

GENE – GENETICS

GENE 369

Genetic Analysis of Bacteria

3 Credits **Weekly (3-0-1)**

This course explores the role of bacteria and bacteriophages in the development of molecular genetics. Major topics include mechanisms of genetic exchange and genome plasticity in bacteria, and the replication processes of bacteriophages. Students propose experimental strategies to solve problems related to these topic areas and analyze data.

Seminars develop the ability to critically analyze scientific literature through discussion of current and historical research papers.

Prerequisites: Minimum grades of C- in BIOL 205 and BIOL 207.

GENE 370

Genetic Analysis of Eukaryotes

3 Credits **Weekly (3-1-0)**

Explore the strategies geneticists utilize in the dissection of biological processes in eukaryotic model systems. Evaluate and contextualize the diverse approaches available to geneticists in their quest to establish connections between genotype and phenotype. In the laboratory develop key molecular biology skills in the context of a research-based project.

Prerequisites: Minimum grades of C- in BIOL 205 and BIOL 207.

GENE 400

Genome Organization

3 Credits **Weekly (3-3-0)**

Recent advances in high-throughput technologies, collectively known as omic methods, have allowed detailed examination of the organization and expression of genetic material. Explore how whole genomes are sequenced, thousands of transcripts are assessed simultaneously, and the total complement of proteins and metabolites are quantified. Read and discuss current literature in the field applying omic methods to questions in medicine, conservation, and evolution. Develop laboratory skills to apply these techniques.

Prerequisites: Minimum grades of C- in GENE 369 and GENE 370.

GENE 404

Investigations into Gene Regulation

3 Credits **Weekly (3-0-1)**

Students investigate mechanisms of gene regulation in prokaryotes and eukaryotes. Transcriptional, post-transcriptional, translational, post-translational and epigenetic regulatory mechanisms are explored. Through the evaluation of primary research papers, students develop their ability to communicate about experimental design in molecular biology.

Prerequisites: Minimum grades of C- in GENE 369 and GENE 370.

GENE 418

Human Genetics

3 Credits **Weekly (3-0-1)**

Discover the complexities associated with establishing the genotype-phenotype correlation in humans. Explore methods available for identifying genes underlying human disease and how this knowledge leads to advances in the diagnosis and treatment of genetic conditions. In the seminar, work collaboratively to appraise and dissect common human genetic approaches presented in the primary literature.

Prerequisites: A minimum grade of C- in GENE 370.