NEUROSCIENCE (BS)

This program was approved for students entering the university in the Summer 2022–Spring 2023 catalog year. For more information about catalog year, go to Catalog Year Information (http://catalog.louisville.edu/undergraduate/university-wide-unit-specific-policies/catalog-year/).

Bachelor of Science in Neuroscience

Unit: College of Arts and Sciences (http://www.louisville.edu/a-s/)
Department: Psychological and Brain Sciences (http://louisville.edu/psychology/); Anatomical Sciences and Neurobiology (http://louisville.edu/medicine/departments/anatomy/)
Academic Plan Code(s): NEURBS

Program Information

The Bachelor of Science in Neuroscience (BS in Neuroscience) is an interdisciplinary degree with a STEM+Health focus. The program trains students to critically assess and analyze ideas and concepts from the diverse disciplines that contribute to the field of neuroscience. Students achieve an in-depth understanding of nervous system function, from the molecular level to the cognitive sciences, and become familiar with the techniques used to measure nervous system function from the cellular level to the whole brain.

Graduates of this program are poised for careers in a wide variety of areas, including neuroscience and health-related fields, the social sciences, and the biological sciences. This program also prepares students for advanced-degree study in graduate school and professional degree programs.

Completion of this degree requires work to be submitted for the department's Learning Outcomes Measurement. For details, contact the department.

Degree Summary

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>General Education Requirements (<a href="http://catalog.louisville.edu/undergraduate/general-education-requirements/">http://catalog.louisville.edu/undergraduate/general-education-requirements/</a>)</td>
<td>31</td>
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<td>College/School Requirements</td>
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<td>Program/Major Requirements</td>
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<tr>
<td></td>
<td>Supporting Coursework</td>
<td>41</td>
</tr>
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<td>Minimum Total Hours</td>
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<td>121-123</td>
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</table>

1 Some credit hours from the General Education Requirements may be satisfied by courses defined by the program, in which case additional electives will be required to complete the minimum hours for the degree.

Specific coursework information can be found on the Degree Requirements tab.

Accelerated BS Neuroscience/MS Experimental Psychology

Neuroscience majors who are considering pursuing a master's degree (MS) in Experimental Psychology can speed up the process by applying some of their undergraduate credit hours toward a master's degree. Students accepted into the accelerated BS Neuroscience/MS Experimental Psychology take three graduate courses (9 credit hours) as an undergraduate that apply toward both the bachelor's degree and the eventual master's degree.

Interested students must apply to the program by December 1 of their junior year. Applicants must have completed PSYC 201, PSYC 301, PSYC 302, and PSYC 491 prior to application. Applicants must have a minimum overall GPA of 3.0 and maintain a GPA of greater than 2.5 during their enrollment in the BS/MS program.

Admission Requirements

Requirements for admission to the BS in Neuroscience:

1. Complete PSYC 201 or (equivalent) and PSYC 305, earning a grade of C or higher.
2. Complete Statistics Requirement (PSYC 301 or BIOL 350), earning a grade of C or higher. Completion of MATH 180 or MATH 205 is required for the degree. For admission to the major, students must have completed the necessary math coursework, or have a math placement score, to satisfy the prerequisites to enroll in MATH 180 or MATH 205.
3. Have an overall cumulative GPA of at least 2.5 (no grades of C-minus or lower in core or supporting coursework may be counted toward requirements for the major).
4. Have completed at least 30 hours of degree-applicable credit.

The Application for Major form can be found on the Arts & Sciences Advising Center website (http://louisville.edu/artsandsciences/advising/apply/).

General Education

<table>
<thead>
<tr>
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<tr>
<td>Minimum Total Hours</td>
<td></td>
<td>121-123</td>
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</tbody>
</table>

1 Some credit hours from the General Education Requirements may be satisfied by courses defined by the program, in which case additional electives will be required to complete the minimum hours for the degree.

The following courses are required by the program and can satisfy the respective General Education Requirement:

- PSYC 201 Introduction to Psychology
- BIOL 240 Unity of Life
- CHEM 201 General Chemistry I
- CHEM 207 Introduction to Chemical Analysis I
- MATH 180 or MATH 205 Elements of Calculus

*All degrees require the completion of the University-wide General Education Program (link provided above). Some General Education requirements may be met in the requirements for the major or supporting
coursework, in which case additional electives may be required to complete the minimum hours for the degree.

### College/School Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<td></td>
<td><strong>Arts &amp; Sciences Requirements</strong></td>
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<tr>
<td>GEN 100</td>
<td>Student Success Center First Year Experience</td>
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<tr>
<td>or GEN 101</td>
<td>Arts &amp; Sciences First Year Experience</td>
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<tr>
<td></td>
<td><strong>Foreign Language</strong></td>
<td>6-8</td>
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<tr>
<td></td>
<td><strong>Electives in Humanities or Social Sciences at 300+level</strong></td>
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<td></td>
<td>WR - two approved courses at the 300 level or above</td>
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<td><strong>Minimum Total Hours</strong></td>
<td>13-15</td>
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### Program/Major Requirements

<table>
<thead>
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<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td></td>
<td><strong>Program Coursework</strong></td>
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<tr>
<td>PSYC 201</td>
<td>Introduction to Psychology</td>
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<tr>
<td>PSYC 301</td>
<td>Statistics for Psychology</td>
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<tr>
<td>or BIOL 350</td>
<td>Biostatistics</td>
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<td>PSYC 302</td>
<td>Research Methods for Psychology</td>
<td>3</td>
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<td>PSYC 305</td>
<td>Brain and Behavior</td>
<td>3</td>
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<td>PSYC 331</td>
<td>Sensation and Perception</td>
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<tr>
<td>BIOL 329</td>
<td>Cellular and Molecular Biology</td>
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<td>PSYC 355</td>
<td>Neuroscience</td>
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<tr>
<td>PSYC 382</td>
<td>Cognitive Neuroscience</td>
<td>3</td>
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<tr>
<td>BIOL 465</td>
<td>Principles of Physiology</td>
<td>3</td>
</tr>
<tr>
<td>or BE 354</td>
<td>Anatomy and Physiology</td>
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<tr>
<td>ASNB 502</td>
<td>Fundamentals of Neuroscience</td>
<td>3</td>
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<tr>
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<td><strong>One of the following:</strong></td>
<td></td>
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<tr>
<td>ASNB 514</td>
<td>Molecular Neuroscience</td>
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<tr>
<td>ASNB 517</td>
<td>Seminar on Developmental Neurobiology</td>
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<tr>
<td>ASNB 530</td>
<td>Origin of Mammalian Sensory Systems and Comparative Neurobiology</td>
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<tr>
<td>ASNB 566</td>
<td>Synaptic Organization of the Central Nervous System</td>
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<td></td>
<td><strong>Minimum Total Hours</strong></td>
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### Supporting Courses

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<tr>
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<tbody>
<tr>
<td>BIOL 240</td>
<td>Unity of Life</td>
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<tr>
<td>BIOL 241</td>
<td>Unity of Life Lab</td>
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<tr>
<td>BIOL 242</td>
<td>Diversity of Life</td>
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<tr>
<td>BIOL 243</td>
<td>Diversity of Life Lab</td>
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<tr>
<td>MATH 180</td>
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<tr>
<td>or MATH 205</td>
<td>Calculus I</td>
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<tr>
<td>CHEM 201</td>
<td>General Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 202</td>
<td>General Chemistry II</td>
<td>3</td>
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<tr>
<td>CHEM 207</td>
<td>Introduction to Chemical Analysis I</td>
<td>1</td>
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<tr>
<td>CHEM 208</td>
<td>Introduction to Chemical Analysis II</td>
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</tr>
<tr>
<td>CHEM 209</td>
<td>Introduction to Chemical Analysis III</td>
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<tr>
<td>PHYS 221</td>
<td>Fundamentals of Physics I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 222</td>
<td>Fundamentals of Physics II</td>
<td>3</td>
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<tr>
<td>PHYS 223</td>
<td>Fundamentals of Physics Lab I</td>
<td>1</td>
</tr>
</tbody>
</table>

### Electives

- **Electives** 6
- **Suggested Electives** 12

### C suede

- BIOL 330 | Genetics and Molecular Biology                           |
- BIOL 331 | Genetics and Molecular Biology: Laboratory               |
- BIOL 415 | Biology of the Cell                                      |
- BIOL 511 | Behavioral Endocrinology                                 |
- BIOL 540 | Metabolic Biochemistry                                   |
- CHEM 341 | Organic Chemistry I                                      |
- CHEM 343 | Organic Chemistry Laboratory I                           |
- CHEM 342 | Organic Chemistry II                                     |
- CHEM 344 | Organic Chemistry Laboratory II                          |
- CHEM 545 | Biochemistry I                                           |
- PHIL 360 | Humanizing Technology                                    |
- PHIL 536 | Philosophy of Science                                    |
- PHIL 358 | Mind and Brain                                            |
- PHIL 580 | Foundations of Bioethics                                  |
- PHIL 581 | Current Controversies in Health Care Ethics              |
- PSYC 307 | Cognitive Processes                                      |
- PSYC 306 | Life Span Developmental Psychology                       |
- PSYC 308 | Foundations of Psychopathology                           |
- PSYC 445 | Special Topics in Neuroscience                           |

### Minimum Total Degree Hours

At least 50 of the total minimum hours required must be at the 300 level or above.

Students who wish to double major in the BS in Neuroscience and the BS in Psychology degrees must complete 18 credit hours toward the Psychology (PSYC) degree that do not count towards meeting the Neuroscience (NS) degree requirements. These 18 credits must include the following courses: PSYC 306, PSYC 307 and PSYC 308. If these courses are taken as electives for the NS degree, additional PSYC courses must be taken in their place. Students must also complete one PSYC CUE course and one NS CUE course. For elective courses that can count toward either degree, the student must specify whether each course will count for NS or for PSYC.

### Culminating Undergraduate Experience (Graduation Requirement)

Requirement fulfilled by completing one of the following:

- PSYC 492 | Undergraduate Psychology Research
- or ASNB 492 | Undergraduate Neuroscience Research CUE
- PSYC 495 | Honors Psychology Research
- or ASNB 495 | Honors Neuroscience Research
- PSYC 496 | Honors Psychology Thesis
- or ASNB 496 | Honors Neuroscience Thesis
- ASNB 530 | Origin of Mammalian Sensory Systems and Comparative Neurobiology
- or ASNB 566 | Synaptic Organization of the Central Nervous System

**NOTE:** ASNB 566 also fulfills the CUE requirement.
Completion of the second semester of a single foreign language; hours will vary depending on the language taken
In addition to courses counted toward General Education
May be incorporated into other degree requirements
Students who satisfy General Education Requirements by courses defined by the program will require additional electives to complete the minimum hours for the degree.
Does not satisfy CUE requirement for the Neuroscience BS
Students may select any courses they wish to fulfill the elective credits; however, the faculty suggest that students consider taking electives from the provided list as these courses are aligned with training in the discipline or may be required to fulfill preparation for certain degree paths (such as completing the typical pre-med requirements).

Flight Plan

### Year 1

#### Fall
- **GEN 101**  Arts & Sciences First Year Experience  1
- **ENGL 101**  Introduction to College Writing  3
- **PSYC 201**  Introduction to Psychology  3
- **BIOL 240**  Unity of Life  3
- **BIOL 241**  Unity of Life Lab  1
- **CHEM 201**  General Chemistry I  3
- **CHEM 207**  Introduction to Chemical Analysis I  1
- **CHEM 208**  Introduction to Chemical Analysis II  1
  
  **Hours**  16

#### Spring
- **ENGL 102**  Intermediate College Writing  3
- **BIOL 242**  Diversity of Life  3
- **BIOL 243**  Diversity of Life Lab  1
- **CHEM 202**  General Chemistry II  3
- **CHEM 209**  Introduction to Chemical Analysis III  1
- **PSYC 305**  Brain and Behavior  3
  
  **Hours**  14

### Year 2

#### Fall
- **BIOL 329**  Cellular and Molecular Biology  3
- **PHYS 221**  Fundamentals of Physics I  3
- **PHYS 222**  Fundamentals of Physics Lab I  1
- **PSYC 355**  Neuroscience  3
- **General Education: Cardinal Core Oral Communication – OC**  3
- **MATH 180**  Elements of Calculus  3
  or **MATH 205**  or Calculus I  3
  
  **Hours**  16

#### Spring
- **BIOL 465**  Principles of Physiology  3
  or **BE 354**  or Anatomy and Physiology  3
- **PHYS 222**  Fundamentals of Physics II  3
- **PHYS 224**  Fundamentals of Physics Laboratory II  1
- **PSYC 301**  Statistics for Psychology  3
  or **BIOL 350**  or Biostatistics  3
- **General Education: Cardinal Core Arts & Humanities – AH**  3
- **Elective**  3
  
  **Hours**  16

### Year 3

#### Fall
- **ASNB 502**  Fundamentals of Neuroscience  3
- **PSYC 302**  Research Methods for Psychology  3
- **PSYC 331**  Sensation and Perception  3
- **PSYC 382**  Cognitive Neuroscience  3
  
  **Hours**  16

### Year 4

#### Fall
- **PSYC 492**  Undergraduate Psychology Research (PSYC 495 or ASNB 492 also fulfills requirement)  3
- **ASNB 517**  Seminar on Developmental Neurobiology  3
- **ASNB 530**  Origin of Mammalian Sensory Systems and Comparative Neurobiology  3
- **ASNB 556**  Synaptic Organization of the Central Nervous System  3
- **Foreign Language**  3-4
- **General Education: Cardinal Core Arts & Humanities – AH**  3
- **General Education: Cardinal Core Historical Perspective – SBH**  3
- **300+ Elective Elective in Humanities or Social Sciences**  3
  
  **Hours**  15-16

#### Spring
- **300+ WR Elective**  3
- **300+ Elective in Humanities or Social Sciences**  3
- **300+ Elective**  3
- **Elective**  3
  
  **Hours**  13

**Minimum Total Hours**  120-122

1. At least two of the courses selected to satisfy these General Education/Cardinal Core requirements must also satisfy Diversity requirements (at last once course/3 credits each of U.S./D1 and Global/D2 Diversity coursework).