BNB 551: Writing Neuroscience
Seminar course for doctoral students in Neuroscience providing practical instruction in written communication in Neuroscience. Topics include writing effective abstracts, cover letters, figure captions, and grant specific aims, among others.
1 credit, Letter graded (A, A-, B+, etc.)
May be repeated for credit.

BNB 552: Neurobiological Techniques
A series of laboratory exercises designed to give students hands-on experience in the basic laboratory techniques of contemporary neuroscience. Includes intracellular and extracellular recording, neuronal tissue culture, neuroanatomical techniques, and integrative physiology.
Fall, 2 credits, Letter graded (A, A-, B+, etc.)

BNB 555: Laboratory Rotations in Neuroscience
Course for doctoral students in Neuroscience in which students participate in three formal laboratory rotations in program faculty laboratories during the first year. Students will work together to develop a reading list (minimum 6-10 papers) from the primary literature that adequately covers the topic. Students will present two or more of these papers in journal club format to the preceptor and to a larger group, e.g., a lab group, as applicable. Students will also synthesize their readings into a written report that follows one of the following Nature Reviews Neuroscience formats (below, but strict adherence to word limits, reference numbers, etc., is NOT expected). NOTE: Students and their research faculty mentors are strongly encouraged to consider using this as a vehicle for delving deeply into a topic or technique of interest that is relevant to the thesis/thesis proposal. Offered:
Fall, 1 credit, Letter graded (A, A-, B+, etc.)
May be repeated for credit.

BNB 556: Introduction to Mammalian Neuroanatomy
This course consists of visual presentations and supplemental lectures providing an overview of the structural organization of the nervous system. The mammalian nervous system and its sensory, motor and cognitive components are emphasized. Opportunities for examination of whole brains and historical sections, and some hands-on experience with basic neuroanatomical techniques may also be available.
1 credit, Letter graded (A, A-, B+, etc.)

BNB 561: Introduction to Neuroscience I
First of a two semester core course introducing students to basic principles of neuroscience. The major focus is cellular and molecular neuroscience. Topics covered include the ionic basis of resting potentials and electrical excitability, the structure, function and molecular biology of voltage- and ligand-gated ion channels, exocytosis, cellular networks, and gene regulation.
4 credits, Letter graded (A, A-, B+, etc.)

BNB 562: Introduction to Neuroscience II
Second of two-semester core course introducing students to basic principles of neuroscience. The major focus is systems neuroscience. Topics covered include analyses of all major sensory systems, motor systems, and systems mediating higher order, cognitive functions in the nervous system.
4 credits, Letter graded (A, A-, B+, etc.)

BNB 563: Advanced Topics in Neuroscience: Individual Learning Plans
In this 12 hour module course, students will work with an identified faculty preceptor on an agreed upon topic of interest. Agreement of preceptor and an outline of the topic must be submitted to and approved by the Course Director in order for students to register for this class. Students and preceptors will work together to develop a reading list (minimum 6-10 papers) from the primary literature that adequately covers the topic. Students will present two or more of these papers in journal club format to the preceptor and to a larger group, e.g., a lab group, as applicable. Students will also synthesize their readings into a written report that follows one of the following Nature Reviews Neuroscience formats (below, but strict adherence to word limits, reference numbers, etc., is NOT expected). NOTE: Students and their research faculty mentors are strongly encouraged to consider using this as a vehicle for delving deeply into a topic or technique of interest that is relevant to the thesis/thesis proposal. Offered:
Fall, 1 credit, Letter graded (A, A-, B+, etc.)
May be repeated for credit.

BNB 564: Advanced Topics in Neuroscience: Curriculum Development
In this 12 hour module course, students will work with an identified faculty preceptor on an agreed upon topic of interest that addresses a gap in the current Graduate Program in Neuroscience curriculum. Agreement of preceptor and an outline of the topic selected must be submitted to and approved by the Course Director in order for students to register for this class. Students and preceptors will work together to develop a course based on the selected topic. Students will first investigate principles of curricular design. They will follow these in generating a course description, a list of overall learning objectives, and a detailed syllabus that identifies the titles, learning objectives and required background readings for each of the course’s sessions. Required readings much include both texts and the primary literature. Students will also generate the in-class materials for at least two class sessions. One must be a Powerpoint for a standard lecture, and one must be any materials needed for some form of active learning (individual or group) of the material. Finally, students must identify the means that students will be evaluated, and identify how these methods will demonstrate achievement of the stated learning objectives, keeping in mind that the form of evaluation will differ depending on whether objectives are related to knowledge, skills, etc. NOTE: Students and their research faculty mentors are strongly encouraged to consider using this as a vehicle for delving deeply into a topic or technique of interest that is relevant to the thesis/thesis proposal. Offered:
Spring, 1 credit, Letter graded (A, A-, B+, etc.)
May be repeated 1 times FOR credit.

BNB 565: Advanced Neuroscience
A modular course introducing concepts in the development of the nervous system. Topics can include neuroembryology, neuronal differentiation, synapse formation, and specificity and plasticity of connections in vertebrates and invertebrates.
Offered
Fall, 1 credit, Letter graded (A, A-, B+, etc.)
May be repeated for credit.

BNB 566: Neurobiology of Disease
This advanced seminar course is coordinated with the Neurobiology of Disease lecture series hosted by the Program in Neuroscience each Spring semester. The Program invites 5-6 distinguished scientists to present research seminars organized around the broad topic of neurobiological and neurological diseases. Students read and discuss papers recommended by the guest speakers. This course also provides students the opportunity to meet with the guest seminar speakers.
Offered
Spring, 1 credit, Letter graded (A, A-, B+, etc.)
May be repeated 1 times FOR credit.

BNB 567: Statistics and Data Analysis in Neuroscience I: Foundations
This course will introduce students to the fundamental principles and methods of the statistical analysis of neural and behavioral data. A major focus of the course will be on how to properly design experiments to test hypotheses, how to avoid common
misconceptions and errors in data analysis and how to report statistics correctly in manuscripts submitted for publication. This course will aim at providing a rigorous foundation of general statistical principles that can be applied generally, with an emphasis on material of high relevance to biology and neuroscience. A companion course (#statistics and data analysis for neuroscience II: Applications) will turn to selected applications to neuroscience. The students will also have the opportunity to hone their statistics skills by analyzing different types of datasets (genetic, molecular, cellular, synaptic, imaging, spike and behavioral) in the MATLAB (or similar) computing environment.

2 credits, Letter graded (A, A-, B+, etc.)

**BNB 568: Statistics and Data Analysis in Neuroscience II: Applications**

**BNB 597: Seminar Themes**

This course focuses on current research topics in neuroscience and is integrated with the Neuroscience Seminar Series. It is centered on a common research theme. Students discuss manuscripts, attend seminars and meet with outside speakers.

*Offered Fall/
Spring, 1 credit, Letter graded (A, A-, B+, etc.)
May be repeated 2 times FOR credit.*

**BNB 599: Research**

Original investigation undertaken with supervision of a member of the staff.

*Fall and Spring, 1-12 credits, S/U grading
May be repeated for credit.*

**BNB 655: Neuropharmacology**

An advanced course for graduate students interested in developing an understanding of neuropharmacology and research on this topic. Following a general introduction to the nerve cell structure, synaptic and chemical transmission, three themes receptors, receptors as channels, and G-protein-coupled receptors are developed. Recent advances in cell and molecular biology provide the framework for instruction and discussion. This course is offered as both HBH 655 and BNB 655. Prerequisite: Admission to Graduate Health Sciences Center Program.

*Spring, 3 credits, Letter graded (A, A-, B+, etc.)*

**BNB 697: Neuroscience Seminar Series**

Seminar presentations delivered by faculty, associates, students and visiting speakers.

*Fall and Spring, 0-2 credits, S/U grading
May be repeated for credit.*