

GENETIC COUNSELING (GENC)

GENC 6010 Advanced Genetics and Genomics

This course will provide an extensive survey of molecular genetics including molecular and cellular biology and the regulation of gene expression. Applications to human clinical genetics and genetic counseling through discussion of relevant case studies will be incorporated. The class will be primarily lecture-based with some small group work. In addition to exams, students will prepare and present a teaching tool to describe a complex topic to laypeople. The content of this course will provide the foundation for understanding topics covered in additional courses in the genetic counseling master's program including Foundations in Clinical Genetics and Genomic Technologies, Cancer Genetics, Reproductive and Developmental Genetics, and Medical Genetics.

Fall

1 Course Unit

GENC 6020 Mechanisms of Disease

Primary concepts in this course introduce the fundamental principles of pathophysiology, including normal and abnormal embryological development. Pathophysiology and development are covered by major organ systems. Lectures and class exercises will review normal as well as 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. Students will give formal presentations on the pathophysiology of specific disorders.

Fall

1 Course Unit

GENC 6030 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, pedigree construction, 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. Students will gain an appreciation for the lived experience of individuals with genetic diseases by reading memoirs, reviewing 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. Students will engage in role play scenarios throughout the course.

Fall

1 Course Unit

GENC 6040 Reproductive and Developmental Genetics

A variety of topics in reproductive genetics will be covered in this course, including a review of human development emphasizing the genetic basis of these complex events and how teratogenic factors lead to abnormal development. The common indications for prenatal genetic counseling, such as advanced maternal age, first-trimester screening, NIPS, ultrasound anomalies, diagnostic procedures, prenatal complications, and prenatal therapies will be reviewed. Through the completion of assignments and discussion, students will demonstrate their abilities to think critically through cases, assess risk, and provide patient-centered care. The course will discuss psychosocial issues surrounding fertility counseling as well as perinatal bereavement and palliative care.

Spring

1 Course Unit

GENC 6110 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 examine specific inherited disorders predisposing individuals to malignancies and counseling for familial cancers. 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.

Spring

1 Course Unit

GENC 6120 Genetic Counseling Theory and Practice I

Students will learn how to structure genetic counseling sessions including the competencies of establishing rapport, contracting, and eliciting patient goals. The teaching of active listening and interviewing skills guides students in responding empathically to patient concerns. Students use role play to practice skills and demonstrate their ability to organize a genetic counseling session. Students will learn chart documentation and practice letter writing. Each student will be responsible for presenting a Genetic Counseling Practice Guideline and leading a class discussion. Through role play and exploration of current practice students learn to adapt genetic counseling skills for alternate service delivery models. 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, all students complete a genetic counseling session with a standardized patient at the Experiential Learning and Assessment Center at the Perelman School of Medicine. The highly skilled staff ensures safe, measurable, and authentic learning with qualified standardized patients.

Spring

1 Course Unit

GENC 6130 Foundations of Clinical Genetics and Genomic Technologies

In this course, students will understand the importance of conveying to families the pathophysiology, inheritance pattern, recurrence risk, testing options and management of genetic disorders. Students will learn the principles of pedigree review, particularly how to apply Mendelian genetics, population genetics, and Bayesian analysis to provide accurate risk assessment. They will also learn how genetic and molecular principles contribute to the etiology, clinical features, and expression of genetic conditions. They will appreciate how the natural history and variable expressivity of many genetic diagnoses influence differential diagnoses, interpretation of dysmorphology, choices of genetic testing, and test report interpretation. Genetic testing methodologies will be examined in depth, particularly the concepts and tools used to analyze and interpret data from next-generation sequencing (NGS). 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.

Fall

1 Course Unit

GENC 6140 Introduction to Genetic Counseling Research

This course will familiarize students with research methodologies in clinical genetics and genetic counseling. Students will gain an appreciation for the importance of well-designed research both in advancing our understanding of all aspects of genetic disease and in addressing the professional practice of genetic counseling. This course will introduce students to scientific writing and interpretation of the literature. Topics include how to formulate testable hypotheses, design appropriate studies, and carry out a literature review. Students will develop and refine their own IRB proposals as preparation for submitting an application to the IRB committee. Students are required to obtain CITI training and to work with their thesis committees as they develop their proposals.

Spring

1 Course Unit

GENC 6200 Medical Genetics I

The first semester of 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, focusing on Genomic Medicine and Pediatric Genetics. Topics covered include autism, ophthalmogenetics, hearing loss, psychiatric genetics, genodermatoses, immune genetics, pediatric cancer genetics, bone marrow failure syndromes, differences of sex development, craniofacial disorders, skeletal dysplasias and imprinting disorders. Students will be exposed to future directions of clinical genetics and genetic counseling and its impact on the management and treatment of common conditions. Students will actively engage in Clinical Case Presentations and a Journal Club session. Course directors will attend each class, and guest lecturers with relevant clinical expertise will be invited to share their clinical knowledge.

Fall

0.5 Course Units

GENC 6210 Genetic Counseling Theory and Practice 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. 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 an individual with a genetic disease. The recordings are analyzed and reviewed. 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 how to address sensitive patient issues such as sharing challenging news and working with angry patients. They will learn to use active listening and value-free communication to manage a genetic counseling session in a culturally responsive manner.

Fall

1 Course Unit

GENC 6220 Biochemical Genetics

This course presents a broad overview of concepts of inborn errors of metabolism as well as detailed reviews of specific conditions so that students will learn to distinguish the basic descriptors of a wide variety of metabolic conditions, including cardinal features, biochemical signatures, genetic etiologies, inheritance patterns, and available treatments. Students will also understand the basis for, and implications of, newborn screening for both metabolic and other disorders. Students will learn the methods available for diagnosis, genetic and tissue-based testing, and the various forms of treatment for the disorder, from nutrition therapy and transplants to clinical trials. Approaches to appropriately counsel families with a wide range of metabolic conditions and to identify at-risk family members are included in this course. Course directors will attend each class, and guest lecturers with relevant clinical expertise will be invited to share their clinical knowledge.

Fall

0.5 Course Units

GENC 6230 Ethical Issues in Genetic Counseling

In this introductory course on bioethics, we will unpack ethical issues that emerge in the context of clinical genetics and genetic research. Though hospital ethics boards advise on the most challenging ethical cases, they often play the simple but crucial role of slowing the conversation down, asking questions of team members, and facilitating calm, reasoned communication regarding the ethical quandaries that family, clinicians, staff pose. Accordingly, this course gives students the opportunity to analyze ethics cases, alongside lectures, student presentations, and class debates. As a class, we aim to establish and maintain a space where students can develop ethical reasoning skills and debate controversial topics within genetics. Class time will be devoted to short lectures and selected video excerpts, student presentations and debates, and extensive discussion guided by a compendium of ethics cases and associated reading assignments that represent the diverse perspectives of different authors.

Fall

1 Course Unit

GENC 6300 Medical Genetics II

The second semester of 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 this semester include single gene disorders, bleeding and clotting disorders, hemoglobinopathies, adult liver disease, connective tissue disorders, cardiovascular genetics, psychiatric genetics, neurogenetic conditions such as epilepsy, movement disorders, ataxias, Huntington disease, and ALS, 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. Students will be exposed to future directions of clinical genetics and genetic counseling and its impact on the management and treatment of common conditions. Therapeutic approaches and different modalities to treating genetic diagnoses will be reviewed, including approved gene therapy treatments as well as investigational therapies and clinical trials. Students will actively engage in Clinical Case Presentations and a Clinical Research Presentation. Course directors will attend each class, and guest lecturers with relevant clinical expertise will be invited to share their clinical knowledge.

Spring

Prerequisite: GENC 6200

1 Course Unit

GENC 6310 Genetic Counseling Theory and Practice III

This course provides students with advanced counseling skills such as advanced empathy and confrontation. Students will explore counseling theories such as solution-focused brief therapy, cognitive behavioral therapy, and family systems models. Counselor issues such as self-disclosure and countertransference will be discussed 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 focus their counseling skills. Each student will analyze one of their clinical cases utilizing at least two theories discussed in class.

Spring

1 Course Unit

GENC 6400 Professional Development I

The goal of this seminar is to increase awareness of the many facets of genetic counseling as a career. The genetic counseling profession is rapidly evolving as new diagnostic technologies and treatments are developed. Skills learned by genetic counselors are applicable to many different job settings. Knowledge of these alternative ways in which counselors may work increases a student's ability to successfully pursue a career. Members of the genetics community from Philadelphia and the surrounding area provide lectures describing the current state of the profession. Selected topics include genetic counseling for a diverse population, the intersection between palliative care and genetic counseling, and how to manage a clinical genetic counseling practice with issues surrounding billing reimbursement and credentialing. This seminar also helps prepare students for the demands of the genetic counseling profession by focusing on emotional well-being through a process group facilitated by a professional counselor. Students prepare a career development plan reflecting on the essential components of an "ideal job" and develop a curriculum vitae and cover letters.

Fall

0 Course Units

GENC 6450 Professional Development II

In this continuation of GENC 6400, the goal is to increase awareness of the many facets of genetic counseling as a career. The students will learn how to obtain a license and register to take the American Board of Genetic Counseling Certification Examination. Members of the genetics community from Philadelphia and the surrounding area provide lectures describing the current state of the profession. Students will explore professional issues by reviewing the National Society of Genetic Counseling position statements and legislative initiatives. This seminar also helps prepare students for the demands of the genetic counseling profession by focusing on emotional well-being through a process group facilitated by a professional counselor. Students will present a journal club reflecting a paper that discusses current trends in genetic counseling. During the semester, students will write Op-Ed pieces exploring contemporary issues that may impact patient care or the genetic counseling profession, identify community resources for adults with neurodevelopmental disabilities, and prepare abstracts of their thesis research for submission to a conference.

Spring

Prerequisite: GENC 6400

0 Course Units

GENC 6500 Genetic Counseling Rounds I

Once a week, students participate in discussion of clinical cases and recent journal literature. Through their participation, students gain familiarity with the process of reviewing clinical material and providing peer supervision. Presenting clinical and scientific information for group discussion in conferences and patient rounds is an important skill for genetic counselors. This seminar provides these experiences in a supportive environment and thus permits skill building in this area. This activity introduces students to a broad range of diagnoses and methods of managing a case. Discussions of case organization and tailoring a presentation to a specific patient is another aspect of this seminar.

Fall

0 Course Units

GENC 6550 Genetic Counseling Rounds II

In this continuation of GENC 6500, students participate in weekly discussions of clinical cases and recent journal literature. Through their participation, students gain familiarity with the process of reviewing clinical material and providing peer supervision. Presenting clinical and scientific information for group discussion in conferences and patient rounds is an important skill for genetic counselors. This seminar provides these experiences in a supportive environment and thus permits skill building in this area. This activity introduces the students to a broad range of diagnoses and methods of managing a case. Discussions of case organization and tailoring a presentation to a specific patient is another aspect of this seminar.

Spring

Prerequisite: GENC 6500

0 Course Units

GENC 6700 Internship

In addition to course-based degree requirements, students participate in internships related to the field of genetic counseling. These internships begin in the students' first term. Internships give students the opportunity to learn in varying practice-based environments including clinical and laboratory settings, as well as placements in a research and/or advocacy capacity with a specific organization or research protocol. Students document their experiences online daily and provide written summaries of their experiences for the program leadership to review. Students attend their internships once a week. Clinical supervisors evaluate the students in each of the placements.

0 Course Units

GENC 6800 Clinical Internship

The clinical internships during the second year consist of four clinical placements in genetics clinics. Students will have a minimum of 20 days in each specialty. This experiential course will expose genetic counseling students to the genetic counselors' role in different clinical settings and to the broad range of diagnoses and methods of effectively managing patient care. Clinical supervision is provided in a supportive environment that permits skill building as students take on more roles throughout the course of the year. Students will have exposure to cases representing the wide range of diagnoses and indications seen in a clinical genetics practice and will collect at least 50 participatory encounters to satisfy the ACGC requirement. All cases will be supervised by certified genetic counselors to be acceptable for the core case log book. Students will log each case for program review, including self-reflection about their performance. All students will be evaluated by their clinical supervisors and will prepare case analyses for the program leadership to review. The course is required for all second-year students.

Fall, Spring, and Summer Terms

Prerequisite: GENC 6700

0 Course Units

GENC 7101 Research Design and Methodologies

This course focuses on study design and proposal development of research projects relevant to clinical genetics and genetic counseling, encompassing translational, clinical, and behavioral projects. Covered topics include identifying a research topic, asking a research question, study design, background, aims, and methods, proposal writing and analysis plans. IRB submission and feasibility issues will also be addressed. This course will include online asynchronous lectures, online group discussions, and weekly exercises. In addition there will be weekly hour-long online group meetings to discuss research progress. Students will implement course lessons by developing and executing a research project during the one-year program.

Fall

1 Course Unit

GENC 7102 Research Bioethics

This course will combine an overview of NHGRI's program in the ethical, legal, and social implications with in-depth discussion of research ethics including ethical issues associated with biobanking and large data sets. From there, five topical areas of particular relevance to genetic counseling and genomics will be highlighted. National experts offer lectures on race and ancestry in relation to biomedical research and practice, disability perspectives on genetics, the social and ethical implications of genomic prognostication, best practices for and challenges with respect to informed consent, and key legislation related to genomics, research, and medicine. Students are expected to complete reading assignments, case analyses, and participate in online discussion. Synchronous sessions will be held occasionally throughout the course.

Fall

1 Course Unit

GENC 7103 Manuscript & Grant Writing

This comprehensive course will focus on the fundamentals of writing and submitting grant proposals and preparing a manuscript for publication. Grant writing training will include the mechanics of proposal writing and aspects of "grantmanship" as students identify appropriate sources of grant funding, use narrative tools to create informative, persuasive and engaging proposals, creation of Aims that outline the goals of the grant, and support of Aims with well thought out research design. Grant submission process will be discussed. Manuscript writing training will include literature review to identify gaps in knowledge and how the research project will add to the field, the various sections of a manuscript, scientific writing, how to identify the appropriate journal for submission, guidance for authorship, and details about article submission, the peer review process, revisions, and response to reviewers and editors. Students will be prepared to submit the results of their thesis project at the completion of the ART-GC program. Synchronous sessions will be held occasionally throughout the course.

Spring

1 Course Unit

GENC 9900 Thesis

This is an independent study course with a strong emphasis on writing. Students conduct their research, gather data, analyze it, and develop their final thesis in the form of a journal submission. Each student will meet regularly with his/her primary thesis mentor and committee to complete his/her project. Students will be required to submit an abstract to a professional meeting and are encouraged to prepare a manuscript for publication. Students will also present their research to members of the genetic counseling program, advisors, thesis committee members, and the public at the end of the semester.

Spring

1 Course Unit