. It will rely on a model known as the Wheel of Global Mental Health, which encompasses seven interdependent elements that together encompass the goals, resources, and dynamics integral to scaling up. Questions raised by the COVID-19 pandemic can also be expected to shape this year’s course.

MPH0713  
Credits: 2  
Health & Human Rights: Human Rights Abuses, Torture & its Consequences  
Offered: Fall

Human rights abuses are pervasive and have both obvious and subtle health consequences. They also need to be understood from different angles: how they affect individual health (including psychological health) as well as population and community health; how human rights abuses involve ethical, scientific, political, social, and cultural considerations; and how the field of public health can address human rights abuses in multiple ways, including advocacy and testimony, influencing health-related practices, education, documentation and accumulation of data. This course is designed to raise students’ awareness of human rights abuses and their effects on health; to describe how human rights abuses adversely impact health; to introduce the epidemiology of human rights abuses; and to consider how disciplines within Public Health can address (and sometimes participate in) human rights abuses. The course covers the ethical and political foundations of Human Rights, how we know human rights abuses are occurring (especially the epidemiology of human rights abuses), and specific health ramifications of pandemics, torture, forced migration and disparities. In addition, public health implications of human rights abuses will be discussed around special topics: pandemic response, children, gender, human rights law, and the role of health care providers in human rights abuses (from overt examples of participation in torture and genocide to more complex realms where public health imperatives may conflict with human rights, as with some forms of public health surveillance).

MPH0802  
Credits: 2  
Statistical Computing with SAS  
Offered: Fall

This course provides students with the skills needed to utilize SAS systems for data management in order to prepare datasets for statistical analysis. In addition, procedures that are used to conduct basic statistical analyses and produce graphical output will be covered. Students will be given hands-on training using sample data provided by the instructor as well as (optionally) data from their own work. Recommended Co-requisite or Pre-requisite: MPH0300 Introduction to Biostatistics
SPRING
MPH0002

Public Health Surveillance

Public health surveillance is the ongoing systematic collection, analysis, and interpretation of data to prevent and control disease. This course will introduce students to local, national and global surveillance systems, including NHANES, BRFSS, NYC Community Health Survey. Through class lectures, demonstrations and lab assignments students will link health data to public health practice. The course is a requirement for students in the Health Promotion Disease Prevention track.

MPH0023

Culminating Experience Seminar

This seminar is designed for second year students who will be completing a capstone for their Culminating Experience. These words are more than a paper - They are major independent projects that requires you to design, implement, and present professional work of public health significance. This course will help you design your Culminating Experience, start writing your works, and give and receive feedback from peers. The course is heavily interactive. We will work with materials provided primarily by the students. By the end of the term, you should be ready to complete your Culminating Experience. Pre-requisites: MPH0320 Research Methods or MPH0720 Preparation for Global Health Fieldwork Students must have their Culminating Experience Statement of Support and Project Outline submitted to the Program Office before registering for this course.

MPH0092

Applied Practice Experience

For students who matriculated in or after Fall 2017 The Applied Practice Experience provides the student with an opportunity to translate theory into practice within a public health setting. The Applied Practice Experience Proposal must be submitted to the Office of Public Health Practice for approval prior to the beginning the experience. Students who matriculated in the Fall 2017 term or later will register for MPH0092 to satisfy the fieldwork requirement. Pre-requisites: Applied Practice Experience Proposal Students should complete at least 15 credits of MPH coursework before starting the Practicum.
MPH0095

Independent Study for Public Health

Credits: 1-3
Offered: Spring 1

An Independent Study is an elective option, providing the student with an opportunity to delve more thoroughly into an area of public health of specific interest to him/her. An Independent Study Proposal should be submitted at least six weeks prior to the anticipated start of the proposed project/course of study. This is to ensure that the goals meet the overall objectives of the Master of Public Health Program before a student commits any time and energy. Approval, when granted, is conditional upon the student completing all of the outlined requirements. The student must submit a Postscript Report and request that the faculty sponsoring the Independent Study complete the Evaluation Form. Final credits are awarded at the end of the project by approval of the Program Director. Three credits are the maximum number of credits that may be awarded to any Independent Study. One credit represents approximately 45 hours of work. Please note that students will not receive any more than three credits for one project/course of study. Each student may complete no more than two independent study projects. An Independent Study must be a unique experience. Material covered during an independent study project should be highly targeted and not simply a review of the regularly offered coursework. Independent study projects should not be attempts to take MPH courses that are offered routinely during the academic year. Students should not expect an Independent Study project to exempt them from required courses without approval by the Specialty Track Advisor and the Program Director. Please see the Student Handbook for the full policy and procedures associated with the Independent Study option.

MPH0097

Culminating Experience

Credits: 3
Offered: Spring 1

Students who are completing a First Author Manuscript or Capstone should register for MPH0097 Culminating Experience (students who are completing a Master’s Thesis should register for MPH0099 only). Students register for their Culminating Experience in their last term before degree conferral, while preparing to submit their First Author Manuscript or Capstone. Please refer to the MPH Culminating Experience Guide as a resource for the steps that need to be taken to fulfill the Culminating Experience requirement.

MPH0099

Thesis: Masters in Public Health

Credits: 3
Offered: Spring 1

Students who are completing a Master’s Thesis should register for MPH0099 in their last term before degree conferral, while preparing to submit their Thesis. Please refer to the MPH Culminating Experience Guide as a resource for the steps that need to be taken to fulfill the Culminating Experience requirement.
MPH0111

Organizational Behavior & Human Resources

Human resource management in health organizations and the relationship between HR, organizational strategy, and organizational behavior is the focus of this course. We will analyze human work behavior at the individual, interpersonal, team and organizational levels. Included are topics such as motivation, communication, group and team dynamics, leadership, decision-making, job and organization design, conflict management, organizational culture and identity, and organizational change. We will apply organizational behavior theory and explore the factors that affect behavior, performance, and job satisfaction of people working in organizations. The objectives of the course will be to understand the characteristics and processes of work organizations; to successfully develop management skills; to apply the skills of management and impact organizational behavior and performance.

MPH0105

Health Economics

The intent of this course is to train future public health practitioners on the economic and political questions that emerge in the process of developing health systems. The various sessions during the course will review core economic principles applied to the role of governments, the private sector and the competitive marketplace. The course will provide an overview of traditional microeconomic theory and practice as applied to demand, supply, competition, monopoly, and social welfare. It will drill down on topics such as role of governments, private sector, market competition, government failure and market failure. Special sessions will be devoted to topics on clinical services, non-clinical services, the health care workforce, health financing, the health related manufacturing sectors (pharmaceuticals, medical technology and information technology) and leadership/health management. Special attention will be paid to the implication of the Covid 19 crisis for the economic function and performance of health care system and its major components. The major course output will be guided, semester-long exercises in analyzing and developing strategic development plans from a public health professional's perspective to guide political and economic decision making. The focus on health systems is a concrete means to understand the more general competencies involved in the application of economic analysis, which include political, financial, technical and organizational skills. The course will link to the ongoing health care reform debate to help participants understand the underlying economic issues raised by the reforms.
MPH0212  
Credits: 2  
Life Cycle of Violence: Implications for Public Health  
Offered: Spring 1

According to Healthy People 2020, “Acts of violence are among the top 15 killers of Americans of all ages.” Once thought of solely as a criminal justice issue, violence prevention and intervention have been embraced as a major public health issue. The television drama, Law and Order: Special Victims Unit (SVU), claims to be “fictional” and states that their show “does not depict any actual person or event.” Yet many episodes strongly resemble real-life situations “ripped from the headlines,” with a few added twists and turns to enhance the plot! Students will view SVU episodes and read peer reviewed articles to guide interactive discussions on the impact of violence over the course of the lifespan on health and wellbeing. Insights from this course will drive more thoughtful and informed practice when working with this important leading health indicator.

MPH0211  
Credits: 2  
Substance Abuse & Public Health  
Offered: Spring 1

Substance abuse is epidemic across NYC and the country. Approximately 20.6 million people ages 12 and over struggle with substance abuse or addiction. Substance abuse is a public health crisis and touches the lives of children, adolescents, and adults across all racial, ethnic, and socioeconomic backgrounds. The course will explore the intersection of Substance Abuse and Public Health. Topics include substance abuse and mental illness, tobacco control, the epidemic of substance abuse in NYC, marijuana and teens, decriminalizing drug use, overdose in the ER, binge drinking on college campuses, environmental and genetic risk factors for opioid addiction, as well as other topics. This problem-based course will be seminar style with experts as well as an emphasis on exposure to recovering addicts coupled with evidence-based practice, policy, and research. Students may attend an AA or NA meeting. At the end of the course, they will present on a controversial area of addiction. Students who successfully complete this course will be able to: Assess the social, cultural, political, economic, and environmental factors that promote or prevent substance abuse in an individual or community. Design an intervention or program to prevent or manage substance abuse on a population level. Identify the behavioral and neurobiological effects of substance abuse.

MPH0120  
Credits: 3  
Managed Care & Healthcare Reform  
Offered: Spring 1

Following a brief survey of the 3000 year history of insurance, the course will focus on health insurance and reform in this country before examining the variety of techniques used by managed care organizations and various national health systems to balance health expenditures, access and quality of healthcare. Through weekly Socratic-type discussions about contemporary healthcare controversies, the course will help develop students’ critical thinking about health policy alternatives and managerial decision-making. Feedback on short weekly essays, student presentations, and a final essay will help students improve their written and presentation skills.
Qualitative research involves the collection and rigorous analysis of observations, interviews, and other records of human activity so that we can come to a richer understanding of structures, processes, and perspectives that drive or shape human behavior, particularly when it comes to health. This course is designed to introduce students to qualitative research methods and will use a combination of didactic, interactive, and applied techniques to teach knowledge and skills relevant to qualitative research. The course emphasizes practical skills of qualitative research design, data collection (i.e., interviewing, focus group facilitation) and data analysis. By the end of the course students will develop skills in how to formulate appropriate qualitative research questions, determine which qualitative data collection method is most appropriate, collect qualitative data using interviews and focus group discussions, and analyze qualitative data. Students will be exposed to different styles of presenting qualitative research results and will consider different ways in which qualitative data is used in practice.

Epidemiology is the study of the distribution and determinants of health-related states and events in specified populations, and the application of this knowledge to control health problems. This course will introduce students to concepts that guide the design and analysis of various epidemiologic study designs, including counterfactuals, confounding, effect measure modification, measurement error and bias, as well as practical considerations. In parallel with lectures and assigned readings, lab sessions will guide students through applications of these concepts, including constructing causal diagrams and using SAS software for epidemiologic analysis. Pre-requisites: MPH0400 Introduction to Epidemiology MPH0300 Introduction to Biostatistics Basic SAS proficiency

Mental health is a critical component for high quality of life. Poor mental health is in and of itself aversive, and can lead to poor physical health and in some cases even death. The purpose of this course is to develop understanding modern conceptualizations of mental health on a population level. This will be accomplished by: studying mental health within the context of its historical perspectives, providing foundational learning on the major classifications of mental health disorders and their impact on society, and providing insights into what is, and what factors lead to, “good” or positive mental health. Pre-requisites: MPH 0400 Introduction to Epidemiology
MPH0419

Credits: 3

Environmental and Occupational Epidemiology

Offered: Spring 1

This course focuses on the fundamentals of epidemiological methods specific to environmental and occupational health research. The course will provide students with an insight to appropriate study designs and methodologies to investigate health effects of environmental and occupational exposures in different settings. These include essential concepts involved in generating research hypotheses, as well as environmental and occupational health specific issues such as use of exposure biomarkers, exposure sampling and modeling of exposures, study design issues, confounding and other types of bias, and phenotyping issues as they relate to environmental and occupational factors. We will also review novel data analytic strategies unique to environmental and occupational health (e.g., exposure mixtures), the nascent field of exposomics, and the interpretation of the study findings and public health implications for environmental and occupational epidemiological research. The students will also learn the techniques for critical appraisal of environmental and occupational epidemiological studies. These are achieved through lectures with in-depth discussion of current research status on environmental and occupational epidemiology, readings, homework assignments, mid-term exam, hands-on statistical analysis workshops, and a final project.

MPH0500

Credits: 3

Introduction to Environmental Health

Offered: Spring 1

This course provides an overview of important topics in environmental and occupational health. The classroom sessions will focus on the health effects of exposures arising from air, water, food, work, built environment, and climate change. Case studies, current events, and relevant public health data tools will be emphasized. Small group sessions will allow students to explore and interpret environmental health data and discuss this data in context of common environmental public health case studies. Applicable principles of risk communication, toxicology, environmental epidemiology, and preventive medicine, as well as fundamentals of occupational and environmental laws and regulation will be discussed. The course provides basic underpinnings of the theory and practice of environmental health, and provides a structural framework for thinking about the field as a public health discipline.

MPH0707

Credits: 3

Humanitarian Aid in Complex Emergencies

Offered: Spring 1

This is an upper level global health course informed by the course director’s experience as advisor to the Director-General of the World Health Organization. This course will explore current public health and humanitarian crises and address the tensions between aid practitioners and academics, between countries and international agencies, health and human rights using historical and current case studies of outbreaks, armed conflict, natural disaster, and climate change. Students will develop critical thinking and hone written communication skills such as opinion pieces in order to inform and engage in public debate. How should international relief efforts respond to modern humanitarian emergencies that have become chronic, expensive, political and unpopular with governments increasingly focused on populism? In armed conflicts, how do officials delivering humanitarian aid ensure that assistance does not provide subsistence to warring factions? For the COVID-19 pandemic, are public-health officials striking the right balance in the global South between a reliance on technical innovations and the need to develop basic health care? This course will examine issues including the politicization of international response and the role of the World Health Organization and United Nations agencies and other international organizations.
MPH0812  
Credits: 3  
Applied Linear Models I  
Offered: Spring 1  

Regression analysis is a widely used set of methods for exploring the relationships between response variables and one or more explanatory variables. This course provides an introduction to regression methods for a single continuous response variable. Both linear and curvilinear regression models are considered. Model assumptions, and regression diagnostics for assessing those assumptions, are explored in detail. Strategies for model selection are presented. The emphasis is on concepts and application rather than on underlying theory. As mathematical results are presented without proof, students are not required to be proficient in calculus or matrix algebra. Pre-requisites: MPH0300 Introduction to Biostatistics

MPH0802  
Credits: 2  
Statistical Computing with SAS  
Offered: Spring 1  

This course provides students with the skills needed to utilize SAS systems for data management in order to prepare datasets for statistical analysis. In addition, procedures that are used to conduct basic statistical analyses and produce graphical output will be covered. Students will be given hands-on training using sample data provided by the instructor as well as (optionally) data from their own work. Recommended Pre-requisite: MPH0300 Introduction to Biostatistics

MPH0710  
Credits: 3  
Global Environmental Change  
Offered: Spring 1  

Climate change is not a single problem, but a lens through which to view myriad changes to our environment that will determine the future for humans on this planet. Changes to biodiversity, hydrological systems, land use, waste management, energy production, distribution of environmental toxicants; these and more are all part of the larger category of global environmental change. This course will focus on how global environmental change is affecting human health, presenting major challenges to physicians, scientists, institutions, governments and communities. There are solutions, and public health messengers must be informed to bring those solutions to the decision-makers in our neighborhoods and around the world.
SPRING 2
Zoonoses diseases transmitted from animals to humans are increasingly being recognized as emerging or re-emerging disease threats to public health. This course will explore the interactions between physicians, veterinarians, and public health professionals; provide an understanding of the public health consequences of these diseases; and explore preventive measures. Finally, we will set the framework for discussions of agents of bioterrorism and the public health response to these threats. The course attracts top speakers from across the country in the fields of public health, infectious diseases, veterinary medicine, and the biomedical sciences. Pre-requisite: MPH0400 Introduction to Epidemiology

What can history tell us about the current state of public health in the United States? This overview of the history of public health will examine evolving notions of a healthy public. Looking at the underlying social, political, and cultural structures that aid, hinder, and shape the public health mission, it will place the history of public health in the context of the larger histories of medicine, the nation, and the world. Several disease case studies will be looked at in detail to provide insight into the factors that go into successful--and unsuccessful--public health movements. The course will conclude with a look at recent public health crises to understand them within the context of global history.

LGBTQI+ people have made considerable progress in securing equal rights from open military service to marriage equality. Polling data indicates the general public has increasingly positive views of LGBTQI+ civil rights. Despite this, LGBTQI+ persons still face discrimination, stigma, and exclusion in many policy arenas and significant health disparities. Development of an evidence base for LGBTQI+ health interventions remains in critical need of more dedicated efforts. This course reviews the demographics and diversity of LGBTQI+ populations; advances and gaps in LGBTQI+ health knowledge and research; and policies and strategies in public health practice towards achieving fuller health equity for LGBT persons. Pre-requisites: MPH0001 Introduction to Public Health or MPH0700 Introduction to Global Health.
MPH0023  
Credits: 1

Culminating Experience Seminar  
Offered: Spring 2

This seminar is designed for second year students who will be completing Culminating Experience (thesis manuscript or capstone). These works are more than a paper - They are major independent projects that requires you to design implement and present professional work of public health significance. This course will help you design your Culminating Experience start writing and give and receive feedback from peers. The course is heavily interactive. We will work with materials provided primarily by the students. By the end of the term you should be ready to complete your Culminating Experience. This course is the prerequisite for registering for MPH0099 Thesis. Pre-requisites: Students must have completed MPH0320 Research Methods. Students must have their Thesis Proposal Outline completed and their Statement of Thesis Support submitted to the Program Office before registering for this course.

MPH0090  
Credits: 0

Practicum for Public Health  
Offered: Spring 2

The Practicum experience provides the student with an exciting opportunity to implement and practice lessons learned in the classroom offering the possibility to integrate knowledge and expose the student to new and exciting prospects for future professional development. The Practicum (Applied Practice Experience) Proposal must be submitted to the Office of Public Health Practice for approval prior to the start of the practicum. Students who matriculated prior to Fall 2017 will register for MPH0090 to satisfy the fieldwork requirement. Pre-requisite: Practicum Proposal, Students should complete at least 15 credits of MPH coursework before starting the Practicum.

MPH0092  
Credits: 3

Applied Practice Experience  
Offered: Spring 2

For students who matriculated in or after Fall 2017 The Applied Practice Experience provides the student with an opportunity to translate theory into practice within a public health setting. The Applied Practice Experience Proposal must be submitted to the Office of Public Health Practice for approval prior to the beginning the experience. Students who matriculated in the Fall 2017 term or later will register for MPH0092 to satisfy the fieldwork requirement. Pre-requisites: Applied Practice Experience Proposal; Students should complete at least 15 credits of MPH coursework before starting the Practicum.
An Independent Study is an elective option providing the student with an opportunity to delve more thoroughly into an area of public health of specific interest to him/her. An Independent Study Proposal should be submitted at least six weeks prior to the anticipated start of the proposed project/course of study. This is to ensure that the goals meet the overall objectives of the Master of Public Health Program before a student commits any time and energy. Approval when granted is conditional upon the student completing all of the outlined requirements. The student must submit a Postscript Report and request that the faculty sponsoring the Independent Study complete the Evaluation Form. Final credits are awarded at the end of the project by approval of the Program Director. Three credits are the maximum number of credits that may be awarded to any Independent Study. One credit represents approximately 45 hours of work. Please note that students will not receive any more than three credits for one project/course of study. Each student may complete no more than two independent study projects. An Independent Study must be a unique experience. Material covered during an independent study project should be highly targeted and not simply a review of the regularly offered coursework. Independent study projects should not be attempts to take MPH courses that are offered routinely during the academic year. Students should not expect an Independent Study project to exempt them from required courses without approval by the Specialty Track Advisor and the Program Director. Please see the Student Handbook for the full policy and procedures associated with the Independent Study option.

Students who are completing a First Author Manuscript or Capstone should register for MPH0097 Culminating Experience (students who are completing a Master’s Thesis should register for MPH0099 only). Students register for their Culminating Experience in their last term before degree conferral while preparing to submit their First Author Manuscript or Capstone. Please refer to the MPH Culminating Experience Guide as a resource for the steps that need to be taken to fulfill the Culminating Experience requirement.

Students who have previously registered for the required credits for the MPH Culminating Experience and who are approved by the Program to complete the MPH Culminating Experience in a full time manner in the last term of their attendance at ISMMS may register for 0 credits of MPH 0098 Project Continuation. Registration is granted to students upon review of academic progress and approval by the Graduate Program in Public Health. Please refer to the MPH Culminating Experience Guide as a resource for the steps that need to be taken to fulfill the Culminating Experience requirement.
MPH0099

Credits: 3
Thesis: Masters in Public Health
Offered: Spring 2

Students who are completing a Master’s Thesis should register for MPH 0099 in their last term before degree conferral while preparing to submit their Thesis. Please refer to the MPH Culminating Experience Guide as a resource for the steps that need to be taken to fulfill the Culminating Experience requirement.

MPH0100

Credits: 3
Introduction to Policy & Management
Offered: Spring 2

Why did U.S. health reform pass in 2010 when historically large scale reform of this magnitude has been blocked? How will the states implement health reform and will it be defeated through a constitutional challenge? Why is HIV prioritized over other health areas even though the global burden is lower than other diseases? How are new public-private partnerships transforming the financing of health systems? This course aims to assist students in understanding how political processes shape health policy and health outcomes both domestically and internationally. Through an introduction to theoretical and applied concepts in public policy and political science students will learn how to assess the political feasibility of different health policy options and how to craft persuasive policy briefs targeting decision makers at all levels of government. In addition to theoretical material the course will draw on insights from a concrete set of case studies across a variety of health policy topics including: the politics of health reform in the U.S. global health agenda setting and health system strengthening in developing countries among other topics.

MPH0104

Credits: 3
Healthcare in Communities and the Public Sector
Offered: Spring 2

A major focus of this class is on understanding how community life and health are related. Students will learn how to analyze communities compare data regarding the health status of communities and to compare selected communities to each other. Case material will be used to emphasize the multiple ways one can assist communities as a whole and those at risk for health problems. Exemplars will be offered by guest lecturers involved in community change. Social and economic factors will be identified that affect community health status.
MPH0107 Credits: 3
Accounting & Budgeting for Public Health Administration Offered: Spring 2

Financial statements enable managers to evaluate the performance of an organization and assess its financial position. Budgets based on forecasts take the form of projected statements and serve as an important managerial tool for planning and control purposes. This course provides an introduction the accounting budgeting and financial reporting techniques commonly used in the health care and not-for-profit environment. Emphasis is placed on enabling students to become comfortable with financial analysis budgets and commonly-used financial terminology so that they can effectively address financial matters they will encounter in leadership roles in health care and not-for-profit organizations.

MPH0110 Credits: 3
Pharmacoeconomics Offered: Spring 2

Why is Gilead Science's Hepatitis C pill (Sovaldi) so expensive ($84000 per course of therapy about $1000 a pill) and is its approximately 90% cure rate worth the cost? US FDA Commissioner Scott Gottlieb recently (WSJ 8.25.18) commented on the difficulty in valuing curative therapies. How important is cost in health policy decisions? Why are pharmaceutical companies more and more developing “orphan” drugs that is drugs for rare diseases. In the current healthcare environment in the US there is rationing of healthcare often not on an objective basis. What makes a medication or device cost-effective or not? Authorities in many countries are using cost-effectiveness analyses (CEA) to make reimbursement decisions and cost of treatments and diagnostics are being hotly debated. Why are there major initiatives afoot even in U.S. medical societies (i.e. American College of Cardiology American Society of Clinical Oncology) to incorporate cost-effectiveness (“value”) into medical decision-making? How are these analyses being done? Learn the principles of CEA get hands-on experience and tutorials with software often used watch excerpts of debates about making Hepatitis C treatments available in California Medicaid and other markets. Hear a key pharmaceutical company researcher discuss his challenges in use of CEA in the fragmented US healthcare coverage environment see user-friendly computer programs that have been developed based on these analyses and debate the use of CEA in making life-or-death reimbursement decisions. This introductory course focuses on the concepts and principles of pharmacoeconomics with particular emphasis on modeling methodologies and data sources. Students will learn about the international use of pharmacoeconomics in drug regulation pricing and reimbursement. Examples of pharmacoeconomic models will illustrate the theoretical lessons.

MPH0203 Credits: 3
Introduction to Medical Anthropology Offered: Spring 2

Biomedicine is defined as the medical science that applies biological and physiological principles in clinical practice to cure patients from disease. For biomedicine the cause of sickness is found at the cellular level-- that is when a pathogen or germ alters the natural balance of the organism. To restore health is to trace and eradicate the physiological entity affecting the organism. In Western societies this scientific understanding of disease is not only at the core of biomedical practice but also of people’s imagination. To enter as a patient in the realm of biomedicine is to enter the realm of science factuality and expert knowledge. Because scientific practice deals with “Nature” science is not only perceived as objective but as removed from culture. This course will attempt to reveal biomedicine as a cultural system. See the Public Health Curriculum Guide for a complete description of the aims of this course.
MPH0210 Credits: 3
Health and Literacy: Improving Health Communication Efforts Offered: Spring 2

The issue of health literacy is critically important to the development of effective health communication strategies and outreach. National evaluations of literacy have raised serious concerns about the ability of nearly half the U.S. adult population to access, understand, and apply health communication messages (NAAL 2003) including those messages found in health information related to health care services and exchanged during health provider/patient interaction. This course explores the link between literacy and health in the US and how poor health literacy impacts accessing, understanding, and applying health communication messages. Course participants will learn how to take health literacy into account in their work as public health practitioners by understanding the consequences of low health literacy in health outcomes, conducting health literacy loads of spoken and written material, and developing skills to communicate health more effectively across a variety of settings and contexts.

MPH0216 Credits: 3
Health Promotion Strategies Offered: Spring 2

Health promotion is the practice of educating, equipping, and empowering individuals with the information and resources they need to fight disease. It is the process of empowering people to increase control over their health and its determinants through health literacy efforts and multi-sectoral action to increase healthy behaviors. This includes activities focused on individual behavior as well as a wide range of social and environmental interventions. Increasingly, lifestyle strategies such as whole food plant-based diet, exercise, stress management, tobacco, and alcohol cessation, and other non-drug modalities are being used to prevent, treat, and reverse chronic disease. This course offers the knowledge and skills recommended by a national panel of representatives from physician and health professional organizations as the basis for providing quality health promotion in lifestyle medicine services. The course provides basic grounding in the field of health promotion and disease prevention via lifestyle medicine and focuses on practice skills for public health professionals.

MPH0320 Credits: 1
Research Methods Offered: Spring 2

Research Methods encompasses a set of fundamental skills and tools necessary for approaching the process of developing and answering a research question being a future investigator or an informed consumer of information in the marketplace. This course provides a solid and practical framework enabling students to successfully embark upon their Culminating Experience. As a prerequisite in the conduct of research it prepares students to conceptualize, propose design, and write research papers in general. Topics covered include the characteristics of a research study, formulating a research question, experimental research designs, survey construction, data analysis and interpretation, and evaluation of research. Also addressed are strategies for conducting literature searches, research ethics, informed consent, and elements of a research proposal. Students will be required to complete IRB training, HIPPA training, data security training, and outline a research proposal for their Culminating Experience project by the end of this course. Full-time students are required to take this course in the Spring II Term of their first year in the Master of Public Health Program. The course is only open to matriculated students in the Master of Public Health Program. This course is graded on a Pass/Fail basis. Recommended Pre-requisites: MPH0001 Introduction to Public Health or MPH0700 Introduction to Global Health
Epidemiology III

Epidemiology is the study of the distribution and determinants of health-related states and events in specified populations and the application of this knowledge to the control health problems. Epidemiology III will cover theoretical and practical considerations in analysis and interpretation of data generated from epidemiologic studies. The course will build on the fundamentals of epidemiologic methods and study design introduced in previous terms. Additional advanced topics will include mediation analysis and sensitivity analyses. Through lectures and guided analysis of epidemiologic datasets students will learn analytic approaches and modelling techniques used to investigate exposure-disease relationships within various epidemiologic study designs. Lab sessions will provide opportunities to apply and practice these techniques using SAS software. The course will culminate in a final project for which students will perform an independent analysis of epidemiologic data. Pre-requisite: MPH0412 Epidemiology II

Big Data Epidemiology: Introduction to OMICS Research

Omics is an emerging multidisciplinary and rapidly evolving field that has started to impact both clinical practice and public health and holds promise to significantly improve precision medicine. Omics encompasses many molecular biology domains including genomics epigenomics transcriptomics proteomics metabolomics and exposomics. These molecular domains can offer a more nuanced perspective on how multiple exposures (e.g. environmental lifestyle social factors) affect health compared with traditional research approaches. However omics datasets are large (tens of thousands of variables or more) resulting in analytical challenges that require adaptation of existing epidemiology designs and methods. This course will provide an overview of omics research areas and applications latest omics epidemiology advances and hands-on training in big omics data analysis. Pre-requisite: MPH0412 Epidemiology II MPH0812 Applied Linear Models I

Toxicology

This course provides an introduction to the major concepts in toxicology with particular emphasis on agents with public health relevance including metals pesticides air pollution drugs of abuse medication and stress. The curriculum is designed to make toxicology accessible to students with broad scientific backgrounds including those outside of the biological science disciplines. Students will learn the basic principles of toxicology as well as review target organs systems contaminants and mechanisms of actions of certain classes of compounds. Specific target organ toxicities will include hepatic renal cardiovascular pulmonary neuronal developmental reproductive and endocrine systems. We will use in-class exercises and small groups to discuss recent publications apply concepts and understand the current knowledge of specific toxicological agents and their effects. This course is designed to present toxicology as an interdisciplinary science in public health.
Zoonoses: An Emerging Public Health Issue

Zoonoses diseases transmitted from animals to humans are increasingly being recognized as emerging or re-emerging disease threats to public health. This course will explore the interactions between physicians, veterinarians, and public health professionals; provide an understanding of the public health consequences of these diseases; and explore preventive measures. Finally, we will set the framework for discussions of agents of bioterrorism and the public health response to these threats. The course attracts top speakers from across the country in the fields of public health, infectious diseases, veterinary medicine, and the biomedical sciences. Pre-requisite: MPH0400 Introduction to Epidemiology

History of Public Health

What can history tell us about the current state of public health in the United States? This overview of the history of public health will examine evolving notions of a healthy public. Looking at the underlying social, political, and cultural structures that aid, hinder, and shape the public health mission, it will place the history of public health in the context of the larger histories of medicine, the nation, and the world. Several disease case studies will be looked at in detail to provide insight into the factors that go into successful—and unsuccessful—public health movements. The course will conclude with a look at recent public health crises to understand them within the context of global history.

LGBTQI+ Health: Research Policies and Best Practices

LGBTQI+ people have made considerable progress in securing equal rights from open military service to marriage equality. Polling data indicates the general public has increasingly positive views of LGBTQI+ civil rights. Despite this, LGBTQI+ persons still face discrimination, stigma, and exclusion in many policy arenas and significant health disparities. Development of an evidence base for LGBTQI+ health interventions remains in critical need of more dedicated efforts. This course reviews the demographics and diversity of LGBTQI+ populations; advances and gaps in LGBTQI+ health knowledge and research; and policies and strategies in public health practice towards achieving fuller health equity for LGBT persons. Pre-requisites: MPH0001 Introduction to Public Health or MPH0700 Introduction to Global Health
Matriculated students must either register for at least one credit-bearing course or register for "Maintenance of Matriculation" for every term up until graduation. Maintenance of Matriculation allows students continued access to essential academic and student services such as access to the ISMMS network and email; however, students on Maintenance of Matriculation status will not be eligible for financial aid. Students with compelling circumstance who wish not to maintain their matriculation status but need to discontinue their studies for a period of time can apply for a Leave of Absence from the program (see Leave of Absence and Withdrawal section). The Maintenance of Matriculation fee is $500 per academic semester or $333 per term for students in programs on trimesters.