

GRADUATE SCHOOL

Overview

The Graduate School at the University of Colorado Denver | Anschutz Medical Campus oversees, facilitates, and enhances graduate education, while encouraging excellence in research, creative and scholarly work. We offer master's degrees, doctoral degrees, graduate certificates, and non-degree options in a wide variety of programs. Disciplines include Architecture, Biomedical Sciences, Education, Engineering and Design, Humanities, Natural Sciences, Nursing, Pharmaceutical Sciences, Public Affairs, and Public Health. The Anschutz Medical Campus (CU Anschutz) is the largest academic health center in the Rocky Mountain region. The campus combines interdisciplinary teaching, research and clinical facilities to prepare the region's future health care professionals and be a national leader in life sciences research.

Diversity, Equity, & Inclusion

The Graduate School is committed to diversity and equity in the recruitment and retention of students. We actively seek persons from underrepresented populations, which include, but are not limited to, underrepresented ethnic groups, disabled persons, and those students who are economically disadvantaged, from rural areas, or first-in-family college graduates.

Graduate School Programs Offered

- Graduate School Certificates (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-certificates/>)
 - Anatomical Sciences Education (Certificate) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-certificates/anatomical-sciences-education-certificate/>)
 - Biomedical Data Science (Certificate) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-certificates/biomedical-data-science-certificate/>)
 - Biomedical Science (Certificate) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-certificates/biomedical-science-certificate/>)
 - Dissemination & Implementation Science (Certificate) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-certificates/dissemination-implementation-science-certificate/>)
 - Health Ethics & Humanities (Certificate) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-certificates/health-ethics-humanities-certificate/>)
 - Palliative Care (Certificate) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-certificates/interprofessional-palliative-care-certificate/>)
 - Personalized & Genomic Medicine (Certificate) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-certificates/personalized-genomic-medicine-certificate/>)
 - Research Management and Compliance (Certificate) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-certificates/research-management-compliance-certificate/>)
- Graduate School Masters Programs (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-masters-programs/>)
 - Biomedical Science & Biotechnology (MS) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-masters-programs/biomedical-science-biotechnology-ms/>)
 - Biostatistics (MS) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-masters-programs/biostatistics-ms/>)
 - Clinical Science (MS) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-masters-programs/clinical-science-ms/>)
 - Epidemiology (MS) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-masters-programs/epidemiology-ms/>)
 - Genetic Counseling (MS) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-masters-programs/genetic-counseling-ms/>)
 - Health Services Research, Policy, & Administration (MS) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-masters-programs/health-services-research-policy-administration-ms/>)
 - Modern Human Anatomy (MS) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-masters-programs/modern-human-anatomy-ms/>)
 - Palliative Care (MS) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-masters-programs/palliative-care-ms/>)
 - Pharmaceutical Sciences (MS) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-masters-programs/pharmaceutical-sciences-ms/>)
- Graduate School PhD Programs (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/>)
 - Biomedical Sciences (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/biomedical-sciences-phd/>)
 - Biostatistics (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/biostatistics-phd/>)
 - Cancer Biology (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/cancer-biology-phd/>)
 - Cell Biology, Stem Cells & Development (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/cell-biology-stem-cells-development-phd/>)
 - Clinical Science (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/clinical-science-phd/>)
 - Computational Bioscience (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/computational-bioscience-phd/>)
 - Epidemiology (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/epidemiology-phd/>)

- Health Services Research (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/health-services-research-phd/>)
- Human Medical Genetics & Genomics (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/human-genetics-genomics-phd/>)
- Immunology (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/immunology-phd/>)
- Integrated Physiology (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/integrated-physiology-phd/>)
- Medical Scientist Training Program (MD/PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/medical-scientist-training-program-mdphd/>)
- Microbiology (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/microbiology-phd/>)
- Molecular Biology (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/molecular-biology-phd/>)
- Neuroscience (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/neuroscience-phd/>)
- Nursing (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/nursing-phd/>)
- Pharmaceutical Outcomes Research (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/pharmaceutical-outcomes-research-phd/>)
- Pharmaceutical Sciences (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/pharmaceutical-sciences-phd/>)
- Pharmacology (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/pharmacology-phd/>)
- Rehabilitation Science (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/rehabilitation-science-phd/>)
- Structural Biology & Biochemistry (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/structural-biology-biochemistry-phd/>)
- Toxicology (PhD) (<http://catalog.ucdenver.edu/cu-anschutz/schools-colleges-programs/graduate-school/graduate-school-phd-programs/toxicology-phd/>)

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Graduate School Courses

ANAT 6111 - Human Gross Anatomy (8 Credits)

The Human Gross Anatomy course examines the form and function of the human body at a macroscopic level. Systems-based and regional anatomy lectures are complemented by full-body cadaver dissection. Medical imaging labs provide the opportunity to learn ultrasound skills. Requirements: Must be a degree-seeking student in MS Modern Human Anatomy program.
 Grading Basis: Letter Grade
 Typically Offered: Spring.

ANAT 6205 - Imaging and Modeling (4 Credits)

This course covers major medical and scientific imaging modalities with an emphasis on 3D scientific and medical visualization. Students will also receive instruction in advanced digital image processing and 3D modeling using industry-standard software such as MATLAB and Maya. Prerequisite: Only ANAT degree-seeking students
 Grading Basis: Letter Grade
 A-GRAD Restricted to graduate students only.
 Typically Offered: Fall.

ANAT 6260 - 3D Scanning and Printing for the Anatomical Sciences (1 Credit)

Introduction to the applications and technical "hands on" details of the procedures involved in 3D printing for the anatomical sciences and education. Students will learn approaches to acquiring and processing 3D imaging data along with strategies for printing and finishing objects using fused-deposition modeling and stereolithography. ANAT 6205: Imaging & Modeling
 Grading Basis: Letter Grade
 Typically Offered: Fall, Spring.

ANAT 6310 - Neuroanatomy (4 Credits)

Structure & Function in the Human Nervous System. Basic neuroanatomy & neural systems with workshop focus employing facilitated discussions & problem-oriented cases. Laboratory sessions will employ brain specimens, models & image sets. Team-based projects are in-depth exploration of topics with development of collaborative presentations.

Requisite: Restricted to ANAT students only.

Grading Basis: Letter Grade

Typically Offered: Fall.

ANAT 6321 - Human Histology (4 Credits)

Histology is the study of the tissues. By exploring the human structure, function and organization at the histological level, students will gain important pattern recognition skills to integrate microscopic knowledge with macroscopic gross anatomy and other foundational anatomical sciences. (Will replace ANAT 6320) Prereq: Restricted to ANAT students only.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

ANAT 6330 - Human Embryology (3 Credits)

This graduate level, introductory human embryology course will emphasize developmental aspects of adult anatomy and congenital malformations. Educational value of three-or-four-dimensional models and other ancillary learning resources for human embryology will also be explored. Requisite: Restricted to ANAT students only.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

ANAT 6412 - Foundations of Teaching (1 Credit)

This course will provide students with training, practice, and constructive feedback in effective teaching skills in order to be successful in the biomedical professions. Topics include learning objectives, the neurobiology of learning, assessments, and effective communication within and outside the classroom.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

ANAT 6490 - Advanced Teaching in Anatomical Sciences (3 Credits)

This course offers a hands-on, supervised experience as an anatomical sciences educator. Readings and discussions will enhance your understanding of educational pedagogy. You will apply these skills as you develop and deliver lecture and lab content in a classroom setting. Instructor consent required.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring.

ANAT 6600 - Experimental Design and Research Methods (1 Credit)

In this course, students will foster and apply strategies that enable critical evaluation of any published research (including basic, clinical, and educational), as well as develop the skills necessary to conduct and appropriately analyze their own research data.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

ANAT 6750 - Special Topics: Modern Human Anatomy (1-6 Credits)

This course is offered in a variety of technical and thematic areas in modern human anatomy. The specific topics vary from year to year. Note: This course includes lectures, discussions and workshops.

Grading Basis: Letter Grade

Repeatable. Max Credits: 6.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

ANAT 6840 - Independent Study (1-6 Credits)

This course enables the student to pursue an investigation in a modern human anatomical field of choice toward completion of a capstone project with relatively minor supervision from faculty advisors.

Grading Basis: Letter Grade

Repeatable. Max Credits: 6.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

ANAT 6910 - Teaching Practicum (1-4 Credits)

Hands-on teaching course in which students apply pedagogical theories to practice in a professional program as a teaching assistant, lecturer or other instructional position. Prereq.: ANAT 6412. Course restricted to ANAT majors.

Grading Basis: Pass/Fail Only

Repeatable. Max Credits: 4.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

ANAT 6911 - Advanced Teaching Practicum (1-4 Credits)

Hands-on teaching course in which students apply pedagogical theories to practice in a professional program as a teaching assistant, lecturer or other instructional position. Pre-requisite: ANAT degree-seeking student; ANAT 6412

Grading Basis: Letter Grade

Repeatable. Max Credits: 4.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

ANAT 6931 - MSMHA Internship (1-6 Credits)

The internship provides hands-on learning opportunities and practical experience for graduate students in institutions related to anatomical sciences, imaging, technology/biotechnology, innovation, and entrepreneurship. Restricted to ANAT students only

Grading Basis: Letter Grade

Repeatable. Max Credits: 6.

Typically Offered: Fall, Spring, Summer.

ANAT 6950 - MSMHA Capstone Project (1-12 Credits)

The Capstone project is a scholarly and/or research-based pursuit of knowledge and content development in the area of anatomical sciences, modern imaging and modeling technologies, and educational science completed as part of the MS in Modern Human Anatomy. Prerequisite:

Must be ANAT degree-seeking student.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 12.

Additional Information: Report as Full Time.

Typically Offered: Fall, Spring, Summer.

BSBT 6060 - Special Topics in Biomedical Science & Biotech (1-3 Credits)

Special topics of interest to graduate students in the biomedical sciences and biotechnology fields.

Grading Basis: Letter Grade

Repeatable. Max Credits: 9.

Typically Offered: Fall, Spring, Summer.

BSBT 6061 - Project Management (2 Credits)

Provides training in initiating, executing & closing a project, including the management of scope, time, cost, human resources, communication, risk and more. Highly interactive intensive course prepares students for Certified Project Management exam (internationally recognized certification). Taught by Project Management Professional.

Grading Basis: Letter Grade

Typically Offered: Fall, Spring, Summer.

BSBT 6062 - Principles & Strategies of Effective Teaching (1 Credit)

Introduces students to research-based, student-centered pedagogies and instructional design techniques. Encourages students to view teaching as an intellectual endeavor. Learn about useful resources for future teaching and formally document pedagogical knowledge and skills for employability. Intensive 1-credit course.

Grading Basis: Letter Grade

Typically Offered: Fall, Spring, Summer.

BSBT 6063 - Speaking & Presenting for Scientists & Educators (1 Credit)

Science Communication in the form of speeches and presentations is essential to the research endeavor. The course will increase your effectiveness to deliver scientific, medical, or educational presentations in an audience-centered and impactful way; to respond to audience questions; and to facilitate audience engagement & discussion.

Grading Basis: Letter Grade

Typically Offered: Fall, Spring, Summer.

BSBT 6064 - Scientific Writing (1 Credit)

Taught by a biomedical researcher and a professional writing instructor, this 15-hour (3-week) course focuses on developing a framework for successful scientific writing practices, including how to effectively structure arguments, how to write grant proposals and more.

Grading Basis: Letter Grade

Typically Offered: Fall, Spring, Summer.

BSBT 6065 - Case Studies in Responsible Conduct of Research (1 Credit)

Anyone conducting research using federal funding must study RCR. You'll learn expectations and regulations that permeate science. You'll understand consequences of violations to individuals and society. We'll explore misconduct through interactive video, written and video case studies, and other engaging activities.

Grading Basis: Letter Grade

Typically Offered: Fall, Spring, Summer.

BSBT 6066 - Independent Study (1-3 Credits)

The Course BSBT 6066, Independent Study, with allow graduate students to explore independently new avenues and opportunities that complement their education and training in a way that is otherwise not offered in required or elective courses of the BSBT Program. Enrollment with permission only. Prerequisite: With permission only

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 3.

Typically Offered: Fall, Spring.

BSBT 6067 - Statistics for Biomedical Sciences (2 Credits)

Learn how and when to apply statistical procedures to answer scientific questions relevant to biomedicine, and how to critically assess statistical data for validity.

Grading Basis: Letter Grade

Typically Offered: Fall, Spring, Summer.

BSBT 6068 - Laboratory Research in Structural Biology (1-6 Credits)

The Course BSBT 6068, Laboratory Research, with allow graduate students to engage in laboratory research training in the biomedical sciences with focus on structural biology.

Grading Basis: Letter Grade

Repeatable. Max Credits: 15.

Typically Offered: Fall, Spring, Summer.

BSBT 6069 - Laboratory Research in Immunology and Microbiology (1-6 Credits)

The Course BSBT 6069, Laboratory Research, with allow graduate students to engage in laboratory research training in the biomedical sciences with focus on immunology and microbiology.

Grading Basis: Letter Grade

Repeatable. Max Credits: 6.

Typically Offered: Fall, Spring, Summer.

BSBT 6070 - Mini-Research Rotations (3 Credits)

The Course BSBT 6070, Mini-Research Rotations, with allow graduate students to learn in three different laboratories about research in immunology and microbiology.

Grading Basis: Letter Grade with IP

Typically Offered: Fall, Spring.

BSBT 6071 - Introduction to R Programming (1 Credit)

Introduction to the statistical programming language R geared primarily to biomedical science students with little to no previous programming experience. Basic features of R as a programming language and as scientific computing platform. Basics of data cleaning, visualization, and analysis.

Grading Basis: Letter Grade

Typically Offered: Spring.

BSBT 6072 - Foundations in Biochemistry (1.5 Credits)

This short course provides a condensed and fast-paced overview of the fundamentals in biochemistry including research strategies and techniques. The course aims to enhance the students' ability to engage in critical scientific reasoning and problem-solving and to prepare students for the scientific analyses and discussions.

Grading Basis: Letter Grade

Typically Offered: Fall.

BSBT 6073 - Foundations in Molecular Biology (1.5 Credits)

This short course provides a condensed and fast-paced overview of the fundamentals in molecular biology including research strategies and techniques. The course aims to enhance the students' ability to engage in critical scientific reasoning and problem-solving and to prepare students for the scientific analyses and discussions.

Grading Basis: Letter Grade

Typically Offered: Fall.

BSBT 6074 - Foundations in Cell Biology (1.5 Credits)

This short course provides a condensed and fast-paced overview of the fundamentals in cell biology including research strategies and techniques. The course aims to enhance the students' ability to engage in critical scientific reasoning and problem-solving and to prepare students for the scientific analyses and discussions.

Grading Basis: Letter Grade

Typically Offered: Fall.

BSBT 6075 - Foundations in Genetics (1.5 Credits)

This short course provides a condensed and fast-paced overview of the fundamentals in genetics including research strategies and techniques. The course aims to enhance the students' ability to engage in critical scientific reasoning and problem-solving and to prepare students for the scientific analyses and discussions.

Grading Basis: Letter Grade

Typically Offered: Fall.

BSBT 6076 - Research Explorations (1 Credit)

This course allows for exploration of SBB research labs in a "mini-rotation" format, through meeting faculty, reading literature and participating in lab group meetings and research in order to choose a research lab and prepare a short research proposal.

Grading Basis: Letter Grade

Typically Offered: Fall, Spring.

BSBT 6078 - Seminar in Immunology and Microbiology (1 Credit)

This course provides students in the Bioinformatics in Immunology/Microbiology program an integration of didactic knowledge with research approaches to outstanding questions in the field. Students will attend department weekly seminar followed by structured discussion.

Prerequisites - IDPT 7810 & IMMU 7630

Grading Basis: Letter Grade

Typically Offered: Fall, Spring.

BSBT 6110 - Introduction to Biocomputing (3 Credits)

This course provides students with hands on experience in basic computation, database, and programming skills set as a pre-requisite for a higher level data analysis course. The students will use example in the context of biomedical and genomic data set. Prerequisite: Undergraduate degree in science, technology, business, engineering or math.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

BSBT 6111 - Introduction to Biomedical Data Practices (2 Credits)

This course provides students with advance knowledge and topics in every aspects of data science.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

BSBT 6310 - Practical Clinical Research Informatics (3 Credits)

This course provides students with hands on experience in clinical research informatics involving secondary use of electronic health record (EHR) data, clinical informatics databases, and basic clinical data science as preparation for more advanced informatics or data science coursework. Requisite: 008754 A-GRAD

Grading Basis: Letter Grade

Typically Offered: Spring.

BSBT 6801 - Biomedical Entrepreneurship (3 Credits)

The course addresses the essential elements of bioscience and health innovation and entrepreneurship. Prerequisites: An undergraduate degree in science, technology, business, engineering or math. Cross-listed with ENTP 6801

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

BSBT 6802 - Reg Env of Life Science Innovation - Drug Discovery (1.5 Credits)

This course is designed to familiarize biomedical scientists and those interested in the business of science with the fundamentals of U.S. and international regulatory affairs regarding drug development. Focus is the development of products, such as drugs, devices, diagnostic tests, and health information software, to receive U.S. and international regulatory clearance or approval for commercialization.

Grading Basis: Letter Grade

Typically Offered: Fall, Summer.

BSBT 6803 - Reg Env of Live Science Innovation - Medical Devices (1.5 Credits)

This course is designed to familiarize biomedical scientists, those interested in the business of science with the fundamentals of U.S. and international regulatory affairs for biomedical and healthcare products. Focus is the development of products, such as Medical, to receive U.S. and international regulatory clearance or approval for commercialization.

Grading Basis: Letter Grade

Typically Offered: Fall, Summer.

BSBT 6939 - Internship - Technology and Innovation (3-6 Credits)

The internship provides hands-on learning opportunities for graduate students in institutions related to technology/biotechnology, computer science, engineering, innovation and entrepreneurship. Requisite: (Formerly IDPT 6939) Enrollment with permission only, contact inge.wefes@ucdenver.edu. Instructor Consent required.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 6.

A-GRAD Restricted to graduate students only.

Additional Information: Report as Full Time.

Typically Offered: Fall, Spring, Summer.

CANB 7600 - Molecular Mechanisms of Cancer (4 Credits)

This is an advanced course that will focus on mechanisms of cancer initiation and progression. The course will include didactic presentations, primary literature analysis and workshops. The course is open to all graduate students but requires some prior knowledge of Cancer Biology.

Grading Basis: Letter Grade

Typically Offered: Spring.

CANB 7602 - Special Topics in Cancer Biology (1 Credit)

Special topics of particular interest to graduate students in the Cancer Biology program. Registration requires department approval. Max hours: 4 credits/4 topics. Requisite: 008754

Grading Basis: Letter Grade

Repeatable. Max Credits: 1.

Typically Offered: Spring.

CANB 7610 - Pathobiology of Cancer Mini-Course (1 Credit)

Provide understanding of clinical issues associated with human cancer. Contains didactic and lab components. The latter will focus on pathology of human tumors at macroscopic/microscopic levels. Students will gain understanding of cancer diagnosis/epidemiology/treatment through student of specific tumor types. Prerequisite: Students are required to take this course twice during their time in the CANB program. IDPT 7806, IDPT 7807, IDPT 7808, IDPT 7809.

Grading Basis: Letter Grade

Repeatable. Max Credits: 1.

Typically Offered: Spring.

CANB 7613 - Research Seminars and Journal Club (1 Credit)

Current research topics in experimental pathology, virology, and tumor biology. Graduate students and faculty presentations.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring.

CANB 7620 - Histophysiology (3 Credits)

Discussions of cell interactions, tissue physiology, and renewal based upon the histologic cell types and structures present. Where pertinent, pathologic alterations will be introduced to facilitate identification of the important normal functions/structures.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

CANB 7640 - Bioinformatics (2 Credits)

This course introduces basic concepts of bioinformatics needed to perform large-scale genomic data mining. A computer workshop will provide students with the relevant and minimal skills to analyze, access and visualize high-throughput data using open source programs and public databases. Prerequisites: IDPT 7806, IDPT 7807, IDPT 7808, IDPT 7809 ; Corequisite: BIOS 6606

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring.

CANB 7650 - Research in Cancer Biology (1-10 Credits)

Research work in cancer biology. Prereq: Consent of Instructor.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 99.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

CANB 7660 - Advanced Topics: CANB (1 Credit)

The specific topics covered in this course vary from year to year. For Fall 2011 the topic will be "Cancer cells and their environment: how the extracellular milieu influences tumor progression" offered by Dr. Schedin.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring.

CANB 7680 - Hypothesis Development and Experimental Design (3 Credits)

Students will discuss recent research papers and develop new hypotheses that extend the findings in the papers. Research proposals to test the hypothesis will be written and an oral defense of the proposal will be performed. Prereq: CANB 7600, IDPT 7806, IDPT 7807, IDPT 7808, IDPT 7809.

Grading Basis: Letter Grade

Repeatable. Max Credits: 3.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring.

CANB 7690 - Grant Writing in Cancer Biology (1 Credit)

This course will use didactic presentations and writing workshops to develop a fellowship grant in the NIH style. Focus will be on grantsmanship, persuasive writing and the peer review system.

This course will run consecutively with CANB7600. Corequisite with CANB 7600

Grading Basis: Letter Grade

Typically Offered: Spring.

CANB 8990 - Doctoral Thesis (1-10 Credits)

Doctoral thesis work in cancer biology. Prereq: Consent of Instructor.

Grading Basis: Letter Grade with IP

A-GRAD Restricted to graduate students only.

Additional Information: Report as Full Time.

Typically Offered: Fall, Spring, Summer.

CAND 6940 - Candidate for Degree (1 Credit)

Prereq: Consent of Instructor.

Grading Basis: Pass/Fail Only

Repeatable. Max Credits: 3.

A-GRAD Restricted to graduate students only.

Additional Information: Report as Full Time.

Typically Offered: Fall, Spring, Summer.

CLSC 6060 - Systems Analysis and Design (3 Credits)

Collaborative offering with Denver Campus, emphasizing information requirements analysis, logical system specification, detailed system design. Topics include structured system development methodologies, prototyping, file design, systems architecture, systems testing, software design strategies. Students use case tool to develop system specifications. Crosslisted: ISMG 6060.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

CLSC 6080 - Database Management Systems (3 Credits)

Offered as a collaborative offering with UCD, this course focuses on the development and management of database systems to support business operations. Important subjects include semantic data modeling, normalization, SQL, fourth generation languages, and client-server database applications. Crosslisted: ISMG 6080.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

CLSC 6210 - Research Seminars in Clinical Science (1 Credit)

This course provides an overview of the types of clinical translational studies being conducted by senior CLSC doctoral students. The interactive seminar series structure allows for interdisciplinary scientific dialogue among students at various stages of training, mentors and faculty.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 3.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

CLSC 6211 - Immersion in Community Engagement (3 Credits)

The course focuses on community-based participatory research, community engagement and understanding health disparities through a community immersion experience. Restrictions: Students need to contact the CLSC program prior to registering.

Grading Basis: Letter Grade

Typically Offered: Summer.

CLSC 6260 - Conducting Clinical Trials for Investigators (2 Credits)

Course is for investigators conducting clinical trials. Course covers good clinical practices/regulations that surround setting up and running clinical trials. Clinical studies and popular press articles highlighting what can go wrong in clinical trials will be reviewed and discussed.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Summer.

CLSC 6270 - Critical Appraisal Seminars in Clinical Science (1 Credit)
This course provides an overview of the approaches for critically appraising common study designs published in the clinical and translational sciences literature, as well as other sources of information.
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Fall.

CLSC 6300 - Scientific Grant Review Process: CCTSI Proposals MS (1 Credit)
Students will understand and participate in the process of scientific review of human subject research protocols submitted to the University of Colorado Denver Clinical Translational Research Centers at University Hospital and The Children's Hospital. Prereq: BIOS 6601, BIOS 6602 (or BIOS 6611, BIOS 6612) & CLSC 7500.
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring.

CLSC 6550 - Applications of Biostatistics to Clinical Research Questions (1 Credit)
Introduction to allow clinician-scientists to be critical consumers of medical literature by improving their ability to discuss statistical issues about their own research and research of others. Familiarity will be gained with commonly used statistical methods and statistical terms.
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring.

CLSC 6560 - Designs and Mixed Methods in Implementation Research (2 Credits)
This course provides an in-depth examination of study designs, comparative effectiveness research, and qualitative, quantitative and mixed methods approaches to dissemination and implementation research. The focus is application to health care and public health settings.
Grading Basis: Letter Grade
Typically Offered: Fall.

CLSC 6580 - Qualitative and Mixed Methods in Health Research (3 Credits)
This course provides an in-depth examination of qualitative and mixed methods approaches that are pertinent to health research.
Grading Basis: Letter Grade
Typically Offered: Spring.

CLSC 6585 - Power for Multilevel & Longitudinal Studies (2 Credits)
Course covers power and sample size methods for longitudinal and multilevel study designs. Software used for this course is free, open-source, web-tablet and smart phone-based (www.glimmpse.SampleSizeShop.org). This is a three-day intensive and interactive course with online discussion the two weeks following the intensive. Prerequisites: BIOS 6601 and BIOS 6602 or equivalent applied statistic courses.
Grading Basis: Letter Grade
Typically Offered: Spring.

CLSC 6590 - Navigating the Clinical Research Regulatory Maze (1 Credit)
This is a seminar series covering regulatory requirements and best practices related to FDA audits, billing, collaborative/team research, and distinguishing research from quality improvement projects. Prerequisites: For students with no clinical research experience, it is recommended they take "Getting Started: your introduction to Clinical Research" a 3 hr. lecture as one of their optional lectures, preferably before the course starts or within first 2 months of the course.
Grading Basis: Letter Grade
Typically Offered: Fall, Spring.

CLSC 6608 - Statistics for the Basic Sciences - CLSC Supplement (1 Credit)
This course provides an overview of epidemiology, logistic regression, and survival analysis, techniques that apply to many areas of clinical research. Coreq: CLSC 6606 (BIOS 6606) Restrictions: Enrollment in CLSC graduate program or permission of the instructor.
Grading Basis: Letter Grade
Typically Offered: Spring.

CLSC 6650 - Guided Research Tutorial - Masters (1-3 Credits)
An independent study course developed by the student and the appropriate faculty member based on the area of study. Students meet regularly with the selected course instructor, the student and course instructor will develop a course plan prior to registration.
Grading Basis: Letter Grade
Repeatable. Max Credits: 3.
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

CLSC 6653 - Key Concepts in Neurodevelopmental Disabilities I (2 Credits)
Course represents part one of two-part interdisciplinary course series focused on systems, options for diagnosis/assessment and alternatives for service provision related to children/youth/young adults with neurodevelopmental and related disabilities and their families to address this population's special health care needs. Prereq: A degree in healthcare profession or related field or instructor consent.
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Fall.

CLSC 6654 - Key Concepts in Neurodevelopmental Disabilities II (2 Credits)
This course represents part two of a two-part interdisciplinary course series focused on service provision, intervention strategies and service provision related to children/youth/young adults with neurodevelopmental and related disabilities and their families to address this population's special health care needs. Prereq: A degree in health care profession or related field or instructor consent and completion of CLSC 6653.
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Spring.

CLSC 6657 - Cultural Factors in Healthcare (1 Credit)
Online course will introduce the subject of cultural/social determinants of maternal and child health in the present society, including worldviews on health perspectives (wellness versus illness), and address the impact of emerging demographic changes on systems of care. Prereq: A degree in health care profession or related field or instructor consent.
Grading Basis: Letter Grade
Typically Offered: Fall, Spring, Summer.

CLSC 6658 - Interdisc. Approach to Promoting Early Parent Child Relationships-Part 1: Theory (2 Credits)

Part one of a two-part course series that will examine the theory and research relevant to the assessment of early parent-child relationships as well as the clinical application for interventions across disciplines that are intended to promote/improve child health outcomes. Prereq: A degree in health care profession or related field or instructor consent.

Grading Basis: Letter Grade

Typically Offered: Fall.

CLSC 6659 - Interdisc. Approach to Promoting Early Parent/Child Relationships- II Measurements (3 Credits)

Part two of a two-part course that will examine research relevant to assessment of early parent/child relationships, identify intervention strategies by analyzing observational findings, as well as evaluate effectiveness of interventions across disciplines intended to promote/improve child health outcomes. Prereq: A degree in health care profession or related field or instructor consent. Completion of CLSC 6658.

Grading Basis: Letter Grade

Typically Offered: Spring.

CLSC 6660 - Team/Consult/Leadership 1 (2 Credits)

Grading Basis: Letter Grade

Typically Offered: Fall, Spring, Summer.

CLSC 6661 - Leadership Dialogues I (2 Credits)

This interdisciplinary leadership course focuses on leadership strategies needed for providing family-centered, culturally competent, community-based services for children with special needs and their families. Prereq: A degree in health care profession or related field or instructor consent.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

CLSC 6662 - Leadership Dialogues II (1 Credit)

This interdisciplinary leadership course focuses becoming change agents to better provide family-centered, culturally competent, community-based services for children with special needs and their families. Prereq: a degree in health care profession or related field or instructor consent.

CLSC 6661

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring.

CLSC 6663 - Intervention for Individuals with Developmental Disabilities (3 Credits)

This interdisciplinary course reviews evidence-based practices in intervention for children with autism and other neurodevelopmental disorders, presented through lectures, critical readings of the literature, case discussions, and case presentations. Prereq: Degree in health care profession or related field or consent of instructor.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

CLSC 6664 - Leadership Dialogues III (1 Credit)

This interdisciplinary leadership course focuses on leadership strategies needed for provided family-centered, culturally competent, community-based services for children with special needs and their families. Prereq: Degree in health care profession or related field or consent of instructor.

Restrictions: Nursing only.

Grading Basis: Letter Grade

Typically Offered: Fall.

CLSC 6665 - Leadership Dialogues IV (1 Credit)

Leadership Dialogues IV builds upon skills addressed in Leadership Dialogues III with the addition of content that integrates critical and systems thinking and ethical decision making with the leadership and team concepts and skills developed in LD III. Prereq: Degree in health care profession or related field or consent of instructor and CLSC 6664.

Restrictions: Nursing only.

Grading Basis: Letter Grade

Typically Offered: Spring.

CLSC 6668 - Screening/Assessment for Children/Youth with Autism/ Neurodevelopmental Disabilities (3 Credits)

This interdisciplinary course presents best practices in screening/assessment for autism, focusing on: identification of symptoms of autism; differentiation of autism from other disorders; recognition of symptoms; examination of culture on clinical presentation; and approaches to share observations. prereq: a degree in health care profession or related fields (or consent of instructor).

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

CLSC 6699 - Masters Research Project: Publishable Paper (1-6 Credits)

During course students working with his/her research mentor and research project committee to plan, execute, write Final Research Project in form of a publishable paper. In addition, students prepare for Final Research Project Examination. This is a capstone course. Prerequisite: Consent of program. BIOS 6601 and BIOS 6602 or BIOS 6611 and BIOS 6612, CLSC 7150, EPID 6630.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 6.

A-GRAD Restricted to graduate students only.

Additional Information: Report as Full Time.

Typically Offered: Fall, Spring, Summer.

CLSC 6750 - Designing for Dissemination and Sustainability (2 Credits)

This course is one of three that focuses on dissemination and implementation research. This course reviews the organization and financing of interventions for health care systems and public health systems. The role of ethics, evidence and health equity are examined.

Grading Basis: Letter Grade

Typically Offered: Summer.

CLSC 6770 - Implementation Science Grant and Article Funding (2 Credits)

This course provides an in-depth examination of issues in submitting successful grant proposals in Dissemination & Implementation research. The course will build upon good general practices in grant and manuscript preparation and submission.

Grading Basis: Letter Grade

Typically Offered: Summer.

CLSC 6800 - Introduction to Health Information Technology (3 Credits)

Course intended as overview to dynamic environment of healthcare informatics. The goal of course is to prepare healthcare professionals to better utilize/manage the emerging communication technologies.

A brief introduction to e-health, telehealth, electronic medical records, telecommunications and bio-informatics is provided.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

CLSC 6820 - Management of Healthcare Information Technology (3 Credits)

This course will provide an introduction to management of information technology in healthcare. A description of information processing, the origin, content and evolution of healthcare information systems and the methodologies deployed to acquire and manage information requirements will be discussed. Crosslisted: HLTH 6072.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

CLSC 6850 - Adv Topics: Dissemination and Implementation Sci (1 Credit)

Provides an overview of intermediate and advanced dissemination and implementation (D&I) science research methods in a small group discussion format. This interactive seminar series structure allows for interdisciplinary scientific dialogue among students at various stages.

Grading Basis: Letter Grade

Repeatable. Max Credits: 2.

Typically Offered: Fall, Spring.

CLSC 6950 - Masters Research Project: Thesis (1-6 Credits)

During this course students plan, execute, and write the Final Research Project in the form of a Masters thesis. In addition, students will prepare for the Final Research Project Examination. This is a capstone course.

Prerequisites: Consent of program, BIOS 6601, BIOS 6602, CLSC 7150, EPID 6630.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 6.

A-GRAD Restricted to graduate students only.

Additional Information: Report as Full Time.

Typically Offered: Fall, Spring, Summer.

CLSC 7101 - Grant Writing I (1 Credit)

The purpose of this course is to develop and improve your skills in writing successful grant applications and participating in the critique and review process of grants. Prerequisites: BIOS 6601 and EPID 6630. Course Restrictions: CLSC students, unless written approval of Course Director.

Grading Basis: Letter Grade

Repeatable. Max Credits: 3.

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

CLSC 7102 - Grant Writing II (1 Credit)

The purpose of this course is to develop and improve your skills in writing successful grant applications and participating in the critique and review process of grants. Prerequisites: BIOS 6601, EPID 6630, CLSC 7101.

Course Restrictions: CLSC students, unless written approval of Course Director.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

CLSC 7150 - Ethics and Responsible Conduct of Research (1 Credit)

Course provides overview of the field of ethics in clinical research. Topics include historical background, current regulations, IRB requirements on human subjects protection issues. Students will learn how to develop approaches to conduct ethical human subjects research in an optimal manner.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

CLSC 7202 - Clinical Outcomes and Applications (3 Credits)

This course focuses on research methodologies in clinical care, costs, health systems, policy, and health outcomes, as well as an overview of major issues in clinical outcomes research. Students are provided with both theory and application through case studies.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

CLSC 7300 - Scientific Grant Review Process: CCTSI Proposals (1 Credit)

Students will understand and participate in the process of scientific review of human subject research protocols submitted to the University of Colorado Denver Clinical Translational Research Centers at University Hospital and the Children's Hospital. Prereq: BIOS 6601 BIOS 6602 or BIOS 6611 and BIOS 6612.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring.

CLSC 7500 - Practical Application of Molecular & Cell Biology Techniques for Clinical Investig (3 Credits)

Designed to teach clinical investigators basic molecular and cellular biology techniques. Format will be hands-on with lectures designed to illustrate significance and clinical application of techniques. Weekly special topics lectures will cover cutting-edge technologies and their application.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Summer.

CLSC 7650 - Guided Research Tutorial - Doctoral (1-3 Credits)

This is an independent study course developed by student and appropriate faculty member based on area of study. Students meet regularly with selected course instructor. The student and course instructor will develop course plan prior to registration of the course.

Prereq: Consent of program approved course plan closed registration.

Grading Basis: Letter Grade

Repeatable. Max Credits: 3.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

CLSC 7653 - Dissemination and Implementation Research in Health (3 Credits)

Introduces dissemination and implementation (D&I) research and practice in the context of health (i.e. translational research in health). This is a graduate level course and students should have a working understanding of study designs and statistics.

Grading Basis: Letter Grade

Typically Offered: Fall, Spring.

CLSC 7663 - Context & Adaptation in D&I Research (2 Credits)

This course covers concepts, frameworks, and methods for understanding and assessing context and guiding adaptations as relevant to dissemination and implementation (D&I) health research and practice. Prerequisite - CLSC 7653.

Grading Basis: Letter Grade

Typically Offered: Spring.

CLSC 8990 - Doctoral Thesis (1-10 Credits)

This course involves the student working with his/her research mentor and research project committee develop, design and execute a clinical science doctoral study as well as to write up the project as a thesis. Prerequisite: Program consent. BIOS 6601 or BIOS 6611, BIOS 6602 or BIOS 6680 and HSMP 6617, CLSC 7150, EPID 6630, BIOS 6648 or EPID 6626 or HSMP 6670. Restrictions: Only CLSC PhD students or collaborative CLSC and CSPH Health Services Research Students. Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 99.

A-GRAD Restricted to graduate students only.

Additional Information: Report as Full Time.

Typically Offered: Fall, Spring, Summer.

CPBS 7001 - Computer Science for Biologists (5 Credits)

This course is an introduction to the fundamental concepts of computer science, the central ideas of computing, and the practices of computational thinking; designed for the basic science PhD programs. It will engage students in activities that allow them to competently apply CS tools to their field.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

CPBS 7605 - Ethics in Bioinformatics (1 Credit)

Discussions of professional conduct, social implications of research and questions raised by biomedical research, with an emphasis on topics relevant to computational biologists. Active student participation is required. Offered every other year.

Grading Basis: Letter Grade

Typically Offered: Fall, Spring.

CPBS 7606 - Statistics for the Basic Sciences (3 Credits)

This course provides an overview of fundamental concepts in statistics such as hypothesis testing and estimation and it provides an overview of statistical methods (for example, regression and analysis of variance) that apply to many areas of science. Crosslisted Course: BIOS 6606.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring.

CPBS 7620 - Advanced Genome Analysis (2 Credits)

Introduction to genomics emphasizing gaining familiarity with: analysis, utilization of genomic data. Topics: sequencing, mapping genomes, transcriptomics, human genome, evolution, genomic disorders, bioinformatics, statistics, population variation, epigenomics, proteomics, metagenomics, microbiome analysis, functional genomics, ethics.

Crosslisted Course: HMGP 7620, STBB 7620, and MICB 7620

Grading Basis: Letter Grade

Typically Offered: Spring.

CPBS 7630 - Computational Methods for Data Challenges in Biomed (3 Credits)

Covers three computational data modules: Bioinformatics, Clinical Informatics, and Public Health Informatics. Cases are from three biomedical big data initiatives; the Grand Opportunity Exome Sequencing Project (GO-ESP), The Cancer Genome Atlas (TCGA), and Library of Integrated Network-Based Cellular Signature (LINCS). Prerequisite:

CPBS 7711 & CPBS 7712

Grading Basis: Letter Grade

Typically Offered: Fall.

CPBS 7640 - Bioinformatics in Linguistics (3 Credits)

This course will be structured around understanding problems, understanding algorithms, and working through solutions from bioinformatics, computational biology, natural language processing, and linguistics. Prerequisite: CPBS 7711; corequisite: CPBS 7712

Grading Basis: Letter Grade

Typically Offered: Spring.

CPBS 7650 - Research in Computational Bioscience (1-5 Credits)

Research work in Computational Bioscience. Prereq: Consent of instructor.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 5.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

CPBS 7655 - Statistical Methods in Genetic Association Studies (3 Credits)

This course is designed to give an introduction to statistical methods in genetic association studies. Topics include an introduction to population genetics topics relevant to genetic association studies, design strategies, and analysis methods for case-control and family data. Prereq: BIOS 6612 or permission of instructor. Crosslisted Course: BIOS 6655.

Grading Basis: Letter Grade

Typically Offered: Fall.

CPBS 7659 - Statistical Methods in Genomics (3 Credits)

This course will give an introduction to statistical methods for analyzing molecular sequences and genomic data. Topics include hidden Markov models for sequence alignment, molecular evolution and gene expression data analysis. Prereq: BIOS 6611 or equivalent graduate level statistics course with consent of instructor. Crosslisted Course: BIOS 6659

(sponsoring department) / BIOS 7659

Grading Basis: Letter Grade

Typically Offered: Spring.

CPBS 7660 - Analysis of Genomics Data Using R and Bioconductor (2 Credits)

This course provides students with hands on experience in solving real life biological problems using the statistical software R and Bioconductor. Students will work and communicate with participating researchers and clinicians on their case studies of genomics data. Pre/Corequisite BIOS 6602 or 6612, or consent of instructor.

Grading Basis: Letter Grade

Typically Offered: Fall, Spring, Summer.

CPBS 7711 - Methods and Tools in Biomedical Informatics (4 Credits)

An introduction to the theory and practice of bioinformatics and computational biology. Topics include: the analysis of macromolecular sequences, structures, gene expression arrays, proteomics, and management of the biological literature. Prerequisites: Permission of instructor. Crosslisted: PHCL 7611 (non-sponsor).

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

CPBS 7712 - Research Methods in Biomedical Informatics (4 Credits)

The CPBS faculty members will present lectures on the research currently being conducted in their laboratories. Students will plan, execute and report on their own research project. This course is beginning transition from well-educated students to independent researchers. Prerequisites: Permission of Instructor. Crosslisted: PHCL 7612 (non-sponsor).

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

CPBS 7785 - Independent Study in Computational Bioscience (1-3 Credits)

This course is listed for the benefit of the advanced student who desires to pursue one or more topics in considerable depth. Supervision by a full-time faculty member is necessary. Prerequisite: Permission of Instructor.
Grading Basis: Letter Grade
Repeatable. Max Credits: 3.
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

CPBS 7791 - Readings in Computational Bioscience (1 Credit)

A seminar course in which students read and present recent publications from the primary computational bioscience literature. Prereq: Consent of instructor.
Grading Basis: Letter Grade
Repeatable. Max Credits: 1.
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

CPBS 7792 - Special Topics in Computational Bioscience (1-3 Credits)

Topic varies by semester. Designed to give students a chance to evaluate critically some practical or theoretical problem under faculty supervision and to present results of their thinking to fellow students and instructors for critical evaluation. Prerequisites: Permission of Instructor.
Grading Basis: Letter Grade
Repeatable. Max Credits: 3.
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

CPBS 8990 - Doctoral Thesis (1-10 Credits)

Doctoral Thesis work in Computational Bioscience. Prerequisites: Permission of instructor.
Grading Basis: Letter Grade with IP
Repeatable. Max Credits: 10.
A-GRAD Restricted to graduate students only.
Additional Information: Report as Full Time.
Typically Offered: Fall, Spring, Summer.

CSDV 7000 - Cells, Stem Cells, and Development: Advanced Topics Discussion (1 Credit)

This course is a student-led paper discussion focusing on advanced topics pertaining to cell biology, stem cells, and developmental biology. Students will select, present, and discuss primary articles on diverse topics within these fields. Restriction: Students in the CSD program only, 2nd year and beyond.
Grading Basis: Pass/Fail Only
Repeatable. Max Credits: 6.
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring.

CSDV 7100 - Advanced Writing Workshop (1 Credit)

This course is a student-led writing workshop focusing on developing writing skills through submission, editing, and discussion of drafts. Draft types will be chosen by the students enrolled and will include manuscripts, these, and documents related to career development. Students must have completed/passed their comprehensive exam in respective program; priority to CSDV PhD students.
Grading Basis: Pass/Fail with IP
Typically Offered: Fall, Spring.

CSDV 7605 - Stem Cells and Development: An Integrated Approach (3-4 Credits)

Integrative introductory course incorporating the related fields of Cell Biology/Developmental Biology/Stem Cells. Through lectures, contemporary literature discussions, student presentations, enrollees will gain a sophisticated understanding of the biological concepts/experimental approaches underlying current understanding of cell, developmental, and stem cell biology. Pre-Requisite: IDPT 7806
Grading Basis: Letter Grade
Repeatable. Max Credits: 4.
A-GRAD Restricted to graduate students only.
Typically Offered: Spring.

CSDV 7606 - Critical Analysis of Research in CSD (3 Credits)

First-year students will learn to critically evaluate scientific literature in preparation for writing and critiquing research grant proposals. Primary literature will focus on cell and developmental biology related to CSDV 7605. Each session concludes with written mini-proposals and peer critiques. For CSDV & BSP first year students. If possible, limit to CSDV-PHD and BMSC-PHD plans. Else: Prerequisite: IDPT 7806 & 7810; Corequisite: CSDV 7605
Grading Basis: Letter Grade
Typically Offered: Spring.

CSDV 7650 - Research: CSDV (1-5 Credits)

Research work in cell biology, stem cells and development. Prereq: Consent of the instructor.
Grading Basis: Letter Grade with IP
Repeatable. Max Credits: 10.
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

CSDV 7670 - Advanced Topics: CSDV (2 Credits)

Spring/Summer, 2019 Course is an introduction to concepts and practice of organ and tissue modeling using adult stem cell organoid culture systems. Lectures/article reviews will be balanced with a significant, hands-on lab component to gain experience in organoid culture techniques. Prereq: IDPT 7806, 7810
Grading Basis: Letter Grade
Repeatable. Max Credits: 7.
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

CSDV 7675 - Practical Teaching Experience in CSDV (1 Credit)

Students will be paired with a CSD faculty mentor to develop a class session for IDPT 7801 courses directed by CSD faculty, CSDV 7605 or CSDV 7670 (depending on student interest and faculty availability). Each session will include a practice presentation and post-session critique. Open to CSDV students in Year 2+. Prerequisite: CSDV 7605; 2nd year+ CSDV-PhD students only
Grading Basis: Pass/Fail Only
Typically Offered: Fall, Spring.

CSDV 7676 - Practical Mentoring Experience in CSDV (1 Credit)

This course will train students in effective mentoring skills for a research lab setting. Class meetings will be discussion-based, with topics including project design, communication, conflict resolution, creating equitable and inclusive mentoring relationships, and more.
Grading Basis: Pass/Fail Only
Typically Offered: Summer.

CSDV 7677 - Science Communication in the Time of COVID (1 Credit)
Science communication is important for most careers in science. In this class, we will focus on communicating science to the general public through oral presentations, humor (Science Riot workshop), discussions, and written articles. During this unusual year, our outreach efforts will be focused on the Covid-19 vaccines.

Grading Basis: Pass/Fail Only
Typically Offered: Summer.

CSDV 7850 - Independent Study in Cell Biology, Stem Cells and Development (1-5 Credits)

Independent Study is to allow students to take professional school course for credit or to gain a defined expertise with faculty mentor other than thesis advisor. Consent of faculty member offering the independent study and Program Director required. Prereq: : IDPT 7806, 7807, 7808, 7809 (BIOM Science Core Courses), and CSDV 7605.

Grading Basis: Letter Grade
Repeatable. Max Credits: 15.

A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

CSDV 8990 - Doctoral Thesis (1-10 Credits)

Doctoral Thesis work in Cell biology, Stem Cells and Development. Prereq: Consent of Instructor.

Grading Basis: Letter Grade with IP

A-GRAD Restricted to graduate students only.
Additional Information: Report as Full Time.
Typically Offered: Fall, Spring, Summer.

GENC 6101 - Psychosocial Aspects of Genetic Counseling 1 (2 Credits)

This is the first course in a two-semester sequence addressing basic psychosocial and counseling theories, approaches, and resources necessary for the provision of genetic counseling to clients and their families in prenatal, pediatric and adult clinical settings. Coreq: GENC 6105, GENC 6110. Restrictions: Matriculated students in Genetic Counseling MS Program.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.
Typically Offered: Fall.

GENC 6102 - Psychosocial Aspects of Genetic Counseling II (2 Credits)

This is the second course in a two-semester sequence addressing basic psychosocial and counseling theories, approaches, and resources necessary for the provision of genetic counseling to clients and their families in prenatal pediatric and adult clinical settings. Prereq: GENC 6101. Co-Req: GENC 6105, GENC 6110. Restrictions: matriculated student in Genetic Counseling M.S. Program.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.
Typically Offered: Spring.

GENC 6105 - Basic Interviewing Skills (1 Credit)

This course covers fundamental theories and principles of effective patient/client interviewing in genetic counseling practice. Lectures are combined with hands-on role plays and interviews so that students may gain applied experience and receive feedback to foster skills development throughout course. Coreq: GENC 6101, GENC 6110. Restriction: Matriculated student in Genetic Counseling M.S. Program

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.
Typically Offered: Fall.

GENC 6110 - Topics in Medical Genetics I (3 Credits)

First course in a two-part course sequence regarding principles of clinical genetics and genetic counseling and development of clinical skills used in various medical genetics settings. Fall semester focuses on principles important in pediatric and general genetics settings.

Restriction: Matriculated student in Genetic Counseling M.S. Program.
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Fall.

GENC 6111 - Topics in Medical Genetics II (2 Credits)

Second course in two-course sequence regarding principles of clinical genetics and genetic counseling used in various medical genetics settings, and development of critical skills. Spring semester focuses on prenatal and adult genetics clinic settings. Prereq: GENC 6110.

Restrictions: Matriculated student in Genetic Counseling M.S. Program.
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Spring.

GENC 6120 - Clinical Cytogenetics and Molecular Genetics (3 Credits)

This course provides integrated instruction regarding human cytogenetic and molecular genetic principles, techniques, and diagnostic testing approaches used in clinical evaluation and risk assessment for genetic disorders/predispositions in prenatal and postnatal patient populations. Coreq: GENC 6121. Restrictions: Matriculated student in Genetic Counseling M.S. Program.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.
Typically Offered: Fall.

GENC 6121 - Laboratory in Clinical Cytogenetics and Molecular Genetics (2 Credits)

Course provides introduction to specific methodologies and interpretation of studies used in diagnostic cytogenetics and molecular genetics laboratories. Principles discussed in the co-requisite clinical cytogenetics and molecular genetics course will be applied through demonstrations, hands-on experiments, discussion of illustrative cases. Coreq: GENC 6120. Restrictions: Matriculated student in Genetic Counseling M.S. Program.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.
Typically Offered: Fall.

GENC 6122 - Seminar in Clinical Cytogenetics and Molecular Genetics (1 Credit)

Course requires students to apply theories/principles of cytogenetics and molecular genetics to analysis of cases that present in daily operations of diagnostic laboratories and formal critique of current research literature. Additionally, students present formal seminar integrating cytogenetic/molecular genetic principles. Prereq: GENC 6120, GENC 6121. Restrictions: Matriculated student in Genetic Counseling M.S. Program.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.
Typically Offered: Spring.

GENC 6125 - Embryogenetics (1 Credit)

Providing practical knowledge for genetic counseling this course on human embryology is focused on major developmental stages and organ systems with an emphasis on molecular genetic pathways and associated syndromes that arise due to their disruption. Requisite: Matriculated student in M.S. Genetic Counseling Program (GENC).

Grading Basis: Letter Grade

Typically Offered: Fall.

GENC 6130 - Cancer Genetics and Genetic Counseling (2 Credits)
 Course in providing genetic counseling services to clients with or at risk for hereditary cancer predisposition. Topics include clinical oncology, epidemiology, molecular biology of cancer, risk assessment, genetic testing, ethical/legal issues, clinical research considerations, psychosocial impact/support, specific genetic counseling approaches. Prereq: GENC 6110, GENC 6120. Restrictions: Matriculated student in Genetic Counseling M.S. Program
 Grading Basis: Letter Grade
 A-GRAD Restricted to graduate students only.
 Typically Offered: Spring.

GENC 6140 - Human Inborn Errors of Metabolism (2 Credits)
 Course provides systematic review of major metabolic disorders, including their clinical phenotypes, diagnosis, and management. Physiological and laboratory testing principles important to understanding these disorders will be reviewed. Psychosocial impact of metabolic disorders and genetic counseling approaches will be discussed. Restrictions: Matriculated student in Genetic Counseling M.S. Program.
 Grading Basis: Letter Grade
 A-GRAD Restricted to graduate students only.
 Typically Offered: Spring.

GENC 6150 - Congenital Malformations and Disorders of the Newborn (1 Credit)
 This survey course covers common major malformations and non-metabolic genetic disorders identified by newborn screening programs. Clinical phenotypes, diagnosis, management and etiology are addressed. Psychosocial impact of these conditions and genetic counseling approaches will be discussed. Prereq: GENC 6110. Co-Req: GENC 6111. Restrictions: Matriculated student in Genetic Counseling M.S. Program.
 Grading Basis: Letter Grade
 A-GRAD Restricted to graduate students only.
 Typically Offered: Spring.

GENC 6170 - Introduction to Clinical Research for Genetic Counseling Students (1 Credit)
 An introduction to clinical research including an overview of ethical principles, study methods and designs, practical execution, data analysis and presentation of results. Possible roles of a genetic counselor in the conduct of clinical research will be a course focus. Restrictions: Matriculated student in MS Genetic Counseling Program.
 Grading Basis: Letter Grade
 A-GRAD Restricted to graduate students only.
 Typically Offered: Fall.

GENC 6201 - Advanced Psychosocial Genetic Counseling (2 Credits)
 This course examines advanced genetic counseling techniques as they relate to psychosocial theories, specific client characteristics and the client/counselor dynamic. Critical discussion of core topics and readings and case analysis will be used for instruction. Prereq: GENC 6101 and GENC 6102. Restrictions: Matriculated second year student in Genetic Counseling M.S. Program.
 Grading Basis: Letter Grade
 A-GRAD Restricted to graduate students only.
 Typically Offered: Fall.

GENC 6210 - Professional Issues in Genetic Counseling I (2 Credits)
 First course in a two course sequence regarding professional practice issues of master's level genetic counselors. The Fall semester course focuses on professional standards, professional ethics, legal principles and health systems and policy issues relevant to genetic counselors. Prereq: GENC 6101, GENC 6105, GENC 6110. Restrictions: Second year student in Genetic Counseling M.S. Program.
 Grading Basis: Letter Grade
 A-GRAD Restricted to graduate students only.
 Typically Offered: Fall.

GENC 6211 - Professional Issues in Genetic Counseling II (2 Credits)
 Second course in a two course sequence regarding professional practice issues of master's level genetic counselors. The Spring semester course focuses on disability issues, cultural competency, public health genetics, research methods in genetic counseling, and professional roles. Prereq: GENC 6210. Restrictions: Second year student in Genetic Counseling M.S. Program.
 Grading Basis: Letter Grade
 A-GRAD Restricted to graduate students only.
 Typically Offered: Spring.

GENC 6250 - Risk Calculation in Genetic Counseling (1 Credit)
 This course covers pedigree analysis and risk calculation principles used by genetic counselors in clinical practice. Prereq: GENC 6110, GENC 6120. Restrictions: Matriculated student in Genetic Counseling M.S. Program.
 Grading Basis: Letter Grade
 A-GRAD Restricted to graduate students only.
 Typically Offered: Fall.

GENC 6610 - Topic in Med Genetic 1 (3 Credits)
 Grading Basis: Letter Grade
 A-GRAD Restricted to graduate students only.
 Typically Offered: Fall, Spring, Summer.

GENC 6910 - Applied General Genetics Clinic (3 Credits)
 This is a clinical rotation for Genetic Counseling M.S. students through a general genetics clinic serving a variety of referral indications. Students will learn and practice case management, history taking, risk assessment, counseling and client advocacy skills. Prereq: GENC 6101, GENC 6105, GENC 6110. Restrictions: Matriculated in Genetic Counseling M.S. Program.
 Grading Basis: Letter Grade with IP
 A-GRAD Restricted to graduate students only.
 Typically Offered: Fall, Spring, Summer.

GENC 6911 - Applied Prenatal Genetics Clinic (3 Credits)
 This is a clinical rotation for genetic counseling students through a prenatal diagnosis and genetics clinic. Students will learn/practice history taking, risk assessment, patient education and genetic counseling, case management, as well as observe prenatal diagnosis and Art procedures. Prereq: GENC 6101, GENC 6105, GENC 6110. Restrictions: Matriculated student in Genetic Counseling M.S. Program.
 Grading Basis: Letter Grade with IP
 Repeatable. Max Credits: 9.
 A-GRAD Restricted to graduate students only.
 Typically Offered: Fall, Spring, Summer.

GENC 6912 - Applied Metabolic Genetics Clinic (3 Credits)

This is a clinical rotation for genetic counseling students through a genetics clinic for inborn errors of metabolism. Students will work with patients referred for diagnostic evaluation, medical/nutritional management of specific conditions, and follow-up of positive newborn metabolic screening results. Prereq: GENC 6101, GENC 6105, GENC 6110. Restrictions: Matriculated student in Genetic Counseling M.S. Program. Grading Basis: Letter Grade with IP
Repeatable. Max Credits: 9.
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

GENC 6913 - Applied Regional & Specialties Genetics Clinics (1-2 Credits)

This is a clinical rotation for genetic counseling students through regional outreach genetics clinics and specialty/multidisciplinary clinics serving patients with various genetic conditions. Prereq: GENC 6101, GENC 6105, GENC 6110. Restrictions: Matriculated student in Genetic Counseling M.S. Program. Grading Basis: Letter Grade with IP
Repeatable. Max Credits: 9.
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

GENC 6914 - Applied Hereditary Cancer Clinic (1-3 Credits)

This is a clinical rotation for genetic counseling students through a hereditary cancer clinic for individuals seeking genetic counseling and testing for genetic cancer predisposition syndromes. Prereq: GENC 6110, PEDS 6601, PEDS 6602. Restrictions: Matriculated student in Genetic Counseling M.S. Program. Grading Basis: Letter Grade with IP
Repeatable. Max Credits: 3.
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

GENC 6915 - Applied Adult Medical Genetics Clinic (1 Credit)

This is a clinical rotation for genetic counseling students through a medical genetics clinic and clinical research settings providing diagnosis, management, risk assessment and genetic counseling for adults. Prereq: GENC 6101, GENC 6105, GENC 6110. Restrictions: Matriculated student in Genetic Counseling M.S. Program. Grading Basis: Letter Grade with IP
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

GENC 6919 - Applied Medical Genetics Clinic - Clinical Elective (1-3 Credits)

This is an elective clinical rotation for genetic counseling students desiring to arrange training in outside of core required clinical rotations or an additional, advanced rotation. Prereq: GENC 6101, GENC 6105, GENC 6110. Restrictions: Matriculated student in Genetic Counseling M.S. Program. Grading Basis: Letter Grade
Repeatable. Max Credits: 9.
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

GENC 6920 - Applied Medical Genetics-Laboratory Genetic Counseling Elective (1 Credit)

An elective rotation for students desiring an advanced, applied training experience with genetic counselors based in a genetics diagnostic laboratory. Restrictions: Matriculated student in GENC program who has completed required prerequisite courses listed; Permission of instructor. Prereq: GENC 6120; GENC 6121; GENC 6122
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

GENC 6940 - Capstone in Genetic Counseling (1-2 Credits)

Students will develop a proposal and complete an individualized scholarly project that contributes to the knowledge and/or practice of genetic counseling. GENC matriculated student with 2 semesters required coursework completed. Permission of instructor. Grading Basis: Letter Grade with IP
Repeatable. Max Credits: 2.
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

GENC 6950 - Master's Thesis (1-6 Credits)

Masters thesis research to be arranged with prior approval of the Graduate Program in Genetic Counseling. Restrictions: Matriculated student in Genetic Counseling M.S. Program. Grading Basis: Letter Grade with IP
Repeatable. Max Credits: 6.
A-GRAD Restricted to graduate students only.
Additional Information: Report as Full Time.
Typically Offered: Fall, Spring, Summer.

HEHE 5000 - Foundations of Health Humanities (3 Credits)

This course explores the relationships among health, medicine, and society as well as the representations of illness, suffering, disability, and death through the lens of literature, the arts and philosophy, paying particular attention to power relationships and categories of difference. Grading Basis: Letter Grade
Typically Offered: Fall.

HEHE 5100 - Foundations of Health Care Ethics (3 Credits)

This course provides learners with an opportunity to explore the foundations of health care ethics. The material will cover several different ethical frameworks, with an eye to application to practical problems of health care and population health. Grading Basis: Letter Grade
Typically Offered: Spring.

HEHE 5250 - Topics in Media, Medicine and Society (3 Credits)

This interdisciplinary course will explore the interconnections and intersections between medicine and media, investigating a significant collaborative enterprise that characterizes American culture. Grading Basis: Letter Grade
Typically Offered: Fall, Spring, Summer.

HEHE 5350 - Narrative Principles and Practices in Healthcare (3 Credits)

This course introduces students to the intellectual and clinical discipline of narrative work in healthcare. Students will explore the theoretical foundations of narrative in healthcare and participate in structured workshops to improve close reading of texts and writing skills. Requisite: 008754
Grading Basis: Letter Grade
Typically Offered: Fall, Spring, Summer.

HEHE 5450 - Addressing Health Stigma in Social Contexts (3 Credits)

This interdisciplinary course will equip students with the tools needed to understand health stigma, to construct an explanation as to why it is so common and to explain what, if anything, should be done to address such stigma. Requisite: 008754

Grading Basis: Letter Grade

Typically Offered: Fall, Spring, Summer.

HEHE 5550 - Independent Study in Health Humanities & Health Ethics (1-3 Credits)

This independent study will permit students to pursue specialized topics and/or previously studied topics in health humanities and health ethics in greater depth and with more flexible scheduling. Requisite: 008754

Grading Basis: Letter Grade

Repeatable. Max Credits: 3.

Typically Offered: Fall, Spring, Summer.

HEHE 5650 - Ethics, Medicine & the Holocaust: Legacies (3 Credits)

German health professionals – especially physicians, but also nurses, dentists, pharmacists, midwives and public health practitioners – developed and led some of the most heinous activities of the Third Reich. Why? And what are the legacies of this history for medicine and society today?

Grading Basis: Letter Grade

Typically Offered: Fall, Spring.

HEHE 5655 - Introduction to Public Health Ethics (3 Credits)

This course provides learners with an introduction to public health ethics. The material explores differences between public health ethics & health care ethics, important frameworks used in public health ethical analysis, and significant practice in analyzing public health ethics cases.

Grading Basis: Letter Grade

Typically Offered: Fall.

HEHE 5750 - Pain, Its Paradoxes & the Human Condition (3 Credits)

This course explores the lived experiences of pain, its paradoxes, and the extent to which it is a key feature of the human condition. Analyses will be drawn from history, religious studies, philosophy, literature, poetry, public health, medicine, and law.

Grading Basis: Letter Grade

Typically Offered: Fall, Spring.

HEHE 5850 - Clinical Ethics (3 Credits)

The course will introduce students to the theory, methods, history and application of clinical ethics through a broad overview of relevant theory and literature and through deep discussion of notable cases in the history of clinical ethics. Prereq: HEHE 5100

Grading Basis: Letter Grade

Typically Offered: Fall, Spring.

HMGP 7600 - Survey of Human Genetics (3-4 Credits)

Survey of human genetics, including Mendelian and other types of inheritance, chromosomes and cytogenetics, molecular and biochemical basis of genetic disease, quantitative genetics and gene mapping, developmental and cancer genetics, clinical genetics, and genetic screening and prenatal diagnosis.

Grading Basis: Letter Grade

Repeatable. Max Credits: 4.

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

HMGP 7610 - Topics in Human Genetics (1-3 Credits)

Two-semester course based on weekly HMGP seminar series. Students meet with speakers and discuss seminar or related topics and arranged readings. Grade based on class participation and required paper and presentation. Required for 1st, 2nd and 3rd year HMGP students.

Prerequisite: Graduate standing.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 3.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring.

HMGP 7630 - Independent Study in Human Medical Genetics (1-2 Credits)

Independent study is intended to permit students to carry out directed reading and discussion with a specific faculty member other than their thesis advisor. Consent of the faculty member offering the independent study and the program director are required.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

HMGP 7650 - Research in Human Medical Genetics (1-10 Credits)

Research work in human medical genetics. Prereq: Consent of the instructor.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 99.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

HMGP 8990 - Doctoral Thesis (1-10 Credits)

Doctoral thesis work in human medical genetics. Prereq: Consent of the instructor.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 99.

A-GRAD Restricted to graduate students only.

Additional Information: Report as Full Time.

Typically Offered: Fall, Spring, Summer.

IDPT 5600 - Topics in Biomedical Science and Research (4 Credits)

Research internship for undergraduate fellows in Graduate Experiences for Multicultural Students (GEMS) Program.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Summer.

IDPT 6006 - Obesity and Cardiovascular Disease (1 Credit)

The course will cover how obesity relates to cardiovascular disease including basic and clinical mechanisms on the pathophysiology of vascular biology, insulin resistance, risk factors, and outcomes, and how therapeutic interventions modify cardiovascular disease risk.

Requirements: Course will span two semesters, Fall and then Spring

Grading Basis: Letter Grade

Typically Offered: Fall, Spring.

IDPT 7160 - Philosophical Foundations of Research Ethics (2 Credits)

This course will examine the philosophical basis for current research ethics practices, address current ethical issues and controversies in biomedical research, and provide students with knowledge and analytical skills to address the ethical dimensions of biomedical research.

Crosslisted: CLSC 7160

Grading Basis: Letter Grade

Typically Offered: Spring.

IDPT 7200 - Scientific Writing for Doctoral Students (2 Credits)
 Scientific writing course for students engaged in research. Focuses on critical thinking, analytical writing, and oral presentation. Taught as a writing workshop, the course emphasizes effective communication with both professional and non-technical audiences. Restrictions: Must have passed preliminary examination; permission of instructor.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

IDPT 7301 - Introduction to Life Science Technology Commercialization (1-3 Credits)

Course designed to familiarize graduate level engineering, business, law, science students with fundamentals of life science technology commercialization including drugs, devices, diagnostics, healthcare IT and platform applications. Three consecutive, 5-week classes, each 1 credit. Open to all graduate level students.

Grading Basis: Letter Grade

Repeatable. Max Credits: 3.

Typically Offered: Fall, Spring.

IDPT 7642 - Introduction to Laboratory Animal Research (1 Credit)

Provides basic knowledge on the use of laboratory animals, animal welfare and animal models. Includes general concepts on animal biology and husbandry for most common laboratory species and incorporates essential principles of anesthesia, analgesia, surgery and peri operative care.

Grading Basis: Letter Grade

Typically Offered: Summer.

IDPT 7646 - Tissue Biology and Disease Mechanism (3 Credits)

This course provides an overview of organ systems and through 1) a survey of the major systems, including the cellular and molecular mechanisms underlying their function and repair, integrated with 2) common diseases, current therapies, and their mechanistic basis. Prereq: IDPT 7811, 7812, 7813, 7814, 7815 (BIOM Sci Core Courses).

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

IDPT 7651 - MSTP Summer Research Rotation (1-3 Credits)

This course is an 8-10 week laboratory rotation experience in an MSTP training laboratory. Prereq: Acceptance into the MST Program and permission of MSTP Director.

Grading Basis: Letter Grade

Repeatable. Max Credits: 3.

A-GRAD Restricted to graduate students only.

Typically Offered: Summer.

IDPT 7850 - Independent Study in Bioethics, Medical Humanities or Health Law (1-6 Credits)

Course is designed to meet the needs of students interested in conducting advanced studies of issues and topics in bioethics, medical humanities, or health law. Students will work under the direction of the course director on a specific research topic. Course Restrictions: Permission of the instructor. Repeatable for credit within the degree program, but not within the same term. Max credits - 6.

Grading Basis: Letter Grade

Repeatable. Max Credits: 6.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

IDPT 8890 - Clinical Experience for CTSI PhD Students (1 Credit)

Each student will identify a clinician mentor who will develop/direct clinical experience tailored to student's thesis research. It may include participation in relevant clinical conferences, a direct clinical experience, clinical research, and preparation of a clinical research protocol. Prereq: IDPT 7805 & 7646, EPID 6630, BIOS 6601 or equivalent. Restrictions: PhD Graduate Students.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

IMMU 7602 - Special Topics in Cancer Immunology (1 Credit)

This interactive course aims to introduce important concepts, models and approaches in cancer immunology. The focuses are mechanisms relevant to the immune response in the context of cancer development and immunotherapy. Students are assessed via presentations, participation, and a paper.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

IMMU 7603 - Special Topics-Immunologic Basis of Human Disease (1 Credit)

Perform translational studies, as they either test hypotheses established in mouse models or lead to new testable hypotheses that will advance understanding of pathogenesis of human disease. Greater understanding of disease pathogenesis will allow for development of new treatment options. Prereq: IMMU 7662.

Grading Basis: Letter Grade

Repeatable. Max Credits: 1.

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

IMMU 7604 - Special Topics in Signal Transduction in the Immune System (1 Credit)

In-depth course, designed primarily for immunology graduate students in their second year, who have completed IMMU 7602. The course covers selected topics (8 in all) encompassing a wide range of topics in signal transduction through receptors important in the immune system. Prereq: IMMU 7662.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

IMMU 7605 - Workshop in Scientific Writing (1 Credit)

This workshop will consist of one session weekly for students to be critiqued on writing assignments designed to provide basic training in writing grant proposals and manuscripts.

Grading Basis: Letter Grade

Typically Offered: Spring.

IMMU 7607 - Science as a Profession (1 Credit)

This course discusses ethical issues, conflicts of interest, and regulations for working with humans or animals. It also includes instruction on writing papers and grants, giving effective presentations and advice on finding jobs in academia and industry.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

IMMU 7608 - Immunology of Infection (1 Credit)

Students will discuss and present selections from the current literature on topics related to the interaction of the immune system with microbial causes of infectious diseases.

Grading Basis: Letter Grade

Typically Offered: Spring.

IMMU 7630 - Overview of Immunology (2 Credits)

An overview course in immunology for non-immunology-program graduate students. The focus is human relevance and the practical use of immunology in a variety of fields. Students gain experience applying immunological knowledge to their own area of interest.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

IMMU 7650 - Research in Immunology (1-5 Credits)

Research work in immunology. Prereq: Consent of Instructor.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 99.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

IMMU 7662 - Immunology (6 Credits)

This course covers the basic principles of the immune system. Included are discussions on (I) the innate and adaptive immune responses, (II) the molecular and cellular basis of immune specificity and (III) aspects of clinical immunology.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

IMMU 8990 - Doctoral Thesis (1-10 Credits)

Doctoral thesis work in immunology. Prereq: Consent of Instructor.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 10.

A-GRAD Restricted to graduate students only.

Additional Information: Report as Full Time.

Typically Offered: Fall, Spring, Summer.

IPHY 6001 - Human Physiology (4 Credits)

This course in Physiology is designed to provide an understanding of the functions of cells, tissues, and organs in the human body and the overall integration of organ functions in the body as a whole. Course restrictions: B.A. or B.S. including Biology, Chemistry and Physics

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

IPHY 7650 - Research in Physiology & Biophysics (1-10 Credits)

Research work in Physiology and Biophysics. Prereq: Consent of Instructor.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 99.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

IPHY 7651 - Reading & Evaluating the Clinical Literature (2 Credits)

Interactive seminar introduces key concepts in clinical study design, basic statistics, & clinical research assessment. Become familiar with clinical study types; rigorously assess the literature; and appreciate how to incorporate clinical data in bench research. Requires presentations, manuscript review, and discussion. Pre-Req: Successful completion of the first year of PhD courses or two years of MSTP training.

Grading Basis: Letter Grade

Typically Offered: Fall.

IPHY 7652 - Special Topics in Reproductive Science (1-3 Credits)

This course provides instruction in a specialized area of Reproductive Science. Course content and the extent of the course varies from year to year. Prereq: Enrollment in PhD Program in Graduate School.

Grading Basis: Letter Grade

Repeatable. Max Credits: 3.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

IPHY 7800 - Comprehensive Physiology (6 Credits)

The course will provide an understanding of the function, regulation and integration of human organ systems. Content will include introductory to cell physiology and all major organ systems and will be taught by experts in each organ system.

Grading Basis: Letter Grade

Typically Offered: Spring.

IPHY 7801 - Molecular Mechanisms of Reproductive Endocrinology and Metabolism (3 Credits)

Endocrine systems will be covered from the molecule to the systems level. Pituitary secretions actions/ regulation, regulation of water, ion, calcium balance, regulation of metabolism including insulin secretion/action will be discussed, the context of normal physiology, the mechanisms of endocrine dysfunction. Prereq: Core courses IDPT 7811, 7812, 7813, 7814, 7815. Restrictions: CU-AMC Graduate students; others by permission of the Course Director.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

IPHY 7840 - Advanced Topics in Cell Signaling (1 Credit)

Students select topics of interest in the area of cell signaling and receive one-on-one instruction from expert faculty. Each one-credit topic will be taught for 5 weeks. Course work will include reading and discussing papers as well as practical exercises. Prereq: Consent of Instructor

Grading Basis: Letter Grade

Repeatable. Max Credits: 9.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

IPHY 8990 - Doctoral Thesis (1-10 Credits)

Doctoral thesis work in physiology.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 99.

A-GRAD Restricted to graduate students only.

Additional Information: Report as Full Time.

Typically Offered: Fall, Spring, Summer.

MICB 7620 - Advanced Genome Analysis (2 Credits)

Introduction to genomics emphasizing gaining familiarity with: analysis, utilization of genomic data. Topics: sequencing, mapping genomes, transcriptomics, human genome, evolution, genomic disorders, bioinformatics, statistics, population variation, epigenomics, proteomics, metagenomics, microbiome analysis, functional genomics, ethics.

Crosslisted Course: CPBS 7620, STBB 7620, and HMGP 7620

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

MICB 7621 - Genome Analysis Workshop (3 Credits)

The Genome Analysis Workshop is a hands-on tutorial of skills needed to process large genomics data sets and visualize their results. The class is taught from the standpoint of biologist with practical goals (e.g. to interpret the results of a sequencing-based experiment and gain biologically meaningful insight).

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

MICB 7628 - Viral Pathogenesis (2 Credits)

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

MICB 7650 - Research in Microbiology (1-10 Credits)

Research work in microbiology. Prereq: Consent of instructor.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 99.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

MICB 7701 - Molecular Virology and Pathogenesis (3 Credits)

Topics in this course include viral structure and genome organization, replication and expression of viral genomes, mechanism of action of tumor viruses, molecular aspects of virus-host cell interactions, animal models of infectious diseases and pathogenesis of human viruses.

Prereq: MICB 7706, MICB 7705 are desirable but not required. Restriction: Permission of Instructor.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

MICB 7703 - Molecular Mechanisms of Bacterial Disease (3 Credits)

The course focuses on molecular processes that bacteria utilize to cause disease in humans. The course content will use specific examples from pathogenic bacteria to illustrate common virulence mechanisms utilized to initiate, maintain and survive interactions with host cells. Prereq: Recommended Fundamentals of Microbiology Restrictions: Permission of the instructor.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

MICB 7704 - Host Response to Infectious Disease (1 Credit)

This interactive graduate course, which provides an overview and specific examples of the host response to infectious disease. Current research and future directions in the field are discussed. Students are assessed via presentations, participation and an exam. Prerequisite: Biomedical Core Courses

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

MICB 7705 - Medical Microbiology (4 Credits)

The course will focus on Microbiology, Infectious Diseases. Course content will focus on: pathogenic bacteria, viruses, fungi, parasites; emphasis on microbial virulence determinants, host-pathogen interactions emphasizing host immune responses, signs, symptoms of disease presentation, epidemiology, and diagnosis of infectious diseases. Prereq: Recommended Fundamentals of Microbiology. Restriction: Permission of Instructor. Cross listed: IDPT 6004.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

MICB 8990 - Doctoral Thesis (1-10 Credits)

Doctoral thesis work in microbiology. Prereq: Consent of the instructor.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 99.

A-GRAD Restricted to graduate students only.

Additional Information: Report as Full Time.

Typically Offered: Fall, Spring, Summer.

MOLB 7650 - Research in Molecular Biology (1-10 Credits)

Research work in molecular biology. Prereq: Consent of the instructor.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 99.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

MOLB 7661 - Molecular Biology Seminar (1 Credit)

Seminar series provides a forum for the presentation of scientific experiments and information in molecular biology by faculty, postdoctoral fellows, graduate students and invited outside guest speakers.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring.

MOLB 7800 - Advanced Topics in Molecular Biology (3-4 Credits)

Course instructs graduate students how to critically evaluate scientific literature. Course in 4 blocks; topics include nucleic acid, chromatin structure, DNA replication, RNA transcription, RNA processing, cell cycle control, genetics of model organisms. Papers chosen by instructors, presentations by students. Prereq: IDPT 7811, 7812, 7813, 7814, 7815. Restriction: By Permission of instructor. Course offered in 4 blocks of 1 hour of credit each.

Grading Basis: Letter Grade

Repeatable. Max Credits: 4.

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

MOLB 7801 - Rigor and Reproducibility in Biomedical Research (1 Credit)

Course will integrate the concepts of rigor, repeatability and reproducibility by combining both wet and dry lab components focused on teaching these concepts and laboratory skills. We will seek to make these concepts routine considerations during the design and execution of any type of experiment. Instructor consent required.

Grading Basis: Pass/Fail Only

Repeatable. Max Credits: 3.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring.

MOLB 7900 - Practical Computational Biology for Biologists: Python (2 Credits)

Comp. biology class aimed at biology PhD students. Topics covered include: basic practices for coding in python; analysis of standard high-throughput genomic data to study the regulation of gene expression; intro to modeling gene expression; data visualization; communicating computational analysis/results. 3 wks. lecture, lab & recitation

Grading Basis: Letter Grade

Typically Offered: Spring.

MOLB 7910 - Practical Computational Biology for Biologists: R (2 Credits)

Comp. biology class aimed at biology PhD students. Topics covered include: basic practices for coding in R; analysis of standard high-throughput genomic data to study the regulation of gene expression; intro to modeling gene expression; data visualization; communicating computational analysis/results. 3 wks. lecture, lab & recitation
Grading Basis: Letter Grade
Typically Offered: Spring.

MOLB 7950 - Informatics and Statistics for Molecular Biology (4 Credits)

This course covers the design and analysis of common molecular biology experiments with thorough coverage of statistical and informatic approaches to data analysis. The course begins with a "boot camp" that covers use of shell programming, R/R Studio, and Python scripting in bioinformatics. Pre-Req: MOLB-PhD or CSDV-PhD students only
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Fall.

MOLB 8990 - Doctoral Thesis in Molecular Biology (1-10 Credits)

Doctoral thesis work in molecular biology. Prereq: Consent of Instructor.
Grading Basis: Letter Grade with IP
Repeatable. Max Credits: 99.
A-GRAD Restricted to graduate students only.
Additional Information: Report as Full Time.
Typically Offered: Fall, Spring, Summer.

NRSC 7501 - Introduction to Neuroscience (1 Credit)

Introduction to study of the nervous system from the level of the brain to an understanding of how neurons are specialized for communication and information processing. This course is a prerequisite for NRSC 7600 series courses.
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Fall.

NRSC 7600 - Cellular & Molecular Biology (3 Credits)

A comprehensive, in-depth, discussion-based course intended for candidates for the Ph.D. in Neuroscience. Topics include ion channel structure and function, ionic basis of the resting and action potential, and the biochemistry and physiology of direct and synaptic transmission.
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Fall.

NRSC 7610 - Fundamentals of Neurobiology (3 Credits)

This course will provide basic knowledge on the structure and function of the nervous system. The lectures will be supplemented by discussion of primary research literature in neurobiology. Prereq: NRSC 7600 or equivalent at the discretion of the instructors.
Grading Basis: Letter Grade
Repeatable. Max Credits: 5.
A-GRAD Restricted to graduate students only.
Typically Offered: Spring.

NRSC 7612 - Nervous System Modeling with NEURON (1 Credit)

The objective of this course is to introduce students to biophysically accurate modeling of single neurons and neuronal networks with NEURON simulation environment. Students will implement NEURON in a project of their choice, possibly related to their primary 'wet' research.
Grading Basis: Letter Grade
Typically Offered: Spring.

NRSC 7614 - Biological Basis of Psychiatric & Neurological Disorders (2 Credits)

This elective, for basic sciences graduate students and medical students, provides a survey of current clinical and molecular aspects of human neuropsychiatric disorders. Both movement disorders and DSMIV diagnoses will be covered. Contact Course Director for a list of topics.
Prereq: IDPT 7812 or BMGN 5000/CSBI 5001.
Grading Basis: Letter Grade
Typically Offered: Spring.

NRSC 7615 - Developmental Neurobiology (3 Credits)

This course will cover fundamental principles regarding development of the nervous system. The format of the course will consist of lecture plus reading of primary literature. Prereq: IDPT 5004, NRSC 7600 & NRSC 7610.
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Spring.

NRSC 7616 - Introduction to Biomedical Photonics (3 Credits)

The course introduces several principles of applying optical techniques to biomedical applications. Current development of biophotonic research, such as microscopy, optical coherence tomography, optical spectroscopic techniques in tissues, will be discussed. Prereq: EE 5802 Optical Engineering. Crosslisted: Electrical Engineering EE 5804.
Grading Basis: Letter Grade
Typically Offered: Spring.

NRSC 7618 - Biology of the Eye (1 Credit)

Crosslisted with OPHT 6610 (for medical students). The objective of this course is to familiarize students with the core concepts and challenges in ophthalmology and vision research. The course integrates cutting-edge basic science with translational research and clinical advances. Pre-req: Must be a graduate student (not a medical student).
Grading Basis: Letter Grade
Typically Offered: Fall.

NRSC 7650 - Research in Neuroscience (1-10 Credits)

Research work in neuroscience. Prereq: Consent of instructor.
Grading Basis: Letter Grade with IP
Repeatable. Max Credits: 99.
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

NRSC 7657 - MATLAB for Neuroscientists (2 Credits)

MATLAB is an accessible programming environment that is widely used by scientists and engineers and offers powerful tools for data acquisition and data analysis. Students will develop their own MATLAB programs that are relevant to their particular line of research.
Grading Basis: Letter Grade
Typically Offered: Summer.

NRSC 7661 - Grant Proposal Writing Workshop (1 Credit)

Course is practical workshop in grant-writing culminating in a mock review panel including course participants. Students will examine various proposal types/formats, then write their own proposal in the format of NRSA fellowship application. Restriction: Students with adequate neuroscience background. Prereq: NRSC 7610.
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Spring.

NRSC 7662 - Survey of Neuroscience (1 Credit)

Designed to expose first year graduate students to current topics in neuroscience.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring.

NRSC 7670 - Advanced Topics in Neuroscience (1-2 Credits)

This course will consist of discussion of manuscripts relevant to a specific topic in Neuroscience. Prereq: NRSC 7600 or consent of instructor.

Grading Basis: Letter Grade

Repeatable. Max Credits: 10.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

NRSC 7674 - Quantitative Neuroscience (3 Credits)

In this course, mathematical models and data processing strategies will be introduced as well as other cutting-edge research techniques to help students understand how these techniques can be applied to solve modern neuroscience problems. Prerequisite: See Instructor. Note: This course is taught Downtown according to the Downtown calendar.

Grading Basis: Letter Grade

Typically Offered: Fall.

NRSC 7675 - Neuroscience, Ethics, & Philosophy (1 Credit)

Elective course provides overview of issues at the intersection of philosophy/ethics/neuroscience. Format involves lecture, student presentations, and relies heavily on student discussion. Topics focus on arguments relevant to the philosophy of mind along with their implications for the individual /society. Prereq: Successful completion of first year graduate courses.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

NRSC 7700 - Drugs and the Brain (1 Credit)

This graduate level course, Drugs and the Brain, will introduce students to the field of addiction. The focus will be on how different drugs of abuse work on brain cells and systems to produce their unique physiological and behavioral consequences.

Grading Basis: Letter Grade

Typically Offered: Spring.

NRSC 7800 - Teaching Neuroscience (1-3 Credits)

Students will be guided in developing two class sessions in systems neuroscience to be presented in the Systems Neuroscience course, NRSC 7610. Each session will include a practice presentation and post-mortem critique. Prereq: NRSC 7610. Restrictions: Second year students in neuroscience or above. Note: Meets 1 - 3 hours a week for 15 weeks depending on credits signed up for.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

NRSC 8990 - Doctoral Thesis (1-10 Credits)

Doctoral thesis work in neuroscience. Prereq: Consent of instructor.

Grading Basis: Letter Grade with IP

A-GRAD Restricted to graduate students only.

Additional Information: Report as Full Time.

Typically Offered: Fall, Spring, Summer.

PALC 6110 - Basic Pain Assessment & Management: IDT Care (3 Credits)

This course reviews basic pain pathophysiology, assessment, non-pharmacological interventions, and non-opioid and opioid pharmacological pain management. Integrated with IDT topics related to pain such as psychological, social & spiritual distress and ethical standards of practice.

Grading Basis: Letter Grade

Typically Offered: Fall, Spring, Summer.

PALC 6111 - Basic Pain Assessment & Management: IDT Care (AHP) (3 Credits)

Offered jointly with PALC 6110; reviews basic pain pathophysiology, assessment, non-pharmacological interventions, and non-opioid & opioid pharmacological pain management. Integrated with IDT topics such as psychological, social & spiritual distress and ethical standards. Some coursework tailored to AHP students.

Grading Basis: Letter Grade

Typically Offered: Fall, Spring, Summer.

PALC 6120 - Advanced Concepts in Pain Management (3 Credits)

This course focuses on methadone, opioid infusions, interventional pain management, and other complex modalities. This class focuses on ethics and psychosocial issues including pain in the face of addiction and public policy around opioids and REMS. Prerequisites: PALC 6110 and 6510

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

PALC 6121 - Advanced Concepts in Pain Management (AHP) (3 Credits)

Offered jointly with PALC 6120; Focuses on safe use of methadone, opioid infusions, interventional pain management, and other complex modalities. This class also covers ethics and psycho-social-spiritual issues related to pain, addiction, and public policy around opioids and REMS. Some thanatology content is tailored for AHP students. Requisite: PALC 6111, 6511, and 6512

Grading Basis: Letter Grade

Typically Offered: Fall, Spring, Summer.

PALC 6210 - IDT Care for Non-Pain Symptoms: Part A (3 Credits)

Course covers the assessment and management of eight common non-pain symptoms (e.g. anorexia, asthenia, constipation and nausea/vomiting). Integrated with IDT topics related to symptom assessment/management such as psychological, social & spiritual distress and ethical standards of practice.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

PALC 6211 - IDT Care for Non-pain Symptoms: Part A (AHP) (3 Credits)

Offered jointly with PALC 6210; assessment/management of eight common non-pain symptoms (e.g. anorexia, asthenia, constipation and nausea/vomiting). Integrated with IDT topics such as psychological, social & spiritual distress, and ethical standards related to practice. Some coursework tailored to AHP students.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

PALC 6220 - IDT Care for Non-Pain Symptoms: Part B (3 Credits)

This course covers the assessment and management of eight different common non-pain symptoms (e.g. dyspnea, cough, and insomnia). Integrated with IDT topics related to symptom assessment/management such as psychological, social & spiritual distress and ethical standards of practice.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

PALC 6221 - IDT Care for Non-Pain Symptoms: Part B (AHP) (3 Credits)

Offered jointly with PALC 6220; covers assessment & management of eight common non-pain symptoms (e.g. dyspnea, cough, and insomnia). Integrated with IDT topics such as psychological, social & spiritual distress and ethical standards. Some coursework tailored to AHP students.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

PALC 6310 - Advanced Illness in Special Settings: Part A (3 Credits)

Assessment/management of 8 chronic illnesses (cardiopulmonary, end stage liver and renal diseases) emphasis on early PC combined with disease focused therapy. Attention: prognostication and transitions into palliative/hospice care or discontinuing treatments including bioethical review and IDT support. Prerequisite: PALC 6510

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

PALC 6320 - Advanced Illness in Special Settings: Part B (3 Credits)

Assessment/management of cancer and HIV as chronic illness with emphasis on early palliative care combined with disease focused therapy. Attention to prognostication, transition into palliative/hospice care. Paired with Spiritual Care review of challenging spiritual issues, hope, miracles and rituals. Prerequisite: PALC 6510

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

PALC 6330 - Advanced Illness in Special Settings: Part C (3 Credits)

Assessment/management of neurodegenerative disorders as chronic illness with emphasis on early palliative care combined with disease focused therapy. Attention to prognostication and transitions into palliative/hospice care. Paired with bioethical review and comfort care for the imminently dying. Prerequisite: PALC 6510

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

PALC 6410 - Death & Dying: Unique Role of the AHP (3 Credits)

This course focuses on methadone, opioid infusions, interventional pain management, and other complex modalities. This class focuses on ethics and psychosocial issues including pain in the face of addiction and public policy around opioids and REMS. For AHP students only.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

PALC 6510 - Core Concepts, Principles & Communication Skills (3 Credits)

Online and on-campus intensive (some physical presence required)

on palliative care topics including: models of care, early palliative care integration, whole person assessment, meaning of illness, and demonstration of advanced communications skills. Special focus on treatment plans with simulated patients/families. Requirement: Restricted to PALC MS or certificate students

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

PALC 6511 - Online: Core Concepts, Principles & Commun. Skills (2 Credits)

Online discussion of palliative care topics including: models of care, early palliative care integration, whole person assessment, meaning of illness, and demonstration of advanced communications skills. Special focus on treatment plans with simulated patients/families. Co-Requisite: PALC 6512

Grading Basis: Letter Grade

Typically Offered: Fall, Spring, Summer.

PALC 6512 - Intensive: Core Topics, Principles & Commun. Skills (1 Credit)

On-campus, in-person intensive (physical presence required) discussion of palliative care topics including: models of care, early palliative care integration, whole person assessment, meaning of illness, and demonstration of advanced communications skills. Special focus on treatment plans with simulated patients/families. Co-Requisite: PALC 6511

Grading Basis: Letter Grade

Typically Offered: Fall, Spring, Summer.

PALC 6520 - Communication Skill Refinement: IDT Collaboration (3 Credits)

Online and on-campus intensive (some physical presence require). Advanced topics in PC including refinement of advance PC skills covered Year 1 (e.g. communication) to ensure effectively application to your PC practice; demonstration of psycho-social-spiritual assessment integrated in treatment plans with simulated patients/families.

Prerequisite: PALC 6510

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

PALC 6521 - Online: Comm. Skill Refinement: IDT Collaboration (2 Credits)

Online. Advanced topics in PC including refinement of advance PC skills covered Year 1 (e.g. communication) to ensure effectively application to your PC practice; demonstration of psycho-social-spiritual assessment integrated in treatment plans with simulated patients/families. Co-Requisite: PALC 6522

Grading Basis: Letter Grade

Typically Offered: Fall, Spring, Summer.

PALC 6522 - Intensive: Comm. Skill Refinement: IDT Collaboration (1 Credit)

On-campus, in-person intensive (physical presence required). Advanced topics in PC including refinement of advance PC skills covered Year 1 (e.g. communication) to ensure effectively application to your PC practice; demonstration of psycho-social-spiritual assessment integrated in treatment plans with simulated patients/families. Co-Requisite: PALC 6521

Grading Basis: Letter Grade

Typically Offered: Fall, Spring, Summer.

PALC 6530 - Palliative Care Integrated in Your Community (3 Credits)
Online and on-campus intensive (some physical presence required). Demonstrate advanced PC communications skills & management of complex pain and symptoms; apply ethical training and practical experience with supportive interventions to help preserve dignity, achieve closure and have peace at life's end. Prerequisites: PALC 6510, PALC 6520, and PALC 6950 or PALC 6960
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

PALC 6531 - Online: Palliative Care Integrated in Your Community (2 Credits)
Online. Demonstrate advanced PC communications skills & management of complex pain and symptoms; apply ethical training and practical experience with supportive interventions to help preserve dignity, achieve closure and have peace at life's end. Co-Requisite: PALC 6532
Grading Basis: Letter Grade
Typically Offered: Fall, Spring, Summer.

PALC 6532 - Intensive: Pall Care Integrated in Your Community (1 Credit)
On-campus, in-person intensive (physical presence required). Demonstrate advanced PC communications skills & management of complex pain and symptoms; apply ethical training and practical experience with supportive interventions to help preserve dignity, achieve closure and have peace at life's end. Co-Requisite: PALC 6531
Grading Basis: Letter Grade
Typically Offered: Fall, Spring, Summer.

PALC 6910 - Systems Topics: Preparation to Capstone (3 Credits)
Palliative Care Research, Quality Improvement, Health Care Policy and Advocacy and Palliative Care Program development including institutional needs assessment and program planning. Instruction to become a PC Educator, development of professional resilience and role of medical humanities. Prerequisite: PALC 6511/PALC 6512
Grading Basis: Letter Grade with IP
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

PALC 6911 - Systems-Level Thinking: Capstone Project Overview (1 Credit)
This course provides an overview of Capstone Project types: Evidence-based practice; quality improvement or patient safety; program development or evaluation; education; engagement; ethics and humanities; and research. Students will formulate problem statements for various project types. Can be taken concurrently with PALC 6912.
Requisite: PALC-MS students only
Grading Basis: Letter Grade with IP
Typically Offered: Fall, Spring, Summer.

PALC 6912 - Systems-Level Thinking: Capstone Project Lit Review (1 Credit)
Students will learn to search for evidence, critique journal articles, and synthesize a literature review. They will develop and refine purpose statements for their Capstone project, conduct their literature search, and create an evidence table for their Capstone Proposal. Can be taken concurrently with PALC 6911. Requisite: PALC-MS students only
Grading Basis: Letter Grade with IP
Typically Offered: Fall, Spring, Summer.

PALC 6913 - Systems-Level Thinking: Capstone Project Proposal (1 Credit)
Students will draft Capstone Proposals for faculty review and feedback. Students will present Capstone Proposals to a Bridge Committee for approval and revise per Bridge Committee feedback. Requisite: PALC 6911, PALC 6912, PALC-MS students only
Grading Basis: Letter Grade with IP
Typically Offered: Fall, Spring, Summer.

PALC 6950 - Capstone Project (1-3 Credits)
MS Palliative Care Capstone Project. Students will design, implement, evaluate, and present the result of a research, QI, education, advocacy, or medical humanities project during year 2 with mentorship from faculty. Results presented at final on-campus course (PALC 6530). Prerequisites: PALC 6910 and PALC 6520
Grading Basis: Letter Grade with IP
Repeatable. Max Credits: 12.
A-GRAD Restricted to graduate students only.
Additional Information: Report as Full Time.
Typically Offered: Fall, Spring, Summer.

PALC 6960 - Masters Thesis in Palliative Care (1-3 Credits)
Masters thesis work in Palliative Care. Final results presented at final on-campus course (PALC 6530). Prerequisite: PALC 6910 and 6520
Grading Basis: Letter Grade with IP
Repeatable. Max Credits: 12.
A-GRAD Restricted to graduate students only.
Additional Information: Report as Full Time.
Typically Offered: Fall, Spring, Summer.

PALC 7001 - Comm-Based Hospice and Pall Med Fellowship - A (8 Credits)
For physicians MSPC students who are accepted as CB-HPM Fellows. Graduate Medical Education and supervision for fellows to complete all clinical requirements for patient care and meet HPM Milestones. Pre- or Co-Requisite - PALC 6511/12
Grading Basis: Pass/Fail with IP
Typically Offered: Fall.

PALC 7002 - Comm-Based Hospice and Pall Med Fellowship - B (8 Credits)
For physicians MSPC students who are accepted as CB-HPM Fellows. Graduate Medical Education and supervision for fellows to complete all clinical requirements for patient care and meet HPM Milestones. Pre- or Co-Requisite PALC 6511/12
Grading Basis: Pass/Fail with IP
Typically Offered: Spring.

PALC 7003 - Comm-Based Hospice and Pall Med Fellowship - C (5 Credits)
For physicians MSPC students who are accepted as CB-HPM Fellows. Graduate Medical Education and supervision for fellows to complete all clinical requirements for patient care and meet HPM Milestones. Pre- or Co-Requisite - PALC 6511/12
Grading Basis: Pass/Fail with IP
Typically Offered: Summer.

PALC 7004 - Comm-Based Hospice and Pall Med Fellowship - D (8 Credits)
For physicians MSPC students who are accepted as CB-HPM Fellows. Graduate Medical Education and supervision for fellows to complete all clinical requirements for patient care and meet HPM Milestones. Pre- or Co-Requisite - PALC 6511/12
Grading Basis: Pass/Fail with IP
Typically Offered: Fall.

PALC 7005 - Comm-Based Hospice and Pall Med Fellowship - E (8 Credits)

For physicians MSPC students who are accepted as CB-HPM Fellows. Graduate Medical Education and supervision for fellows to complete all clinical requirements for patient care and meet HPM Milestones. Pre- or Co-Requisite - PALC 6511/12

Grading Basis: Pass/Fail with IP

Typically Offered: Spring.

PALC 7006 - Comm-Based Hospice and Pall Med Fellowship - F (5 Credits)

For physicians MSPC students who are accepted as CB-HPM Fellows. Graduate Medical Education and supervision for fellows to complete all clinical requirements for patient care and meet HPM Milestones. Pre- or Co-Requisite - PALC 6511/12

Grading Basis: Pass/Fail with IP

Typically Offered: Summer.

PHCL 7600 - Frontiers in Pharmacology (1 Credit)

Course is intended to introduce students to cutting-edge pharmacology research and to the range of research opportunities available within the Pharmacology Training Program. Pharmacology Department faculty presentations will focus on cellular signaling, molecular mechanisms of drug actions, structure-based drug design.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

PHCL 7602 - Pharmacology Journal Club (1 Credit)

The overall goal of the course is to teach the students to read and discuss current literature in their field and to gain a comprehensive view of the directions that lead to high-impact research. Students will present and discuss papers.

Grading Basis: Letter Grade

Repeatable. Max Credits: 1.

Typically Offered: Fall, Spring.

PHCL 7605 - Responsible Conduct of Research (1 Credit)

The Department of Pharmacology in the University of Colorado School of Medicine organizes and offers an interactive course during the fall semester entitled "Responsible Conduct of Research". The course is designed to inform students, trainees and faculty to the NIH requirements for ethical and responsible research.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

PHCL 7606 - Receptors and Cell Signaling (3 Credits)

This elective course presents an in-depth treatment of the role of receptors and signal transduction systems in the regulation of cell functions through faculty-presented lectures and student-led discussions of current literature. Prereq: IDPT 7811, 7812, 7813, 7814, 7815.

Grading Basis: Letter Grade

Typically Offered: Spring.

PHCL 7609 - Statistical Methods in Pharmacology (3 Credits)

Introduction to basic statistical methods utilized to analyze scientific data. The goal of course is to provide students in the biological/health sciences with the knowledge/skills necessary to analyze/interpret data which is essential for communicating scientific results. Restriction:

Restricted to Pharmacology PhD Students. Crosslisted with BIOS 6606.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

PHCL 7610 - Survey of Bioinformatics Methods (2 Credits)

What is Bioinformatics and why study it? How is large-scale molecular biology data generated, where and how can researchers gain access to it, and what computational analyses are possible? Crosslisted: CPBS 7710.

Grading Basis: Letter Grade

Typically Offered: Fall.

PHCL 7611 - Bioinformatics I (4 Credits)

What is Bioinformatics and why study it? How is large-scale molecular biology data generated, where and how can researchers gain access to it, what computational analyses are possible and computational techniques for solving inference problems in molecular biology? Prereq: Bioinformatics PhD students or consent of instructor. Crosslisted: CPBS 7711.

Grading Basis: Letter Grade

Typically Offered: Fall.

PHCL 7612 - Bioinformatics II (4 Credits)

Inference problems and computational techniques for molecular biology, with emphasis on machine learning approaches. Use of computational induction techniques on information extraction from biomedical literature, inference of biochemical networks from high-throughput data, and prediction of protein function. Prereq: CPBS 7711. Crosslisted: CPBS 7712.

Grading Basis: Letter Grade

Typically Offered: Spring.

PHCL 7613 - Pharmacology Journal Club (1 Credit)

The overall goal of the course is to teach the students to read and discuss current literature in their field and to gain a comprehensive view of the directions that lead to high-impact research. Students will present and discuss papers.

Grading Basis: Pass/Fail Only

Repeatable. Max Credits: 1.

Typically Offered: Fall, Spring.

PHCL 7614 - Membrane Biophysics (2 Credits)

Lectures and homework on ionic mechanisms and underlying cellular excitability, especially in the central nervous system. Descriptive mathematics, pharmacology and molecular biology will be stressed. An introductory application to real-life problems using the NEURON simulation environment will be taught. Prereq: NRSC 7600 or equivalent. Restrictions: 2nd year students with approval of instructor. Crosslisted: NRSC 7614.

Grading Basis: Letter Grade

Typically Offered: Spring.

PHCL 7615 - Grant Proposals in Pharmacology (1 Credit)

We will learn principles of good grants(wo)manship and hone our skills in homework assignments and discussions. Our goal is to enable a better learning experience during comps proposal writing, by gaining the tools for optimized self-assessment. Prereq: IDPT 7811, IDPT 7812, IDPT 7813, IDPT 7814, IDPT 7815.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

PHCL 7620 - Principles of Pharmacology (6 Credits)

Lectures are provided in the general areas of pharmacokinetics, receptor theory, structure-activity relationships, drug metabolism, basic pharmacological mechanisms with a particular emphasis on systems such as the nervous system and cardiovascular system, as well as cancer and microbial chemotherapy. Prereq: IDPT 7811, 7812, 7813, 7814, 7815.

Restriction: Consent of Course Directors.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

PHCL 7622 - Principles of Pharmacology for MSTP Students (1 Credit)

Lectures are provided in the general areas of pharmacokinetics, receptor theory, structure-activity relationships, drug metabolism, and basic pharmacological mechanisms with a particular emphasis on systems such as the nervous system and cardiovascular system, as well as cancer and microbial chemotherapy. Prereq: IDPT 7811, 7812, 7813, 7814, 7815, PHCL 6000. Restriction: Consent of course directors.

Grading Basis: Letter Grade

Typically Offered: Spring.

PHCL 7630 - Molecular Bio Lab Tech PHCL (3 Credits)

Grading Basis: Letter Grade

PHCL 7650 - Research in Pharmacology (1-5 Credits)

Research work in pharmacology. Prereq: Consent of Instructor.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 99.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

PHCL 7660 - Advanced Topics in Pharmacology (1 Credit)

An in-depth discussion-oriented course for advanced students focusing each term on specific topics associated with pharmacological studies including new insights about drug addiction, alcohol actions and alcoholism memory models and LTP, rational approaches to cancer chemotherapy, cardiovascular physiology. Prereq: PHCL 7600, PHCL 7606, PHCL 7609, PHCL 7620, PHCL 7650. Coreq: IDPT 7811, 7812, 7813, 7814, 7815.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

PHCL 7801 - Rigor and Reproducibility in Biomedical Research (1 Credit)

Course will integrate the concepts of rigor, repeatability, and reproducibility by combining both "wet" and "dry" lab components focused on teaching these concepts and laboratory skills.

Grading Basis: Pass/Fail Only

Typically Offered: Spring.

PHCL 8990 - Doctoral Thesis (1-10 Credits)

Doctoral thesis work in pharmacology. Prereq: Consent of Instructor.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 10.

A-GRAD Restricted to graduate students only.

Additional Information: Report as Full Time.

Typically Offered: Fall, Spring, Summer.

RHSC 7000 - Foundations in Rehabilitation Science (2 Credits)

This course provides an overview of the field of Rehabilitation Science and an introduction to disablement frameworks with an emphasis on biopsychosocial models of the enabling-disabling process across the life span. Restrictions: Instructor permission required for students not enrolled in the RHSC Program.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

RHSC 7001 - Rehabilitation Science Seminar (1 Credit)

Students will attend contemporary research seminars presented by established scientists, and will participate in group discussions to assess the implications of seminar topics on the full spectrum of disablement constructs in Rehabilitation Science ranging from pathophysiology to community participation. Prerequisites: RHSC 7000 Foundations in Rehabilitation Science or Instructor Permission. Restrictions: Instructor permission required for students not enrolled in RHSC Program.

Grading Basis: Letter Grade

Repeatable. Max Credits: 1.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring.

RHSC 7002 - Professional Skills in Academia (2 Credits)

This course provides an overview of instructional methods and professional skills for academic educators and scientists. Topics include instructional methods for graduate education, and development of professional skills in communication, management, networking, and promotion for academic careers in Rehabilitation Science. Restrictions: Instructor permission required for students not enrolled in RHSC Program.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

RHSC 7500 - Neurophysiology of Pain (2 Credits)

This course will review neurophysiologic mechanisms involved in normal and pathologic processing of nociceptive stimuli, and their effects on human movement. Contemporary, evidence-based methods of pain assessment and management will be discussed for research and clinical applications. Prerequisites: Non-degree students must have instructor permission. Prerequisite: NRSC 5100 or NRSC 7600.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

RHSC 7910 - Research Practicum in Rehabilitation Science I (3 Credits)

This research practicum exposes students to a variety of experimental tools and techniques available to Rehabilitation scientists. Mentored practicum experiences are selected by each student with permission from faculty mentor(s). Prerequisites: Instructor permission. Restrictions: Instructor permission required for students non enrolled in RHSC Program.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

RHSC 7911 - Research Practicum in Rehabilitation Science II (3 Credits)

This research practicum exposes students to a variety of experimental tools and techniques available to Rehabilitation scientists. Mentored practicum experiences are selected by each student with permission from faculty mentor(s). Prerequisites: Instructor permission. Restrictions: Instructor permission required for students not enrolled in RHSC program.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

RHSC 8900 - Independent Study in Rehabilitation Science (1-3 Credits)

This course is designed for the advanced student to pursue one or more Rehabilitation Science topics in considerable depth. Faculty supervision is required. Prerequisites: Instructor permission. Restrictions: Instructor permission required for students not enrolled in RHSC Program.

Grading Basis: Letter Grade

Repeatable. Max Credits: 3.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

RHSC 8990 - Doctoral Thesis (1-10 Credits)

Doctoral thesis work in Rehabilitation Science. Prerequisites: Instructor permission. Restrictions: Enrollment in RHSC Program.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 10.

A-GRAD Restricted to graduate students only.

Additional Information: Report as Full Time.

Typically Offered: Fall, Spring, Summer.

RPSC 7802 - Reproductive Development (1 Credit)

Focus of course is developmental biology of reproductive systems. Sex determination, fertilization, implantation, development of placenta and mammary glands will be covered in lectures and discussions of current literature. Course is designed to follow Endocrinology and Metabolism in Spring semester. Prereq: Core Courses IDPT 7811, 7812, 7813, 7814, 7815.

Grading Basis: Letter Grade

Typically Offered: Spring.

RPSC 8990 - Doctoral Thesis (1-10 Credits)

Doctoral thesis work in Reproductive Science. Prereq: Consent of instructor.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 10.

A-GRAD Restricted to graduate students only.

Additional Information: Report as Full Time.

Typically Offered: Fall, Spring, Summer.

STBB 7608 - Molecular Interactions (3 Credits)

Provides chemical/physical basis for protein structure, folding, function & stability; presents methods/principles of protein/peptide purification & enzyme catalysis including electron transfer & mutagenesis. The role of molecular dynamics & use of molecular simulations in the investigations of protein-ligand/protein-protein interactions. Cross-listed with PHSC 7608.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

STBB 7609 - Biophysics & Spectroscopy (3 Credits)

This course will teach fundamentals of modern molecular spectroscopies and biophysical techniques as applied to biomolecules and the structural/dynamic information they afford. Cross listed with PHSC 7609

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

STBB 7620 - Advanced Genome Analysis (2 Credits)

Introduction to genomics emphasizing gaining familiarity with: analysis, utilization of genomic data. Topics: sequencing, mapping genomes, transcriptomics, human genome, evolution, genomic disorders, bioinformatics, statistics, population variation, epigenomics, proteomics, metagenomics, Crosslisted Course: HMGP 7620, CPBS 7620, and MICB 7620microbiome analysis, functional genomics, ethics.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

STBB 7621 - Genome Analysis Workshop (3 Credits)

A tutorial of skills needed to process genomics data sets and visualize their results. Taught experimentalists with practical goals (e.g. to interpret the results of an experiment and gain biologically meaningful insight). Course is designed to closely mirror HMGP 7620. Restrictions: Students cannot have previously taken MOLB 7620. Cross listed with MOLB 7621.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

STBB 7631 - Molecular Structure A (1.5 Credits)

Gain an in-depth understanding of the underlying principles of an NMR experiment, so that student can turn NMR theory into NMR practice for their research.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

STBB 7632 - Molecular Structure B (1.5 Credits)

Understand the theory and practice of structural determination using x-ray crystallography.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

STBB 7633 - Molecular Structure C (1.5 Credits)

The purpose of this course is to provide students with a concise understanding of biological mass spectrometry and its application to study and characterize various classes of biomolecules in state of the art research. Course is 7.5 weeks.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

STBB 7634 - Molecular Structure D (1.5 Credits)

The course will provide an introduction to conceptual and practical aspects of macromolecular cryo-electron microscopy (cryo-EM). A combination of lectures and hands-on experiences will give students a working understanding of cryo-EM and its application for structural analysis of biological macromolecules.

Grading Basis: Letter Grade

Typically Offered: Fall.

STBB 7650 - Research in Structural Biology & Biochemistry (1-10 Credits)

Research work in Structural Biology and Biochemistry. 2 laboratory hours per week per credit.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 10.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

STBB 7660 - Structure Seminar (1 Credit)

Seminar series provides a forum for the presentation of scientific experiments and information in structural biology by faculty, postdoctoral fellows and graduate students.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring.

STBB 7670 - Independent Study in Structural Biology and Biochem (1-3 Credits)

This course is listed for the benefit of the advanced student who desires to pursue one or more topics in Structural Biology and Biochemistry in considerable depth. Supervision by a full-time faculty member is necessary.

Grading Basis: Letter Grade

Repeatable. Max Credits: 3.

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

STBB 7807 - Structural Biol & Biophysics Core Course II (2 Credits)

Provide first year students enrolled in the core course the opportunity to obtain or review background material in the fields of structural biology and biophysics.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

STBB 8990 - Doctoral Thesis (1-10 Credits)

Doctoral thesis work in Structural Biology and Biochemistry.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 10.

A-GRAD Restricted to graduate students only.

Additional Information: Report as Full Time.

Typically Offered: Fall, Spring, Summer.

Academic Grievance & Appeals Process

The following procedures address those student appeals and grievances arising from suspension, termination/dismissal, or denial of progression based on unsatisfactory academic performances from the Graduate School or its programs.

The intent of the academic appeal procedure is to assure fairness and due process to all involved parties. **Good faith efforts should always be made by students, faculty, and administration to settle all appeals, complaints, and grievances on an informal basis.** These efforts will include conferences between the persons directly involved and others whom these persons believe to be able to help solve the problems.

definitions

- **Suspension:** Removal of the student from the graduate program for a defined period of time and/or the specification that a student must fulfill certain requirements before readmission or re-instatement will be considered. While suspended, the student is not entitled to attend classes, use University facilities, participate in University activities, or be employed by the University. Special conditions may be stipulated for reinstatement at the conclusion of the period of reinstatement of

the period of suspension. The student is not in good standing with the University during the term of the suspension.

- **Termination/Dismissal:** Terms used synonymously to refer to a student being withdrawn from a graduate program and Graduate School. Official notification is sent to students by email and US mail. Per this policy, students terminated have the right to appeal their dismissal in writing within one week. As with a suspension, the student is no longer entitled to attend classes, use University facilities, participate in University activities, or be employed by the University as a student.
- **Denial of Progress:** Students failing to meet program progression criteria, with course failures, too many incomplete grades, or some other programmatic issue, would fall into this category. Students in this category may be suspended or terminated/dismissed as defined by the corresponding criteria above.

Graduate programs and students should be in continuous communication. To assist this process, graduate programs have developed programmatic handbooks and students are responsible for following the policies and procedures outlined in the Graduate School and program handbooks and rules. Ignorance of the guidelines and procedures will not constitute an affirmative defense in an appeals process.

General procedures

1. The student should be informed in writing by the relevant instructor, faculty committee, Program Director, or administrator (e.g., Dean or Assistant Dean) that he/she is not meeting the academic requirements to continue in the graduate program. Written notices of course failures, unsatisfactory program progress, and intent to request dismissal or suspension from the Graduate School are distributed to the involved student, the student's academic advisor, the Program Director, the program progression's committee (if present), and the Assistant Dean for issues on the Anschutz Medical Campus and the Associate Dean of the Graduate School for the issues on the Denver Campus.
2. Should the student disagree with the decision made by the faculty, committee, Program Director, or administrator regarding course failure or intent to terminate progression in the program based on unsatisfactory academic performance, the student should initiate a conference with the involved person(s) to determine if the disagreement can be resolved within 2 weeks.
3. If the results of the first conference are not acceptable to the student, the student informs the involved faculty within 1 week and requests a conference with the involved faculty and Program Director or school administrator. NOTE: This step is required only in situations in which the Program Director and/or school administrator have not already approved or concurred with the initial notice of failure or intent to terminate.
4. If the consensus of the program is still that the student should be terminated/dismissed or suspended, the Program Director or Chairperson notifies the appropriate Graduate School Dean (the Assistant Dean for the Anschutz Medical Campus, and the Associate Dean for the Denver Campus) and recommends the student's dismissal or suspension. The email or letter should outline the reason for the dismissal or suspension and steps taken to date. If suspension is recommended, the recommendation also includes specific criteria for the term of the suspension and requirements for reinstatement.

- The appropriate Graduate School Dean (the Assistant Dean for the Anschutz Medical Campus, and the Associate Dean for the Denver Campus) will review the student's academic record and the information submitted by the program to ensure that the student has received due process. If the student's academic record and/or submitted information support termination/dismissal, the student will be dismissed from the program and the Graduate School. If suspension is recommended and supported by the academic record and submitted information, the student will be suspended per the request. The student will be notified by email and US mail. The program will be notified by email.

Written Appeal Procedure

- Should the student wish to appeal the Graduate School Dean's (the Assistant Dean for the Anschutz Medical Campus, and the Associate Dean for the Denver Campus) decision, the student should submit a written response to the Dean within 1 week of receiving the written notice of suspension or termination/dismissal. The appeal should include rationale for the appeal and desired outcome. The student also may request a personal interview with the Dean to discuss the situation after they have submitted their written appeal.
- The final decision rests with the Dean of the Graduate School. At the Dean's discretion, he/she may discuss the Graduate School Dean's decision with the involved faculty and student's program, as well as any other persons affected by the recommended resolutions.
- The Dean will notify the student of her/his decision by email and certified U.S. mail within 5 working days of submission of the appeal or interview with the student (whichever falls last). The decision of the Dean is final.
- If the student is suspended, terminated/dismissed, or otherwise unable to continue his or her academic studies either temporarily or permanently because of disciplinary or other action, the Dean shall notify the appropriate CU Registrar of the change in the student's academic status and order the Registrar to suspend the student's registration.

Academic Honor Code

Academic Integrity Expectations

Please refer to the Academic Honesty Policies and Academic Dishonesty definitions at the University of Colorado Denver, Anschutz Medical Campus Catalog Website.

Honor Code Guidelines

Education at the CU Denver | Anschutz is conducted under the honor system. All students who have entered graduate and health professional programs should have developed the qualities of honesty and integrity, and each student should apply these principles to his or her academic and subsequent professional career. All students are also expected to have achieved a level of maturity which is reflected by appropriate conduct at all times. Expectations, definitions, and procedures regarding graduate student conduct are outlined in the Code of Conduct (<http://www.ucdenver.edu/life/services/standards/Documents/CUDenver-CodeofConduct.pdf>).

Academic Honesty

Students should adhere to the highest standards of academic honesty and integrity, to include completing individual work as assigned, adhering to department requirements, accurately documenting sources of information and records, and engaging in personal conduct both on and off campus that reflects well on the University, your professional duties, and your ability to perform in classroom and/or laboratory environments.

Examples of behavior that violates these standards include: plagiarism (including the undocumented use of internet and web-based information), cheating, illegitimate possession and/or use of examinations, violation of the ethical standards for conducting research, and falsification of official records.

Professional Conduct

As current and/or future professionals, students are expected to adhere to the highest standards of professionalism during their academic career. This means that students adhere to the professional and ethical standards of their respective fields, and the academic and honor code expectations for the University of Colorado Graduate School.

The University of Colorado Graduate School has a commitment to accepting a diverse culture and highly values multiple perspectives. This means that not only is discrimination of any form unacceptable, but the University upholds the expectation that students remain open-minded, and respectfully discuss and interact with diverse backgrounds and perspectives.

Examples of unprofessional conduct include misrepresentation of effort, credentials, or achievement in either the academic or professional setting; any action which compromises the quality or safety of consumer care; violation of confidentiality; and any other conduct unbecoming a professional practitioner or researcher. When conducting research, individuals need to comply with research guidelines established by the IRB.

Although it is not possible to list every situation that violates the Academic Integrity Expectations of the Graduate School at University of Colorado Denver and Anschutz Medical Campus, the following examples will provide a reference point:

- Academic Dishonesty
- Complicity with Academic Dishonesty
- Plagiarism
- Cheating
- Fabrication and Falsification
- Submission of the same papers more than once or for different classes
- Misuse of Academic Materials
- Any conduct, both on and off campus, that interferes with the student's ability to perform his/her classroom, laboratory, or professional duties or reflects poorly on the University
- Violation of any University of Colorado, Anschutz Medical Campus, Denver Campus, or Graduate School policy

Relationship of Honor Code to Local, State, and Federal Laws

The University adheres to all applicable local, state and federal laws, and cooperates with law enforcement officials in all matters. Any alleged violation of local, state or federal laws will be referred to the appropriate law enforcement agency and such laws have precedence over the provisions of this policy.

Reporting Violations of the Honor Code

The primary responsibility for reporting violations of the student honor code rests with the individual who has committed the violation. However, fellow students and members of the faculty and staff also share in this responsibility. Students, faculty, and staff must report violations of the Honor Code to the Graduate School. As part of the orientation process,

each student is required to electronically sign an agreement to adhere to the Honor and Conduct Codes.

Guidelines for Implementation of the Student Honor Code

Members of the Graduate School community, including faculty and students, accept the responsibility to maintain the highest standards of intellectual honesty and ethical and professional conduct. Upon admission, all students in the Graduate School electronically review or receive a copy of the Graduate School guidelines and procedures for implementing the Graduate School Honor Code. Students indicate their willingness to adhere to the Code by electronically signing the acknowledgment form. Ignorance of the guidelines and procedures may not constitute an affirmative defense to a violation of the Honor or Conduct Codes. All questions or concerns regarding the Honor and Conduct Codes should be directed to, the appropriate Graduate School office.

CU Anschutz location: Academic Office 1, room 1503 (303-724-2911)

CU Denver location: Lawrence Street Center, Suite 1251 (303-315-2183)

The Graduate School has developed the following guidelines and procedures to review alleged violations of the Student Honor Code and to make recommendations concerning violations of the Code. Alleged violations by faculty or students of the Code are first reported to the Dean or Assistant Dean. Normally, disciplinary action should not be taken against the alleged violator until the Honor Code Committee and Assistant Dean have reviewed the case and made a recommendation to the Dean; however, if the alleged violation threatens the welfare or safety of others or is against the law (see Relationship of Code to the Laws above), appropriate action should be taken immediately.

Honor Code Committee

The committee generally consists of four faculty members and one student representative.

The faculty members are selected on an ad hoc basis from outside the school of the alleged violator(s). The student representative is also selected on an ad hoc basis from a different program and school than the alleged violator(s). Faculty selected to serve in this ad hoc capacity commit to be available to serve for a two year period as needed. Students commit to one year. Faculty and students can be reappointed for additional terms. The Chairperson of the committee will be one of the faculty members and will be elected by the Committee. Decisions of the committee shall be reached based upon a simple majority vote. The primary focus of this advisory committee is to examine alleged violations of the honor code as defined above, to hear testimony, and to make recommendations to the Assistant Dean as appropriate. All matters referred to the Student Honor Code Committee shall be confidential to the extent practical and permitted by law, throughout the proceedings. Note: Issues regarding violations of student conduct will be considered under guidelines as outlined in the Code of Student Conduct. Issues related to academic grievance or suspension will be dealt with as outlined in the procedure in Appendix B of the Graduate Student Handbook.

Procedures

The Honor Code Committee will be convened as necessary by the Assistant Dean. The Honor Code Committee shall follow these guidelines to the extent possible. However, the Committee reserves the right to modify these procedures if necessary based on extraordinary circumstances to be determined on a case-by-case basis.

1. Faculty, staff, and other students have the responsibility to report alleged violations of the Student Honor Code. The failure of a student

to report an observed violation of the honor code may constitute a violation of the honor code and may subject the observer to an honor code proceeding. Any reasonable suspicion of a violation of the Student Honor Code shall be reported to the Graduate School Assistant Dean. All charges must be submitted in writing. Normally, disciplinary action will not be taken against the alleged violator until the Student Honor Code Committee has deliberated. However, if the alleged violation threatens the welfare or safety of others, or is against the law, the Graduate School Dean or designee will take appropriate action if necessary (e.g., immediate suspension).

2. If the reporting party is a student who has evidence that another student has violated the Student Honor Code, he/she may meet with the student to discuss the issue. The reporting party may seek the counsel of a neutral person such as the Campus Ombudsperson or another professor. The reporting party or a third party representing the reporting party shall give the student the opportunity to self-report. If the student refuses to self-report, the party shall report the suspicion to a professor, the Program Director, or School Associate Dean. The party must submit a written statement, including evidence, in writing to the Graduate School Assistant Dean within 5 working days of discussing the situation with the student.
3. If the reporting party is a faculty member who has evidence that a student has violated the Student Honor Code, he/she may meet with the student to discuss the issue. The faculty member may seek the counsel of a neutral person such as the Campus Ombudsperson or another professor. The reporting party or a third party representing the reporting party shall give the student the opportunity to self-report. If the student refuses to self-report, the faculty member shall report the suspicion to their graduate Program Director or School Associate Dean. That party must submit a written statement, including evidence, in writing to the Graduate School Assistant Dean within 5 working days of discussing the situation with the student.
4. The Assistant Dean will review the information submitted concerning the alleged violation. If the student(s) has been confronted with the violation and admits having violated the honor code, the case may be referred immediately to the Assistant Dean for review and action. If there is no admission of wrongdoing, the case will be referred to the Honor Code Committee for a hearing. The Assistant Dean will coordinate the hearing process.
5. When an alleged violation is referred to the Honor Code Committee, the reporting party and student(s) will be notified of the charges in writing within 10 working days of the date of referral to the Committee and the date of the scheduled hearing.
6. The Honor Code Committee will hold a hearing. The Assistant Dean will coordinate the activities of the Committee and attend the hearings as a non-voting observer. The hearing will be held, if possible, within thirty 30 days of the student(s) being notified of the alleged Honor Code violation. (a) The student(s) shall have the opportunity to submit a written pre-hearing statement in response to the charges. (b) The student(s) shall have the opportunity to review any evidence against him/her prior to the hearing upon submission of a written request to the Assistant Dean. (c) The reporting party shall also have the opportunity to review any evidence presented by the student(s) so they might clarify or update their statements prior to them being given to the Honor Code Committee. Full transparency shall be provided to all parties for evidence provided to the Committee.

The student accused of violating the Honor Code will be given an opportunity to be heard during the hearing and to present any evidence or witness he/she wishes. The reporting party may either attend the

proceedings in person or submit a statement of the incident in lieu of personally attending the hearing. The Committee shall have no power to compel any individual to testify.

Legal counsel will **not** be present for either the student or the University parties.

7. Following the hearing, the Student Honor Code Committee will discuss the proceedings outside the presence of the parties and determine a course of action to follow with respect to the student in question. Upon a majority vote of the Honor Code Committee, they will make their recommendation in writing to the Graduate School Assistant Dean, which may include but is not limited to the following actions:

- Take no action against the student based on a finding of no violation.
- Place the student on disciplinary probation for a specified period of time.
- Suspend the student's registration at the University of Colorado, including Extended Studies, for a specified period of time.

If the Committee is unable to reach a majority opinion on whether the student violated the Honor Code and what, if any, discipline should occur, the Chairperson will act as the tiebreaker.

8. A record of all documents associated with the case and a record of the action taken will be kept in a file in the Assistant Dean's office.

9. The Assistant Dean will review the decision of the Committee and notify the student(s) of her/his decision by email and certified U.S. mail within 5 working days of the hearing. The reporting party will also be notified by email of the decision.

10. The Assistant Dean will only reverse or modify the findings and recommendations of the Honor Code Committee if he/she concludes by a preponderance of the evidence that one of the following situations exists: (a) new information regarding the student's alleged violation of the Honor Code which was previously unknown to the student or the Committee is discovered; (b) there was an error in the process that prevented the student from presenting relevant information to the Committee that could have materially changed the Committee's decision; or (c) there is evidence that the Honor Code Committee acted in an arbitrary or capricious manner.

11. If the student wishes to appeal the decision in the case, the appeal along with the rationale for the appeal shall be submitted in writing to the Graduate School Dean within 7 working days after the letter notifying the student of the Assistant Dean's decision has been sent by certified U.S. mail. The Dean will review the appeal within 14 working days and notify the student of the decision by email and US mail. Should extenuating circumstances necessitate an extended review or additional time, all parties will be notified. The decision of the Dean is final.

12. If the student is suspended, terminated/dismissed, or otherwise unable to continue his or her academic studies either temporarily or permanently because of disciplinary or other action, the Dean shall notify the appropriate CU Registrar of the change in the student's academic status and order the Registrar to suspend the student's registration.

Conflict of Interest Policy

CONFLICT OF INTEREST POLICY FOR GRADUATE STUDENTS WHO HOLD OTHER POSITIONS AT CU ANSCHUTZ

Graduate students may hold employment positions within the University of Colorado Anschutz Medical Campus in addition to their positions as graduate students at CU Anschutz. When this situation occurs, there is the potential for conflicts of interest to arise. This policy governs such situations.

- A graduate student may not also be a regular faculty member (Instructor or above) in the same program in which s/he is enrolled as a student.
- If two individuals exist in a student-faculty relationship in a graduate program, they may not both hold faculty (Instructor or above) appointments in the same graduate program, even though that graduate program is different from the one in which the student is enrolled.
- Recent graduates can be granted a graduate faculty appointment in the graduate program from which they graduated. In this situation, the new faculty member must not direct courses taken by individuals who were students when the new faculty member was also a student. (In programs where independent student cohorts exist, then the new faculty member must not direct a course taken by students from his/her cohort.) The new faculty member may not serve on an examination committee of any individual who was a student in the program (regardless of cohort) when the new faculty member was still a student.
- A faculty member who employs a graduate student as a PRA:
 - Can be an "in" graduate faculty member of the student's program and can serve on the student's graduate degree examination committee(s) with the approval of the Graduate Program Director; or
 - Can serve as an additional (but not sole) "outside" graduate faculty member of the student's program and examination committee with the approval of the Graduate Program Director; but
 - Cannot serve as Chair of the student's examination committee(s).
- Despite the allowable participation on examination committees described above (#4), the Graduate School discourages such involvement and suggests that the employer not serve on the committee, but attend all committee meetings as an invited guest.

Student Email Policy

A. Purpose of the Policy

There is an expanding reliance on electronic communication among students, faculty, staff and administration at the University of Colorado Denver, Graduate School and in other schools on campus. Because of this increasing reliance and acceptance of electronic communication, email is considered an official means for communication within UCD Graduate School.

Implementation of this policy ensures that students have access to this critical form of communication. For the majority of students, this will not represent any change from what is currently done; it will, however, ensure that all students can access, and be accessed by, email as the need arises.

B. Scope

The student email policy provides guidelines regarding the following aspects of email as an official means of communication:

- University use of email;
- Assignment of student email addresses;
- Student use of and responsibilities associated with assigned email addresses; and
- Expectations of email communication between faculty and student and staff and student.

C. Policy**1. University use of email**

Email is an official means for communication within UCD Graduate School. Therefore, the University of Colorado Denver Graduate School has the right to send communications to students via email and the right to expect that those communications will be received and read in a timely fashion.

2. Assignment of student email address

Information Systems (IS) will assign all students an official University email address. It is to this official address that the University of Colorado Denver Graduate School will send email communications; this official address will be the address listed in the University's Global Address List for that student.

3. Redirecting of email

UCD email cannot be electronically redirected to another email address. Support is available for setting email clients to read multiple accounts. Please go to the Health Sciences Library for information on how to set up your computer to receive multiple email accounts. The University will not be responsible for the handling of email by outside vendors or by departmental servers.

4. Expectations regarding student use of email

Not reading email does not absolve a student from the responsibilities associated with communication sent to his or her official email address. Students are expected to check their official email address on a frequent and consistent basis in order to stay current with University communications (at a minimum, once a week). Students have the responsibility to recognize that certain communications may be time critical. "I didn't check my email," error in forwarding email, or email returned to the University with "Mailbox Full" or "User Unknown" are not acceptable excuses for missing University communication sent via email.

5. Educational uses of email

Faculty will determine how email will be used in their classes. It is highly recommended that if faculty have email requirements and expectations they specify these requirements in their course syllabus. Faculty can make the assumption that students' official email addresses are being accessed, and faculty can use email for their courses accordingly.

6. Appropriate use of student email

- a. All use of email including use for sensitive or confidential information, will be consistent with the Administrative Policy Statement on Use of Electronic Email. See <http://www.cusys.edu/policies/General/email.html>
- b. Confidentiality regarding student records is protected under the Family Educational Rights and Privacy Act of 1974 (FERPA). All use of email, including use for sensitive or confidential information, will be consistent with FERPA.
- c. Email shall not be the sole method for any legal notification, action, or correspondence.

7. Procedures

The Office of the Assistant Vice Chancellor for Information Systems will review this policy as needed. Changes will be authorized by the approval of the Dean and the Assistant Dean.

8. References

This policy complies with the guidelines as found in: Family Educational Rights and Privacy Act, UCD Registrar; UCD's Information Technology Services, Rights and Responsibilities <http://www.UCHSC.edu/is/policies/aup.htm>; University of Colorado System, Use of Electronic Mail Policy: <http://www.cusys.edu/policies/General/email.html>; University of Colorado System, Student Rights to privacy of Educational Records: <http://www.cusys.edu/policies/Academic/studentrights.html>

Format Guidelines for Theses & Dissertations

Please reference the guide found on the Graduate School website, at https://www.ucdenver.edu/docs/librariesprovider138/denver-anschutz-graduate-school/resources/format-guide.pdf?sfvrsn=df0622b9_10.

Graduate School Acceptable Use Policy

A. Introduction

The purpose of the acceptable use policy is to establish processes and guidelines to all staff members in **Graduate School**, including full time staff, part time staff, and temporary staff (includes contractors, temps and students). The user shall only be granted access to the minimum necessary data that they require to perform their duties.

B. Policy Statement

The use and access of **Graduate School** information systems is restricted to appropriately identified, validated and authorized individuals. The following subsections outline the requirements for gaining access to **Graduate School** information systems.

C. Workstation Use and Security

1. Each workforce member must use a unique user name and strong password to access their workstation and subsequent data both locally and via server.
2. Computer workstations accessing FERPA data must maintain security configurations that restrict access to data to only those workforce members that have been legitimately granted access. Recommended security configurations include, but are not limited to:
 - a. Enabling a password protected screen saver
 - b. Setting computers or applications to automatically terminate a computing session after a set period of idle time
 - c. The use of campus standard anti-virus products
 - d. Applying security patches to computer software applications and operating systems
 - e. When CU Denver|Anschutz stores, shares, and syncs work files internally or externally, it is important that the confidentiality, integrity, and availability of that data be preserved. OneDrive can be used to store, share, and sync work files internally or externally with the following guidance.
 - i. <https://www1.ucdenver.edu/offices/office-of-information-technology/software/how-do-i-use/onedrive> (<https://www1.ucdenver.edu/offices/office-of-information-technology/software/how-do-i-use/onedrive/>)
 - ii. https://www1.ucdenver.edu/docs/default-source/offices-oit-documents/how-to-documents/onedrive-staying-secure.pdf?sfvrsn=668bb7b8_4

D. Unit Responsibilities

1. Unit educates their workforce members on the unit's specific procedures and requirements as necessary. Training requirements for gaining access to Unit Information Systems are listed below.
 - a. Required skillport courses in UCDAccess once beginning employment term:
 - i. CU: Information Security and Privacy Awareness (u00063)
 - ii. CU: FERPA (u00049)
 - b. Per OIT's Active Directory compliance, users must create a password to meet OIT's standards for mail, AD, domain access, etc. This password is changed each quarter, and must be different from the previous 12 passwords. See password policy below:

Password must be at least 8 characters in length.

Password must contain letters from at least three out of the following five categories: Uppercase alphabetic characters (A-Z); Lowercase alphabetic characters (a-z); Numerals (0-9); Non-alphanumeric characters (for example: !, \$, #, or %); Unicode characters.

Password must not contain any of user ID, first name, or last name when their length is larger than 2.

Password must not be one of the 12 previous passwords.

E. User Responsibilities

1. CU Denver|Anschutz workforce members must observe the CU Denver Information Systems' Appropriate Use Policy (AUP) (http://www.ucdenver.edu/faculty_staff/employees/policies/Policies%20Library/DDC/Computing/Acceptable-Use-of-Information-Technology-Resources-Policy-v5-Mar-20-2014.pdf) which outlines expectations regarding the ethical and permissible use of CU Denver|Anschutz computing resources.
2. CU Denver|Anschutz workforce members must follow the provisions of the CU Denver|Anschutz OIT Security Computing policy in regard to guarding against, detecting, and reporting malicious software
3. CU Denver|Anschutz workforce members shall not attempt to alter audit records or avoid accounting for computing services. (See CU Denver Information Systems' Appropriate Use Policy (AUP) (http://www.ucdenver.edu/faculty_staff/employees/policies/Policies%20Library/DDC/Computing/Acceptable-Use-of-Information-Technology-Resources-Policy-v5-Mar-20-2014.pdf))
4. CU Denver|Anschutz workforce members shall not use CU Denver|Anschutz resources to develop or execute programs that could infiltrate the systems or alter the software components of the workstations.
5. CU Denver|Anschutz workforce members must follow the Portable Media Security Policy. Portable media can include, but is not limited to, laptops, mobile devices such as personal digital assistants (PDAs) or other types of wireless handheld devices, USB flash drives, memory sticks, and any other portable device used to store or transport data.
6. CU Denver|Anschutz workforce members must follow the Visitor Control guidelines outlined in the Access Control Policy when visitors are on-site.
7. All members of the CU Denver|Anschutz workforce are reminded to wear their badges while on University property.

F. Action

All suspected policy violations, workstation compromise, virus infections, and other conditions which might jeopardize CU Denver|Anschutz information systems, data, or business must be immediately reported to the OIT Security Office.

Graduate School Access Control Policy

A. Introduction

The purpose of the access management section is to establish processes to control access and use of Graduate School information resources.

Access management incorporates Role Based Access Controls (RBAC), privileged user access, access definitions, roles, and profiles. The user shall only be granted access to the minimum necessary information that they require to perform their duties.

B. Policy Statement

The use and access of Graduate School information systems is restricted to appropriately identified, validated and authorized individuals. The following subsections outline the requirements for gaining access to Graduate School information systems.

C. Access Control Procedures

Systems must develop, adopt or adhere to a formal, documented access control procedure that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance.

1. Account Management-User Access

- Access management to information systems to be granted (ex. passwords, etc)
 - Graduate School relies on OIT authentication systems (AD, etc.) to authorize users of the University of Colorado Denver|Anschutz computing resources.
 - The GS IT Admin adjusts user permissions based on requests of their supervisors for server shares.
 - Default passwords are to be changed or disabled, replaced with secure passwords
- Responsible party for monitoring and reviewing access rights
 - GS IT Admin reviews access rights upon every new hire, every termination, and at a bi-annual schedule, after each semester.
- Access and use of systems resources and subsequent monitoring (project space/ application/storage, remote access, mobile devices, etc.)
 - Systems are audited internally every semester, reviewing security groups and users on GS domain
 - Users with edit access on web pages are also reviewed
 - Remote access is limited to access via GlobalProtect VPN hosted by OIT
- Off-boarding process for users that are no longer working on the project, terminated, or have a change in job role.
 - User's supervisor notifies and submits request to GS IT Admin
 - GS IT Admin removes user from security groups, using the concept of least privilege, or removing altogether if terminated
- GAIA access has always been granted to Departmental and Program administrators upon request (desire to use GAIA for data storage and reporting). Users are only given as much access as required (typically level 4 for admins). Faculty are also given access, but with a lower level (2).

1. Workstation Use and Security

- a. Each workforce member must use a unique user name and strong password.
- b. Computer workstations must maintain security configurations that restrict access to only those workforce members that have been legitimately granted access. Recommended security configurations include, but are not limited to:

- i. Enabling a password protected screen saver;
- ii. Setting computers or applications to automatically terminate a computing session after a set period of idle time;
- iii. The use of campus standard anti-virus products;
- iv. Applying security patches to computer software applications and operating systems.

D. Physical Access

1. Facility Access Controls
 - a. Facility security consists of:
 - i. On both campuses, the Graduate School is locked down outside the hours of 8am-5pm, requiring approved card access.
 - ii. Upon entry, each office and subsequent equipment is further protected by physical lock-and-key.
2. Access Control
 - a. Access determinations must be based on the workforce member's role or function within the unit. Determinations of access should take into account at what time(s) access will occur and under what conditions.
 - b. Unit managers or supervisors will work with the Badging and Security Services Security Badging Office/Electronic Security Department to request and recommend access for each member of the unit workforce. For specific access forms, contact the Badging and Security Services Security Badging Office/Electronic Security Department at (303) 724-0399.
 - c. If a workforce member's access needs change or end, the unit manager or supervisor must work with the Electronic Security Department to modify or terminate the member's access.
 - i. Anschutz Medical Campus
 1. Associate Dean works with Electronic Security Department to enable/disable access based on new employment, termination, or move within CU.
 2. The supervisor or HR advisor submits the request to Associate Dean, who funnels all requests accordingly.
 - ii. Denver Campus
 1. Supervisor requests access card via Facilities Management and turns it in upon termination or relocation outside of GS.
 - d. The unit manager or supervisor must ensure that access is limited to what is appropriate for the workforce member's job function.
3. Validation Procedures
 - a. Once an individual's facility access has been determined and recommended by the individual's supervisor, validation of identity is performed by the Badging Office.
 - b. All members of the CU Denver workforce are reminded to wear their badges while on University property.
4. Maintenance Records
 - a. The Badging and Security Services Security Badging Office/Electronic Security Department is responsible for maintaining records on all installations, repairs, or replacements of access control devices at a building or campus-level.

E. User Responsibilities

1. Graduate School educates their workforce members on the Graduate School's specific procedures and requirements as necessary. Each Unit will educate users on the Acceptable Use Policy specific to their environment.
 - a. See Acceptable Use Policy, section E

2. Please explain your unit's training requirements for gaining access to Graduate School Information Systems.
 - a. See Acceptable Use Policy, section D

F. Graduate School Access Review

Review accounts on a periodic basis, but no less than every 6 months.

G. Graduate School Policy Review

Review and update policy and procedures on an Annual basis.

H. Document Retention

All unit procedures, documentation of decisions made, information system activity reviews, and investigations conducted pursuant to this policy must be retained for a period of no less than six (6) years from the date the policy was last in effect or from the date the decision or investigation was made.

Graduate School Policies & Procedures

Please reference the documentation on the Graduate School website at https://www.ucdenver.edu/docs/librariesprovider138/denver-anschutz-graduate-school/resources/graduate-school-policies-and-procedures.pdf?sfvrsn=d00622b9_2.

Inclement Weather Policy

Snow Policy

In the event of inclement weather the Graduate School staff, its faculty and students will follow the University closure announcements and schedule. If the university remains open, the faculty, administrators, and staff will be expected to make every reasonable effort to maintain their regular work schedules, but are advised to exercise their judgment and avoid undue risks in traveling. Employees who anticipate arriving late or not arriving at work at all should notify their immediate supervisor.

Delayed Opening

In the event of a delayed opening, the specific time of opening will be announced to the campus community through the local media and via www.ucdenver.edu/alert. All faculty and staff are expected to arrive on campus by the delayed opening time. Students are expected to report to their regularly scheduled classes. In a delayed opening, all classes scheduled prior to the set time of opening are cancelled for the day. Students will be responsible for any academic work missed due to absences caused by severe weather conditions. It is the individual student's responsibility to take the initiative to make up any missed class work. It is the faculty member's responsibility to provide a reasonable opportunity for students to complete assignments or examinations missed due to inclement weather. Faculty members have discretion in determining whether additional classes will be added for the class or if additional work is assigned due to a closure or delayed opening.

Early Closure

In the event that weather conditions become unfavorable during the day and necessitate the early closure of the campus or the school, classes will be cancelled for the remainder of the day. Should this decision be reached by the Graduate School Dean prior to a formal announcement being made for an early campus closure, an email will be sent to all graduate students, graduate program administrators, and notification posted on the Graduate School website regarding an early closure.

IT Acceptable Use Policy

I. Policy Snapshot

Brief Description: Sets forth the University's policy with regard to use of and access to University of Colorado Denver | Anschutz Medical

Campus IT Resources including university account use, privacy, computer and network security, legal and ethical use, networking and computing conduct, and software and intellectual property use. Further includes the steps the university may take should this policy be violated.

II. Scope

This policy applies to all users of University of Colorado Denver | Anschutz Medical Campus IT resources (including faculty, staff, students, and sponsored accounts) whether affiliated with the University or not, and to all uses of those resources, whether on campus or from remote locations.

III. Introduction

The Office of Information Technology at the University of Colorado Denver | Anschutz Medical Campus (CU Denver | Anschutz) is charged with the acquisition, development, and maintenance of computers, computer systems and networks. These Information Technology (IT) resources are intended for University-related purposes, including direct and indirect support of the University's instruction, research, clinical and service missions; University administrative functions; student and campus life activities; and the free exchange of ideas within the University community and among the University community and the wider local, national, and world communities.

The use of network, computing, and other technology resources at the University is a privilege. It is the shared responsibility of all users, including faculty, staff and students to use these resources in an efficient, ethical, and legal manner.

This policy may be modified as deemed appropriate by the University. Users are encouraged to periodically review this policy as posted on CU Denver | Anschutz Office of Information Technology web site.

IV. General Rules

Users of University IT resources shall comply with federal and state laws, University rules, regulations and policies, and the terms of applicable contracts including software licenses while using University IT resources. Users who engage in electronic communications with persons in other states or countries or on other systems or networks may also be subject to the laws of those jurisdictions and the rules and policies of those other systems and networks. Users with questions as to how the various laws, rules and regulations may apply to a particular use of University computing resources should contact the University Counsel for more information.

Users are responsible for ascertaining what authorizations are necessary and for obtaining them before using University IT resources. Users are responsible for any activity originating from their accounts which they can reasonably be expected to control. In cases when unauthorized use of accounts or resources is detected or suspected, the account owner should change the password and report the incident to the appropriate account administrator, Unit Information Security Manager, and/or Dean, Director, or Department Chair. Users must understand that disclosing their account credentials to cybercriminals may result in personal losses that that they are ultimately responsible for.

V. Statement of Policy

As a condition of use of University network and computing resources, every University IT resource user agrees:

Account Use

- Users shall utilize their accounts only for the purposes specified by the account grantor.

- Users shall not use any other individual's credentials or attempt access to account not granted for them.
- Users shall not attempt to alter or avoid account access controls for computing systems.
- Accounts and passwords may not, under any circumstances, be used by persons other than those to whom they have been assigned by the account administrator.
- Users shall not share/disclose their account passwords with/to others.

Privacy

- Users shall not intentionally seek information on, obtain copies of, or modify files, hard drives, passwords or credentials, or any type of data belonging to other users unless specifically authorized to do so by the data owner or by University Counsel.
- Users should always avoid violating others' privacy by:
 - tampering with security provisions,
 - attempting entry to non-public hosts, or
 - sharing login credentials with others.

Computer and Network Security

- Users shall not attempt to alter, delete or avoid computer audit controls and accounting log files.
- Users shall not attempt to bypass computer and network access controls.
- Users shall not use CU Denver | Anschutz IT resources to infiltrate other systems, or damage or alter the software components of the systems.
- Users should avoid overuse of resources as defined by CU Denver | Anschutz OIT. For example:
 - network bandwidth,
 - network file storage
 - printers
 - wireless networks (WiFi), and
 - all other CU Denver | Anschutz IT resources
- Users must conform to campus standards for anti-virus protection. Exceptions are only allowed if the CU Denver | Anschutz OIT authorizes exclusions in writing due to unique and extraordinary circumstances.
- Users shall not implement their own network infrastructure without explicit written permission by OIT. This includes, but is not limited to, network devices such as hubs, switches, routers, network firewalls, DHCP servers, DNS servers, email servers or relays and wireless access points. Users must not implement alternate methods of access to CU Denver | Anschutz IT resources such as wireless access points (WiFi) and virtual private networks (VPNs).

Legal and Ethical Use

- Users shall not;
 - abuse, harass, intimidate, threaten, stalk, or discriminate against others through the use of computing resources or
 - send obscene, abusive, harassing, or threatening messages to any other individual.
- IT resources are not to be used for personal commercial purposes, non-University business, or for personal financial or other gain. Occasional personal use of University IT resources for other purposes is permitted when it does not consume a significant amount of those resources, does not interfere with the performance of the user's job or other University

responsibilities, and is otherwise in compliance with this and other University policies, including without limitation the University's policies on outside activities and use of University trademarks and names. Further limits may be imposed upon personal use in accordance with normal supervisory procedures concerning the use of University equipment.

- Users shall not misrepresent oneself or others through electronic communication including email.
- Users shall follow all University of Colorado, CU Denver | Anschutz, and CU Denver | Anschutz OIT policies, ethical standards and all local, state, and federal laws related to computing.
- Engaging in physical or cyber vandalism or mischief that incapacitates, compromises, or destroys CU Denver | Anschutz IT resources.

Network and Computing Policies

- Users should avoid violating others' privacy, tampering with security provisions, or attempting entry to non-public hosts and/or data without written approval from the University Security Principal.
- Disruptive use of University IT resources is not permitted.
- Users should avoid excessive use of resources, controlled or otherwise. For example, University workstations/computers, servers, graphics devices, printers and networks, both voice and data, are resources that must be shared in an equitable manner.
- Users may not use any IT resource to gain unauthorized access to remote computers or to impair or damage the operations of University computers or networks, terminals or peripherals. This includes blocking communication lines, intercepting or sniffing communications, and running, installing or sharing virus programs.

Software and Intellectual Property Use

- Use of copyrighted software must be in compliance with vendor license requirements. Obtaining proper licensing for software that is not provided by the University is the responsibility of the user, as is the proper maintenance of such licenses and any associated software licensing fees.
- Users shall not violate vendor software copyright and authorized use policies. This includes using, duplicating, or distributing licensed software and documentation without the express written permission of the original copyright owner.
- Users shall not install and use:
 - File and/or music sharing programs,
 - Video and/or audio streaming programs that are playing non-campus mission related content.
 - Other programs that violate the ethical, efficient, and productive use of the campus internet resources.

VI. Responsibility & Action

Violation of this policy or other University information technology policies can result in revocation of computing privileges as well as corrective and/or disciplinary action.

Office of Information Technology (OIT)

OIT is responsible for interpretation and guidance regarding this policy. OIT also reserves the right to take additional action against violations of these policies. OIT may also refer suspected violations of law to appropriate law enforcement agencies for further investigation or action.

Other Responsible Parties

Other offices, departments, schools, etc. may be responsible for campus compliance and enforcement of this policy to take further action against violations. Other responsible parties include but are not limited to The Office of Regulatory Compliance, Human Resources, University Counsel, Student Affairs, and the Office of the Chancellor.

Users who violate this policy may be subject to other penalties and disciplinary action, including expulsion or dismissal, under applicable University or Board of Regents rules, regulations, policies, or collective bargaining agreements. Other responsible parties may also refer suspected violations of law to appropriate law enforcement agencies for further investigation or action.

The University may suspend, block or restrict access to an account when it appears necessary to do so: a) to protect the integrity, security, or functionality of University or other IT resources; b) to comply with legal or contractual requirements; c) to investigate alleged or potential violations of law or policy including, without limitation, state, federal, or local law, or University or Board of Regents rules, regulations, policies, or collective bargaining agreements; d) to investigate any asserted, threatened or potential complaint or grievance filed or credibly alleged pursuant to law or University or Board of Regents rules, regulations, policies, or collective bargaining agreements, or subject of law enforcement review or investigation; e) or to protect the University from liability or disruption.

VII. Reference Documents

CU System APS 6001: Information Technology; Providing and Using
 CU System APS 6002: Use of Electronic Email
 CU System APS 6005: IT Security Program Policy
 Ethical Use of Computing Policy; June 27, 2006

Staff Effort Percentage - Research Assistants

Research Assistants - Job Code 1505

In 2015, departments were advised to enter the FTE and percentage for research assistants working directly on a funded research project directly connected with and part of their progress towards earning a master's degree or PhD as zero/2.5% in HCM.

While doing a recent review of job codes last year, University Counsel determined that entering a more precise FTE and percentage better reflects the number of hours of service that are actually performed for the University by the research assistant/trainee over a semester. As a result, it has been determined that appointments should be entered into HCM as follows:

Job Code: 1505 (Research Assistant)

% Time: 50%

Standard Hours Wk: 20

Pay Group: STM

FTE: .5

Job Code: 3204 (Trainee on Fellowship or Training Grant)

% Time: 50%

Standard Hours Wk: 20

Pay Group: SPD

FTE: .5

All active and new research assistants should be set-up and coded in this manner. Please contact Susan Nagel in the Graduate School if you have questions.

Vacation & Leave Policy

GRADUATE SCHOOL POLICY FOR VACATION AND LEAVE FOR PH.D. STUDENTS

Graduate school is a privilege; working in the biomedical research/academic field, whether as a graduate student, a postdoctoral fellow, or an independent investigator, is a time-honored and challenging profession that requires a high level of commitment and responsibility. Students who receive full-support stipends from the University of Colorado Denver | Anschutz Medical Campus Ph.D. programs are required to pursue their training on a full-time basis, devoting each day of the normal work week, plus any additional time required by their research projects and academic courses. Additionally, for a student to maintain full-time student status, the following guidelines for vacation and leave time have been established by the Graduate School. These represent the leave to which a graduate student is entitled; however, research demands and commitment to graduate studies often result in students using less than the allotted leave. Individual graduate programs might not have a formalized system for accounting for vacation and sick leave; if so, vacation and leave monitoring falls under the honor system and is the responsibility of the student.

Vacation and Holidays

Graduate students shall receive all University holidays and no more than 14 calendar days (counting all days Monday through Sunday) of vacation per annum, with no year-to-year accrual. Students shall continue to receive stipends during vacations and holidays. In the Graduate School at the University of Colorado Denver | Anschutz Medical Campus, the times between academic terms and the summers are considered active parts of the training period and are not necessarily free times. However, students taking courses are expected to attend all classes and take all exams as scheduled. They should not take vacations when classes or exams are scheduled. For advanced students, vacation time should be arranged with the dissertation advisor.

Sick Leave and Other Leave

Graduate students may continue to receive stipends for up to 15 calendar days (counting all days Monday through Sunday) of sick leave per annum, with no year-to-year accrual. Under exceptional circumstances, additional sick days may be granted following a written request and approval by the student's program director. Sick leave may be used for the *medical* conditions related to pregnancy and childbirth.

- *Parental Leave*

Graduate students may also receive stipends for up to 60 calendar days (counting all days Monday through Sunday) of parental leave per annum for the adoption or the birth of a child. Either parent is eligible for parental leave. Parental leave must be approved by the student's program director. Sick leave may not be used to supplement parental leave, except as noted above.

- *Unpaid Leave*

Individuals requiring more than 15 calendar days of sick leave or more than 60 calendar days of parental leave, must seek approval from their program for an unpaid leave of absence. Approval for a leave of absence must be requested in advance by the student and approved by the program. The leave period and conditions must be documented, both at the time of leave and at the time of re-entry into the program. A copy of this agreement must be submitted to the Graduate School.

- *Termination*

Upon graduation or termination a graduate student forfeits all unused annual and sick leave; payment may not be made from grant funds (training grants or research grants) for leave not taken.