**GENETIC COUNSELING (GENC)**

**GENC 500 First Year Internship**
In addition to course-based degree requirements, students participate in internships related to the field of genetic counseling. These internships begin in the student's first term. Internships give students the opportunity to learn in varying practice-based environments. Activity: Clinic

0.0 Course Units

**GENC 510 Clinical Internship**
In addition to course-based degree requirements, students participate in internships related to the field of genetic counseling. These internships begin in the student's first term. The clinical internships begin in the summer after the first year of coursework is completed. Clinical internships continue through the spring of the second year. Internships give students the opportunity to learn in varying practice-based environments. Activity: Clinic

0.0 Course Units

**GENC 601 Advanced Genetics and Genomics**
This course will provide an extensive survey of molecular genetics including molecular biology and the regulation of gene expression. Applications to human clinical genetics through discussion of relevant case studies will be incorporated. The content of this course will facilitate an understanding of the application of molecular techniques in genetic testing and diagnosis and provide the necessary background knowledge to understand topics covered in Foundations in Clinical Genetics and other courses in the genetic counseling master's program including Cancer Genetics, Reproductive Genetics, and Medical Genetics. Activity: Lecture

1.0 Course Unit

**GENC 602 Mechanisms of Disease**
The material covered in this course introduces the fundamental principles of normal and abnormal physiology in all systems. The focus of the course will be on understanding the pathophysiology of human genetic diseases. The coursework serves as the background for understanding specific diseases as they present in clinical genetics and research that has led to improved therapy and treatment for patients. The class will be primarily lecture-based using case-based learning. Activity: Lecture

1.0 Course Unit

**GENC 603 Introduction to Genetic Counseling**
Genetic counseling students will be oriented to the profession through a review of the history of genetic counseling. Topics covered include medical terminology, the structure of genetic counseling sessions, discussion of the scope of practice and disability rights, instruction in obtaining family pedigrees, review of genetic testing practices, and the National Society of Genetic Counselors Code of Ethics and Scope of Practice. Students will gain an appreciation for the lived experience of individuals with genetic diseases by reading novels and memoirs, viewing online support groups, watching videos and performing role plays. The course will provide experiential learning about advocacy groups for patients and their families through first-hand interviews and a tour of the CHOP NICU. Activity: Lecture

1.0 Course Unit

**GENC 604 Reproductive and Developmental Genetics**
A variety of topics to prepare students to practice genetic counseling in reproductive genetics will be covered in this course. Topics include a review of human development from gametogenesis and fertilization to organogenesis, emphasizing the genetic basis of these complex events and how teratogenic factors lead to abnormal development. The common indications for prenatal genetic counseling, including advanced maternal age, first-trimester screening, NIPS, ultrasound anomalies, diagnostic procedures, and prenatal complications, will be reviewed. Through the completion of assignments and role plays, students will demonstrate their abilities to critically think through cases, assess risk, and provide patient-centered care. The course will discuss psychosocial issues surrounding fertility counseling. Activity: Lecture

1.0 Course Unit

**GENC 611 Cancer Genetics**
In this course, students will gain an understanding of cancer genetics. Topics covered include an overview of cancer biology and clinical oncology; diagnostics and predictive testing in cancer, including familial mutations in BRCA 1 and 2, and panel testing; cancer risk assessment; psychosocial aspects of cancer genetic testing and counseling. Students will gain an understanding of specific inherited disorders predisposing individuals to malignancies and of counseling for familial cancers. In this class, students will learn how to conduct a genetic counseling session for inherited cancer syndromes such as HBOC and Lynch syndrome and to identify when genetic testing panels are indicated. In addition, the course will cover somatic cancer NGS technology and its relevance in cancer genetic counseling. Activity: Lecture

1.0 Course Unit

**GENC 612 Genetic Counseling Theory I**
Students will learn the basic organization of a genetic counseling session including contracting, building rapport and eliciting patient goals in a patient encounter. Through lectures and various activities such as role play, students will demonstrate their abilities to organize a genetic counseling session. Students will learn to write chart notes, patient and physician letters, and letters of medical necessity. Each student will be responsible for reviewing a Genetic Counseling Practice Guideline and sharing its content with the class. Students will gain an appreciation of appropriate professional interactions and expand their understanding of the impact of genetic disease on families. At the end of the semester, students will complete a genetic counseling session with a standardized patient. Activity: Lecture

1.0 Course Unit
GENC 613 Foundations of Clinical Genetics and Genomic Technologies
In this course, students learn to apply knowledge of genetic principles and understand how they contribute to the etiology, clinical features, and expression of genetic conditions. They will appreciate the natural history and variable expressivity of a variety of genetic diagnoses including differential diagnoses, dysmorphism, genetic testing, and test report interpretation. Students will understand the importance of conveying to families the pathophysiology, inheritance pattern, recurrence risk, and management of genetic disorders. In this class, students will learn the principles of Pedigree Review and Bayesian Analysis. The concepts and tools used to analyze and interpret data from next-generation sequencing (NGS) will be discussed. The nature of mutations, variant analysis, and database analysis will be explored. This class will provide students with hands-on opportunities to utilize databases to systemically review and classify variants. Clinical case variant interpretation and clinical relevance will be discussed in terms of its importance in genetic counseling. Case-based learning will help students understand the complexities of genetic diseases and the importance of obtaining an accurate medical history.
Activity: Lecture
1.0 Course Unit

GENC 614 Introduction to Genetic Counseling Research
This course is designed to allow students to become familiar with research methodologies in clinical genetics. Students will gain an appreciation for the importance of well-designed research in advancing our understanding of diseases. They will learn how to formulate testable hypotheses, design appropriate studies, and develop their thesis proposals. This course will introduce students to scientific writing. Topics covered include the IRB process, research ethics, and informed consent, which prepares students to conduct their own research projects. They will be required to obtain CITI training and to work with their thesis committees as they develop their proposals. Students will develop and refine their own IRB proposals before submitting an application to the IRB committee.
Activity: Lecture
1.0 Course Unit

GENC 620 Medical Genetics I
This year-long course presents a broad overview of concepts in medical genetics including natural history, management and counseling strategies for major pediatric and adult genetics diagnoses and syndromes. Topics covered include chromosomal conditions, hemoglobinopathies, biochemical genetics, cardiovascular genetics, psychiatric genetics, neuro/developmental genetics conditions, skeletal dysplasias, and ophthalmological disorders, as well as classic genetic conditions identified by the organ system involved, such as cystic fibrosis. Students will learn the methods available for genetic testing, diagnosis, and treatment of genetic conditions. They will be provided with a broad overview of metabolic and mitochondrial disorders as well as detailed reviews of specific conditions. Newborn screening will be covered in depth. Students will be exposed to future directions of clinical genetics and genetic counseling and its impact on the management and treatment of common conditions. Course directors will attend each class, and guest lecturers with relevant clinical expertise will be invited to share their clinical knowledge.
Activity: Lecture
1.0 Course Unit

GENC 621 Genetic Counseling Techniques II
In this class, students are taught the basic tenets of counseling theory and how they can be applied to genetic counseling sessions. Theories covered include person-centered counseling with its emphasis on genuineness, empathy and positive regard. Students will also explore other counseling theories such as solution-focused brief therapy, cognitive behavioral therapy, and family systems models. Narrative Medicine will be covered in detail and students will be required to digitally record a narrative medicine interview with an individual or parent of a patient with a genetic disease. The recordings are then analyzed and critiqued. Standardized patient assessments will be performed to monitor students acquisition of more advanced counseling skills. Students will learn the integration of process in the genetic counseling session and to address sensitive patient issues. They will learn to use active listening and value-free communication to manage a genetic counseling session in a culturally responsive manner.
Activity: Lecture
1.0 Course Unit

GENC 623 Ethical Issues in Genetic Counseling
In this introductory course on bioethics, the content will be tailored to issues that emerge in the context of clinical genetics and genetics research. The parallel histories of bioethics and genetic counseling will be reviewed. Students will learn the ways in which bioethics is typically taught in order to adopt a critical approach to bioethics that helps us identify and navigate the ethics of daily genetic counseling practice. The main goal of the class is to think critically and speak openly about readings and cases. Topics to be covered include basic bioethical principles and theories, conflicts of interest and individual biases, informed consent, direct-to-consumer testing, genetic testing of minors, non-directiveness, the ethical nuances of communication, the ethics of how we represent diseases and risks, incidental findings, and genomics research. Readings will vary from classic ethical casebook selections to topical articles, patient education materials, and short excerpts from social science studies of genetic counseling to provide different perspectives. The class will consist of short lectures, individual and group exercises, periodic short videos, and extensive discussion.
Activity: Lecture
1.0 Course Unit

GENC 630 Medical Genetics II
This year-long course presents a broad overview of concepts in medical genetics including natural history, management and counseling strategies for major pediatric and adult genetics diagnoses and syndromes. Topics covered include chromosomal conditions, hemoglobinopathies, biochemical genetics, cardiovascular genetics, psychiatric genetics, neuro/developmental genetics conditions, skeletal dysplasias, and ophthalmological disorders, as well as classic genetic conditions identified by the organ system involved, such as cystic fibrosis. Students will learn the methods available for genetic testing, diagnosis, and treatment of genetic conditions. They will be provided with a broad overview of metabolic and mitochondrial disorders as well as detailed reviews of specific conditions. Newborn screening will be covered in depth. Students will be exposed to future directions of clinical genetics and genetic counseling and its impact on the management and treatment of common conditions. Course directors will attend each class, and guest lecturers with relevant clinical expertise will be invited to share their clinical knowledge.
Activity: Lecture
1.0 Course Unit
GENC 631 Genetic Counseling Theory and Practice III
This course provides students with advanced counseling skills such as advanced empathy and confrontation. Discussions regarding counselor issues such as self-disclosure and countertransference will be explored in detail. Additional skills and techniques from the counseling literature will be practiced in role plays to illustrate the usefulness of various counseling techniques in clinical genetics. This course includes an experiential component for the practice of techniques utilizing standardized patients. Students will analyze their standardized patient recordings and identify missed opportunities and areas in which they need to work on their counseling skills. Each student will analyze a case that they were involved with utilizing at least two theories discussed in class.
Activity: Lecture
1.0 Course Unit

GENC 990 Thesis
Activity: Independent Study
1.0 Course Unit