GENE (GENE)

GENE 367. Commercialization and Intellectual Property Management. 3 Units.
This interdisciplinary course covers a variety of topics, including principles of intellectual property and intellectual property management, business strategies and modeling relevant to the creation of start-up companies and exploitation of IP rights as they relate to biomedical-related inventions. The goal of this course is to address issues relating to the commercialization of biomedical-related inventions by exposing law students, MBA students, and Ph.D. candidates (in genetics and proteomics) to the challenges and opportunities encountered when attempting to develop biomedical intellectual property from the point of early discovery to the clinic and market. Specifically, this course seeks to provide students with the ability to value a given technological advance or invention holistically, focusing on issues that extend beyond scientific efficacy and include patient and practitioner value propositions, legal and intellectual property protection, business modeling, potential market impacts, market competition, and ethical, social, and healthcare practitioner acceptance. During this course, law students, MBA students, and Ph.D. candidates in genomics and proteomics will work in teams of five (two laws students, two MBA students and one Ph.D. candidate), focusing on issues of commercialization and IP management of biomedical-related inventions. The instructors will be drawn from the law school, business school, and technology-transfer office. Please visit the following website for more information: fusioninnovate.com. Offered as LAWS 5341, MGMT 467, GENE 367, GENE 467, EBME 467 and EECS 467.

GENE 451. A Data-Driven Introduction to Genomics and Human Health. 3 Units.
This course introduces the foundational concepts of genomics and genetic epidemiology through four key principles: 1) Teaching students how to query relational databases using Structure Query Language (SQL); 2) Exposing students to the most current data used in genomics and bioinformatics research, providing a quantitative understanding of biological concepts; 3) Integrating newly learned concepts with prior ones to discover new relationships among biological concepts; and 4) Providing historical context to how and why data were generated and stored in the way they were, and how this gave rise to modern concepts in genomics. Offered as PQHS 451, GENE 451, and MPHP 451.

GENE 467. Commercialization and Intellectual Property Management. 3 Units.
This interdisciplinary course covers a variety of topics, including principles of intellectual property and intellectual property management, business strategies and modeling relevant to the creation of start-up companies and exploitation of IP rights as they relate to biomedical-related inventions. The goal of this course is to address issues relating to the commercialization of biomedical-related inventions by exposing law students, MBA students, and Ph.D. candidates (in genetics and proteomics) to the challenges and opportunities encountered when attempting to develop biomedical intellectual property from the point of early discovery to the clinic and market. Specifically, this course seeks to provide students with the ability to value a given technological advance or invention holistically, focusing on issues that extend beyond scientific efficacy and include patient and practitioner value propositions, legal and intellectual property protection, business modeling, potential market impacts, market competition, and ethical, social, and healthcare practitioner acceptance. During this course, law students, MBA students, and Ph.D. candidates in genomics and proteomics will work in teams of five (two laws students, two MBA students and one Ph.D. candidate), focusing on issues of commercialization and IP management of biomedical-related inventions. The instructors will be drawn from the law school, business school, and technology-transfer office. Please visit the following website for more information: fusioninnovate.com. Offered as LAWS 5341, MGMT 467, GENE 367, GENE 467, EBME 467 and EECS 467.

GENE 488. Yeast Genetics and Cell Biology. 3 Units.
This seminar course provides an introduction to the genetics and molecular biology of the yeasts S. cerevisiae and S. pombe by a discussion of current literature focusing primarily on topics in yeast cell biology. Students are first introduced to the tools of molecular genetics and special features of yeasts that make them important model eukaryotic organisms. Some selected topics include cell polarity, cell cycle, secretory pathways, vesicular and nuclear/cytoplasmic transport, mitochondrial import and biogenesis, chromosome segregation, cytoskeleton, mating response and signal transduction. Offered as CLBY 488, GENE 488, MBIO 488, and PATH 488.

GENE 500. Advanced Eukaryotic Genetics I. 3 Units.
Fundamental principles of modern genetics; transmission, recombination, structure and function of the genetic material in eukaryotes, dosage compensation, behavior and consequences of chromosomal abnormalities, mapping and isolation of mutations, gene complementation and genetic interactions. Recommended preparation: BIOL 362.

GENE 503. Readings and Discussions in Genetics. 0 - 3 Units.
(Credit as arranged.) In-depth consideration of special selected topics through critical evaluation of classic and current literature.

GENE 504. Advanced Eukaryotic Genetics II. 3 Units.
Fundamental principles of modern genetics; population and quantitative genetics, dissection of genome organization and function, transgenics, developmental genetics, genetic strategies for dissecting complex pathways in organisms ranging from Drosophila and C. elegans to mouse and human. Recommended preparation: GENE 500 or permission of instructor.

GENE 505. Genetics Journal Club. 1 Unit.
Genetics Journal Club is a graduate level course designed to facilitate discussion of topics in Genetics. Students choose "hot" papers in Genetics and present them to their peers. Group presentations are designed to encourage audience participation. The intent of this class is to expose students to cutting edge topics in Genetics and to instill teaching and leadership skills.
GENE 511. Grant Writing and Reviewing Skills Workshop. 3 Units.
This is an introductory graduate course in grant writing and reviewing
tools. During this course each student will write a research grant on a
topic of his or her choice. Proposals may form the basis for the written
component of the preliminary examination in the Genetics Department. Students will also participate in editing and reviewing the proposals
of their classmates. Prereq: GENE 500 and GENE 504 or consent of
instructor.

GENE 513. Stem Cell Genetics. 3 Units.
This course focuses on fundamental aspects of development with
implications for stem cell therapy, tissue engineering, regenerative
medicine and postnatal health. The goal of the class is to inform
and promote critical thinking and discussion of research topics of
medical importance in developmental biology. The themes of the course
will include the conditions and factors which promote pluripotency
and differentiation, regeneration and repair, epigenetic stability and
reprogramming, and prenatal conditions which affect postnatal health. The topics will include early embryonic development and embryonic stem
cells, cardiac development and regeneration, bone development and
repair, pancreatic development and regeneration, germ line stem cells
and conditions affecting postnatal health. The course will be structured
around facilitated discussion of the primary literature.

GENE 524. Advanced Medical Genetics: Molecular & Cytogenetics. 2 - 3
Units.
This course provides an in-depth forum for discussion of fundamental
principles regarding clinical cytogenetics and molecular genetics and
their relevance to medical genetics, genomics and genetic counseling.
Following a historical overview, topics include a discussion of numerical
and structural aberrations, sex chromosome abnormalities, issues
regarding population cytogenetics, clinical relevance of such findings
as marker chromosomes, mosaicism, contiguous gene deletions and
uniparental disomy. The course will cover principles of molecular
genetics including structure, function and regulations of genes (DNA,
RNA, proteins), genetic variation, inheritance patterns and both
cytogenetic and molecular laboratory techniques (fluorescence in situ
hybridization, micro-array, SNP analyses, sequencing) in the clinical
laboratory. Students who register for 3.00 credit hours are required to do
an additional paper.

GENE 525. Advanced Medical Genetics: Clinical Genetics. 2 - 3 Units.
Fundamental principles regarding congenital malformations,
dysmorphology and syndromes. Discussion of a number of genetic
disorders from a systems approach: CNS malformations, neurodegenerative disorders, craniofacial disorders, skeletal dysplasias,
connective tissue disorders, hereditary cancer syndromes, etc.
Discussions also include diagnosis, etiology, genetics, prognosis and
management.

GENE 526. Advanced Medical Genetics: Quantitative Genetics &
Genomics. 2 - 3 Units.
The purpose of this course is twofold: first, to provide a foundation in
quantitative genetics and second, to focus on genomic approaches
and technologies which have greatly expanded our understanding
of not only rare genetic disorders but common ones as well. We will
cover concepts related to risk assessment and calculation and its
application to medical genetics including principles and application
of Hardy Weinberg equilibrium as well as applying Bayes' Theorem as
a mechanism to refine risk assessment based on data specific to a
patient. We will also focus on understanding the clinical implications
of the interpretation of next generation sequencing results, identify
limitations of genomic technologies, and practice curation / annotation
and interpretation of genomic testing results. In addition, we will discuss
resources and bioinformatics tools including national databases and
clinical labs to aid in the interpretation of genomic test results including
variants of uncertain significance. Students who register for 3.00 credit
hours are required to do an additional paper.

GENE 527. Advanced Medical Genetics: Biochemical Genetics. 2 - 3
Units.
Fundamental principles of metabolic testing; amino acid disorders;
organic acid disorders; carbohydrate disorders; peroxisomal disorders;
mitochondrial disorders; etc. Discussion of screening principles and
newborn screening as well as approaches to diagnosis, management and
therapy for metabolic diseases.

GENE 528. Principles and Practices of Genetic Counseling. 3 Units.
Fundamental principles needed for the practicing genetic counselor.
Topics include skills in obtaining histories (antenatal, perinatal, medical,
developmental, psychosocial and family); pedigree construction and
analysis, physical growth and development; the genetic evaluation; the
physical examination and laboratory analyses; prenatal issues, prenatal
screening and diagnosis; and teratogenicity.

GENE 529. Psychosocial Issues in Genetic Counseling. 3 Units.
Fundamental principles regarding the psychosocial aspects of genetic
disease and birth defects, its psychological and social impact on
the individual and family. Topics include the genetic counseling
interview process, issues regarding pregnancy and prenatal diagnosis,
chronicity, death and loss. Cultural issues and their impact on the genetic
counseling session are addressed. Resources for families are also
explored. Basic interviewing skills are presented. Students will have an
opportunity for practice of skills through role play and actual interviewing
situations.

GENE 531. Cancer Genetics. 2 - 3 Units.
This seminar will discuss basic concepts in cancer epidemiology,
principles of cancer genetics, inherited cancer syndromes, cytogenetics
of cancers, prediagnosis analysis for familial cancer risk and approaches to
the differential diagnosis of inherited and familial cancers. Additionally,
topics of risk assessment, genetic testing, screening, management and
psychosocial issues in providing genetic counseling to patients with
familial and inherited cancers will be discussed.

GENE 532. Clinical Practicum in Genetic Counseling. 1 - 6 Units.
This clinical practicum provides the student an opportunity to function
as a genetic counselor by preparing for cases; obtaining appropriate
histories; determining risks; performing psychosocial assessments;
discussing disease characteristics, inheritance, and natural history;
providing anticipatory guidance and supportive counseling; using medical
and community resources; and follow-up. Students rotate through four
clinical areas and one laboratory and will register for a total of 12 hours
over the course of the program. Recommended preparation: Admission to
Genetic Counseling Training Program.
GENE 537. Microscopy-Principles and Applications. 3 Units.
This course provides an introduction to various types of light microscopy, digital and video imaging techniques, and their applications to biological and biomedical sciences via lectures and hands-on experience. Topics covered include geometrical and physical optics; brightfield, darkfield, phase contrast, DIC, fluorescence and confocal microscopes; and digital image processing. Offered as GENE 537, MBIO 537, and PHOL 537.

GENE 601. Research in Genetics. 1 - 9 Units.
(Credit as arranged.)

GENE 651. Thesis M.S.. 1 - 9 Units.
(Credit as arranged.) Master’s Thesis Plan A.

GENE 701. Dissertation Ph.D.. 1 - 9 Units.
(Credit as arranged.) Prereq: Predoctoral research consent or advanced to Ph.D. candidacy milestone.