Twin Cities Campus

Neuroscience B.S.

Neuroscience

College of Biological Sciences

- Program Type: Baccalaureate
- Requirements for this program are current for Spring 2018
- Required credits to graduate with this degree: 120
- Required credits within the major: 74 to 83
- Degree: Bachelor of Science

Neuroscience majors study the molecular and cellular building blocks that make up the brain and control its function. The study of neuroscience aims to understand how complex animals, including humans, see, hear, move, think, and feel. Neuroscientists also study abnormalities that cause diseases and mechanisms that underlie pain and addiction.

A BS in neuroscience prepares undergraduates to pursue advanced studies in neuroscience, professional degrees in medicine, or related fields.

Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

Admission Requirements

Freshmen students are usually admitted to pre-major status before admission to this major

A GPA above 2.0 is preferred for the following:

- 2.50 transferring from another University of Minnesota college
- 2.50 transferring from outside the University

For information about University of Minnesota admission requirements, visit the Office of Admissions website.

General Requirements

All students are required to complete general University and college requirements including writing and liberal education courses. For more information about University-wide requirements, see the liberal education requirements.Required courses for the major or minor in which a student receives a D grade (with or without plus or minus) do not count toward the major or minor (including transfer courses).

Program Requirements

Foundational Courses

Nature of Life/Nature of Science and Research

BIOL 1805 - Nature of Life: Introducing New Students to the Biological Sciences (0.5 cr)
BIOL 1806 - Nature of Life, Part Two (0.5 cr)
BIOL 2905 - Nature of Life, Part III (0.5 cr)
BIOL 2906 - Nature of Life, Part IV (0.5 cr)
or BIOL 3001 - Nature of Science and Research (1.0 cr)

Foundations of Biology

BIOL 1951 - Foundations of Biology Lecture I for Biological Sciences Majors [BIOL] (4.0 cr)
BIOL 1961 - Foundations of Biology Lab I for Biological Sciences Majors [BIOL] (2.0 cr)
or BIOL 1951H - Foundations of Biology Lecture I for Biological Sciences Majors [BIOL] (4.0 cr)
BIOL 1961H *{Inactive}*[BIOL] (2.0 cr)
BIOL 2003 - Foundations of Biology for Biological Sciences Majors, Part II (3.0 cr)
BIOL 3004 - Foundations of Biology for Biological Sciences Majors, Part II Laboratory (3.0 cr)
or BIOL 2003H - Foundations of Biology for Biological Sciences Majors, Part II (3.0 cr)
BIOL 3004H *{Inactive}*(3.0 cr)

Quantitative Requirements

MATH 1241 - Calculus and Dynamical Systems in Biology [MATH] (4.0 cr)
or MATH 1271 - Calculus I [MATH] (4.0 cr)
or MATH 1571H - Honors Calculus I [MATH] (4.0 cr)
Take 1 or more course(s) from the following:
•CSCI 1133 - Introduction to Computing and Programming Concepts (4.0 cr)

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•CSCI 1133H - Honors Introduction to Computing and Programming Concepts (4.0 cr)
•MATH 1272 - Calculus II (4.0 cr)
•MATH 1572H - Honors Calculus II (4.0 cr)
•MATH 2241 - Mathematical Modeling of Biological Systems (3.0 cr)
•STAT 3011 - Introduction to Statistical Analysis [MATH] (4.0 cr)
•BIOL 3272 - Applied Biostatistics (4.0 cr)
or BIOL 5272 - Applied Biostatistics (4.0 cr)

Chemistry

Track 1: Preferred CBS Chemistry Sequence

CHEM 1081 - Chemistry for the Life Sciences I [PHYS] (3.0 cr)
CHEM 1065 - Chemical Principles I Laboratory [PHYS] (1.0 cr)
CHEM 1082 - Chemistry for the Life Sciences II (3.0 cr)
CHEM 1086 - Chemistry for the Life Sciences II Laboratory (1.0 cr)
CHEM 2081 - Chemistry for the Life Sciences III (3.0 cr)
CHEM 2085 - Chemistry for the Life Sciences III Laboratory (2.0 cr)

or **Track 2**

This track is allowable for students entering CBS with previous chemistry credit or for whom space is not available in the preferred track. Students should speak with a CBS academic advisor to determine eligibility for this track.

CHEM 1061 - Chemical Principles I [PHYS] (3.0 cr)
CHEM 1065 - Chemical Principles I Laboratory [PHYS] (1.0 cr)
CHEM 1062 - Chemical Principles II [PHYS] (3.0 cr)
CHEM 1066 - Chemical Principles II Laboratory [PHYS] (1.0 cr)
CHEM 2301 - Organic Chemistry I (3.0 cr)
CHEM 2302 - Organic Chemistry II (3.0 cr)

or **Track 2 (Honors Option)**

This track is allowable for CBS honors students.

CHEM 1071H - Honors Chemistry I [PHYS] (3.0 cr)
CHEM 1075H - Honors Chemistry I Laboratory [PHYS] (1.0 cr)
CHEM 1072H - Honors Chemistry II [PHYS] (3.0 cr)
CHEM 1076H - Honors Chemistry II Laboratory [PHYS] (1.0 cr)
CHEM 2331H - Honors Elementary Organic Chemistry I (3.0 cr)
CHEM 2332H - Honors Elementary Organic Chemistry II (3.0 cr)

Physics

PHYS 1201W *{Inactive}*[PHYS, WI] (5.0 cr)
or PHYS 1301W - Introductory Physics for Science and Engineering I [PHYS, WI] (4.0 cr)
or PHYS 1401V - Honors Physics I [PHYS, WI] (4.0 cr)
or PHYS 1501V *{Inactive}*[PHYS, WI] (4.0 cr)
PHYS 1202W *{Inactive}*[PHYS, WI] (5.0 cr)
or PHYS 1302W - Introductory Physics for Science and Engineering II [PHYS, WI] (4.0 cr)
or PHYS 1402V - Honors Physics II [PHYS, WI] (4.0 cr)
or PHYS 1502V *{Inactive}*[PHYS, WI] (4.0 cr)

Molecular and Cellular Biology

BIOL 3025 - Molecular Biology and Society [TS] (3.0 cr)
BIOC 3022 - Biochemistry for Life Scientists (3.0 cr)
or BIOC 4331 - Biochemistry I: Structure, Catalysis, and Metabolism in Biological Systems (4.0 cr)
BIOL 4003 - Genetics (3.0 cr)
BIOL 4004 - Cell Biology (3.0 cr)

Additional Core

Take 1 or more course(s) from the following:
•EEB 3811W - Animal Behavior in the Field [WI] (4.0 cr)
•EEB 3411 - Introduction to Animal Behavior (3.0 cr)
•EEB 3412W - Introduction to Animal Behavior, Writing Intensive [WI] (4.0 cr)
•BIOL 3211 - Physiology of Humans and Other Animals (3.0 cr)
BIOL 2005 - Animal Diversity Laboratory (2.0 cr)
•BIOL 3211 - Physiology of Humans and Other Animals (3.0 cr)
BIOL 2007 - Marine Animal Diversity Laboratory (1.0 cr)
•EEB 3409 - Evolution (3.0 cr)
or EEB 5409 - Evolution (3.0 cr)

Neuroscience Major-specific Requirements

NSCI 2101 - Human Neuroanatomy [BIOL] (4.0 cr)
or NSCI 2001 - Human Neuroanatomy (without a lab) (3.0 cr)
NSCI 3101 - Neurobiology I: Molecules, Cells, and Systems (3.0 cr)
NSCI 3102W - Neurobiology II: Perception and Behavior [WI] (3.0 cr)

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NSCI 4101 - Development of the Nervous System: Cellular and Molecular Mechanisms (3.0 cr)
Students may use a maximum of seven credits of directed research toward a CBS degree.
Take 3 or more credit(s) from the following:
- NSCI 4105 - Neurobiology Laboratory I (3.0 cr)
- NSCI 4167 *{Inactive}*(1.0 - 3.0 cr)
- NSCI 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
- NSCI 4994 - Directed Research (1.0 - 6.0 cr)

Neuroscience Major Electives
Take 3 or more credit(s) from the following:
- BMEN 5411 - Neural Engineering (3.0 cr)
- EEB 4330W - Animal Communication [WI] (3.0 cr)
- EEB 5221 *{Inactive}*(3.0 cr)
- GCD 4034 - Molecular Genetics and Genomics (3.0 cr)
- GCD 4134 *{Inactive}*(3.0 cr)
- GCD 4151 - Molecular Biology of Cancer (3.0 cr)
- GCD 5036 - Molecular Cell Biology (3.0 cr)
- MICB 4131 - Immunology (3.0 cr)
- NSC 5203 - Basic and Clinical Vision Science (3.0 cr)
- NSC 5461 - Cellular and Molecular Neuroscience (3.0 cr)
- NSC 5561 - Systems Neuroscience (4.0 cr)
- NSC 5661 - Behavioral Neuroscience (2.0 cr)
- NSC 8217 - Systems and Computational Neuroscience (2.0 cr)
- NSCI 3001W - Neuroscience and Society [CIV, WI] (4.0 cr)
- NSCI 3505W - Mind and Brain [WI] (4.0 cr)
- NSCI 4105 - Neurobiology Laboratory I (3.0 cr)
- PHAR 4248 - Drugs of Abuse (2.0 cr)
- PHCL 4343 - Pharmacology of the Synapse (3.0 cr)
- PSY 5036W - Computational Vision [WI] (3.0 cr)
- PSY 5038W - Introduction to Neural Networks [WI] (3.0 cr)
- PSY 5062 - Cognitive Neuropsychology (3.0 cr)
- NSCI 5300 *{Inactive}*(3.0 cr)
- Take 0 - 1 course(s) from the following:
  - GCC 3xxx
  - GCC 5xxx

Upper Division Writing Intensive within the Major
Students are required to take one upper division writing intensive course within the major. If that requirement has not been satisfied within the core major requirements, students must choose one course from the following list. Some of these courses may also fulfill other major requirements.
Take 0 - 1 course(s) from the following:
- BIOC 4025W - Laboratory in Biochemistry [WI] (2.0 cr)
- BIOC 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 7.0 cr)
- BIOC 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
- PMB 3005W - Plant Function Laboratory [WI] (2.0 cr)
- PMB 3007W - Plant, Algal, and Fungal Diversity and Adaptation [WI] (4.0 cr)
- BIOL 4321W - Deconstructing Research: Writing about Biological Research for Non-scientists [WI] (2.0 cr)
- BIOL 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 7.0 cr)
- BIOL 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
- EEB 3408W - Ecology [WI] (4.0 cr)
- EEB 3412W - Introduction to Animal Behavior, Writing Intensive [WI] (4.0 cr)
- EEB 4330W - Animal Communication [WI] (3.0 cr)
- EEB 4609W - Ecosystem Ecology [ENV, WI] (3.0 cr)
- EEB 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 7.0 cr)
- EEB 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
- GCD 4005W - Cell Biology-Writing Intensive [WI] (4.0 cr)
- GCD 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 7.0 cr)
- GCD 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
- MICB 4161W - Eukaryotic Microbiology [WI] (3.0 cr)
- MICB 4225W - Advanced Laboratory: Microbial Genetics [WI] (3.0 cr)
- MICB 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 7.0 cr)
- MICB 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
- NSCI 3001W - Neuroscience and Society [CIV, WI] (4.0 cr)
- NSCI 3102W - Neurobiology II: Perception and Behavior [WI] (3.0 cr)
- NSCI 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 6.0 cr)
- NSCI 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
- PMB 4516W - Plant Cell Biology: Writing Intensive [WI] (3.0 cr)

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•PMB 4793W - Directed Studies: Writing Intensive [WI] (1.0 - 7.0 cr)
•PMB 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)

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