

College of Science
Bachelor of Science in Neuroscience
For Student Date of Entry Under UG Catalog 2022-2023
Major: Cognitive and Behavioral Neuroscience

1. Pathways to General Education Requirements (45 Credits)			
Concept 1F: Discourse (Foundational)	_____ (3) ()	_____ (3) ()	
Concept 1A: Discourse (Advanced)	_____ (3) ()		
Concept 2: Critical Thinking in the Humanities	_____ (3) ()	_____ (3) ()	
Concept 3: Reasoning in the Social Sciences	_____ (3) ()	_____ (3) ()	
Concept 4: Reasoning in the Natural Sciences			
	<u>BIOL 1105 Principles of Biology¹</u> (3) ()	<u>BIOL 1106 Principles of Biology¹</u> (3) ()	
Concept 5F: Quantitative and Computational Thinking (Foundational)			
	<u>MATH 1025 Elementary Calculus¹</u> (3) ()	<u>MATH 1026 Elementary Calculus¹</u> (3) ()	
Concept 5A: Quantitative and Computational Thinking (Advanced)			
	<u>#STAT 3615 Biological Statistics</u> (3) ()		
Concept 6A: Critique and Practice in Design and the Arts (Arts)	_____ (3) ()		
Concept 6D: Critique and Practice in Design and the Arts (Design)	_____ (3) ()		
Concept 7: Critical Analysis of Identity and Equity in the United States	_____ (3) ()		
2. Core Neuroscience Requirements (22 Credits)			
CHEM 1035-1036 ¹	General Chemistry	(3) ()	(3) ()
NEUR 1004 ¹	Neuroscience Orientation Seminar		(2) ()
#NEUR 2025-2026 ¹	Introduction to Neuroscience	(3) ()	(3) ()
NEUR 2035-2036 ¹	Neuroscience Laboratory	(1) ()	(1) ()
#NEUR 4044 ¹	Neuroscience Senior Seminar		(3) ()
PSYC 1004 ^{1*}	Introductory Psychology		(3) ()
*note that because PSYC1004 is in the "Core" requirements, it <i>may not</i> double count as a concept 3 course			
3. Cognitive and Behavioral Neuroscience Major Requirements (20 Credits)			
BIOL 1115-BIOL 1116 ¹	Principles of Biol. Lab	(1) ()	(1) ()
#NEUR 3084	Cognitive Neuroscience		(3) ()
#NEUR 3144	Mechanisms of Learning and Memory		(3) ()
#PSYC 2044	Psychology of Learning		(3) ()

#STAT 3616	Biological Statistics		(3) ()
#PHYS 2205-2206	General Physics	(3) ()	(3) ()

4. Restricted Electives (15 Total Credits)

Students must complete 12 credits of restricted electives including:

- a. At least two (2) of the following: NEUR 2464, NEUR 3914, NEUR 3594, NEUR 4454
- b. At least two (2) additional courses with a “NEUR” prefix from the approved list
- c. At least three (3) additional restricted elective credits from the approved list

Section 4a. (6 credits)

Choose two (2) of the following courses. Courses may not double count with the credits chosen for any other CBNU requirement. If NEUR2464 is selected as an option, you must choose at least 3 credits from section 4b or 4c at the 3000-level or 4000-level such that at least 6 of the 12 total restricted elective credits are at the 3000/4000 level.

NEUR 2464	Neuroscience and Society		(3) ()
#NEUR 3914	Neuroscience of Drug Addiction		(3) ()
#NEUR 3594	Neurobiology of Psych Disorders		(3) ()
#NEUR 4454	Neuroeconomics		(3) ()

Section 4b. (6 credits)

Choose two (2) of the following courses. Courses may not double count with the credits chosen for any other CBNU requirement. If NEUR4994 is selected, research must total to 3 credits.

NEUR 2464	Neuroscience and Society		(3) ()
#NEUR 2594	Exploring Clinical Neuroscience		(3) ()
#NEUR 2554	Experimental Neuroscience		(3) ()
#NEUR 3044	Cellular and Molecular Neuroscience		(3) ()
#NEUR 3234	The Artificial Brain		
#NEUR 3554	Neuroscience Research and Practical Experience		(3) ()
#NEUR 3774	Neuroendocrinology		(3) ()
#NEUR 3844	Computational Neuroscience & Neural Engineering		(3) ()
#NEUR 3914	Neuroscience of Drug Addiction		(3) ()
#NEUR 3944	War and the Brain		(3) ()
#NEUR 3594	Neurobiology of Psych Disorders		(3) ()
#NEUR 4034	Diseases of the Nervous System		(3) ()
#NEUR 4314	Genetics in Neuroscience		(3) ()
#NEUR 4364	Neuroscience of Language and Communication Disorders		(3) ()
#NEUR 4454	Neuroeconomics		(3) ()
	<small>(NEUR 4454 is cross listed with ECON4454 and PSYC4454)</small>		
#NEUR 4514	Neuroimmunology in Health and Disease		(3) ()
#NEUR 4594	Clinical Neuroscience in Practice		(3) ()
#NEUR 4914	Drug Development in Neuroscience		(3) ()
NEUR 4994	Undergraduate Research		(3) ()
	<small>(NEUR4994 may only be taken after two terms of research at the 2994 level)</small>		

Section 4c. (3 credits)

*Choose at least **three (3) additional restricted elective credits** from the approved list below. Courses may not double count with credits chosen for any other CBNU requirement.*

#ALS 2304	Comparative Animal Physiology and Anatomy		(4) ()
#ALS/BIOL 4554	Neurochemical Regulation		(3) ()
#BCHM 2024	Concepts of Biochemistry		(3) ()

#BCHM 3114	Biochemistry for Biotechnology	(3)	()
#BIOL 2004	Genetics	(3)	()
#BIOL 2134	Cell Function and Differentiation	(3)	()
#BIOL 3404	Introductory Animal Physiology	(3)	()
#BIOL 4824	Bioinformatics Methods	(3)	()
#BMSP 2135-2136	Human Anatomy and Physiology	(3) ()	(3) ()
CHEM 1045-1046	General Chemistry Laboratory	(1) ()	(1) ()
#CHEM 2514	Survey of Organic Chemistry	(3)	()
#CHEM 2535-2536	Organic Chemistry	(3) ()	(3) ()
#CHEM 2545-2546	Organic Chemistry Lab	(1) ()	(1) ()
#CHEM 4554	Drug Chemistry	(3)	()
#CHEM 4615-4616	Physical Chemistry for the Life Sciences	(3) ()	(3) ()
NEUR 2464	Neuroscience and Society	(3)	()
#NEUR 2554	Experimental Neuroscience	(3)	()
#NEUR 2594	Exploring Clinical Neuroscience	(3)	()
#NEUR 3034	Global Perspectives Pre-Depart	(2)	()
#NEUR 3044	Cellular and Molecular Neuroscience	(3)	()
#NEUR 3234	The Artificial Brain	(3)	()
#NEUR 3554	Neuroscience Research and Practical Experience	(3)	()
#NEUR 3774	Neuroendocrinology	(3)	()
#NEUR 3844	Computational Neuroscience & Neural Engineering	(3)	()
#NEUR 3914	Neuroscience of Drug Addiction	(3)	()
#NEUR 3944	War and the Brain	(3)	()
#NEUR 3594	Neurobiology of Psych Disorders	(3)	()
#NEUR 4034	Diseases of the Nervous System	(3)	()
#NEUR 4314	Genetics in Neuroscience	(3)	()
#NEUR 4364	Neuroscience of Language and Communication Disorders	(3)	()
#NEUR 4454	Neuroeconomics	(3)	()
	(NEUR 4454 is cross listed with ECON4454 and PSYC4454)		
#NEUR 4514	Neuroimmunology in Health and Disease	(3)	()
#NEUR 4594	Clinical Neuroscience in Practice	(3)	()
#NEUR 4914	Drug Development in Neuroscience	(3)	()
NEUR 4994	Undergraduate Research	(3)	()
	(NEUR4994 may only be taken after two terms of research at the 2994 level)		
#PHYS 2215-2216	General Physics Lab	(1) ()	(1) ()
#PHYS 4714	Introduction to Biophysics	(3)	()
#PSYC 4044	Advanced Learning	(3)	()
#PSYC 4064	Physiological Psychology	(3)	()
#PSYC 4074	Sensation and Perception	(3)	()
#PSYC 4114	Cognitive Psychology	(3)	()
#STAT 3424	Introduction to Statistical Neuroscience and Image Analysis	(3)	()
#STAT 4204	Experimental Designs	(3)	()

5. Free Electives (18 Credits)

	(__ cr)		(__ cr)
	(__ cr)		(__ cr)
	(__ cr)		(__ cr)
	(__ cr)		(__ cr)

Acceptable Substitutions:

BIOL 1105: BIOL 1005 General Biology
BIOL 1106: BIOL 1006 General Biology
BIOL 1115: BIOL 1015 General Biology Lab
BIOL 1116: BIOL 1016 General Biology Lab
CHEM 1035-1036: CHEM 1055-1056 General Chemistry for Majors
CHEM 1045-1046: CHEM 1065-1066 General Chemistry Lab for Majors
CHEM 2535-2536: CHEM 2565-2566 Principles of Organic Chemistry
CHEM 2545-2546: CHEM 2555-2556 Org Syn Tech Lab
MATH 1025-1026: MATH 1225-1226 Calculus of a Single Variable
NEUR 1004: Any approved FYE course
PHYS 2205, 2215: PHYS 2305 Foundations of Physics
PHYS 2206, 2216: PHYS 2306 Foundations of Physics

Double Majors/Minors: The School of Neuroscience offers majors in Cognitive and Behavioral Neuroscience, Clinical Neuroscience, Computational and Systems Neuroscience, and Experimental Neuroscience. Courses for these majors overlap slightly. Therefore, students may not pursue multiple majors within the School.

Foreign Language Requirement: Students who did not successfully complete at least two years of a single foreign, classical, or sign language during high school must successfully complete six semester hours of a single foreign, classical, or sign language at the college level. Courses taken to meet this requirement do not count toward the hours required for graduation. Please consult the Undergraduate Catalog for details.

¹Grade Requirements: Students must earn a grade of “C-” or better in all core neuroscience coursework (CHEM 1035, CHEM 1036, NEUR 1004, NEUR 2025, NEUR 2026, NEUR 2035, NEUR 2036, NEUR 4044, PSYC 1004) or the equivalent coursework. Students must also earn a “C-” or better in BIOL 1105, BIOL 1106, BIOL 1115, BIOL 1116, MATH 1225, and MATH 1226. Only two attempts, including course withdrawals with a grade of “W,” are allowed for each core neuroscience course, BIOL 1105, BIOL 1106, BIOL 1115, BIOL 1116, MATH 1225, and MATH 1226.

Graduation Requirements: Student must complete a minimum of 120 credit hours with an overall GPA of 2.0 and a minimum in-major GPA of 2.0. For purposes of GPA computation, courses IN-MAJOR will include Core requirements, Major requirements, Restricted Electives, BIOL 1105, 1106, 1115, 1116, and MATH 1025-1026.

#Prerequisites: This check sheet contains courses that have at least one prerequisite that may not be included as part of this degree. Please see your advisor or consult the Undergraduate Course Catalog for more information.

Progress Toward Degree Policy: After attempting 72 credits, students must have completed BIOL 1105, 1106, 1115, 1116, CHEM 1035-1036, NEUR 2025-2026 and 2035-2036; have a minimum overall GPA of 2.5; and have completed at least 24 credits that apply to the Pathways to General Education requirements.

Terminology:

Pathways Requirements: Pathways to General Education is defined by the university as “A vibrant, flexible, and innovative general education program that provides a coherent and meaningful learning experience and allows students to integrate the learning for use throughout their lifetimes.”

Core Neuroscience Requirements: Core neuroscience requirements are those requirements that must be fulfilled by all students in the School of Neuroscience, regardless of major.

Major Requirements: Major requirements are those requirements that are unique to the CBNU major and do not apply across all School of Neuroscience majors.

Restricted Elective: Restricted elective courses provide students the autonomy to select 12 or more credits of coursework within an approved list to count towards the students' degree requirements. These courses expand on the depth and breadth of the CBNU major.

Free Elective: Free elective credits may consist of any credit-bearing Virginia Tech coursework to ensure that students reach the 120 credits required by the university to earn a bachelor's degree. Coursework that does not apply elsewhere towards the degree will apply here (this includes non-duplicative coursework for double majors, minors, or AP coursework that does not count elsewhere towards the degree).