

# BACHELOR OF SCIENCE IN NEUROSCIENCE

Students majoring in neuroscience will complete a 120 credit-hour curriculum (plus a required 2-credit class in health). They will learn fundamental principles and up-to-date advances in the field of neuroscience. The program will build on a strong foundation of required courses in the physical sciences and mathematics (chemistry, computer science, calculus, statistics and physics) in order to prepare students with the analytical skills needed to address the complexity of problems in neuroscience. The program will emphasize technological methods and innovations that have been critical, as well as ones needed to continue progress in neuroscience.

Code	Title	Credit Hours
<b>Wellness Requirement</b>		
APPH 1040	Scientific Foundations of Health	2
	or APPH 10 The Science of Physical Activity and Health	
	or APPH 10 Flourishing: Strategies for Well-being and Resilience	
<b>Core IMPACTS</b>		
<b>Institutional Priority</b>		
CS 1301	Introduction to Computing	3
	or CS 1315 Introduction to Media Computation	
	or CS 1371 Computing for Engineers	
<b>Mathematics and Quantitative Skills</b>		
MATH 1552	Integral Calculus	4
	or MATH 1555 Calculus for Life Sciences	
<b>Communicating in Writing</b>		
ENGL 1101	English Composition I	3
ENGL 1102	English Composition II	3
<b>Political Science and U.S. History</b>		
HIST 2111	The United States to 1877	3
	or HIST 211 The United States since 1877	
	or INTA 120 American Government in Comparative Perspective	
	or POL 1101 Government of the United States	
	or PUBP 30 American Constitutional Issues	
<b>Arts, Humanities, and Ethics</b>		
Any HUM		6
<b>Technology, Mathematics, and Sciences</b>		
PHYS 2211	Introductory Physics I	4
PHYS 2212	Introductory Physics II	4
MATH 1551	Differential Calculus	2
	or MATH 1552 Introduction to Differential Calculus	
MATH 1553	Introduction to Linear Algebra <sup>1</sup>	2
	or MATH 1554 Linear Algebra	
	or MATH 1555 Linear Algebra with Abstract Vector Spaces	
<b>Social Sciences</b>		
PSYC 1101	General Psychology	3
Any SS		6
<b>Field of Study</b>		
CHEM 1310	Principles of General Chemistry for Engineers	4
	or CHEM 12 Chemical Principles I	

CHEM 1315	Survey of Organic Chemistry for Engineers <sup>2</sup>	3
	or CHEM 230 Organic Chemistry I	
BIOS 1107	Biological Principles	3
	or BIOS 120 Biological Principles for Majors	
BIOS 1107L	Biological Principles Laboratory	1
	or BIOS 120L Biological Principles Project Laboratory	
CHEM 3511	Survey of Biochemistry <sup>3</sup>	3
NEUR 2001	Principles in Neuroscience	4
<b>Major Requirements</b>		
NEUR 3001	Cell and Molecular Neuroscience	3
NEUR 3002	Neural Systems, Networks, and Behavior	3
NEUR 3003	Neuroscience of Behavior	3
NEUR 3010	Methods in Neuroscience	3
<b>Neuroscience Depth Electives</b>		
<b>18</b>		
Select one research based elective:		
	NEUR 4001 Neuroscience Research Project <sup>4</sup>	
	NEUR Thesis Option	
Select one statistics elective: <sup>5</sup>		
	BIOS 4401 Experimental Design and Statistical Methods in Biological Sciences	
	BMED 2400 Introduction to Bioengineering Statistics	
	ISYE 3770/ Statistics and Applications	
	ECE 3077	
	PSYC 2020 Psychological Statistics	
	MATH 3215 Introduction to Probability and Statistics	
	MATH 3225 Honors Probability and Statistics	
	MATH 3670 Probability and Statistics with Applications	
10-11 credits of additional Neuroscience electives <sup>6</sup>		
	BIOS 2600 Genetics	
	BIOS 2610 Integrative Genetics	
	BIOS 3450 Cell and Molecular Biology	
	BIOS 3451 Cell and Molecular Biology Lab	
	BIOS 3753 Human Anatomy	
	BIOS 3754 Laboratory in Human Anatomy	
	BIOS 3755 Human Physiology	
	BIOS 3756 Physiology Laboratory	
	BIOS 4200 Kinesiological Basis of Human Movement	
	BIOS 4238 Ion Channels	
	BIOS 4400 Human Neuroanatomy	
	BIOS 4464 Developmental Biology	
	BIOS 4471 Behavioral Biology	
	BIOS 4480 Evolutionary Developmental Biology – How to Build an Organism	
	BIOS 4651 Bioethics	
	BIOS 4746 Signaling Molecules	
	CHEM 4511 Biochemistry I	
	CHEM 4512 Biochemistry II	
	NEUR 2699 Undergraduate Research	
	NEUR 4100 Neurodevelopment	
	NEUR 4740 Neuroethics	
	NEUR 4300 Neuroscience of Memory	
	NEUR 4400 Neuroendocrinology	
	NEUR 4699 Undergraduate Research	

NEUR 4803 Special Topics	
PHYS 3804 Special Topics (Neurophysics)	
PHYS 4803 Special Topics (Physical Principles of Living Systems)	
PSYC 2015 Research Methods	
PSYC 2103 Human Development Over the Life Span	
PSYC 2230 Abnormal Psychology	
PSYC 3011 Cognitive Psychology	
PSYC 3012 Introduction to Cognitive Psychology	
PSYC 3040 Sensation and Perception	
PSYC 3041 Human Sensation and Perception	
PSYC 4100 Behavioral Pharmacology	
PSYC 4090 Cognitive Neuroscience	
<b>Breadth Electives</b>	<b>15</b>
<b>Free Electives</b>	<b>14</b>
<b>Total Credit Hours</b>	<b>122</b>

<sup>1</sup> MATH 1553 (2 cr.) is preferred but MATH 1554 (Linear Algebra, 4 cr.) or MATH 1564 (Linear Algebra with Vector Spaces, 4 cr.) can satisfy this requirement with the excess 2 cr. to be applied to free electives.

<sup>2</sup> CHEM 2311 is an approved substitution for CHEM 1315 to fulfill Field of Study only for students who complete a full year of organic chemistry (i.e., both CHEM 2311 and CHEM 2312 or CHEM 2313 must be completed).

<sup>3</sup> CHEM 4511 is an approved substitution for CHEM 3511 to fulfill Field of Study only for students who complete a full year of biochemistry (i.e., both CHEM 4511 and CHEM 4512 must be completed).

<sup>4</sup> Four credits of NEUR 4699 credit is only allowed to substitute for NEUR 4001 if completing the Georgia Tech Research Option. The Research Option requires an additional 6 credits of research (an additional 2 credits of NEUR 4699 may be applied to "Additional Neuroscience Electives"; the additional 3 credits of research credit will be applied to Free Electives), and LMC 4701 (1 credit) and LMC 4702 (1 credit) (applied to Free Electives). A research proposal and thesis/report is also required to complete the Research Option.

<sup>5</sup> PSYC 2020 may be completed only for students completing the Psychology Breadth Elective option.

<sup>6</sup> Biological Sciences, Chemistry, Mathematics, and Psychology Special Topics must be approved by Neuroscience Curriculum Committee

approved proposal is required for admission to the class "Writing an Undergraduate Thesis" (see below).

- The thesis/report must be approved and graded by two faculty members.
- Theses will be published in the Georgia Tech Library.
- Take the two-credit class "Writing an Undergraduate Thesis." [LMC 4701 and LMC 4702]

<http://www.undergradresearch.gatech.edu/research-option/>

## BSMS Option

The BSMS Option allows eligible students to double count a maximum of 6 credit hours toward undergraduate and graduate requirements while still completing all other program requirements to earn both degrees. The credit must be approved coursework (4000-level or higher; not seminar or research credit) completed with a grade of 'B' or higher.

To apply for the option, undergraduate Neuroscience students must have at least 30 credit hours earned at Georgia Tech with an undergraduate GPA of 3.3 or higher, and fewer than 90 credits overall (including transfer credit).

The minimum GPA to graduate with an undergraduate degree in Neuroscience to continue to the MS in Psychology program is 3.0. The minimum GPA for graduation with the MS in 2.7.

Students will need to consult with an advisor to indicate which courses are sharing with the graduate degree in DegreeWorks.

## Research Option

BS in Neuroscience students are able to complete the Georgia Tech Research Option.

To complete the research option for Neuroscience, the student must:

- Complete ten units of supervised research, over a period of preferably three but at least two terms.
- Research may be for either pay or credit [typically 4698 or 4699]\* - for BS in Neuroscience, this will be NEUR 4699.
- At least six credit hours must be on the same research project, broadly defined.
- Write an undergraduate thesis or other substantial, written report showing results of the research.
- A research proposal must be approved by a faculty advisor and one other faculty member. The proposal will normally be completed at the end of the student's first semester of research, but must be approved at latest before the start of their final term of research. An