

NEUROSCIENCE

Neuroscience Interdepartmental Graduate Program

Work is offered for the master of science and doctor of philosophy degrees with a major in neuroscience. Cooperating departments include Animal Science; Biochemistry, Biophysics and Molecular Biology; Biomedical Sciences; Chemical and Biological Engineering; Chemistry; Ecology, Evolution and Organismal Biology; Food Science and Human Nutrition; Genetics, Development and Cell Biology; Kinesiology; Psychology; Veterinary Clinical Sciences; and Veterinary Diagnostic and Production Animal Medicine.

The diversity of faculty in the Interdepartmental Neuroscience major provides students with a variety of research opportunities and reflects the structure of contemporary neuroscience which has become a diverse and interdisciplinary field. Facilities and faculty are committed to research in the following areas: neuronal membrane functions, signal transduction, neuroanatomy, neurodegenerative diseases, neuroendocrinology, neurotoxicology, neuropathology, developmental neurobiology, neurogenetics, computational neuroscience, neural networks, behavioral neuroscience, tissue engineering, neuroregeneration and brain repair. Additional information about program faculty members is available at: www.neuroscience.iastate.edu (<http://www.neuroscience.iastate.edu/>).

An undergraduate or advanced degree in one of the basic or applied sciences is ordinarily a prerequisite for admission to the program. Typical program disciplines include majors in biochemistry, biology, biomedical sciences, human medicine, immunology, neurobiology, physiology, pharmacology, psychology, veterinary medicine, or zoology. Appropriate undergraduate coursework includes mathematics, chemistry, physics, and biological sciences. Prior research experience is highly encouraged. The submission of GRE General Test scores is required for admission.

Prospective students are admitted by the Neuroscience program following an internal application process and after review by the Neuroscience Admissions Committee. Students are admitted either to participate in research rotations with several faculty before deciding on a major professor and laboratory, or by direct admission into a specific lab and department. Ph.D. students typically enter via rotation and M.S. students typically enter via a direct admit. Those students entering through a rotation admit are required to complete a minimum of three research lab rotations with faculty of interest. At the end of their second semester, students on rotation must select a major professor from the faculty participating in the program.

CURRICULUM REQUIREMENTS FOR NEUROSCIENCE GRADUATE STUDENTS

M.S. Curriculum

Students seeking an M.S. degree must take a total of 30 credits, with not less than 22 credits earned at ISU. The following courses are the core curriculum. In addition, students are required to take a minimum of 6 credits of elective courses and an ethics course.

BMS 5370	Neuroanatomy	3
KIN 5720	Neural Basis of Human Movement	2-3
	or NEURO 5890 Systems Neuroscience: Brain, Behavior, and Nutrition-Related Integrative Physiology	
GDCB 5560	Cellular, Molecular and Developmental Neuroscience	3
NEURO 6960	Neuroscience Seminar	1
NEURO 6990	Research	
PSYCH 5190	Cognitive Neuropsychology	3
STAT 5870	Statistical Methods for Research Workers	4

Ph.D. Curriculum

Ph.D. candidates majoring in Neuroscience must take at least 72 graduate credits. These 72 credits includes the below core course requirements and applicable research credits earned. Credits taken during a student's M.S. program in Neuroscience at Iowa State University will count towards their Ph.D. in Neuroscience.

BMS 5370	Neuroanatomy	3
KIN 5720	Neural Basis of Human Movement	2-3
	or NEURO 5890 Systems Neuroscience: Brain, Behavior, and Nutrition-Related Integrative Physiology	
GDCB 5560	Cellular, Molecular and Developmental Neuroscience	3
NEURO 5570	Rotations in Neuroscience	2
NEURO 6610	Advanced Topics in Neuroscience (Repeatable)	3
NEURO 6960	Neuroscience Seminar (Taken every fall & spring)	1
NEURO 6990	Research	arr †
PSYCH 5190	Cognitive Neuropsychology	3
STAT 5870	Statistical Methods for Research Workers	4
MANDATORY ETHICS TRAINING: All Neuroscience students are also required to complete 1 credit hour of ethics training.		1

† Arranged with instructor.

In addition to the above coursework, all Neuroscience majors are expected to take a minimum of six credits of approved elective neuroscience courses.

Additional coursework for both Ph.D. and M.S. degrees is selected by the student in consultation with their POS Committee to meet departmental requirements and to satisfactorily prepare the student for their research project.

Graduate credits of B or better earned at another institution may be transferred at the discretion of the POS Committee and with the approval of the Neuroscience Program and the ISU Graduate College.

Additional information relating to credits required for graduate degrees can be found in the ISU Graduate College Handbook (<http://www.grad-college.iastate.edu/common/handbook/>).

Curriculum Requirements for Graduate Students Seeking a Neuroscience Minor

Graduate students interested in completing a Neuroscience minor are required to complete 12 credits from the list below.

Students must be approved for the minor by the Neuroscience Program and must follow Graduate College guidelines for POS Committee membership.

Graduate students wishing to seek a minor in Neuroscience are encouraged to contact the Neuroscience Interdepartmental Graduate Program Coordinator for further information. Inquiries can be submitted to idgp@iastate.edu.

Approved Neuroscience Minor Courses

BMS 5370	Neuroanatomy	3
KIN 5720	Neural Basis of Human Movement	3
GDCB 5560	Cellular, Molecular and Developmental Neuroscience	3
NEURO 5890	Systems Neuroscience: Brain, Behavior, and Nutrition-Related Integrative Physiology	2
NEURO 6960	Neuroscience Seminar	1
PSYCH 5190	Cognitive Neuropsychology	3

Courses primarily for graduate students, open to qualified undergraduates:

NEURO 5560: Cellular, Molecular and Developmental Neuroscience

(Cross-listed with BMS 5560/ GDCB 5560).

Credits: 3. Contact Hours: Lecture 3.

Fundamental principles of neuroscience including cellular and molecular neuroscience, nervous system development, and regulatory systems.

Offered odd-numbered years. (Typically Offered: Fall)

NEURO 5570: Rotations in Neuroscience

(Cross-listed with GDCB 5570).

Credits: 2. Contact Hours: Lecture 2.

Rotation experiences in various neuroscience research methods and techniques related to our current faculty specialties. (Typically Offered: Fall, Spring)

NEURO 5890: Systems Neuroscience: Brain, Behavior, and Nutrition-Related Integrative Physiology

(Cross-listed with FSHN 5890/ GERON 5890/ NUTRS 5890/ PSYCH 5890).

Credits: 2. Contact Hours: Lecture 2.

Structural, functional, and biochemical aspects of brain and non-motor behavior across the human lifespan. Types of neuroimaging used to assess the brain. Current research is leveraged to gauge how nutrition, diseases related to nutrition, and associated physiological processes influence the brain, particularly for common developmental, psychological, and neurological disorders. (Typically Offered: Spring)

Courses for graduate students:

NEURO 6610: Advanced Topics in Neuroscience

(Cross-listed with BBMB 6610/ KIN 6610/ GDCB 6610).

Credits: 3. Contact Hours: Lecture 3.

Repeatable.

Prereq: NEURO 5560 (or comparable course) or permission of instructor

Students will present three journal articles and two overview lectures on topics in neuroscience that are related but outside of their own research interest. Offered even-numbered years. (Typically Offered: Spring)

NEURO 6960: Neuroscience Seminar

Credits: 1. Contact Hours: Lecture 1.

Repeatable.

Seminar in neuroscience, current research interests, and/or professional development. (Typically Offered: Fall, Spring)

NEURO 6990: Research

Credits: 1. Repeatable.

Prereq: Instructor Permission for Course