Neuroscience, B.S.

Degree Offered

- Bachelor of Science

Nature of the Program

The demand for basic and applied neuroscience researchers and clinicians continues to grow. The rigorous and interdisciplinary training that defines the BS program in Neuroscience prepares students to address a wide range of health and societal issues relating to brain function. Students graduating with the Neuroscience major at West Virginia University are uniquely prepared for admission into advanced degree programs in neuroscience, medicine, biomedical engineering, and biomedical sciences at WVU or other institutions. These graduates also are prepared to serve in academic and technical positions in private industry, as well as the broader healthcare industry.

Areas of Emphasis

- Behavioral Neuroscience
- Cellular, Molecular, and Systems Neuroscience

Minors

All students have the possibility of earning one or more minors; a list of all available minors and their requirements is available at http://catalog.wvu.edu/undergraduate/minors/. Please note that students may not earn a minor in their major field.

FACULTY

PROGRAM DIRECTOR

- Becca Coltogirone - Ph.D. (West Virginia University)
  Undergraduate Program in Neuroscience Director. Undergraduate Neuroscience Advisor. Teaching of Neuroscience, Developmental Neuroscience, Neurodevelopmental Disorders, Molecular Biology

PROFESSORS

- Kevin C. Daly - Ph.D. (University of Arizona)
  Regular Graduate Faculty. Sensory Neurobiology, Neural Coding, Brain-Behavior Interactions, Comparative Psychobiology
- Kevin T. Larkin - Ph.D. (University of Pittsburgh)
  Regular Graduate Faculty. Clinical Health Psychology, Applied Psychophysiology, Cardiovascular Behavioral Medicine
- Randy Nelson - Ph.D. (Psychology; University of California - Berkeley), Ph.D. (Endocrinology; University of California - Berkeley)
  Hazel Ruby McQuain Chair for Neurological Research. WVU Center for Foundational Neuroscience Research & Education Director. Executive Director of Basic & Foundational Neuroscience Research at Rockefeller Neuroscience Institute. Disrupted Circadian Rhythms on Immune Functioning, Neuroinflammation, Metabolism, Sleep & Mood, Behavioral Neuroendocrinology

ASSOCIATE PROFESSORS

- Karen Anderson - Ph.D. (University of Florida)
  Psychology Associate Department Chair. Regular Graduate Faculty. Behavioral Pharmacology, Self-Control & Impulsivity
- Sadie Bergeron - Ph.D. (University of Massachusetts - Amherst)
  Regular Graduate Faculty. Developmental Neurobiology
- Melissa Blank - Ph.D. (Virginia Commonwealth University)
  Behavioral Neuroscience Program Coordinator. Regular Graduate Faculty. Behavioral Neuroscience, Tobacco Use, Tobacco-Related Health Risks, Genetics of Substance Use
- Andrew Dacks - Ph.D. (University of Arizona)
  Biology Associate Chair for Graduate Studies. Regular Graduate Faculty. Neurobiology, Sensory Processing
- Sarah M. Farris - Ph.D. (University of Illinois - Urbana-Champaign)
  Evolution & Development of the Insect Brain, Neuroanatomy
- Gary Marsat - Ph.D. (McGill University)
  Regular Graduate Faculty. Systems Neuroscience, Sensory Processing and Neural Coding of Communication Signals
- Sharon Tenenholz - Ph.D. (University of California, Los Angeles)
  Psychology Director of Undergraduate Studies. Curriculum Design, Teaching of Psychology, Visual Perception

ASSISTANT PROFESSORS

- Mariya Cherkasova - Ph.D. (McGill University)
  Regular Graduate Faculty. Behavioral Neuroscience, Addiction, Reward-Related Behavior
- Becca Coltogirone - Ph.D. (West Virginia University)
  Undergraduate Program in Neuroscience Director. Undergraduate Neuroscience Advisor. Teaching of Neuroscience, Developmental Neuroscience, Neurodevelopmental Disorders, Molecular Biology
- Eric Horstick - Ph.D. (University of Michigan)
  Regular Graduate Faculty, Molecular Neuroscience, Functional Lateralization
- Kathleen Morrison - Ph.D. (University of Tennessee - Knoxville)
  Regular Graduate Faculty. Behavioral Neuroscience, Stress, Development, Neuropsychiatric Disease
- Kate Karelina Weil - Ph.D. (Ohio State University)
  Traumatic Brain Injury, Stroke, Behavioral Neuroscience
- James Cole - Ph.D. (University of Virginia Medical School)
  Undergraduate Neuroscience Advisor. Sensory and Developmental Neuroscience, History of Neuroscience, Neuroaesthetics

Admissions for 2026-2027

- First Time Freshmen are admitted directly to the major. For the timely completion of the degree, it is recommended that students have a minimum MATH ACT of 20, a MATH SAT of 520, or an ALEKS score of 40.
- Students transferring from another WVU major or from another institution with fewer than 24 credits and at least a 2.0 overall GPA are admitted directly to the major. For the timely completion of the degree, it is recommended that students have a minimum MATH ACT of 20, a MATH SAT of 520, or an ALEKS score of 40.
- Students transferring from another WVU major or from another institution with 24 credits or more and at least a 2.0 overall GPA must meet the following requirement prior to being admitted to the major: completion of BIOL 115 (http://catalog.wvu.edu/search/?P=BIOL%20115) & BIOL 115L (http://catalog.wvu.edu/search/?P=BIOL%20115L) and CHEM 115 (http://catalog.wvu.edu/search/?P=CHEM%20115) & CHEM 115L (http://catalog.wvu.edu/search/?P=CHEM%20115L) with a C-.

Major Code: 14C9

General Education Foundations

Please use this link to view a list of courses that meet each GEF requirement. **(**http://registrar.wvu.edu/gef/**)**

NOTE: Some major requirements will fulfill specific GEF requirements. Please see the curriculum requirements listed below for details on which GEFs you will need to select.

Code	Title	Hours
General Education Foundations		
F1 - Composition & Rhetoric		3-6
ENGL 101 & ENGL 102	Introduction to Composition and Rhetoric and Composition, Rhetoric, and Research	
or ENGL 103	Accelerated Academic Writing	
F2A/F2B - Science & Technology		4-6
F3 - Math & Quantitative Reasoning		3-4
F4 - Society & Connections		3
F5 - Human Inquiry & the Past		3
F6 - The Arts & Creativity		3
F7 - Global Studies & Diversity		3
F8 - Focus (may be satisfied by completion of a minor, double major, or dual degree)		9
Total Hours		31-37

Please note that not all of the GEF courses are offered at all campuses. Students should consult with their advisor or academic department regarding the GEF course offerings available at their campus.

Degree Requirements

Students must complete WVU General Education Foundations requirements, Eberly Edge requirements, major requirements, and electives with a minimum of 120 hours.

Departmental Requirements for the B.S. in Neuroscience

- **Calculation of Major GPA:** A minimum GPA of 2.0 is required in all courses applied to major requirements, with a minimum grade of C- in all courses included in the STEM Foundations and in the Neuroscience Core, except for BIOL 349. If a course is repeated, all attempts will be used to calculate the GPA in the Neuroscience major, unless the course is eligible for a D/F repeat.
- **Writing and Communication Skills Requirement**: Students in the Neuroscience Bachelor of Science complete this requirement by completing ENGL 101 and ENGL 102, or ENGL 103 and BIOL 115, BIOL 117, BIOL 219, and NRSC 201.
- **Area of Emphasis (AOE):** Students must select an area of emphasis and complete all requirements for the selected AoE.
- **Capstone Requirement**: The university requires the successful completion of NRSC 485L or NRSC 489.

Curriculum Requirements

Code	Title	Hours
University Requirements		31
Eberly Edge Requirements		15
Neuroscience Major Requirements		74
Total Hours		120

University Requirements

Code	Title	Hours
General Education Foundations (GEF) 1, 2, 3, 4, 5, 6, 7, and 8 (31-37 Credits)		
Outstanding GEF Requirements 1, 5, 6, and 7		15
NRSC 191	First-Year Seminar	1
General Electives		15
Total Hours		31

Eberly Edge Program Requirements

Code	Title	Hours
EDG 1: Data and Society		3
EDG 2: Effective and Civil Communication		3
EDG 3: Ethics and Civil Responsibility		3
EDG 4: Global and Regional Perspectives		3
EDG 5: Practicing Arts & Sciences		3
EDG 6: High Impact Experience (NRSC 485L or NRSC 489)		
Total Hours		15

Neuroscience Major Requirements

Code	Title	Hours
STEM FOUNDATION COURSES: *		**20**
MATH 150	Applied Calculus	
or MATH 155	Calculus 1	
BIOL 115 & 115L	Principles of Biology and Principles of Biology Laboratory	
BIOL 117 & 117L	Introductory Physiology and Introductory Physiology Laboratory	
CHEM 115 & 115L	Fundamentals of Chemistry 1 and Fundamentals of Chemistry 1 Laboratory	
CHEM 116 & 116L	Fundamentals of Chemistry 2 and Fundamentals of Chemistry 2 Laboratory	
CORE COURSES:		**20**
BIOL 219 & 219L	Cellular and Molecular Biology and Cellular & Molecular Biology Laboratory (minimum grade of C-)	
BIOL 348	Neuroscience 1 (minimum grade of C-)	
BIOL 349	Neuroscience 2	

NRSC 101	Introduction to Neuroscience (minimum grade of C-)	
NRSC 201 & 201L	Biological Foundations of Behavior and Biological Foundations of Behavior Laboratory (minimum grade of C-)	
PSYC 101	Introduction to Psychology (minimum grade of C-)	
RESEARCH METHODS:		**6**
Select one option:		
PSYC 203 & 203L & PSYC 204 & PSYC 204L	Research Methods and Analysis 1 and Research Methods and Analysis 1 Laboratory and Research Methods and Analysis 2 and Research Methods and Analysis 2 Laboratory	
STAT 211 & BIOL 302	Elementary Statistical Inference and Biometry	
STAT 211 & STAT 312	Elementary Statistical Inference and Intermediate Statistical Methods	
ADVANCED CHEMISTRY:		**4**
Select one course:		
CHEM 231 & 231L	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course Laboratory	
CHEM 233 & 233L	Organic Chemistry 1 and Organic Chemistry 1 Laboratory	
AREA OF EMPHASIS: **		**12**
Select one Area of Emphasis:		
Behavioral Neuroscience		
Cellular, Molecular, & Systems Neuroscience		
NEUROSCIENCE ELECTIVES:		**9**
Complete 6 credits in the alternate AOE		
Behavioral Neuroscience AoE:		
BIOL 339	Animal Communication & Behavior	
BIOL 439	Neuroethology	
PSYC 302	Behavior Principles	
PSYC 423	Cognition and Memory	
PSYC 425	Perception	
PSYC 426	Physiological Psychology	
PSYC 427	Neuroscience of Sleep	
PSYC 428	Hormones and Behavior	
PSYC 429	Clinical Neuroscience	
Cellular, Molecular, and Systems Neuroscience AoE:		
BIOL 339	Animal Communication & Behavior	
BIOL 439	Neuroethology	
BIOL 472	Neurodevelopmental Disorders	
BIOL 474	Neurogenetics and Behavior	
BIOL 475	Neurobiological Diseases	
BIOL 476	Computational Neuroscience	
BIOL 477	Evolution of the Human Brain	
BIOL 478	Sensory Neural Systems and Behavior	
BIOL 479	Principles of Systems Neuroscience	
Complete 3 credits in either AoE or upper-division NRSC course* (except NRSC 490, NRSC 491)		
CAPSTONE:		**3**
Select one course:		
NRSC 485L	Neuroscience Research Laboratory Capstone	
NRSC 489	Independent Research Capstone	
Total Hours		74

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STEM foundation courses are common to most STEM majors and excluded from the calculation of the percentage of upper-division courses.

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If choosing a course in selected AoE, it must be in addition to the requirements to complete the AoE. NRSC 490, NRSC 491 are excluded from the NRSC upper-division electives.

SUGGESTED PLAN OF STUDY

First Year

Fall	Hours	Spring	Hours
BIOL 115 & 115L (F2B)	4	BIOL 117 & 117L (F8 Course 2)	4
CHEM 115 & 115L (F8 Course 1)	4	CHEM 116 & 116L (F8 Course 3)	4
MATH 155 (F3)	4	PSYC 101 (GEF 4)	3
NRSC 101	3	EDG 1: Data and Society	3
NRSC 191	1		
	16		14

Second Year

Fall	Hours	Spring	Hours
BIOL 219 & 219L	4	BIOL 348	3
ENGL 101 (GEF 1)	3	ENGL 102 (GEF 1)	3
EDG 2: Effective and Civil Communication	3	EDG 3: Ethics and Civil Responsibility	3
NRSC 201 & 201L	4	Research Methods 2	3
Research Methods 1	3	F5	3
	17		15

Third Year

Fall	Hours	Spring	Hours
BIOL 349	3	AoE Course 2	3
Advanced Chemistry	4	NRSC Elective 1	3
AoE Course 1	3	EDG 5: Practicing Arts & Sciences	3
EDG 4: Global and Regional Perspectives	3	F6	3
General Elective	3	F7	3
	16		15

Fourth Year

Fall	Hours	Spring	Hours
AoE Course 3	3	AoE Course 4	3
NRSC Capstone (EDG 6)	3	NRSC Elective 3	3
NRSC Elective 2	3	General Elective	3
General Elective	3	General Elective	3
General Elective	3		
	15		12

Total credit hours: 120

Areas of Emphasis Offered:

- Behavioral Neuroscience (p. 5)
- Cellular, Molecular, & Systems Neuroscience (p. 6)

BEHAVIORAL NEUROSCIENCE AOE REQUIREMENTS:

This focused training will prepare the graduate for careers from basic research to translational or clinical settings. Students interested in medicine or other healthcare-related fields should consider this option.

Code	Title	Hours
Behavior Neuroscience Courses:		**12**
Select a minimum of 12 credits from the following options:		
BIOL 339	Animal Communication & Behavior	
BIOL 439	Neuroethology	
PSYC 302	Behavior Principles	
PSYC 423	Cognition and Memory	
PSYC 425	Perception	
PSYC 426	Physiological Psychology	
PSYC 427	Neuroscience of Sleep	
PSYC 428	Hormones and Behavior	
PSYC 429	Clinical Neuroscience	
Total Hours		12

CELLULAR, MOLECULAR, & SYSTEMS NEUROSCIENCE AOE REQUIREMENTS:

This focused training will prepare the graduate for careers from basic research to translational or clinical settings. Students interested in medicine or other healthcare-related fields should consider this option.

Code	Title	Hours
Cellular, Molecular, & Systems Neuroscience Courses:		**12**
Select a minimum of 12 credits from the following options:		
BIOL 339	Animal Communication & Behavior	
BIOL 439	Neuroethology	
BIOL 472	Neurodevelopmental Disorders	
BIOL 474	Neurogenetics and Behavior	
BIOL 475	Neurobiological Diseases	
BIOL 476	Computational Neuroscience	
BIOL 477	Evolution of the Human Brain	
BIOL 478	Sensory Neural Systems and Behavior	
BIOL 479	Principles of Systems Neuroscience	
Total Hours		12

Degree Progress

- By the end of their second semester in the major (excluding summer), students should have completed the following classes with a minimum grade of C-:
  - BIOL 115 & BIOL 115L
  - BIOL 117 & BIOL 117L
  - MATH 124 or MATH 126 (or higher-level math course)
  - NRSC 101
  - PSYC 101
- By the end of their fourth semester in the major (excluding summer), students should also have completed the following classes with a minimum grade of C-:
  - BIOL 219 & BIOL 219L
  - CHEM 115 & CHEM 115L
  - CHEM 116 & CHEM 116L
- Students must meet with their neuroscience adviser at least once per semester.

Students who do not meet their benchmarks may be removed from the major.

Major Learning Outcomes

NEUROSCIENCE

This B.S. curriculum will provide a comprehensive introduction to the field of neuroscience and many of the professional skills needed for post-graduation career options.

Upon completion of the B.S. in Neuroscience program at WVU, the graduate will be able to:

1. Describe the structure and function of the nervous system at the molecular, cellular, and behavioral/organismal levels.
2. Apply fundamental principles underlying the organization and function of the nervous system across sub-systems and species.
3. Synthesize information from across the field of neuroscience to:
    a. Read and comprehend basic neuroscience literature
    b. Critically evaluate new neuroscience research and emerging techniques
    c. Establish testable hypotheses
    d. Design approaches to test hypotheses about nervous system function
4. Collect, analyze, and interpret basic neuroscience research data
5. Communicate research via a variety of venues including:
    a. Written reports
    b. Oral presentation of journal articles
    c. Poster-based oral presentations of their research