NEUROSCIENCE, BS (DEPARTMENT OF PSYCHOLOGICAL AND BRAIN SCIENCES)

Neuroscience is a multidisciplinary science dedicated to understanding how nervous systems are built and function at different scales, from molecules and cells to circuits and systems. Neuroscientists are involved in work to improve the human condition with new discoveries that could prevent or treat neurodevelopmental defects and disorders, psychiatric disorders, and neurodegenerative diseases.

The Neuroscience major is listed under both the Department of Biological Sciences and the Department of Psychological and Brain Sciences. The requirements are the same in both listings.

A neuroscience major is an excellent starting point for a career in human or animal medicine, psychology, medical research, pharmaceuticals, public health or science writing. Entry level jobs for students with a bachelor's degree include positions as assistants in hospitals and private healthcare clinics; as technicians in academic, governmental, or commercial research laboratories; in pharmaceutical sales and marketing; and in government agencies and nonprofits in roles related to grant writing, regulatory management, or technical assistance. Many of these occupational areas are projected to grow faster than average in the next decade. The average annual salary for a neuroscientist with a BS degree is $66,975 (as of 2021). The major is also excellent preparation for students pursuing doctoral degrees in medicine, medical research, or professional counseling.

The courses for the major come primarily from the Department of Biological Sciences and the Department of Psychological and Brain Sciences. Students will learn about the structure and function of nervous systems, from the cellular level to the systems level; the connections between the brain and behavior; experimental design and research methods; and data analysis, interpretation, and use. Within the major students can take coursework in neuroscience subdisciplines such as cognitive, cellular and molecular, or computational neuroscience.

Course of Study – Bachelor of Science Degree

Complete 120 credits including 75 credits in the College of Letters & Science and with 36 of the 75 credits in L&S upper-level (numbered above 300) courses and 30 of those 36 credits in designated L&S Advanced Natural Science courses (https://catalog.uwm.edu/letters-science/approved-courses-advanced-natural-science/).

The College requires that students complete in residence at UWM at least 15 credits in upper-division (numbered 300 or above) courses in their major. The College also requires that students complete at least 30 credits overall in residence at UWM. For additional residency and transfer credit limitations, see L&S Undergraduate Policies and Regulations (https://catalog.uwm.edu/letters-science/#policiesandregulationstext).

Students are also required to complete University-wide General Education Requirements (https://catalog.uwm.edu/policies/undergraduate-policies/#bachelorsdegreegeneraleducation) and the specific L&S requirements listed below.

To complete a major, students must satisfy all the requirements of the major as stated in this catalog. Students who declare their majors within five years of entering the UW System as a degree candidate may satisfy the requirements outlined in any catalog issued since the time they entered. Credits used to satisfy the major also may be used to satisfy other degree requirements.

University General Education Requirements (GER)

Code	Title	Credits
Oral and Written Communication		
Part A		
Achieve a grade of C or better in the following course:		
ENGLISH 102	College Writing and Research (or equivalent)	
Part B		
Course designated as OWC-B; may be completed through a major-specific course requirement		
Quantitative Literacy		
Part A		
Earn at least 3 credits with a grade of C or higher in one of the following courses or an equivalent course, or achieve a placement code of at least 30 on the mathematics placement test (or other appropriate test, as determined by the Mathematical Sciences Department)		
MATH 102	Mathematical Literacy for College Students II	
MATH 103	Contemporary Applications of Mathematics	
MATH 105	Introduction to College Algebra	
MATH 108	Algebraic Literacy II	
MATH 111	Introduction to Logic - Critical Reasoning [1]	
or PHILOS 111	Introduction to Logic - Critical Reasoning	
MATH 116	College Algebra	
Or equivalent course		
Part B		
Course designated as QL-B; may be completed through a major-specific course requirement		
Arts		
Select 3 credits		3
Humanities		
Select 6 credits		6
Social Sciences		
Select 6 credits		6
Natural Sciences		
Select 6 credits (at least two courses including one lab)		6
UWM Foreign Language Requirement		
Complete Foreign Language Requirement through:		
Two years (high school) of a single foreign language		
Two semesters (college) of a single foreign language		
Or equivalent		
UWM Cultural Diversity Requirement		

One course from the Arts, Humanities, or Social Sciences must also satisfy UWM's Cultural Diversity requirement

[1] Math 111 and Philosophy 111 are jointly offered and count as repeats of one another. Students cannot receive credit for both courses.

College of Letters & Science Requirements

The degree requirements in the College of Letters and Science build on the University General Education Requirements to provide a broad base of knowledge as well as an array of skills cited by employers as critical to professional success: critical thinking, problem solving, oral and written communication, ability to work well with others, and adaptability to change.

For the Bachelor of Science (B.S.), you must complete the UWM General Education Requirements as well as these L&S requirements: the International requirement, the Breadth requirement, and the Research requirement. The International requirement develops your potential for cross-cultural understanding in a globalizing world. The Breadth requirement ensures that you take classes in a wide variety of subjects, across humanities, natural sciences, and social sciences. The Research requirement calls for you to build your critical thinking and oral and written communication skills through conducting an independent research project, usually in your major.

For the Bachelor of Science (B.S.) you will complete additional coursework in L&S Advanced Natural Science courses (https://catalog.uwm.edu/letters-science/approved-courses-advanced-natural-science/).

I. Total Credits and Upper-Division Courses Requirement

Students must complete 120 credits including 75 credits in the College of Letters & Science and with 36 of the 75 credits in L&S upper-level (numbered above 300) courses.

II. L&S Advanced Natural Sciences Requirement

For the Bachelor of Science, students must complete 30 credits of the 36 credits in upper-division courses in designated L&S Advanced Natural Science courses (https://catalog.uwm.edu/letters-science/approved-courses-advanced-natural-science/).

III. International Requirement

To meet the International Requirement, students must successfully complete some three course (minimum 9 credits) combination of

1. language other than English (*not* including American Sign Language) at 3rd semester level or above, ***and/or***
2. non-language courses with L&S approved international content (see Courses Approved for the L&S International Requirement (https://catalog.uwm.edu/letters-science/approved-courses-international-requirement/) for course options).

IV. Breadth Requirement

In addition to completing the University General Education Requirements, L&S students must complete the Breadth requirement.

The L&S Breadth requirement calls for 6 credits each in L&S courses designated L&S Humanities, L&S Natural Sciences, and L&S Social Sciences breadth. One of the L&S Natural Science breadth courses must be a laboratory or fieldwork course. These courses must be beyond and in addition to courses in those areas used to satisfy General Education Requirements.

Please refer to the list of Courses Approved for the L&S Breadth Requirement (https://catalog.uwm.edu/letters-science/breadth-requirement-course-list/).

V. The Major

The College requires that students attain at least a 2.0 GPA in all credits in the major attempted at UWM. In addition, students must attain a 2.0 GPA on all major credits attempted, including any transfer work. Individual departments or programs may require higher GPAs for graduation. Some departmental majors require courses from other departments. Contact your major department for information on whether those credits will count as part of the major GPA. The College requires that students must complete in residence at UWM at least 15 credits in upper-division (numbered 300 or above) courses in their major.

Research Requirement

Within their majors, students must complete a research experience approved by the L&S faculty. A list of courses satisfying the research requirement in each major can be found here (https://catalog.uwm.edu/letters-science/approved-courses-research-requirement/).

VI. The Minor

Students are encouraged to consider completing a minor, but it is not required. To complete a minor, the College of Letters and Science requires that students attain at least a 2.0 GPA in all credits in the minor attempted at UWM. In addition, students must attain a 2.0 GPA on all minor credits attempted, including any transfer work. The minor must contain at least 9 credits in upper-division (numbered 300 and above) courses.

Degree Requirements

The program requires at least 120 credits, which include University-wide General Education Requirements (https://catalog.uwm.edu/policies/undergraduate-policies/#bachelorsdegreegeneraleducation), 24 credits of mandatory preparatory courses, 23-24 credits of required core courses, 11 credits of elective courses within the major, a research experience course at the end of the coursework, and additional elective courses to fulfill the overall credit requirement.

An overall GPA of 2.000 on all coursework attempted at UWM is required for this degree. In addition, students must achieve a 2.000 GPA on all coursework attempted, including transfer work. A minimum 2.000 GPA must be earned on all 300-level and above courses taken to satisfy the advanced requirements. Students satisfy the residency requirement for the degree at UWM by completing at least 15 credits in the upper-division (numbered 300 or above) courses in the major.

Code	Title	Credits
Preparatory courses		
Chemistry		
CHEM 102	General Chemistry	5
CHEM 104	General Chemistry and Qualitative Analysis	5
CHEM 343	Organic Chemistry	3
CHEM 345	Organic Chemistry	3
Physics		
PHYSICS 120	General Physics I (Non-Calculus Treatment)	4
or PHYSICS 209	Physics I (Calculus Treatment)	
PHYSICS 122	General Physics II (Non-Calculus Treatment)	4

or PHYSICS 210	Physics II (Calculus Treatment)	
Total Credits		**24**

Code	Title	Credits
Required courses		
Biological Sciences		
BIO SCI 150	Foundations of Biological Sciences I	4
BIO SCI 152	Foundations of Biological Sciences II	4
BIO SCI 315	Cell Biology	3
BIO SCI 455	Cellular, Molecular and Developmental Neurobiology	3
Psychology		
PSYCH 101	Introduction to Psychology	3
PSYCH 254	Introduction to Neuroscience	3
One of these courses in statistics:		*3-4*
BIO SCI 465	Biostatistics	
MTHSTAT 215	Elementary Statistical Analysis	
PSYCH 210	Psychological Statistics	
Electives (see below for approved elective courses)		*11*
Research experience (see below for course options)		*1-4*
Total Credits		**35-39**

Code	Title	Credits
Required research experience (select one of the options below)		
NEURO 690	Undergraduate Research in Neuroscience	3
NEURO 699	Independent Study	1-3
BIO SCI 672	Undergraduate Seminar in Cell and Molecular Biology	1
BIO SCI 697	Independent Study in Cell and Molecular Biology [1]	1-3
BIO SCI 699	Independent Study [1]	1-3
PSYCH 654	Advanced Behavioral Neuroscience	4
PSYCH 656	Psychophysiology	4
PSYCH 690	Undergraduate Research: Upper Division	1-3

[1] These independent study courses may be counted toward the research requirement in the Neuroscience major only with approval of the student's Neuroscience faculty advisor.

Code	Title	Credits
Elective courses (select courses to complete 11 credits from the options below)		
BIO SCI 203	Anatomy and Physiology II	4
BIO SCI 290	Independent Study and Research:	1-3
BIO SCI 316	Laboratory in Genetics and Cell Biology	2
BIO SCI 325	Genetics	4
BIO SCI 356	Developmental Biology	3
BIO SCI 370	Mammalian Physiology	3
BIO SCI 469	Genomic Data Analysis	2
BIO SCI 490	Molecular Genetics	3
BIO SCI 539	Laboratory Techniques in Molecular Biology	4
BIO SCI 542	Biological Electron Microscopy	3
BIO SCI 543	Scanning Electron Microscopy Laboratory	2
BIO SCI 544	Transmission Electron Microscopy Laboratory	3
BIO SCI 564	Endocrinology	3
BIO SCI 565	Gene Regulation in Stem Cells and Regeneration	3
BIO SCI 566	Cell Biology of Human Disease	3
BIO SCI 572	Functional Genomics	3
BIO SCI 672	Undergraduate Seminar in Cell and Molecular Biology	1
BIO SCI 697	Independent Study in Cell and Molecular Biology	1-3
BMS 610	Pharmacology	3
CHEM 501	Introduction to Biochemistry	3
PSYCH 214	Introduction to Conditioning and Learning	3
PSYCH 290	Undergraduate Research: Lower Division	1-3
PSYCH 325	Research Methods in Psychology	4
PSYCH 433	Neuropsychology	3
PSYCH 454	Psychopharmacology and Addiction	3
PSYCH 503	Perception	3
PSYCH 510	Advanced Psychological Statistics	3
PSYCH 610	Experimental Design	3
PSYCH 611	Current Topics:	3
PSYCH 623	Perceptual Processes	4
PSYCH 627	Cognitive Neuroscience	3
PSYCH 645	Hormones and Behavior	3
PSYCH 654	Advanced Behavioral Neuroscience [2]	4
PSYCH 656	Psychophysiology [2]	4
PSYCH 657	Neurobiology of Learning and Memory	3
PSYCH 682	The Aging Brain	3
PSYCH 690	Undergraduate Research: Upper Division [2]	1-3

[2] If not taken to satisfy research experience requirement.

Neuroscience BS Learning Outcomes

Students graduating from the BS program in Neuroscience will be able to:

1. Describe how brain cells function on a biological, chemical, physical, and/or systems level.
2. Explain how brain function translates into behavioral, cognitive, and/or physiological change.
3. Display critical thinking skills by analyzing and/or evaluating neuroscience literature.
4. Collect, analyze, and/or interpret data in neuroscience or related disciplines.
5. Communicate scientific ideas and research findings in written or oral forms.

Letters & Science Advising

During your time at UWM, you may have multiple members of your success team, including advisors, peer mentors and success coaches. Letters & Science students typically work with at least two different types of advisors as they pursue their degrees: professional college advisors and faculty advisors. L&S college advisors advise across your entire degree program while departmental faculty advisors focus on the major.

College advisors are located in Holton Hall (or virtually for online students) and serve as your primary advisor. They are your point person for your questions about navigating college and completing your degree. College advisors will:

- Assist you in defining your academic and life goals.
- Help you create an educational plan that is consistent with those goals.
- Assist you in understanding curriculum, major and degree requirements for graduation, as well as university policies and procedures.
- Provide you with information about campus and community resources and refer you to those resources as appropriate.
- Monitor your progress toward graduation and completion of requirements.

Faculty advisors mentor students in the major and assist them in maximizing their development in the program. You will begin working with a faculty advisor when you declare your major. Faculty advisors are an important partner and will:

- Help you understand major requirements and course offerings in the department.
- Explain opportunities for internships and undergraduate research and guide you in obtaining those experiences.
- Serve as an excellent resource as you consider potential graduate programs and career paths in your field.

Students are encouraged to meet with both their college advisor and faculty advisor at least once each semester. Appointments are available in-person, by phone or by video.

Currently enrolled students should use the Navigate360 website (https://uwm.navigate.eab.com/) to make an appointment with your assigned advisor or call (414) 229-4654 if you do not currently have an assigned Letters & Science advisor. Prospective students who haven't enrolled in classes yet should call (414) 229-7711 or email let-sci@uwm.edu.

College of Letters and Science Dean's Honor List

GPA of 3.750 or above, earned on a full-time student's GPA on 12 or more graded credits in a given semester.

Honors College Degree and Honors College Degree with Distinction

Granted to graduating seniors who complete Honors College requirements, as listed in the Honors College (https://catalog.uwm.edu/honors-college/) section of this site.

Commencement Honors

Students with a cumulative GPA of 3.500 or above, based on a minimum of 40 graded UWM credits earned prior to the final semester, will receive all-university commencement honors and be awarded the traditional gold cord at the December or May Honors Convocation. Please note that for honors calculation, the GPA is **not** rounded and is truncated at the third decimal (e.g., 3.499).

Final Honors

Earned on a minimum of 60 graded UWM credits: Cum Laude - 3.500 or above; Magna Cum Laude - 3.650 or above; Summa Cum Laude - 3.800 or above.