New Ph.D. Minor in Cancer Biology

A minimum of 12 credit hours outside of the student’s major department, including two courses from the following list of five: Q622 Cytogenetics of Malignancies (2-3 cr.), F819 Chemical Carcinogenesis (3 cr.), J842 Neoplastic Determinants (2 cr.), G724 Molecular Cancer Genetics (1 cr.), G852 Concepts of Cancer: Signaling Gone Awry (2 cr.), G505 Responsible Conduct of Research must also be taken.

The remainder of the minor will be selected from the following courses: Graduate G715 Biomedical Science I–Biochemical Basis of Biological Processes; G716 Biomedical Science II–Molecular Biology and Genetics; G717 Biomedical Science III–Cellular Basis of Systems Biology; G720 Stem Cell Biology; G726 Developmental Genetics; G729 Immunology I–Introduction to the Immune System; GRAD-G737/ANAT-D851 Introduction to Histology/Histology; G748 Principles of Toxicology 1; G848 Bioinformatics, Genomics, Proteomics, and Systems Biology; G817 Molecular Basis of Cell Structure and Function; G749 Introduction to Structural Biology; G807 Structural and Chemical Biology; G837 Mammalian DNA Repair and Disease; G727 Animal Models of Human Disease; Medical and Molecular Genetics Q620 Human Cytogenetics; Q622 Cytogenetics of Malignancies; Microbiology and Immunology J807 Current Topics in Immunology; J829 Current Topics in Molecular Genetics of Microorganisms; J842 Neoplastic Determinants; Pharmacology and Toxicology F819 Chemical Carcinogenesis; F820 Cancer Chemoprevention.

The minor program must be approved by the student’s Advisory Committee, which will take into consideration the student’s total didactic experience. In the case of combined M.D./Ph.D. students, the Committee may approve substitution of appropriate medical school courses. The minor representative on this Committee will be selected from outside the student’s major department and must be a member of the Cancer Biology Training Program.
CURRICULUM FOR BIOCHEMISTRY AND MOLECULAR BIOLOGY Ph.D. PROGRAM

Year 1

Fall

- G715 Biomedical Science I—Biochemical Basis of Biological Processes (3 cr.)
- G716 Biomedical Science II—Molecular Biology and Genetics (3 cr.)
- G717 Biomedical Science III—Cellular Basis of Systems Biology (3 cr.)
- G718 Research in Biomedical Science (1st lab rotation) (2 cr.)

Spring

- G655 Research Communication Seminar (1 cr.)
- G718 Research in Biomedical Science Rotations 2 and 3 (4 cr.)

Students will take 6 credits from the IBMG open enrollment electives in Spring.

Students must take at least two of the six 2-credit Biochemistry “core” courses (G805, 807, 817, 848, 852, 825) shown below (offered among the Spring IBMG electives or offered in Fall 2). These may also be taken in later years.

- G817 Molecular Basis of Cell Structure and Function (2 cr.)
- G852 Concepts of Cancer Biology: Signaling Gone Awry (2 cr.)
- G807 Structural and Chemical Biology (2 cr.)
- G848 Bioinformatics, Genomics, Proteomics and Systems Biology (2 cr.)

Year 2

Fall

- G805 Diabetes and Obesity (2 cr.)
- G825 Advanced Topics in Molecular Biology (2 cr.)
- G505 Responsible Conduct of Research (1 cr.)
- G855 Experimental Design and Research Biostatistics (1 cr.)

Spring

- B803 Advanced Biochemistry (1 cr.)

This course in grant writing will culminate in the submission and oral defense of an “NIH or NSF style” grant proposal on the students intended research topic. The assigned grade for this course is dependent on the successful defense of the proposal that will serve as a qualifying exam and be required for Advancement to Candidacy.
Students meet once every six months with an advisory committee to review progress in course work. Continuation in the program depends upon satisfactory performance and progress in each phase of the program. The final examination in the series is an oral defense of a written research proposal, which constitutes the written examination.

**Dissertation**

A minimum of 45 credit hours in research, completed with a grade point average of 3.0 (B) or above. It is expected that the dissertation will qualify for publication in a recognized journal.

**Final Examination**

Oral, covering dissertation, major, and minor.