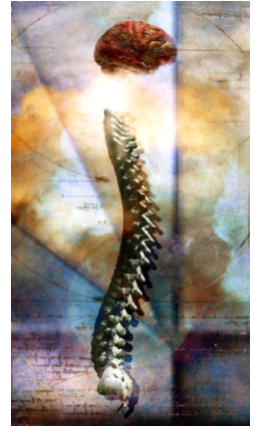




Graduate Program in Neuroscience

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Graduate Program in Neuroscience - Curricular Program Details; Proposed, Revised August, 2008

The Ph.D. in Neuroscience follows the curricular guidelines established by the Graduate College of the University of Illinois at Chicago. A total of 96 credit hours is required for graduation. Of these 96 hours, 32 will be obtained from formal graded courses (not including research and NEUS 595 Seminar in Neuroscience; i.e. Journal Club). These constitute the “GPA” credit hours. A minimum of 8 GPA hours at the 500 level (not including core courses GCLS 503, NEUS 501 and 502) must be obtained by all students, whether or not they enter the program with a Masters of Science degree. These 8 credit hours are included within the 32 hours of course work required for the degree. All graduate trainees will take a first year of core courses in biology and neuroscience, as well as rotations through laboratories in participating departments that will begin in the first semester. Before starting their second year, students will choose their thesis advisor. At the end of their second year, students will take a Preliminary Examination before continuing their dissertation research.

First Year Core:

Students are expected to register for a minimum of 12 hours credit each semester (not to exceed 16 credit hours). During the first semester all students will be required to take:

Course Number	Course Name	Credits
GCLS 503	Cell Biology	3
NEUS 501	Foundations of Neuroscience I	3
NEUS 506	Research Rotations	3-6
	Elective chosen from courses listed under Second year core	2-3
NEUS 595	Seminar in Neuroscience	1

Students who enter the program without a foundation in Biochemistry (3-4 credit hours at the 300 level) or General/Organic Chemistry may be asked to take GCLS 501 Biochemistry their first semester in lieu of an elective.

During the second semester, students will be required to take:

Course Number	Course Name	Credits
NEUS 403	<i>either</i> Human Neuroanatomy	3
BioS/NEUS/PSCH 483	<i>or</i> Mammalian Neuroanatomy	4
NEUS 502	Foundations of Neuroscience II	3
NEUS 506	Research rotations	3-6
	Elective chosen from courses listed under Second year core	2-3
NEUS 595	Seminar in Neuroscience	1

During the summer semester of their first year, students will complete their research rotations (students on fellowships will register for 6 hours of NEUS 506 during the summer) and select a thesis research advisor before the start of the Fall semester.

Second Year Core: In their second year, students, in consultation with their thesis advisor, will take elective courses that may focus on one of the three defined concentrations:

1. Neural signal transduction and molecular biology
2. Systems & integrative neuroscience
3. Human/ therapeutic neuroscience and methods of neural imaging

The following list of courses, while representative of the three concentrations, are not exhaustive and would be expected to change over time. It is not guaranteed that these courses will be offered every year. It would be expected that students take at least three courses in their area of research specialization, but every effort will be made to provide a flexible curricular experience for the students. When registering for graduation, you will have the option of applying for a concentration in one of these three areas.

Concentration 1
Neural signal transduction and molecular biology

Course Number	Course Name	Credits
GCLS 501	Biochemistry	3
GCLS 502	Molecular Biology	3
GCLS 515	Receptor Pharmacology and Cell Signaling	3
BIOE 440	Biological Signal Analysis	4
BIOE 472	Models of the Nervous System	4
BIOS 489	Cellular Neurobiology Laboratory	3
BIOS 586	Cell & Molecular Neurobiology	3
NEUS 561	Current Topics in Visual Neuroscience	2
PCOL 540	Ion Channels: Structure, Function, Pharm and Path	2
PHYB 569	Methods in Experimental Physiology	3
PHYB 592	Tactics and strategy of research in Physiology	2

Concentration 2
Systems & integrative neuroscience

Course Number	Course Name	Credits
ANAT 520	Concepts of Synaptic Function and Morphology	2
ANAT 521	Plasticity in the Nervous System	2
ANAT/BIOS 527	Cellular and Systems Neurobiology	3
ANAT 554	Neuroendocrinology	2
BIOE 440	Biological Signal Analysis	4
BIOE 465	Metabolic Engineering	4
BIOE 475	Neural Engineering I: Introduction to Hybrid Neural Systems	4
BIOE 476	Neural Engineering I Laboratory	2
BIOE 575	Neural Engineering II - Neural Coding	4
BIOS 486	Animal Behavior & Neuroethology	4
GCLS 500	Physiology	3
NEUS 561	Current Topics in Visual Neuroscience	2
PSCH 465	Neural Basis of Perception	3
PSCH 462	Neural Basis of Learning and Memory	3
PSCH 466	Neural Basis of Motivation	3

Concentration 3
Human/ therapeutic neuroscience and methods of neural imaging

Course Number	Course Name	Credits
ANAT/NEUS 525	Molecular and Cellular Mechanisms of Neurodegenerative Disease	2
BIOE 421	Biomedical Imaging	4
BIOE 576	Sensory Prosthesis Engineering	4
BIOE 579	Neural and Neuromuscular Prostheses	4
MVSC 472	Movement Neuroscience	3
NEUS 511	Biomedical Neuroscience I	2
NEUS 512	Biomedical Neuroscience II	2
NEUS 561	Current Topics in Visual Neuroscience	2
NEUS 588	Human Neuroscience: Functional Magnetic Resonance Imaging	3
PCOL 540	Ion Channels: Structure, Function, Pharmacology, and Pathology	2
PSCH 564	Clinical Psychopharmacology	3

In their second year, it is recommended that students take two modules of Research Methods (GCLS 504 and GCLS 505) or other methods-based courses (see list below) for at least 2 credit hours which will count toward their total elective credit.

GCLS 504 Research Methods I, First Semester -

- Module I - Separation Methods (Chromatography, Electrophoresis, Mass Spectrometry)
- Module II - Molecular Biology Techniques and Discovery Bioinformatics
- Module III - Spectroscopic and Structural Biology Methods

GCLS 505 Research Methods II, Second Semester -

- Module IV - Cell Physiology and Imaging Methods
- Module V - Advanced Molecular Genetics Methods
- Module VI - Biochemical and Chemical Methods
- Module VII - Immunological Methods

Other courses that can fulfill these recommendations include:

BioS 489	Cellular Neurobiology Laboratory
BioS/NEUS 582	Methods in Modern Neuroscience
NEUS 588	Human Neuroscience: Functional Magnetic Resonance Imaging

as well as 400 level courses in Bioengineering for those students following that track.

Students will be required to take a statistics course that is appropriate for their research concentration and dissertation work. Courses appropriate to specific programs of study such as Bioengineering or Psychology can be recommended in consultation with each student's thesis advisor or the Director of Graduate Studies.

Each semester, students will be required to register for and participate in **NEUS 595**, Seminar in Neuroscience (i.e. the Neuroscience Program Journal Club). This seminar will allow Neuroscience students to come together as a group on a weekly basis to listen to and interact with invited speakers as well as to present and lead discussions on timely research topics. A grade of satisfactory/unsatisfactory will be given.

Students will also be expected to register and participate in 0 credit hour course in research ethics (**GC 401**) and the use of animals in research (**GC 470**) as required by the Graduate College and the National Institutes of Health.

Starting in their second year, students will register for NEUS 599, thesis research, to complete the 96 required credit hours.

Evaluation of Student Progress

First Year Progress: During their first year, students will experience a rigorous program comprised of both formal course work and laboratory experiences. Successful completion of both educational experiences is required for advancement.

Competency in formal courses will be evaluated by written tests and oral presentations on assigned topics. Thus, successful completion of the first year and progression to the second year of study will first be contingent upon the student **(1) keeping in good academic standing**. Graduate students in the Neuroscience Program are considered to be in good standing during their first year if they have a minimum graduate grade point average of 3.0 (A = 4.0).

Second, students must obtain satisfactory evaluations by faculty advisors during their research rotations. Students will be guided by the Director of Graduate Studies to experiences that represent the different areas of concentration in Neuroscience program. Competency in research will be evaluated by the research advisor in consultation with the Director of Graduate Study. At the end of the Fall and Spring semesters, first year students will be required to present Research Rotation talks. First year students will be asked to give a short presentation on their research experiences and respond to question from the faculty and their peers. This will serve as an additional opportunity for evaluation of the students' ability to conceptualize information and express their understanding of that information. First year students will have additional opportunities to practice making presentations and integrating material across the several concentrations by participating in Journal Club with their fellow students. This experience will bring together all of the Neuroscience students to discuss not only their own research but critical topics in the Neuroscience literature that spans the multiple concentrations. All students will be expected to lead discussion on various topics and receive feedback from participating faculty and peers.

Thus, successful completion of the first year and progression to the second year of study will also be contingent upon the student **(2) demonstrating progress in developing research skills as determined by faculty evaluation** and ultimately **(3) securing a thesis advisor who will agree to support the student through research or other funding sources available to the advisor** (which could include training grants, foundation or National Research Service Awards, Departmental Teaching or Research Assistantships, etc.). **In the event that a student's GPA falls below 3.00 and/or the student has not secured a thesis advisor who is able to arrange for his/her continued support by the end of the Summer semester of the first year, that student will not be allowed to continue in the Program.**

Second Year Progress: During the second year, students will continue their elective course work in their chosen concentration and begin research in the laboratory of their chosen thesis advisor. In general, the same assessment standards used in the first year will be applied during the second year, which includes the maintenance of a 3.0 GPA and

