Neuroscience, PhD

For information about predoctoral training opportunities in neuroscience, contact the Neuroscience Program.

Learning Outcomes

Graduates will:

- achieve a broad and deep knowledge base in neuroscience spanning the subdisciplines from cell/molecular to systems/cognitive neuroscience;
- achieve a high proficiency in research theory, design, and practice, including the ability to apply appropriate quantitative methods and statistical approaches, design and carry out the research with rigor and reproducibility, and incorporate responsible conduct in all phases of the research;
- develop strong oral and written communication skills so that they can be conversant with neuroscientists in any area of the field and can bring a broad interdisciplinary perspective to their own research;
- develop teaching effectiveness in formal and informal settings and establish credentials in teaching excellence; and
- provide impactful service to the program, institution, and scientific community, and understand the value of providing engaging outreach to society to prepare them for effective entry into the workforce and society.

Requirements

The Doctor of Philosophy program in neuroscience requires a minimum of 72 s.h. of graduate credit. Students must maintain a cumulative grade-point average of 3.00. The program's curriculum is designed around three tracks: molecular/cellular, developmental/systems, and cognitive/behavioral. Following broad-based instruction in a core curriculum, students specialize in one of the tracks.

Within a framework of core, track-specific, and elective courses, students pursue a program of study individually designed according to their undergraduate training and graduate research goals. After enrolling in the neuroscience program, entering students consult with the advisory committee regarding their level of preparation for the program's required courses.

The Student Advisory Committee meets with all first- and second-year graduate students once each semester, helping students explore their research interests and select faculty mentors for the required laboratory rotations. Each student is expected to complete three rotations in faculty laboratories before selecting a thesis advisor. Rotations ordinarily last 12 weeks but may last from 8 to 16 weeks. Under special circumstances, two rotations may be in the same laboratory, an arrangement that permits a student to learn a variety of techniques and approaches before settling down to work on the dissertation project. Students usually choose a dissertation lab at the end of their first year.

Background Requirements

Successful students will have demonstrated preparedness for graduate training in neuroscience by completing a bachelor's degree and substantive prior research experience in one or more of the following areas: biochemistry, general physiology, cell biology, and statistics. Didactic coursework in quantitative methods, statistics, and/or computer programming is also beneficial.

Neuroscience Core

The following courses form the core of the neuroscience graduate curriculum.

Course #	Title	Hours
NSCI:5653	Fundamental Neurobiology I	3
NSCI:7235	Neurobiology of Disease	3
ACB:6252	Functional Neuroanatomy	arr.
BMED:7270	Scholarly Integrity/Responsible Conduct of Research I	0
BMED:7271	Scholarly Integrity/Responsible Conduct of Research II	0
PSY:6370	Principles of Neuropsychology	3
One statistics course		3-4

In addition, students register for the following two courses each semester:

Course #	Title	Hours
NSCI:6265	Neuroscience Seminar	0-1
NSCI:7305	Neuroscience Research	arr.

Electives

Elective requirements may be met by completing 8 s.h. from a list of courses offered by the departments of Anatomy and Cell Biology, Biology, Molecular Physiology and Biophysics, Neuroscience and Pharmacology, Psychological and Brain Sciences, and other departments as appropriate. With permission of the Student Advisory Committee, students may satisfy the elective requirement wholly or in part by registration in the following courses.

Course #	Title	Hours
NSCI:5212	Foundations in Behavioral and Cognitive Neuroscience	4
NSCI:5365	Seminar: Neuropsychology and Neuroscience	arr.
BIOL:3343	Animal Physiology	3
BIOL:4213	Bioinformatics	2,4
BMED:5207	Principles of Molecular and Cellular Biology	3
CSD:5234	Acquired Cognitive-Communication Disorders	arr.
CSD:6230	Psychoacoustics	2-3
GENE:6200	Current Topics in Genetics	1
HHP:6300	Motor Control Seminar	1
MATH:5750	Mathematical Biology I	3
MICR:5218	Microscopy for Biomedical Research	arr.
MMED:6220	Mechanisms of Cellular Organization	3
MMED:6226	Cell Cycle Control	1
MMED:6227	Cell Fate Decisions	1
PCOL:5135	Principles of Pharmacology	1
PCOL:5137	Neurotransmitters	1
PCOL:6207	Ion Channel Pharmacology	1
PCOL:6225	Growth Factor Receptor Signaling	1
PSY:3320	Psychopathology	3

Course	Title	Hours
PSY:5070	Programming for Psychologists	3
PSY:5080	Foundations in Cognitive Neuroscience	4
PSY:5610	Proseminar in Cognition and Perception	3
PSY:6440	Developmental Cognitive Neuroscience	3
PSY:7150	Current Topics in Psychology	3
PSY:7210	Seminar: Advanced Topics in Behavioral and Cognitive Neuroscience	3
RHET:7500	Science Communication in the Digital Age	2-3
STAT:6300	Probability and Stochastic Processes I	3

Combined Programs

PhD/MD

Students may work toward the Doctor of Medicine degree and a PhD in neuroscience in a combined degree program offered by the Graduate College and the Carver College of Medicine. Applicants apply to the Medical Scientist Training Program (Carver College of Medicine) in the catalog.

Admission

Applicants must meet the admission requirements of the Graduate College; see the Manual of Rules and Regulations on the Graduate College website.

Academic Plans

Sample Plan of Study

Sample plans represent one way to complete a program of study. Actual course selection and sequence will vary and should be discussed with an academic advisor. For additional sample plans, see MyUI.

Neuroscience, PhD

Course	Title	Hours
Academic Career		
Any Semester		
72 s.h. must be graduate level coursework; graduate transfer credits allowed upon approval. More information is included in the General Catalog and on department website. [a, b]		
Graduate College program GPA of at least 3.00 is required. [c]		
	Hours	**0**
First Year		
Any Semester		
Choose a Dissertation Lab [d]		
	Hours	**0**
Fall		
NSCI:5653	Fundamental Neurobiology I	3
NSCI:6265	Neuroscience Seminar	1
NSCI:7235	Neurobiology of Disease	3
NSCI:7305	Neuroscience Research	5
PSY:6370	Principles of Neuropsychology	3
	Hours	**15**
Spring		
ACB:6252	Functional Neuroanatomy	4
NSCI:6265	Neuroscience Seminar	1
NSCI:7305	Neuroscience Research	7
Elective course [e]		3
	Hours	**15**
Second Year		
Fall		
BMED:7270	Scholarly Integrity/Responsible Conduct of Research I	0
NSCI:6265	Neuroscience Seminar	1
NSCI:7305	Neuroscience Research	8
Statistics course [f]		3 - 4
Elective course [e]		3
	Hours	**15-16**
Spring		
BMED:7271	Scholarly Integrity/Responsible Conduct of Research II	0
NSCI:6265	Neuroscience Seminar	1
NSCI:7305	Neuroscience Research	12
Elective course [e]		2
	Hours	**15**
Summer		
Exam: Doctoral Comprehensive Exam		
	Hours	**0**
Third Year		
Fall		
NSCI:6265	Neuroscience Seminar	1
NSCI:7305	Neuroscience Research	3
	Hours	**4**
Spring		
NSCI:6265	Neuroscience Seminar	1
NSCI:7305	Neuroscience Research	3
	Hours	**4**
Fourth Year		
Fall		
NSCI:6265	Neuroscience Seminar	1
NSCI:7305	Neuroscience Research	1
	Hours	**2**
Spring		
NSCI:6265	Neuroscience Seminar	1
NSCI:7305	Neuroscience Research	1
Exam: Doctoral Final Exam [g]		
	Hours	**2**
	Total Hours	**72-73**

a This Interdisciplinary graduate program is designed within a framework of core, track-specific, and elective courses. Students pursue a program of study individually designed according to their undergraduate training and graduate research goals. The curriculum is designed around three tracks: molecular/cellular, developmental/systems, and cognitive/behavioral; following broad-based instruction in a core curriculum, students specialize in one of the tracks.

b Students must complete specific requirements in the University of Iowa Graduate College after program

admission. Refer to the Graduate College website and the Manual of Rules and Regulations for more information.

c Graduate College program GPA is comprised of all courses that are approved degree requirements. If a student takes more than the minimum required number of semester hours to complete the degree, but all courses taken are eligible to count toward the degree, those courses will be included in the Graduate College program GPA.

d Each student is expected to complete three rotations in faculty laboratories before selecting a dissertation advisor. Rotations ordinarily last 12 weeks but may last from 8 to 16 weeks. Under special circumstances, two rotations may be in the same laboratory, an arrangement that permits a student to learn a variety of techniques and approaches before settling down to work on the dissertation project.

e Elective requirements may be met by completing 8 s.h. from a list of courses offered by the departments of Anatomy and Cell Biology, Biology, Molecular Physiology and Biophysics, Neuroscience and Pharmacology, Psychological and Brain Sciences, and other departments with approval.

f Work with faculty advisor to select an appropriate course.

g Dissertation defense.