

# BACHELOR OF SCIENCE WITH A MAJOR IN NEUROSCIENCE (STEM)

GW's Neuroscience program teaches the core concepts and methods involved in modern neuroscience. The program provides students with a rigorous, interdisciplinary education in molecular, cellular, and cognitive neuroscience, resulting in a comprehensive understanding of the mechanisms and circuitry in the brain that drive behavioral outputs. Critically evaluating and applying the core experimental methods used in molecular neuroscience and neurobiology results in students being fluent in the core concepts, methods, and current literature involved with modern neuroscience. This preparation puts students in a position to pursue advanced graduate studies, including for medicine and other pre-health careers. Program graduates also may go on to conduct research, teach, support government agencies, and work in global or public health fields.

This is a STEM designated program.

Visit the program website (<https://biology.columbian.gwu.edu/bs-neuroscience/>) for additional information.

## ADMISSIONS

For information about the admission process, including deadlines, visit the Office of Undergraduate Admissions website (<https://undergraduate.admissions.gwu.edu/>). Applications can be submitted via the Common Application (<https://go.gwu.edu/commonapp/>).

Supporting documents not submitted online should be mailed to:

Office of Undergraduate Admissions  
The George Washington University  
800 21st St NW Suite 100  
Washington, DC 20052

For questions visit [undergraduate.admissions.gwu.edu/contact-us](http://undergraduate.admissions.gwu.edu/contact-us) (<http://undergraduate.admissions.gwu.edu/contact-us/>).

## REQUIREMENTS

The following requirements must be fulfilled:

The general requirements stated under Columbian College of Arts and Sciences, Undergraduate Programs (<http://bulletin.gwu.edu/arts-sciences/#degreeregulationstext>).

Program-specific curriculum:

Code	Title	Credits
<b>Required</b>		
38 or 41 credits (10 or 11 courses) in basic science <sup>1</sup>		
BISC 1111	Introductory Biology: Cells and Molecules	

BISC 1112	Introductory Biology: The Biology of Organisms
BISC 2207	Genetics <sup>2</sup>
or BISC 2202	Cell Biology
CHEM 1111	General Chemistry I
CHEM 1112	General Chemistry II
CHEM 2151 & CHEM 2153	Organic Chemistry I and Organic Chemistry Laboratory I
CHEM 2152 & CHEM 2154	Organic Chemistry II and Organic Chemistry Laboratory II
PHYS 1025	University Physics I with Biological Applications
or PHYS 1011	General Physics I
or PHYS 1021	University Physics I
PHYS 1026	University Physics II with Biological Applications
or PHYS 1012	General Physics II
or PHYS 1022	University Physics II
MATH 1220 & MATH 1221	Calculus with Precalculus I and Calculus with Precalculus II
or MATH 1231	Single-Variable Calculus I
6 credits (two courses) in quantitative methods, selected from the following:	
BISC 2585	Biometry
CSCI 1012	Introduction to Programming with Python
DATS 1001	Data Science for All
DATS 2102	Data Visualization for Data Science
DATS 2103	Data Mining for Data Science
DATS 2104	Data Warehousing for Data Science
PUBH 3201	Introduction to Bioinformatics
STAT 1127	Statistics for the Biological Sciences <sup>2</sup>
9 credits in three gateway courses that introduce core neuroscience concepts, selected from the following:	
ANAT 2160	Human Functional Neuroanatomy
or SLHS 2106	Neural Substrates of Speech, Language, and Hearing

BISC 2320	Neural Circuits and Behavior
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BISC 3320	Human Neurobiology
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PSYC 2015	Biological Psychology
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15 credits (five courses), taken in the following three categories:

Cellular/molecular/systems neuroscience: 6 credits (two courses), selected from the following:

ANTH 3413	Evolution of the Human Brain
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BISC 2220	Developmental Neurobiology
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BISC 3214	Developmental Biology
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BISC 3320	Human Neurobiology
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PSYC 3199	Current Topics in Psychology
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Cognitive neuroscience: 6 credits (two courses), selected from the following:

PSYC 3118	Neuropsychology
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PSYC 3121	Memory and Cognition
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PSYC 3122	The Cognitive Neuroscience
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PSYC 3124	Visual Perception
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PSYC 3127	Social and Affective Neuroscience
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SLHS 2133	Autism
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SLHS 3116	Brain and Language
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Advanced biochemistry: 3 or 4 credits (one course), selected from the following:

BISC 3261	Introductory Medical Biochemistry
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CHEM 3165	Biochemistry I <sup>2</sup>
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CHEM 3166	Biochemistry II
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Research/laboratory experience

3 or 4 credits in a research/laboratory experience, which may be fulfilled by one semester of guided or independent research in ANTH, CHEM, PHIL, PSYC, or SLHS, or in one of the following courses: <sup>3</sup>

BISC 2452 & BISC 2453	Animal Behavior and Animal Behavior Laboratory
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BISC 4171	Undergraduate Research
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or BISC 4171W Undergraduate Research

BISC 4172	Independent Study
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BISC 4180	Undergraduate Research Seminar
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PSYC 4106W	Research Lab in Sensation and Perception
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PSYC 4107W	Research Lab in Cognitive Neuroscience
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<sup>1</sup>38 credits (10 courses) if MATH 1231 is taken; 41 credits (11 courses) if MATH 1220 and MATH 1221 are taken

<sup>2</sup>Recommended for premed students. In addition, premed students are advised to take BISC 2322, BISC 2337, and SOC 1001.

<sup>3</sup>SLHS courses are available only to students with a minimum GPA of 3.5 in major courses and/or the permission of the instructor.

## GENERAL EDUCATION

In addition to the University General Education Requirement (<http://bulletin.gwu.edu/university-regulations/general-education/>), undergraduate students in Columbian College must complete a further, College-specific general education curriculum—Perspective, Analysis, Communication (G-PAC) (<https://advising.columbian.gwu.edu/general-education-curriculum-gpac/>) as well as the course CCAS 1001 First-Year Experience. Together with the University General Education Requirement, G-PAC engages students in active intellectual inquiry across the liberal arts. Students achieve a set of learning outcomes that enhance their analytical skills, develop their communication competencies, and invite them to participate as responsible citizens who are attentive to issues of culture, diversity, and privilege.

**Coursework (<http://bulletin.gwu.edu/university-regulations/general-education/#generaleducationtext>) for the University General Education Requirement is distributed as follows:**

- One course in critical thinking in the humanities.
- Two courses in critical thinking, quantitative reasoning, or scientific reasoning in the social sciences.
- One course that has an approved oral communication component.
- One course in quantitative reasoning (must be in mathematics or statistics).
- One course in scientific reasoning (must be in natural and/or physical laboratory sciences).
- UW 1020 (<https://bulletin.gwu.edu/search/?P=UW%201020>) University Writing (4 credits).
- After successful completion of UW 1020, 6 credits distributed over at least two writing in the discipline (WID) courses taken in separate semesters. WID courses are designated by a "W" appended to the course number.

**Coursework for the CCAS G-PAC requirement is distributed as follows:**

- Arts—one approved arts course that involves the study or creation of artwork based on an understanding or interpretation

of artistic traditions or knowledge of art in a contemporary context.

- Global or cross-cultural perspective—one approved course that analyzes the ways in which institutions, practices, and problems transcend national and regional boundaries.
- Local or civic engagement—one approved course that develops the values, ethics, disciplines, and commitment to pursue responsible public action.
- Natural or physical science—one additional approved laboratory course that employs the process of scientific inquiry (in addition to the one course in this category required by the University General Education Requirement).
- Humanities—one additional approved humanities course that involves critical thinking skills (in addition to the one course in this category required by the University General Education Requirement).
- CCAS 1001 First-Year Experience

**Certain courses are approved to fulfill GPAC requirements in more than one category.**

Courses taken in fulfillment of G-PAC requirements may also be counted toward majors or minors. Transfer courses taken prior to, but not after, admission to George Washington University may count toward the University General Education Requirement and G-PAC, if those transfer courses are equivalent to GW courses that have been approved by the University and the College.

Lists of approved courses in the above categories are included on each undergraduate major's (<http://bulletin.gwu.edu/arts-sciences/#majorstext>) page in this Bulletin.

## SPECIAL HONORS

In addition to the general requirements stated under University Regulations, in order to be considered for graduation with Special Honors, students must maintain a cumulative 3.5 grade-point average in biological sciences courses and at least a 3.0 cumulative overall grade-point average. Students who meet these criteria and wish to pursue special honors must complete an approved research project under faculty direction.

## COMBINED PROGRAM

### Combined program

- Dual Bachelor of Science with a major in neuroscience and Master of Science in the field of biological sciences (<http://bulletin.gwu.edu/arts-sciences/biological-sciences/dual-bs-neuroscience-ms-biological-sciences/>)