

GENETICS (GENETICS)

GENETICS 133 – GENETICS IN THE NEWS

3 credits.

The science of genetics is at the heart of many issues facing our society, and as such, genetics is often in the news. Explores the underlying genetics and methodologies to gain a deeper understanding of the science behind the headlines so that we can make more informed decisions as citizens.

Requisites: None

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Elementary

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2024

GENETICS 155 – FRESHMAN SEMINAR IN GENETICS

1 credit.

Introduction to the discipline of genetics, to the UW Laboratory of Genetics, to some of the research projects the faculty are pursuing, to resources available at UW-Madison, and to the career options open to an individual with a genetics undergraduate degree.

Requisites: None

Repeatable for Credit: No

Last Taught: Fall 2023

GENETICS 289 – HONORS INDEPENDENT STUDY

1-2 credits.

Research work for Honors students under direct guidance of a faculty member in an area encompassing Genetics. Students are responsible for arranging the work and credits with the supervising instructor.

Requisites: Consent of instructor

Course Designation: Honors - Honors Only Courses (H)

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2010

GENETICS 299 – INDEPENDENT STUDY

1-3 credits.

Research work for students under direct guidance of a faculty member in an area encompassing Genetics. Students are responsible for arranging the work and credits with the supervising instructor.

Requisites: Consent of instructor

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2024

GENETICS 375 – SPECIAL TOPICS

1-4 credits.

Specialized subject matter of current interest to undergraduate students.

Requisites: None

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2024

GENETICS 399 – COORDINATIVE INTERNSHIP/COOPERATIVE EDUCATION

1-8 credits.

An internship under guidance of a faculty or instructional academic staff member in Genetics and internship site supervisor. Students are responsible for arranging the work and credits with the faculty or instructional academic staff member and the internship site supervisor.

Requisites: Consent of instructor

Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Workplace - Workplace Experience Course

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Fall 2023

GENETICS 400 – STUDY ABROAD IN GENETICS

1-6 credits.

Provides an area equivalency for courses taken on Madison Study Abroad Programs that do not equate to existing UW courses.

Requisites: None

Repeatable for Credit: Yes, unlimited number of completions

GENETICS 466 – PRINCIPLES OF GENETICS

3 credits.

Genetics in eukaryotes and prokaryotes. Includes transmission genetics, molecular genetics, evolutionary genetics, genetic engineering, and societal issues associated with genetics. Illustrative material includes bacteria, plants, insects, and vertebrates.

Requisites: (ZOOLOGY/BIOLOGY/BOTANY 151 or BIOCORE 381 or BOTANY/BIOLOGY 130 or ZOOLOGY/BIOLOGY 101 and 102) and (CHEM 104 or CHEM 109 or CHEM 115). Not eligible to enroll if credit earned for GENETICS 467 or 468

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2024

GENETICS 467 – GENERAL GENETICS 1

3 credits.

Genetics of eukaryotes and prokaryotes. Includes Mendelian genetics, probability and hypothesis testing, genetic mapping, molecular genetics, gene expression and genetic engineering. Illustrative material includes viruses, bacteria, plants, fungi, insects, and humans.

Requisites: (ZOOLOGY/BIOLOGY 101 and 102, or ZOOLOGY/BIOLOGY/BOTANY 151, BIOCORE 381, or BOTANY/BIOLOGY 130) and (CHEM 104, 109, or 115). Not open to students with credit for GENETICS 466.

Repeatable for Credit: No

Last Taught: Fall 2023

GENETICS 468 – GENERAL GENETICS 2

3 credits.

Genetic analysis, population genetics, evolution and quantitative genetics. Includes mutant screens, pathway analysis, mosaic analysis, reverse genetics, genomics, Hardy-Weinberg linkage equilibrium, inbreeding, genetic drift, natural selection, population structure, inheritance of complex traits, domestication and human evolution.

Requisites: GENETICS 467**Repeatable for Credit:** No**Last Taught:** Spring 2024**GENETICS 470 – BASIC CYTOLOGY AND LABORATORY PROCEDURES**

1 credit.

A comprehensive review of cellular biology, the study of optical methods with emphasis on the light microscope and the various techniques used in preparation and staining of specimens for cytologic and histologic study.

Requisites: Declared in Cytotechnology**Repeatable for Credit:** No**Last Taught:** Fall 2023**GENETICS 471 – ADVANCED LABORATORY PROCEDURES**

1 credit.

Preparation of non-gynecologic cytologic specimens using several different instrument methodologies. Application of universal precautions and safety in the handling of unknown biologic hazards. Introduction to histologic preparatory techniques and special staining methods.

Requisites: Declared in Cytotechnology**Repeatable for Credit:** No**Last Taught:** Spring 2024**GENETICS 520 – NEUROGENETICS**

3 credits.

The genetic basis of nervous system development, structure, function, and dysfunction. Will emphasize both current research findings on the genetic basis of specific neurological disorders, as well as genetic methodologies and experimental approaches used in neurobiological research.

Requisites: GENETICS 466, 467, BIOCORE 587, ZOOLOGY/ PSYCH 523, or PSYCH 454**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No**Last Taught:** Spring 2024**GENETICS/BIOLOGY 522 – COMMUNICATING EVOLUTIONARY BIOLOGY**

2-3 credits.

Exposure to diverse topics in contemporary evolutionary biology and development of critical thinking and communication skills. Most weeks guest lecturers present their own primary research on a specialized topic in evolutionary biology. Seminars include perspectives from genetics, ecology, geoscience, zoology, botany, microbiology, systematics, molecular biology, and integrative research. Some weeks feature special topics and discussions on pedagogical, legal, outreach, or other issues in evolutionary biology. Includes thinking critically about methodology, experimental design and interpretation, and how conclusions are reached in evolutionary biology by reading primary and secondary literature, attending seminars, discussing topics with speakers and other students, and preparing a written report. The 3-credit version of the course delves deeper into communication of evolutionary biology to researchers, undergraduates, K-12 students, and the general public.

Requisites: GENETICS 466, 468, ZOOLOGY/ANTHRO/BOTANY 410, or BIOCORE 381, or concurrent enrollment**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No**Last Taught:** Spring 2024**GENETICS 525 – EPIGENETICS**

3 credits.

Introductory course in epigenetics - the layer of chemical information that sits on top of the genome - that switch genes 'on' or 'off'. Will introduce how the epigenome, in collaboration with the genome, controls versatile biological processes and cell fates. Will also cover the latest advances of how humans can control their own epigenetic destiny by lifestyle, diet, and other environmental factors.

Requisites: GENETICS 466 or 467**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Fall 2021

GENETICS 527 – DEVELOPMENTAL GENETICS FOR CONSERVATION AND REGENERATION

3 credits.

Human-induced factors such as changes in land use and global climate are causing rapid worldwide biodiversity loss. Can modern molecular genetics contribute to species preservation? In this course, we will first explore the challenges and potential of molecular genetic methods based on biobanking, gene editing and nuclear transfer for animal biodiversity preservation. Topics covered will include: i) maternal factors and early animal development, ii) interspecies somatic cell nuclear transfer (isSCNT) and oocyte-mediated reprogramming in animal cloning, iii) developmental, phylogenetic and ecological considerations for biobanking, iv) gene editing and synthetic biology as potential tools to recapture biodiversity. Use knowledge in animal population status, developmental genetics and phylogeny to address real-life problems involving the conservation of threatened animal populations.

Requisites: GENETICS 466, 467, or BIOCORE 381**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No**Last Taught:** Spring 2024**GENETICS 528 – BANKING ANIMAL BIODIVERSITY: INTERNATIONAL FIELD STUDY IN COSTA RICA**

1 credit.

Study abroad course that provides an on-site educational experience where we use developmental genetics concepts to guide projects of biobanking and oocyte-mediated cloning, as a potential last-defense resort for the preservation of living species under risk of extinction. It will provide hands-on experience in current research and activities in biodiversity areas, including visits to biodiversity-rich ecosystems, on site seminars and demonstrations, biodiversity preservation activities, as well as exposure to local culture and social needs.

Requisites: GENETICS 466, 467, BIOCORE 381, or ZOOLOGY 470**Repeatable for Credit:** No**GENETICS 545 – GENETICS LABORATORY**

2 credits.

Gain practical experience in classical and molecular genetic laboratory techniques using plants, animals, and fungi. Topics include complementation and linkage analysis, gene mapping, library screening, yeast and bacterial transformation, restriction analysis, PCR, sequencing, and Southern blot analysis.

Requisites: GENETICS 466 or 467**Course Designation:** Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No**Last Taught:** Spring 2024**GENETICS 548 – THE GENOMIC REVOLUTION**

3 credits.

Profound advances are now possible thanks to genomic data and analysis. Introduces the structure, function, and evolution of genomes. It also outlines the realized and prospective benefits of genomic technology for human health, agriculture, and conservation.

Requisites: GENETICS 466, 468, or BIOCORE 587**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No**Last Taught:** Spring 2024**GENETICS/HORT 550 – MOLECULAR APPROACHES FOR POTENTIAL CROP IMPROVEMENT**

3 credits.

Introduction of basic concepts of plant molecular biology and molecular techniques in current use. Topics include: organization and regulation of plant genes, gene cloning and analysis, transformation systems for plants, and molecular techniques for crop improvement.

Requisites: BIOCHEM 501 and (GENETICS 466 or 467); or graduate/professional standing**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No**Last Taught:** Spring 2023**GENETICS 564 – GENOMICS AND PROTEOMICS**

3 credits.

The basic principles of genomics, proteomics and bioinformatics will be taught through a semester-long project of the students choosing. Creative problem solving in science skills will be learned through a variety of active-learning techniques that include: reading of primary literature, group presentations, peer review, bioinformatic lab exercises, science communication skills (writing visualization), and creating a website. Emphasis will be placed upon how to effectively communicate science (written, oral and written). Topics include: genomic sequencing, phylogeny, domain analysis, transcriptomics, CRISPR screens, chemical genomics, quantitative proteomics and protein networks. Capstone course.

Requisites: GENETICS 466, 468, or BIOCORE 587. Not open to graduate students**Course Designation:** Gen Ed - Communication Part B

Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No**Last Taught:** Spring 2024

GENETICS/MD GENET 565 – HUMAN GENETICS

3 credits.

Principles, problems, and methods of human genetics. Surveys aspects of medical genetics, biochemical genetics, molecular genetics, cytogenetics, quantitative genetics, and variation as applied to humans.

Requisites: Graduate/professional standing, GENETICS 466, 468, or BIOCORE 587

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Fall 2023

GENETICS 566 – ADVANCED GENETICS

3 credits.

Principles of classical and modern genetic analysis taught through readings in the scientific literature and group projects. Capstone course.

Requisites: Declared in Genetics undergraduate program and GENETICS 466, 468, or BIOCORE 587

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2024

GENETICS 567 – COMPANION RESEARCH SEMINAR

1 credit.

Student-led discussions on scientific, societal, and professional topics relevant to Senior research and selected original research presentations.

Requisites: Consent of instructor

Repeatable for Credit: No

Last Taught: Fall 2023

GENETICS 568 – THE CENTRAL NERVOUS SYSTEM

1 credit.

Anatomy, physiology, histology and pathology of the central nervous system and the corresponding cellular manifestations which provide diagnostic information. Cell changes related to specimen preparation. Correlation of the didactic information with the microscopic cellular patterns to provide a diagnosis.

Requisites: Declared in Cytotechnology

Repeatable for Credit: No

Last Taught: Spring 2024

GENETICS 569 – THE BREAST

1 credit.

Anatomy, histology, physiology and pathology of the breast and the corresponding cellular manifestations which provide diagnostic information. Cell changes related to specimen processing. Correlation of the didactic information with the microscopic cell patterns to provide a diagnosis.

Requisites: Declared in Cytotechnology

Repeatable for Credit: No

Last Taught: Spring 2024

GENETICS 570 – THE FEMALE REPRODUCTIVE SYSTEM

8 credits.

Anatomy, histology, physiology, and pathology of the female reproductive tract and the corresponding cellular manifestations which provide diagnostic information. Cellular changes due to therapy and specimen collection. Correlation of the didactic information with the microscopic cellular patterns to provide a diagnosis.

Requisites: Declared in Cytotechnology

Repeatable for Credit: No

Last Taught: Fall 2023

GENETICS 571 – CLINICAL PRACTICE I

1 credit.

Clinical practicum to develop diagnostic expertise involving the microscopic examination of routine gynecologic specimens (Pap smears). Observe the signout of abnormal cytologic specimens by cytopathologist staff.

Requisites: Declared in Cytotechnology

Repeatable for Credit: No

Last Taught: Fall 2023

GENETICS 572 – THE RESPIRATORY SYSTEM

3 credits.

Anatomy, histology, physiology and pathology of the respiratory tract and the corresponding cellular manifestations which provide diagnostic information. Cell changes related to specimen processing. Correlation of the didactic information with the microscopic cellular patterns to provide a diagnosis.

Requisites: Declared in Cytotechnology

Repeatable for Credit: No

Last Taught: Fall 2023

GENETICS 573 – THE GENITOURINARY SYSTEM

2 credits.

Anatomy, physiology, histology and pathology of the urinary tract and male reproductive systems and the corresponding cellular manifestations which provide diagnostic information. Cell changes related to specimen processing. Correlation of didactic information with microscopic cell patterns to provide a diagnosis.

Requisites: Declared in Cytotechnology

Repeatable for Credit: No

Last Taught: Fall 2023

GENETICS 574 – THE GASTROINTESTINAL SYSTEM

3 credits.

Anatomy, histology, physiology and pathology of the gastrointestinal system and the corresponding cellular manifestations which provide diagnostic information. Cell changes related to specimen processing. Correlation of the didactic information with the microscopic cellular patterns to provide a diagnosis.

Requisites: Declared in Cytotechnology

Repeatable for Credit: No

Last Taught: Spring 2024

GENETICS 575 – MISCELLANEOUS SYSTEMS

3 credits.

Anatomy, histology, physiology and pathology of skin, thyroid, lymph nodes and other sites and the corresponding cellular manifestations which provide diagnostic information. Emphasis on specimen collection by fine needle aspiration. Correlation of the didactic information with the microscopic cellular patterns to provide a diagnosis.

Requisites: Declared in Cytotechnology**Repeatable for Credit:** No**Last Taught:** Spring 2024**GENETICS 576 – EFFUSIONS**

2 credits.

Anatomy, physiology, histology and pathology of the body cavities. Cytologic manifestations which provide diagnostic information. Cell changes related to specimen processing. Correlation of the didactic information with the microscopic cellular patterns to provide a diagnosis.

Requisites: Declared in Cytotechnology**Repeatable for Credit:** No**Last Taught:** Spring 2024**GENETICS 577 – APPLIED CYTOLOGY I**

1 credit.

Written and practical application of the comprehensive body of knowledge to all aspects of preparation, evaluation, correlation and diagnosis of cytologic specimens.

Requisites: Declared in Cytotechnology**Repeatable for Credit:** No**Last Taught:** Spring 2024**GENETICS 578 – APPLIED CYTOLOGY II**

1 credit.

Written and practical application of the advanced comprehensive body of knowledge to all aspects of preparation, evaluation, correlation and diagnosis of cytologic specimens. Practice in nationally offered cytologic examinations.

Requisites: Declared in Cytotechnology**Repeatable for Credit:** No**Last Taught:** Summer 2023**GENETICS 588 – IMMUNOGENETICS**

3 credits.

Immunogenetics focuses on the unique genetic phenomena that occur in lymphocytes during development and response to stimuli. It pays particular attention to the processes of adaptive antigen receptor development and maturation, major histocompatibility complex molecule polygeny and polymorphism in the context of current real-life challenges (e.g. COVID-19, influenza, and HIV), immunological evolution, epigenetics associated with autoimmunity, sex differences in immune responses, and some genetic processes involved in cancer of white blood cells. Ultimately, the genetic mechanisms that drive the immunological and clinical differences observed between individuals when confronted with the same challenge will be examined, and explored through the primary and secondary research literature in order to strengthen scientific literacy.

Requisites: GENETICS 466, 467 or BIOCORE 383**Repeatable for Credit:** No**Last Taught:** Fall 2023**GENETICS 605 – CLINICAL CASES IN MEDICAL GENETICS**

3 credits.

The use of genetics in medicine has experienced significant growth over the past 50 years, identifying risk genes, and devising diagnostic tests and therapies based on this knowledge for specific clinical disorders such as cystic fibrosis, achondroplasia, and Retts syndrome. MDs and biomedical scientists from UW Hospital and Clinics, the School of Medicine and Public Health, and other UW units will present lectures in this field followed by question-answers sessions. Other class sessions will be devoted to student presentations and open discussion of research literature.

Requisites: GENETICS 466, 467 or BIOCORE 383**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2024**GENETICS/BIOCHEM/MICROBIO 612 – PROKARYOTIC MOLECULAR BIOLOGY**

3 credits.

Molecular basis of bacterial physiology and genetics with emphasis on molecular mechanisms; topics include nucleic acid-protein interactions, transcription, translation, replication, recombination, regulation of gene expression.

Requisites: (BIOCHEM 501 or 507) and (MICROBIO 470, GENETICS 466 or 468) or graduate/professional standing**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No**Last Taught:** Fall 2023**GENETICS/AGRONOMY/AN SCI/HORT 615 – GENETIC MAPPING**

3 credits.

Computing-intensive course to prepare students for genetic mapping research; linkage analysis and QTL mapping in designed crosses; linkage disequilibrium and association analysis (GWAS). Recommended preparation is undergraduate courses in genetics and statistics and prior experience writing R scripts (such as module 1 of STAT 327).

Requisites: Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2023**GENETICS/BIOCHEM/MD GENET 620 – EUKARYOTIC MOLECULAR BIOLOGY**

3 credits.

Focuses on the basic molecular mechanisms that regulate DNA, RNA, and protein metabolism in eukaryotic organisms.

Requisites: BIOCHEM 501, 508 or graduate/professional standing**Course Designation:** Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No**Last Taught:** Spring 2024

GENETICS/ENTOM/ZOOLOGY 624 – MOLECULAR ECOLOGY

3 credits.

Basic principles of molecular ecology. Lecture topics include population genetics, molecular phylogenetics, rates and patterns of evolution, genome evolution, and molecular ecology.

Requisites: GENETICS 466, 467, BIOCORE 383, or graduate student standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2023

GENETICS/CHEM 626 – GENOMIC SCIENCE

2 credits.

Brings cutting-edge topics in the genomic sciences into the reach of those in chemistry, biology, engineering, computer science statistics fields. Enables biologically-oriented students to deal with advances in analytical science so that they may incorporate new genomic science concepts into their own scientific repertoires.

Requisites: Graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2024

GENETICS 627 – ANIMAL DEVELOPMENTAL GENETICS

3 credits.

Advanced genetics course focusing on genetic mechanisms of animal embryonic development, with particular emphasis on central molecular circuitries that control development and genetic analytical tools used to reveal them. Address topics including maternal and epigenetic inheritance, the egg-to-embryo transition, pattern formation, organogenesis, coordination of cellular and molecular mechanisms, and animal models of human congenital disorders.

Requisites: GENETICS 466, 468, or BIOCORE 587

Repeatable for Credit: No

Last Taught: Spring 2024

GENETICS/BIOCHEM 631 – PLANT GENETICS AND DEVELOPMENT

3 credits.

Covers the basic concepts of genetics and genomics as applied to plants and their development, including discussions on breeding systems (modes of reproduction, sex determination, self incompatibility and crossing barriers), linkage analysis, genome structure and function (structure, function and evolution of nuclear and organellar chromosomes; haploidy and polyploidy; expression regulation and epigenetics), along with a description of current methodologies used in the analysis of these processes within the context of plant development. The objective is to instigate a broader knowledge and understanding of the principles and methodologies used in plant genetics and their applications in investigations of the molecular mechanisms that modulate plant development.

Requisites: GENETICS 466, 468, BIOCORE 587, or graduate/professional standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Fall 2023

GENETICS 633 – POPULATION GENETICS

3 credits.

Population genetics, aimed at preparing students to initiate research in this field. Explore how genetic variation is influenced by mutation and recombination, population size changes and migration, and natural selection for or against new mutations.

Requisites: GENETICS 466, 468, BIOCORE 381, or graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2024

GENETICS/MD GENET/POP HLTH 636 – PUBLIC HEALTH GENOMICS

1 credit.

Provides an introduction to public health genomics through a review of fundamental principles of genetics, the use of genetic information in clinical and research settings, and its implications for disease management and prevention, and health promotion. Explores policies that guide public health and discusses current ethical, legal, and social implications of these policies.

Requisites: (Junior standing and ZOOLOGY/BIOLOGY/BOTANY 151) or graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2022

GENETICS/BOTANY/M M & I/PL PATH 655 – BIOLOGY AND GENETICS OF FUNGI

3 credits.

Fungal genetics, genomics, and physiology using plant pathogenic fungi and the genetic models *Aspergillus nidulans* and *Neurospora crassa* as model systems to explore the current knowledge of fungal genetics and plant/fungal interactions.

Requisites: Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Fall 2022**GENETICS/MD GENET 662 – CANCER GENETICS**

3 credits.

Cancer remains one of the most difficult health issues facing our society. There is hope in the horizon due to an increasing understanding of both genetic and epigenetic alterations in cancer. In particular, DNA sequencing of human cancers is becoming more common in major health care centers, and there is expectation that this technology will allow for personalized medicine. Thus, there has been a rapid increase in this knowledge over the last decade. Become aware of the current major issues in cancer research and critically evaluate the cancer genetics literature.

Requisites: GENETICS 466, 467 or BIOCORE 383**Repeatable for Credit:** No**Last Taught:** Spring 2024**GENETICS 670 – SEMINAR IN CLINICAL CYTOGENETICS**

1 credit.

Overview of the basic features of chromosome structure and behavior including karyotyping clinical correlates of numerical and structural chromosome aberrations, sex chromosome abnormalities, breakage syndromes and the chromosomal changes associated with the development of cancer.

Requisites: Declared in Cytotechnology**Repeatable for Credit:** No**Last Taught:** Spring 2024**GENETICS 671 – ADVANCED CLINICAL PRACTICE**

8 credits.

Clinical practicum to develop diagnostic expertise of cytologic specimens. Examine challenging cases with emphasis on diagnostic pitfalls. Observe patient clinics related to cytologic specimen collection. Participate at clinical experiences in fine needle aspiration, histology, and a private cytology laboratory.

Requisites: Declared in Cytotechnology**Repeatable for Credit:** No**Last Taught:** Summer 2023**GENETICS 672 – SEMINAR IN LABORATORY OPERATIONS AND QUALITY CONTROL**

1 credit.

Review the fundamentals of basic administrative functions and regulatory requirements including planning, organizing, supervising and controlling business management, record keeping, data processing and laboratory safety. Quality assurance procedures necessary for obtaining, processing, diagnosing and reporting cytologic specimens.

Requisites: Declared in Cytotechnology**Repeatable for Credit:** No**Last Taught:** Spring 2024**GENETICS 673 – SEMINAR IN CLINICAL CYTOLOGY**

1 credit.

Preparation of a case study or clinical topic of choice by each student to present to a peer professional group of cytology staff and medical faculty. Preparation of a referenced scientific term paper or participation in an approved research or class project pertaining to clinical cytology.

Requisites: Declared in Cytotechnology**Repeatable for Credit:** No**Last Taught:** Spring 2024**GENETICS/MD GENET 677 – ADVANCED TOPICS IN GENETICS**

1-3 credits.

Contents vary; consideration of subjects not included in the curriculum.

Requisites: Graduate/professional standing, GENETICS 466, 468, or BIOCORE 383**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: Yes, unlimited number of completions**Last Taught:** Spring 2024**GENETICS 681 – SENIOR HONORS THESIS**

2-4 credits.

Individual study for majors completing theses for Honors degrees as arranged with a faculty member.

Requisites: Consent of instructor**Course Designation:** Honors - Honors Only Courses (H)**Repeatable for Credit:** Yes, unlimited number of completions**Last Taught:** Spring 2023**GENETICS 682 – SENIOR HONORS THESIS**

2-4 credits.

Individual study for majors completing theses for Honors degrees as arranged with a faculty member.

Requisites: Consent of instructor**Course Designation:** Honors - Honors Only Courses (H)**Repeatable for Credit:** No**Last Taught:** Fall 2023

GENETICS 699 – SPECIAL PROBLEMS

1-3 credits.

Individual advanced work in an area of Genetics under the direct guidance of a faculty member.

Requisites: Consent of instructor

Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2024

GENETICS 701 – ADVANCED GENETICS

3 credits.

First semester of professional level training in genetic mechanisms and analysis as applied to genetic transmission, gene expression, forward and reverse genetics, molecular genetics, genomics, developmental genetics, and epigenetics.

Requisites: Declared in Genetics doctoral program

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Fall 2023

GENETICS 702 – ADVANCED GENETICS II

3 credits.

Second of semester of professional level training in genetic mechanisms and analysis as applied to genetic transmission, gene expression, forward and reverse genetics, molecular genetics, genomics, developmental genetics, and epigenetics.

Requisites: GENETICS 701

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2024

GENETICS/MD GENET 707 – GENETICS OF DEVELOPMENT

3 credits.

A research-level analysis of the current status of the investigation of processes controlling differential gene activity and cellular behavior. The major emphasis is genetic. In successive years, the focus moves from the gene to the cell to the organism.

Requisites: Declared in Genetics graduate program

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2023

GENETICS/MD GENET 708 – METHODS AND LOGIC IN GENETIC ANALYSIS

3 credits.

Contemporary issues in genetic, developmental, cell, and molecular biology are addressed in a discussion format. Invited speakers give research lectures and reading material is taken from the primary literature. The discussion focuses on evaluating genetic approaches to biological problems.

Requisites: Declared in Genetics graduate program

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2024

GENETICS/CRB 710 – DEVELOPMENTAL GENETICS

3 credits.

Covers a broad range of topics in animal development, with an emphasis on molecular mechanisms. Focuses on common themes, with the goal of understanding and analyzing current research in developmental biology and genetics.

Requisites: Graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Fall 2023

GENETICS/BOTANY/ENTOM/ZOOLOGY 820 – FOUNDATIONS OF EVOLUTION

2 credits.

Explore some of the most important themes and debates that have permeated evolutionary biology over the last 50 years. Read key papers related to each controversial topic, debate the pros and cons of competing viewpoints, and reflect on the relevance of the issue to contemporary evolutionary biology.

Requisites: Graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Fall 2022

GENETICS/BIOCHEM/BOTANY 840 – REGULATORY MECHANISMS IN PLANT DEVELOPMENT

3 credits.

Molecular mechanisms whereby endogenous and environmental regulatory factors control development; emphasis on stimulus perception and primary events in the signal chain leading to modulated gene expression and cellular development.

Requisites: Graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Fall 2020

GENETICS/AN SCI/POP HLTH 849 – GENETIC EPIDEMIOLOGY
3 credits.

This course will provide an introduction to genetic epidemiology. Topics will include a general overview of genetics and Mendelian and complex inheritance, as well as various elements of study design, including participant ascertainment; phenotype definition; biologic sample selection; genotyping, sequencing, and quality control; measurement of covariates, and choice of analytic methods. We will briefly discuss some of the original study designs and then focus on current study designs for the remainder of the class. Additional emerging topics will be briefly touched upon. Students will complete short homework assignments to enforce concepts learned during lectures, discuss journal articles, and prepare a very short grant application for the mid-term project. In the final weeks of class, students will work together to analyze data from a real genetic study, prepare tables, interpret the findings, and present their project to their peers.

Requisites: Graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2024

GENETICS 875 – SPECIAL TOPICS

1-4 credits.

Special topics of current interest to graduate students.

Requisites: Graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2024

GENETICS 885 – ADVANCED GENOMIC AND PROTEOMIC ANALYSIS

3 credits.

With the availability of genome sequences and high-throughput techniques, organismal physiology can now be examined on a global scale by monitoring the behavior of all genes or proteins in a single experiment. This course will present modern techniques in genomics and proteomics, with particular focus on analyzing the data generated by these techniques. Course material will cover genomic sequencing, comparative sequence analysis, phylogeny construction and phylogenomics, transcription factor motif discovery, DNA microarray analysis, techniques in mass spectrometry, proteomic screening methods, and protein-interaction network analysis. In addition to lecture time, the course includes computer lab where students get hands-on experience analyzing genomic and proteomic datasets. Students should have coursework in general statistics and intermediate or advanced genetics.

Requisites: Graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Fall 2022

GENETICS/B M E/B M I/BIOCHEM/CBE/COMP SCI 915 – COMPUTATION AND INFORMATICS IN BIOLOGY AND MEDICINE

1 credit.

Participants and outside speakers will discuss current research in computation and informatics in biology and medicine. This seminar is required of all CIBM program trainees.

Requisites: Consent of instructor

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2024

GENETICS/AN SCI/DY SCI 951 – SEMINAR IN ANIMAL BREEDING
0-1 credits.

Requisites: Graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2020

GENETICS/AGRONOMY/HORT 957 – SEMINAR-PLANT BREEDING

1 credit.

Graduate seminar in Plant Breeding Plant Genetics (PBPG) that requires students to give oral scientific presentations on topics chosen by the instructors and/or the student's thesis research. This seminar is coordinated by PBPG faculty on a rotating basis.

Requisites: Graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2024

GENETICS 990 – RESEARCH

1-12 credits.

Independent laboratory research in preparation of a graduate thesis under supervision of a faculty member.

Requisites: Consent of instructor

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2024

GENETICS 993 – SEMINAR IN GENETICS

0-1 credits.

Various aspects of genetics: Drosophila, maize, immunogenetics, developmental genetics, or other special topics.

Requisites: Graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Summer 2023