NEUROSCIENCE (B.S.)

The goal of the Neuroscience major is to provide students with a strong background in fundamental basic sciences and exposure to the integrative nature of neuroscience to allow students to understand nervous system function from a variety of perspectives. Students will emerge with a strong foundation in basic science and applied neuroscience that will make them competitive for post-graduate studies or employment in industry, government, health, and education.

The degree program is offered jointly through the Departments of Biological Sciences and Psychology. During the freshman year, or as early as possible, students interested in neuroscience should consul one of these departments to obtain information from an undergraduate advisor.

The Neuroscience major will lead to a Bachelor of Science (B.S.) degree. Candidates must complete 120 credits in course work including satisfaction of the University General Education Requirements (http://bulletins.wayne.edu/undergraduate/general-information/general-education/) and the College of Liberal Arts and Sciences Group Requirements (http://bulletins.wayne.edu/undergraduate/college-liberal-arts-sciences/bachelors-degree-requirements/), as well as the major requirements cited below. All course work must be completed in accordance with the regulations of the University (http://bulletins.wayne.edu/undergraduate/general-information/academic-regulations/) and the College (http://bulletins.wayne.edu/undergraduate/college-liberal-arts-sciences/academic-regulations/) governing undergraduate scholarship and degrees.

Major Requirements

Major requirements are divided into three categories: (A) Basic science courses, (B) Neuroscience core courses, and (C) Electives. Elective courses are organized into two sub-categories and students must select from each; this is to ensure breadth of exposure. Students must receive a grade of C-minus or better in all required major courses. A grade point average of 2.0 (C) is required for graduation. The major requires a minimum of three unique courses that do not count towards requirements of other declared majors.

Basic Science Courses

Students may double-count up to 11 - 12 credits with University General Education requirements.

Code	Title	Credits
Math		**4**
MAT 2010	Calculus I	
Statistics		**3-4**
PSY 2030	Statistical Methods in Psychology	
or STA 1020	Elementary Statistics	
or STA 2210	Probability and Statistics	
Biology		**8**
BIO 1510	Basic Life Mechanisms	
BIO 2550	Fundamentals of Cell Biology for Neuroscience	
Chemistry		**14**
CHM 1100 & CHM 1130	General Chemistry I and General Chemistry I Laboratory	
CHM 1140 & CHM 1150	General Chemistry II and General Chemistry II Laboratory	
CHM 1240	Organic Chemistry I	
Biochemistry		**3**
BIO 3100	Cellular Biochemistry	
or CHM 5600	Survey of Biochemistry	
Physics		**10**
Select one of the following sequences:		
Option 1:		
PHY 2130 & PHY 2131	Physics for the Life Sciences I and Physics for the Life Sciences Laboratory	
PHY 2140 & PHY 2141	Physics for the Life Sciences II and Physics for the Life Sciences Laboratory	
Option 2:		
PHY 2170 & PHY 2171	University Physics for Scientists I and University Physics Laboratory	
PHY 2180 & PHY 2181	University Physics for Scientists II and University Physics Laboratory II	
Social/Behavioral Science		**4**
PSY 1010	Introductory Psychology	
Total Credits		**46-47**

Neuroscience Core Courses

Code	Title	Credits
BIO 3200	Human Physiology	3
PSY 3330	Systems Neuroscience	3
Total Credits		**6**

Elective Courses

Select 18 credits, with a minimum of 6 credits each from the Behavioral and Cognitive Neuroscience and Cellular and Molecular Neuroscience categories. Students may choose directed study courses to complete the 18 credit requirement.

Code	Title	Credits
Behavioral and Cognitive Neuroscience		
BIO 4220	Biological Dimensions of Evolutionary Psychology	3
KIN 3550	Motor Learning and Control	3
NEU 4200	Neurobiology of Addiction	3
NFS 5170	Nutrition, Physical Activity, and the Brain	3
PHI 5230	Philosophy of Science	4
PHI 5550	Philosophy of Mind	4
PSY 3040	Psychology of Perception: Fundamental Processes	3
PSY 3060	Psychology of Learning and Memory: Fundamental Processes	3
PSY 3080	Cognitive Psychology: Fundamental Processes	3
PSY 4140	Hormones and Behavior	3
PSY 5040	Cognitive Neuroscience	3
PSY 5070	Neuropharmacology	3
PSY 5080	Cellular Basis of Animal Behavior	3
PSY 5330	Human Neuropsychology	3
PSY 5440	Developmental Neuropsychology	3
Cellular and Molecular Neuroscience		
BIO 3070	Genetics	4-5
BIO 4120	Comparative Physiology	4
BIO 4690	Molecular and Cellular Neurobiology	3
BIO 5040	Biometry	4
BIO 5620	Developmental Biology	3
BIO 5660	Neural Signaling in Health and Disease	3
BIO 5890	Neuroplasticity	3
BIO 5996	Senior Research	1-2
BIO 6055	Biology of the Eye	3

BIO 6180	Membrane Biology	3
BIO 6190	Advanced Special Topics	6
BIO 6690	Special Topics in Neurobiology	3
NEU 5470	Preclinical and Clinical Assessments of Neurologic Disease I	3
NEU 6470	Preclinical and Clinical Assessments of Neurologic Disease II	3
PHY 3750	Introduction to Computational Methods	1
PHY 6750	Applied Computational Methods	2
ROC 6710	Physics in Medicine	3
Directed Study		
NEU 4990	Introduction to Research Practice	1
NEU 4991	Undergraduate Research in Neuroscience	1
NEU 4992	Undergraduate Research in Neuroscience	2
NEU 4993	Undergraduate Research in Neuroscience	3
NEU 4994	Undergraduate Research in Neuroscience	4
NEU 6990	Honors Introduction to Research Practice	1
NEU 6992	Honors Undergraduate Research in Neuroscience	2
NEU 6993	Honors Undergraduate Research in Neuroscience	3
NEU 6994	Honors Undergraduate Research in Neuroscience	4
NEU 6998	Honors Thesis in Neuroscience	3

Neuroscience Honors (B.S. Program)

To be recommended for an honors degree from this program, a student must maintain a cumulative g.p.a. of at least 3.30 and complete a minimum of 14 honors course credits including:

Code	Title	Credits
One 42XX level Honors Seminar		3
NEU 6990	Honors Introduction to Research Practice	1
Complete at least two credits of Honors research with one of the following		2
NEU 6992	Honors Undergraduate Research in Neuroscience	
NEU 6993	Honors Undergraduate Research in Neuroscience	
NEU 6994	Honors Undergraduate Research in Neuroscience	
Complete an Honors thesis		3
NEU 6998	Honors Thesis in Neuroscience	
Remaining credits to be earned in honors sections or honors options within the Neuroscience major coursework.		5
Total Credits		**14**

NEU 4200 Neurobiology of Addiction Cr. 3
An in-depth examination of the neurobiology of addiction in the context of psychopharmacology. Emphasis is on neurochemical and neuropharmacological aspects of drug and related addictions, using molecular, cellular, and clinical approaches. Offered Fall.
Prerequisites: BIO 3200 with a minimum grade of C-, PSY 3120 with a minimum grade of C-, or PSY 3300 with a minimum grade of C-

NEU 4990 Introduction to Research Practice Cr. 1
This seminar is an introduction to laboratory safety, research practice and scientific integrity for undergraduate students engaged in independent research. It will be a co-requisite that each student must take with their first enrollment in a NEU directed study course. The course is structured to provide instruction in basic laboratory safety and accepted standards for research conduct. It will also provide professional development and networking opportunities for students interested in careers in research and the biomedical sciences. Instruction will be provided in the form of reading assignments, discussions, lectures and case studies. Offered Fall, Winter.

NEU 4991 Undergraduate Research in Neuroscience Cr. 1
Laboratory or academic research performed under the mentorship of a faculty member. Offered Every Term.
Prerequisites: NEU 4990 with a minimum grade of C- (may be taken concurrently)

NEU 4992 Undergraduate Research in Neuroscience Cr. 2
Laboratory or academic research performed under the mentorship of a faculty member. Offered Every Term.
Prerequisites: NEU 4990 with a minimum grade of C- (may be taken concurrently)

NEU 4993 Undergraduate Research in Neuroscience Cr. 3
Laboratory or academic research performed under the mentorship of a faculty member. Offered Every Term.
Prerequisites: NEU 4990 with a minimum grade of C- (may be taken concurrently)

NEU 4994 Undergraduate Research in Neuroscience Cr. 4
Laboratory or academic research performed under the mentorship of a faculty member. Offered Every Term.
Prerequisites: NEU 4990 with a minimum grade of C- (may be taken concurrently)

NEU 5470 Preclinical and Clinical Assessments of Neurologic Disease I Cr. 3
An exploration of central and peripheral nervous system diseases from four perspectives: 1) broad disease connections 2) disease mechanisms 3) preclinical animal models 4) clinical trials and outcomes. Diseases covered are from mature research fields, with known molecular mechanisms, animal models and disease-modifying therapies in clinical trials. Students will master communication and teaching skills using: short presentations to the class, active participation in class discussions and peer-performance assessments.Students will research and present material, coordinate information between student groups, and moderate class discussions. Offered Fall.
Prerequisites: (BIO 3200 with a minimum grade of C- and 1 of (STA 1020 with a minimum grade of C-, STA 2210 with a minimum grade of C-, or PSY 2030 with a minimum grade of C-))

NEU 6470 Preclinical and Clinical Assessments of Neurologic Disease II Cr. 3
A continuation of NEU 5470 focusing on diseases from maturing research fields, where disease etiology may be ambiguous for many patients, and there may be relatively few molecular mechanisms, animal models and therapeutics available. Students will gain an appreciation of how translational research develops from pre-clinical models to clinical trials and practice. Offered Winter.
Prerequisites: NEU 5470 with a minimum grade of C-

NEU 6990 Honors Introduction to Research Practice Cr. 1
This seminar is an introduction to laboratory safety, research practice and scientific integrity for undergraduate students engaged in independent research. It will be a co-requisite that each student must take with their first enrollment in a NEU Honors directed study course. The course is structured to provide instruction in basic laboratory safety and accepted standards for research conduct. It will also provide professional development and networking opportunities for students interested in careers in research and the biomedical sciences. Instruction will be provided in the form of reading assignments, discussions, lectures and case studies. Offered Fall, Winter.

NEU 6992 Honors Undergraduate Research in Neuroscience Cr. 2
Laboratory or academic research performed under the mentorship of a faculty member. Offered Every Term.
Prerequisites: NEU 6990 with a minimum grade of C- (may be taken concurrently)

NEU 6993 Honors Undergraduate Research in Neuroscience Cr. 3
Laboratory or academic research performed under the mentorship of a faculty member. Offered Every Term.
Prerequisites: NEU 6990 with a minimum grade of C- (may be taken concurrently)

NEU 6994 Honors Undergraduate Research in Neuroscience Cr. 4
Laboratory or academic research performed under the mentorship of a faculty member. Offered Every Term.
Prerequisites: NEU 6990 with a minimum grade of C- (may be taken concurrently)

NEU 6998 Honors Thesis in Neuroscience Cr. 3
Original laboratory or academic research performed under the guidance of a faculty member for the purpose of completing an Honor's thesis required for the completion of an Honors Degree. Offered Every Term.
Prerequisites: NEU 6990 with a minimum grade of C- (may be taken concurrently)