

## School of Graduate Studies: Course Descriptions Fall 2007

Department	Course Subject	Course No.	Course Title	Course Description	Credit Hrs.	Bill Hrs.	Lecture Hrs.	Lab Hrs.	Other Hrs.
Biostatistics	NURS	6300	Intro to Epidemiology and Biostat	This course will focus on applying epidemiologic principles to health promotion and illness prevention along the continuum of care in multiple settings.	3	3	3		
Biostatistics	STAT	4010	Statistics and Research Method	This course provides an introduction to research methodology and principles including basic methods of statistical analysis. Topics include descriptive and inferential statistics, epidemiology research designs, and reliability and validity of measurement. Students will perform statistical analysis and display of data and results, including use of microcomputer software package, and will critically evaluate published reports of clinical and epidemiological studies.	3	3	2	2	
Biostatistics	STAT	4020	Statistics and Research Method	This course provides an introduction to research methodology and principles including basic methods of statistical analysis. Topics include descriptive and inferential statistics, basic probability, nonparametrics, statistical process control, epidemiology, and research designs. Students will create data summaries and perform statistical analyses using a statistical software package.	3	3	3	1	
Biostatistics	STAT	6300	Intro to Epidemiol and Biostat	This course serves as an introduction to epidemiology and biostatistics. The epidemiology portion of this course is intended to introduce students to epidemiology and its application to public health research and	3	3	3		

application to public health research and practice. It provides a conceptual foundation for further study of epidemiology; especially study design, quantitative concepts and methods, analysis, and interpretation. The biostatistics portion of this course offers an introduction to the basic statistical techniques used to analyze and interpret data in the biomedical, health sciences and related fields. Emphasis is on applications of these methods, with probability, discrete and continuous distribution, inferential statistics (estimation and hypothesis testing) for numeric and categorical data, non-parametric methods, analysis of variance, regression, and correlation topics covered.

Biostatistics	STAT	7010	Biostatistic I	This course offers an introduction to the basic statistical techniques used to analyze and interpret data in the health sciences and related fields. Emphasis is on application of these methods, with the following topics covered: graphical methods, probability, discrete and continuous distribution, inferential statistics (estimation and hypothesis testing) for numeric and categorical data, non-parametric methods, analysis of variance, regression, correlation and critical reading of the research literature. Prerequisites: College Algebra (Calculus highly recommended).	3	3	3	0	0
Biostatistics	STAT	7020	Biostatistic II	This course is the second course in a two-course sequence in Biostatistics that offers an introduction to some of the more advanced statistical techniques used to analyze and interpret data in the health sciences and related fields. Emphasis is on applications of these methods. Topics include factorial ANOVA, multiple linear regression and	3	3	3	0	0

ANOVA, multiple linear regression and correlation, ANCOVA, logistic regression, longitudinal data analysis, survival analysis, clinical trials, experimental design, epidemiology, diagnostic tests, and critical reading of the research. Prerequisites: Biostatistics I (or comparable introductory graduate-level statistics course).

Biostatistics	STAT	7040	Biomedical Statistics	<p>This survey course offers an introduction to the majority of statistical techniques used to analyze and interpret data in the biomedical sciences and related fields. Emphasis is on applications of these methods, with the following topics covered: graphical methods, probability, discrete and continuous distributions, inferential statistics (estimation and hypothesis testing for the one and two-sample case) for numeric and categorical data, non-parametric methods, one-way ANOVA, simple linear regression, correlation, factorial ANOVA (fixed and random effects), multiple linear regression and correlation, ANCOVA, logistic regression, longitudinal data analysis, and survival analysis and the critical reading of the research literature. Prerequisites: College Algebra (Calculus highly recommended) or prior approval of course director.</p>	3	3	3	0	0
Biostatistics	STAT	7050	Research Design and Statistics	<p>The primary objective of this course is to provide students with an understanding of basic concepts and methods of statistical inference in the biomedical health sciences. Upon completion of the course, students should be able to understand, interpret, and critique the results of application of statistical techniques as found in the health sciences literature. This course is comprised of eight</p>	1	1	1	0	0

modules with voice-overs and remote administration/testing. Prerequisites: College algebra or permission of the instructor.

Biostatistics	STAT	7060	Research Design and Statistics	The primary objective of this course is to provide students with an understanding of basic concepts and methods of statistical inference in the biomedical health sciences. Upon completion of the course, students should be able to understand, interpret, and critique the results of application of statistical techniques as found in the health sciences literature. This course is comprised of eight WebCT modules with voice-overs and remote administration/testing capabilities. Prerequisites: College algebra or permission of the instructor.	1	1	1		
Biostatistics	STAT	7070	Biomedical Statistics	This course offers an introduction to the basic statistical techniques used to analyze and interpret data in the biomedical, health sciences and related fields. Emphasis is on applications of these methods, with graphical methods, probability, discrete and continuous distributions, inferential statistics (estimation and hypothesis testing) for numeric and categorical data, non-parametric methods, analysis of variance, regression, and correlation. Students will learn to use the NCSS microcomputer statistical software package.	3	3	3		
Biostatistics	STAT	8110	Intro to Biostat	This course offers an introduction to the basic statistical techniques used to analyze and interpret data in the health sciences and	3	3	3	0	0

related fields. Emphasis is on applications of these methods, with graphical statistics (estimation and hypothesis testing for the one and two-sample case) for numeric categorical data, non-parametric methods, analysis of variance, regression, and correlation. Prerequisites: Calculus.

Biostatistics	STAT	8120	Probability and Distributions	This course covers basic probability theory, the concepts of random variables, univariate and multivariate distributions, discrete and continuous joint, marginal, and conditional distributions in general. Several specific probability distributions are covered in detail: normal, binomial, multinomial, Student's t, F, chi-square. Expectation theorems, the law of large numbers, and the central limit theorem are also covered. Prerequisites: Calculus.	3	3	3	0	0
Biostatistics	STAT	8130	Intro to Epidemiology	This course serves as an introduction to epidemiology. Topics include basic concepts, types of studies, description and analysis of epidemiologic data, and epidemiology in disease control.	3	3	3	0	0
Biostatistics	STAT	8140	Programming for Data Analysis	This course provides a hands-on exposure to programming, data management and report generation with one of the most popular statistical software packages.	2	2	2	0	0
Biostatistics	STAT	8210	Linear Models I	This course is a study of the general linear statistical model and the linear hypothesis. Topics include the multivariate normal distributions of quadratic forms, and parameter estimation and hypothesis testing for full-rank regression models. Variable selection, regression diagnostics and "dummy" variable coding will also be covered. Prerequisites: Knowledge of linear algebra.	3	3	3	0	0

Biostatistics	STAT	8220	Est & Hypothesis Testing	Introduction to the theoretical properties of point estimators and tests of hypotheses. Sufficient statistics, likelihood, best linear unbiased estimates, elements of statistical tests, the Neyman-Pearson Lemma, UMP tests, univariate normal inference, decision theory and multivariate distributions are covered. Prerequisites: Multivariable Calculus and Probability & Distributions. STAT8120.	3	3	3	0	0
Biostatistics	STAT	8230	Experimental Design	This course covers the basic principles of experimental design. It covers the concepts of randomization, blocking, replication and interaction. Various designs are covered and their strengths and weaknesses are illuminated. These designs include factorials, complete and incomplete designs, Latin and Greco-Latin square designs, and split-plot designs. Confounding and fractional replication is also covered.	3	3	3	0	0
Biostatistics	STAT	8240	Intro to Clinical Trials	This introductory course will address basic and advanced statistical techniques used in clinical trials. Material presented will include the principles underlying the planning, management and implementation of clinical trials, the application of basic statistical methods used in the analysis of data from clinical trials, and the interpretation of results.	3	3	3		
Biostatistics	STAT	8260	Design & Analysis of Observational Study	Advantages and disadvantages of prospective and retrospective study designs; design and analysis issues in both cohort and case-control studies, including proper selection of study subjects, data quality, sources and types	3	3	3		

study subjects, data quality, sources and types of bias, controlling for confounding, maximizing participation and minimizing loss to follow-up in prospective studies, power and sample size; statistical methods including categorical data analysis, logistic regression, Cox regression; use of statistical packages such as SAS and StatXact for analysis. Review and discussion of current representative studies.

Biostatistics	STAT	8270	Categorical Data Analysis	This course focuses on statistical methods for analyzing categorical data; topics include inference for a single proportion; inference for two-way contingency tables; models for categorical response variables, including logistic and loglinear models; analysis of matched-pairs data; power and sample size considerations. Emphasis will be placed on methods and models most useful in health-related research.	3	3	3		
Biostatistics	STAT	8310	Linear Models II	This course is a continuation of Linear Models I, and covers the analysis of experiments using linear models. Single- and multiple-factor analysis of variance and analysis of covariance will be examined, including types of factor effects and analysis involving missing data. Topics of experimental design relevant to biomedical research will also be covered.	3	3	3	0	0
Biostatistics	STAT	8311	Demo & Analy Rates & Prop	This course introduces students to the basics of demographic estimation and analysis and introduces students to those statistical methods useful in the analysis of rates and proportions.	3	3	3	0	0
Biostatistics	STAT	8320	Time to Event Data	This course serves as an introduction to time-	3	3	3	0	0

## Analysis

to-event (survival) data analysis. Both theory and applications are covered and methods include non-parametric, parametric, and semi-parametric (Cox model) approaches.

Biostatistics	STAT	8321	Stat Mod of Mole Evo & Phyl	Introduction to modeling DNA and protein evolution and to reconstructing evolutionary relationships from DNA and protein sequences. Statistical models are applied to comparisons of DNA and protein sequences to make inferences about their common ancestry and past evolutionary events.	3	3	3	0	0
Biostatistics	STAT	8330	Special Topics in Biostat	This course is designed to cover special topics in theory and methods of Biostatistics that are not covered in regular courses. The topics will depend on the research interest of the instructor and the students. Prerequisites: Permission of the Instructor.	3	3	3	0	0
Biostatistics	STAT	8331	Mendelian Genetics	The analysis of frequencies of single Mendelian genes within populations including Hardy-Weinberg equilibrium, non-random mating, admixture/subdivision, linkage equilibrium, selection/mutation, likelihood estimation, latent variables and the EM algorithm, pedigree analysis and genetic identify, linkage analysis.	3	3	3	0	0
Biostatistics	STAT	8340	Reading and Research	This course consists of readings and research in the current biostatistical literature, advanced topics in biostatistical theory and methods, and a supervised research project which will potentially lead to publications and/or presentations. Prerequisite: Permission of instructor.	1	1	1	0	0
Biostatistics	STAT	8341	Intro to Clinical	This introductory course will address basic	3	3	3	0	0

Trials and advanced statistical techniques used in clinical trials. Material presented will include the principles underlying the planning, management and implementation of clinical trials, the application of basic statistical methods used in the analysis of data from clinical trials, and the interpretation of results.

Biostatistics	STAT	8350	Epidemic Modeling	This course serves as an introduction to types of epidemiological studies and covers modeling of various types of epidemics.	3	3	3		
Biostatistics	STAT	8360	Systematic Reviews	This course covers systematic reviews of the literature for controlled clinical trials and observational studies. Statistical methods and computer software is reviewed and how to use systematic reviews in practice is detailed. Topics to be covered are introduction to systematic reviews and meta analysis, systematic reviews of controlled clinical trials, investigating variability between studies, systematic reviews of observational studies, statistical methods and computer software, using systematic reviews in practice, the Cochrane collaboration, and other evidence-based medicine topics.	3	3	3		
Biostatistics	STAT	8410	Generalized Linear Models	This course serves as an introduction to Generalized Linear Models (GLMs). It instructs students in a unifying theory that combines the areas of linear models, non-linear models, regression, categorical data, and analysis of variance. Prerequisites: All other biostatistics courses except Time-To-Event Data Analysis - STAT 8320.	3	3	3	0	0
Biostatistics	STAT	8412	Epidemic Modeling	This course serves as an introduction to types of epidemiological studies and covers	3	3	3	0	0

modeling of various types of epidemics.

Biostatistics	STAT	8422	Biological Seq Analysis	Introduction to statistical methods in the analysis of DNA and protein sequence data. This course exposes students to applications of statistical theory to assembling biological sequences, making inferences about single sequences, and comparing two or more sequences. Statistical foundations of BLAST tests are covered.	3	3	3	0	0
Biostatistics	STAT	8432	Quantitative Genetics	The statistical analysis of complex phenotypes. Topics include genotypic value, genetic variance, and linear models. Environmental variance, genotype by environment interaction, threshold models and generalized linear mixed models, mapping quantitative trait loci (QTL), and variance component estimation.	3	3	3	0	0
Biostatistics	STAT	8442	Design Analy Clinical Trials	This course will address advanced statistical techniques used in the design and analysis of both clinical and sequential trials.	3	3	3	0	0
Biostatistics	STAT	8510	Programming for Data Analysis	This course provides a hands-on exposure to programming, data management and report generation with one of the most popular statistical software packages. Prerequisite: College algebra	2	2	2		
Biostatistics	STAT	8513	Systematic Reviews	This course covers systematic reviews of the literature for controlled clinical trials and observational studies. Statistical methods and computer software is reviewed and how to use systematic reviews in practice is detailed. Topics to be covered are introduction to systematic reviews and meta analysis, svstematic reviews of controlled clinical trials.	3	3	3	0	0

systematic reviews of controlled clinical trials, investigating variability between studies, systematic reviews of observational studies, statistical methods and computer software, using systematic reviews in practice, the Cochrane collaboration, and other evidence-based medicine topics.

Biostatistics	STAT	8520	Statistical Theory I	Fundamentals of random variables and probability theory; discrete and continuous distributions; exponential families; joint, marginal, and conditional distributions; functions of random variables; transformation and change of variables; order statistics; convergence concepts; central limit theorem; sampling distributions. Prerequisites: Multivariable Calculus and Matrix Algebra.	3	3	3		
Biostatistics	STAT	8523	Analysis Microarray Gen Expr Dat	Introduction to modeling and analyzing expression data of microarrays. Methods of cluster analysis will be covered as ways to attempt to group genes of the same biochemical pathways together. Students will also learn to test hypotheses related to microarray designs, with emphasis on determining which genes are differentially expressed between two populations.	3	3	3	0	0
Biostatistics	STAT	8533	Med Gentic & Gentic Epide	Advanced statistical analyses specific for medical and health data and designs involving humans. Topics included are linkage analyses, association studies, linkage disequilibrium mapping, segregation analyses, and gene and environment interaction.	3	3	3	0	0
Biostatistics	STAT	8600	Biostat Consulting in Res	This course is designed for students to gain practical experience in integration of statistical theory and application in current research, systematic formulation of problems, data format, collection procedures, design	3	3	3	0	0

format, collection procedures, design, analysis, interpretation and communication of results. A project write-up will be required at the conclusion of each project. Course Prerequisites: All core biostatistics courses (except STAT8320) and one of the three elective module courses.

Biostatistics	STAT	8610	Applied Linear Models I	This course will continue the investigation of simple linear regression from the introduction to Biostatistics course with extension to multiple linear regression models. Model selection, validation, diagnostics and remedial measures will be covered. SAS will be used for applying these methods to biomedical data.	3	3	3
Biostatistics	STAT	8620	Statistical Theory II	Point and interval estimation; hypothesis and significance testing maximum likelihood and moment estimators; Bayes estimators; unbiased estimators; sufficiency and completeness; Fisher information; uniformly most powerful tests; likelihood ratio tests; asymptotic inference; introduction to Bayesian inference.	3	3	3
Biostatistics	STAT	8710	Applied Linear Models II	One-way analysis of variance (ANOVA), multiple treatment comparisons, ANOVA diagnostics, factorial ANOVA, randomized complete block designs, analysis of covariance (ANCOVA), ANOVA with unbalanced data, random and mixed effect models, repeated measures designs, nested designs and response surface methods.	3	3	3
Biostatistics	STAT	8720	Survival Analysis	This course offers an introduction to the analysis of observed times to events, e.g., times to death (survival times). The course	3	3	3

focuses on methods of regression generalized to the case of censored survival data. Regression models studied include non-parametric (Kaplan-Meier), semi-parametric (Cox's PH Model), and parametric regression models (Exponential, Weibull, Log-Logistic, & others). Other topics covered include model development, model adequacy, extensions to the Cox PH model, recurrent event models and frailty models.

Biostatistics	STAT	8740	Design and Analy of Clin Trial	This course will address advanced statistical techniques used in the design and analysis of both clinical and sequential trials.	3	3	3
Biostatistics	STAT	8870	Biostatistical Consul in Resea	This course is designed for student to gain practical experience in integration of statistical theory and application in current research, systematic formulation of research problems, data formatting, data collection, study design, data analysis, and interpretation and communication of results.	3	3	3
Biostatistics	STAT	8880	Special Topics	This course is designed to cover special topics in theory and methods of Biostatistics that are not covered in regular courses. The topics will depend on the research interests of the instructor and the students.	1	1	3
Biostatistics	STAT	8890	Readings and Research	This course consists of readings in the biostatistical literature, culminating in written and oral presentations. Prerequisites: Permission of instructor	1	1	
Biostatistics	STAT	8910	Biostatistical Consulting Proj	Required course for Master of Science students who choose the Non-Thesis Option. Consists of one or more consulting project write-up(s), directed by a Biostatistics faculty member. A formal oral presentation is required at the conclusion of the consulting project(s)	3	3	

at the conclusion of the consulting project(s).

Biostatistics	STAT	8920	Thesis Research	The thesis project for the MS program will be for two types: (i) use of established but state-of-the-art statistical tools to analyze and report on collected data sets; or (ii) a rigorous review of statistical literature, possibly involving a small amount of methodological research, that has potential use in complex biomedical data analysis.	3	3			
Biostatistics	STAT	9000	Thesis Research	The thesis project for the MS program will be of two types: 1) Use of established but state-of-the-art statistical tools to analyze and report on collected data sets or 2) A rigorous review of statistical literature, possibly involving a small amount of methodological research, that has potential use in complex biomedical data analysis. Course Prerequisites: All core biostatistics courses (except STAT8320) and one of the three elective module courses.	3	3	0	0	0
Graduate Studies	BCMB	8201	Cur Topics & Tech in MB	Elective course for advanced graduate students (2nd year and up) across departments. Students will solve current problems in molecular biology using the various techniques.	3	3	3	0	0
Graduate Studies	BCMB	8310	Adv Topi Micro & Infec Dis I	This is a highly focused course designed to provide students with in-depth discussions of pathogenic bacteria and associated diseases. The emphasis of the course will be on the molecular mechanisms underlying the virulence of medically important bacterial pathogens. Class time will consist of student-led lectures and discussions, facilitated by Microbiology faculty. Students will present comprehensive backgrounds of the topics of	2	2	2	0	0

discussion, followed by critical evaluation of scientific papers taken from recent primary literature. This course will provide students both with comprehensive knowledge of bacterial pathogenesis and increased experience with reading, presenting, and critically analyzing scientific literature. Prerequisites: SGSS8021 and SGSS8022 or approval from course director.

Graduate Studies	BCMB	8320	Adv Topi Micro & Infec Dis II	This is a highly focused course designed to provide students with in-depth discussions of pathogenic bacteria and associated diseases. The emphasis of the course will be on the molecular mechanisms underlying the virulence of medically important bacterial pathogens. Class time will consist of student-led lectures and discussions, facilitated by Microbiology faculty. Students will present comprehensive backgrounds of the topics of discussion, followed by critical evaluation of scientific papers taken from recent primary literature. This course will provide students both with comprehensive knowledge of bacterial pathogenesis and increased experience with reading, presenting, and critically analyzing scientific literature. Prerequisites: SGSS8021 and SGSS8022 or approval from course director.	2	2	5	0	0
Graduate Studies	BCMB	9010	Seminar in BMB	Research presentations by MCG faculty, students and visiting research scientists.	1	1	1	0	
Graduate Studies	BCMB	9210	Investigation of Problem	The student works with individual faculty members on a specific investigative research problem. This provides an introduction to analytical techniques and the scientific method in action. Prerequisite: Admission in a	1	1	0	0	

in action. Prerequisite: Admission in a graduate program.

Graduate Studies	BCMB	9300	Research	The student works closely with his faculty thesis/dissertation advisor on an in-depth study of a research problem of interest to both student and advisor. This course culminates in the preparation of a PhD. dissertation or MS thesis. Prerequisites: Permanent assignment to a specific lab with a faculty advisor and a defined research project.	1	1	0	0	
Graduate Studies	MOLM	8040	Molecular Medicine	This course covers a variety of current topics centered on specific human diseases with a molecular aspect to diagnosis or treatment. Clinical case presentations form the starting point for an interactive discussion of the interface between basic research and clinical medicine. The course emphasizes acquisition of skills in interpreting cutting-edge primary scientific literature, and synthesizing this knowledge with real-world patient care. Prerequisite: Completion of 1st year biomedical sciences graduate core curriculum.	3	3	0	0	
Graduate Studies	MOLM	8110	Adv Topics Neurobiology	This course will cover current topics in neurobiology including developmental neurobiology, intracellular and intercellular communication, neurodegeneration and other diseases of the nervous system. The course will emphasize an understanding of the neurochemical and molecular mechanisms under normal conditions and leading to dysfunction. The course will focus on developing a critical understanding of the current scientific literature in neurobiology and preparing the students for careers in	3	3	0	0	0

neurobiological research. Prerequisite: Completion of 1st year biomedical sciences graduate core curriculum, and be in good standing in one of the biomedical sciences PhD programs. Total class enrollment will be limited to 10 students and preference will be given to students in the neurobiologically oriented graduate program.

Graduate Studies	MOLM	9010	Adv Sem in Molecular Med	Seminar-style course covers a single, current topic in Molecular Medicine. Prerequisite: Completion of 1st year biomedical sciences graduate core curriculum.	1	1	0	0	2
Graduate Studies	MOLM	9020	Seminar in Molecular Med	This course will provide training in critical evaluation of basic biomedical research. Students will be expected to attend seminars given by both internal and external speakers to provide written summaries of some of the topics presented. This course is offered in the fall semester. Prerequisites: Entry into the Molecular Medicine graduate program. Required course for all Molecular Medicine students each fall semester until completion of the dissertation defense.	1	1	0	0	0
Graduate Studies	MOLM	9030	Seminar in Molecular Med	This course will provide training in critical evaluation of basic biomedical research. Students will be expected to attend seminars given by both internal and external speakers and to provide written summaries of some of the topics presented. This course is offered in the spring semester. Prerequisites: Entry into the Molecular Medicine graduate program. Required course for all Molecular Medicine students each spring semester until	1	1	0	0	1

completion of the dissertation defense.

Graduate Studies	MOLM	9210	Invest of a Problem	This course is a laboratory rotation course that allows students to spend time during their first year in a faculty member's lab and prior to completion of the second qualifying examination. Prerequisites: Admission to a graduate program.	1	0	0	0
Graduate Studies	MOLM	9300	Research	After successful completion of the second qualifying examination, the student works closely with his/her major advisor on an in-depth study of a research problem of interest to both student and advisor. This course culminates in the preparation of a PhD dissertation. Prerequisites: Permanent assignment to a specific lab with a major advisor and a defined research project.	1	1	0	0
Graduate Studies	NURO	8082	Neuroscience II	Neuroscience II will cover neuronal development, learning and memory, executive functions, sleep and circadian rhythms, mood, motivation and addiction, language and communication, and cell death regeneration.	4	4	4	0
Graduate Studies	NURO	8090	Clinical Neuroscience	This course will give students intensive clinical exposure to neurological, psychiatric and ophthalmic disorders. Students will attend a month-long survey of neurological disorders course and then choose a clinical rotation experience from a list of opportunities. For example, during the epilepsy rotation students will shadow physicians in the epilepsy clinic, be involved with EEG conferences, brain imaging and epilepsy surgery. Students will also be involved in using human brain tissue from these surgeries in basic neuroscience	4	4	4	0

research.

Graduate Studies	NURO	9010	Neuroscience Seminar	The Neuroscience Seminar course consists of research seminars by visiting neuroscientists. In addition, students will have an opportunity to talk to each speaker during a lunch meeting and to serve as hosts to visiting scientists.	1	1	0	0	1
Graduate Studies	NURO	9210	Inv of a Problem in Neuro	Laboratory rotation course in which the student works with individual faculty members on a specific research topic. This provides an introduction to techniques utilized in that laboratory as well as an introduction to the scientific method.	1	1	0	24	0
Graduate Studies	NURO	9300	Research in Neuroscience	The student works closely with his/her faculty dissertation mentor on an in-depth study of a research question of interest to both student and mentor. This course culminates in the preparation of a PhD dissertation.	1	1	0	24	0
Graduate Studies	SGSS	8011	Respon Conduct of Research	Course will provide an overview, via lecture and discussion, of critical issues related to the responsible conduct of research. In addition, it will fulfill the requirements established by the Office of Research Integrity and the Public Health Service for ensuring that PHS-supported researchers are provided adequate instruction in conducting responsible research and ensuring integrity of the research record. Prerequisites: Acceptance into the School of Graduate Studies.	1	1	1	0	0
Graduate Studies	SGSS	8012	Scientific Communications	Course focuses on writing and presentations skills needed for a career in biomedical sciences. It provides basic instruction in writing abstracts, curriculum vitae, and grant applications as well as how to organize and	1	1	1	0	0

applications as well as how to organize and give oral scientific presentations. Also covered are basic aspects related to teaching skills needed in the biomedical classroom and laboratory. Prerequisites: Acceptance into the School of Graduate Studies.

Graduate Studies	SGSS	8021	Biochem & Gene Regulation	One semester course includes metabolism: enzyme structure, kinetics and mechanisms: RNA, DNA, and protein biogenesis: DNA repair and recombination; cell cycle control, cancer genetics. Classroom time includes lectures, discussion, and demonstrations using traditional and alternative teaching methods. Prerequisites: Acceptance into the School of Graduate Studies.	5	5	4	0	2
Graduate Studies	SGSS	8022	Molecular Cell Biology	One semester course focuses on the study of the cell as the fundamental structural and functional unit of which all living organisms are constructed. Cell biology serves as a bridge between molecular biology, basic biochemistry, physiology, and morphology at the gross anatomical level and is increasingly a principal area of focus for biomedical research. In this course, the properties of cells are analyzed initially by viewing the structural organization, functional interactions, and biogenesis of cellular components with particular emphasis on understanding of processes involved in regulating the specific composition and interactions of cellular organelles. This understanding forms a basis for the subsequent consideration of cell-cell interactions at the cellular and the tissue level. Prerequisites: Acceptance into the School of Graduate Studies.	5	5	4	0	2

Graduate Studies	SGSS	8033	Integrated Systems Biology	One semester course includes basic anatomy, physiology, and pharmacology of all the organ systems. Special topics also covered include integrated biosystems and feedback, physiological genomics, modern drug discovery, and hot research topics. Classroom time includes lectures, discussion, and demonstrations using traditional and alternative teaching methods. Prerequisites: Acceptance into the School of Graduate Studies.	6	6	5	2	0
Graduate Studies	SGSS	8040	Intro to Faculty Research	An introduction to all research topics currently being conducted by biomedical sciences graduate faculty. Prerequisites: Acceptance into the School of Graduate Studies PhD program.	2	2	0	0	4
Graduate Studies	SGSS	8050	Intro to Research I	Individualized instruction in research or core laboratories. Students should master at least one laboratory technique and become familiar with the various activities of the laboratories. Prerequisites: Acceptance into the School of Graduate Studies Ph.D. program.	2	2	0	10	0
Graduate Studies	SGSS	8060	Intro to Research II	Individualized instruction in two research or core laboratories. For each laboratory, students should master at least one laboratory technique and become familiar with the various activities of the laboratory. Students will spend half of the semester in each laboratory.	2	2	0	10	0
Graduate Studies	SGSS	8065	Critical Analy of Mechni	This interdisciplinary course is designed to teach students how to read and analyze literature in the context of introducing students to the pathophysiological basis of disease. Emphasis is placed in three major areas: immunology, microbiology, and organ system	4	4	4	0	0

immunology, microbiology, and organ system pathophysiology. Class time includes a mixture of traditional lectures to cover background material along with a heavy emphasis on student discussion of the primary literature. Prerequisites: SGS 8021, SGS 8022, or approval from course director.

Graduate Studies	SGSS	8070	Cancer Biology & Immunology	This course is the first course of a two-hour sequence covering fundamental aspects of cancer biology. There is an emphasis on basic immunology and immunobiology as related to cancer, the etiology of cancer, natural history of neoplasia, epidemiology, host-tumor relationships and principles of chemotherapy biological therapy and radiotherapy.	6	6	5	2	0
Graduate Studies	SGSS	8080	Neuroscience I	Neuroscience I will cover the cell and molecular biology of neurons and synapses, motor systems, somatosensory, vision, audition, chemical senses, tastes and olfaction, glia and neuroimmunology, regulatory, autonomic and neuroendocrine systems. Prerequisites: For PhD students: Satisfactory completion of SGS 8022 Molecular Cell Biology is required. For MD/PhD students: Satisfactory completion of first two years of medical school is required.	4	4	4	0	0
Graduate Studies	SGSS	8091	Fundamentals of Functional Genomics	This course will provide a fundamental understanding of how genomic and proteomic information can be used to elucidate functional mechanisms in an organism. Emphasis will be placed on linking genomic information to functional changes occurring at the cellular, organ and whole organism levels. The course will provide interdisciplinary lectures to train	2	2	2	0	0

... provide interdisciplinary lectures to train students to move freely among the disciplines needed to investigate genome function. The focus of the course will be on the relevance of functional genomics to inherited and acquired diseases and the process of converting the knowledge to the discovery of new therapeutics.

Graduate Studies	SGSS	8092	Fundamentals of Genomic Medicine	Course will provide a theoretical framework for understanding the fundamental concepts of mammalian genetics, functional genomics and bioinformatics as well as advanced technical and biological tools used in today's biomedical research environment. The course will provide lectures on a wide range of classical and modern topics such as classical genetics, linkage analysis, genetic mapping, positional cloning, genomics, proteomics and bioinformatics. The focus of the course will be to understand the experimental identification of genes responsible for disease and modern applications of genomics and proteomics to understanding biological processes as well as their impact on modern medicine. Prerequisites: SGS 8021, SGS 8022, or approval from course director.	4	4	4	0	0
Graduate Studies	SGSS	8121	Gastrointestinal Physiology	This one hour course will cover the basics of GI Physiology for upper-level graduate students. Students will be introduced to cellular and systemic physiology of digestion and absorption, the biology of gastric hormones and the regulation of hepatic function.	1	1	1		
Graduate Studies	SGSS	8122	Pulmonary Physiology	This one hour course will cover the basics of Pulmonary Physiology for upper-level	1	1	1		

graduate students. Students will be introduced to cellular and systemic physiology of ventilation, gas exchange and the regulation of the pulmonary circulation.

Graduate Studies	SGSS	8130	Scientific Grant Writing	Practical course on grant writing. Specific steps in writing a grant application, from the hypothesis and specific steps through the final product, are presented and discussed as the student writes an application that will be submitted to a granting agency. Prerequisites: Satisfactory completion of the first year biomedical sciences core curriculum, or permission of the course director.	1	1	1	0	0
Graduate Studies	SGSS	8210	Fundamentals of Oncology I	As the first semester of a two-semester course sequence, this course covers fundamental aspects of cancer biology with emphasis on the etiology of cancer, natural history of neoplasia, epidemiology of human malignancies, host-tumor relationships, immunobiology and principles of chemotherapy and radiotherapy. Prerequisites: Satisfactory completion of the first year biomedical sciences core curriculum, or permission of the course director.	4	4	3	2	0
Graduate Studies	SGSS	8220	Fundamentals of Oncology II	As the second semester of a two-semester course sequence, this course offers a survey of the entire spectrum of human neoplasias, emphasizing their classification, their natural history, their cellular and molecular biology and the diverse ways of which they are treated. Prerequisites: Satisfactory completion of SGS 8210, or permission of the course director.	4	4	3	2	0
Graduate Studies	SGSS	9210	Investigation of	The student works with individual faculty	1	1	0	0	0

Problem members on a specific investigative research problem. This provides an introduction to analytical techniques and the scientific method in action. Prerequisites: Satisfactory completion of the first two semesters of the biomedical sciences core curriculum or permission of the course director.

Graduate Studies	BCMB	5002	RSCH-Biochem-Molecular Bio	To provide the student an opportunity to train in basic research with direct relevance to the clinical interests of the student.	7	7			
Graduate Studies	BCMB	7450	Medical Biochemistry	Covers the chemistry and reactions of the constituents of living matter, metabolism and control mechanisms at levels of biological organization from subcellular to organism. Emphasis on medical application.	7	7	8	0	0
Graduate Studies	IMMB	8110	Medical Microbiology	This course combines principles of Immunology, Medical Microbiology and Infectious Diseases.	7	7	6	0	0