

Program Change Request

Date Submitted: 10/17/25 1:21 pm

Viewing: SC-BS-NEUR : Neuroscience, BS

Last approved: 04/28/25 11:46 am

Last edit: 12/18/25 9:53 am

Changes proposed by: jbazaz

Catalog Pages

Using this Program

[Neuroscience, BS](#)

No Longer
Anticipated closure

Are you completing this form on someone else's behalf?

Yes

Requestor:

In Workflow

1. NEUR Chair
2. SC Curriculum Committee
3. SC Assistant Dean
4. Assoc Provost-Undergraduate
5. Registrar-Programs

Approval Path

1. 12/16/25 3:24 pm
Saleet Jafri (sjafri):
Approved for NEUR Chair

History

1. Nov 22, 2017 by clmig-jwehrheim
2. Feb 1, 2019 by Jennifer Bazaz Gettys (jbazaz)
3. May 1, 2019 by Tory Sarro (vsarro)
4. Mar 3, 2020 by Jennifer Bazaz Gettys (jbazaz)
5. Sep 21, 2020 by Jennifer Bazaz Gettys (jbazaz)
6. Mar 4, 2021 by Ginny Scott (gscott21)
7. Apr 12, 2021 by Tory Sarro (vsarro)

8. May 3, 2021 by Tory Sarro (vsarro)
9. Feb 9, 2022 by Ginny Scott (gscott21)
10. May 24, 2023 by Ginny Scott (gscott21)
11. Jun 1, 2023 by Tory Sarro (vsarro)
12. Apr 26, 2024 by Ginny Scott (gscott21)
13. Apr 28, 2025 by Jennifer Bazaz Gettys (jbazaz)

Name	Extension	Email
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Effective Catalog: 2026-2027

Program Level: Undergraduate

Program Type: Bachelor's

Degree Type: Bachelor of Science

Title: Neuroscience, BS



5. Is this badge co-sponsored by another institution?

Banner Title: Neuroscience, BS

*Is this a retitling of
program?*

Registrar/OAPI Use Approved
Only – SCHEV
Status

Registrar's Office
Use Only –
Program Start Term

Registrar/OAPI Use
Only – SCHEV
Letter

Registrar/OAPI Use
Only – SACSCOC
Status

Concentration(s):

Registrar/IRR Use
Only –
Concentration CIP
Code

College/School: College of Science

Department / Interdisciplinary Neuroscience Program
Academic Unit:

Jointly Owned No
Program?

Is there an
embedded degree
as part of a
program?

 **Justification**

What: Adding a new concentration.

Why: The integration of computational methods into neuroscience has surged, driven by advancements in artificial intelligence (AI), machine learning, and big data analytics. The global neuroscience market was valued at USD 42.5 billion in 2022 and is projected to reach USD 65.2 billion by 2030, growing at a compound annual growth rate (CAGR) of 5.56% from 2023 to 2030 (Grand View Research, 2023). A significant portion of this growth stems from computational approaches, such as neural network modeling and neuroimaging analysis, which demand expertise in both neuroscience and data science.

Computational models are increasingly vital in neuroimaging studies, providing frameworks to decode complex brain-behavior relationships and predict outcomes for clinical conditions

(Smith, 2024). These models rely on advanced tools to process large-scale neural data, underscoring the need for interdisciplinary skills.

The rise of AI-driven technologies, such as brain-computer interfaces (e.g., Neuralink) and precision medicine, has heightened demand for professionals who bridge neuroscience and computational expertise. Job postings on platforms like LinkedIn and Indeed reflect this trend, with 7,778 U.S.-based "computational neuroscience" roles listed on LinkedIn as of September 29, 2025 (LinkedIn, 2025). These positions frequently require skills in programming, data analysis, visualization, and neural modeling—core components of the proposed minor's curriculum, including courses like NEUR 430: Introduction to Neuroinformatics, NEUR 431: Neuroinformatics Methods, and BENG 434/699: Computational Modeling of Neurons and Neural Networks.

A 2025 bibliometric analysis reported a 12.32% annual growth rate in studies integrating AI and neuroscience, with U.S. publications increasing from 162 in 2015 to 1,213 in 2024, and China's rising from 17 to 714 over the same period (Tekin & Dener, 2025). This growth reflects the escalating complexity of neurological data, necessitating advanced theoretical and analytical tools (Fairhall, 2023).

Federal funding further underscores this demand. The National Institutes of Health (NIH), through the BRAIN Initiative, prioritizes computational neuroscience, emphasizing data-driven approaches to understanding brain function (National Institutes of Health, 2024). The Collaborative Research in Computational Neuroscience (CRCNS) program, with an anticipated annual budget of \$5 million to \$30 million, supports 20 to 30 awards yearly, with research grants ranging from \$100,000 to \$250,000 annually for three to five years (National Science Foundation, 2024).

By offering the Computational Concentration to Neuroscience majors in the undergraduate program, the university positions itself at the forefront of this emerging field, preparing students for high-demand careers in academia and industry, while addressing the critical need for interdisciplinary expertise in computational neuroscience.

References

Fairhall, A. (2023). The state of computational neuroscience. *Nature Neuroscience*, 26(11), 1837–1838. <https://doi.org/10.1038/s41593-023-01409-y>

Grand View Research. (2023). Neuroscience market size, share & trends analysis report by component, by technology, by end-use, by region, and segment forecasts, 2023–2030.

<https://www.grandviewresearch.com/industry-analysis/neuroscience-market>

LinkedIn. (2025). Computational neuroscience jobs.

<https://www.linkedin.com/jobs/computational-neuroscience-jobs>

National Institutes of Health. (2024). BRAIN Initiative: Development and validation of novel tools to analyze cell-specific and circuit-specific processes in the brain (RFA-MH-24-190).

<https://grants.nih.gov/grants/guide/rfa-files/RFA-MH-24-190.html>

National Science Foundation. (2024). Collaborative Research in Computational Neuroscience (CRCNS) (NOT-MH-24-140). <https://grants.nih.gov/grants/guide/notice-files/NOT-MH-24-140.html>

Smith, R.-L. (2024). How AI tools are shaping the future of neuroscience. *Neuroscience Today*.

<https://www.neurosciencetoday.com/articles/how-ai-tools-shaping-future-neuroscience>

Tekin, U., & Dener, M. (2025). A bibliometric analysis of studies

What: Removing PSYC 472.

Why: The course is being inactivated.

Total Credits Total credits: minimum 120

Required:

Registrar's Office Use Only - Program Code:

SC-BS-NEUR

Registrar/IRR Use 26.1501 - Neuroscience.

**Only – Program CIP
Code**

**Admission
Requirements:**

Admissions

University-wide admissions policies can be found in the [Undergraduate Admissions Policies](#) section of this catalog.

To apply for this program, please complete the [George Mason University Admissions Application](#).

**Program-Specific
Policies:**

Policies

Students must fulfill all [Requirements for Bachelor's Degrees](#), including the [Mason Core](#).

[NEUR 411](#) Seminar in Neuroscience ([Mason Core](#)) fulfills the writing intensive requirement.

For policies governing all undergraduate programs, see [AP.5 Undergraduate Policies](#).

**Degree
Requirements:**

Students should refer to the [Admissions & Policies](#) tab for specific policies related to this program.

Students must complete the Foundation Courses, then they have the option of choosing a concentration. The remaining credits are fulfilled via Mason Core requirements and electives.

Foundation Courses

Biology

[BIOL 213](#) Cell Structure and Function ¹

4

Select one from the following: ^{1,2}

3-4

[BIOL 311](#) General Genetics

[BIOL 322](#) Developmental Biology

[BIOL 326](#) Animal Physiology

<u>BIOL 425</u>	Human Physiology	
<u>BIOL 430</u>	Advanced Human Anatomy and Physiology I	
Chemistry		
<u>CHEM 211</u>	General Chemistry I(Mason Core)	4
& <u>CHEM 213</u>	and General Chemistry Laboratory I(Mason Core)	
<u>CHEM 212</u>	General Chemistry II(Mason Core)	4
& <u>CHEM 214</u>	and General Chemistry Laboratory II(Mason Core)	
Mathematics		
Select one option (4 or 6 credits) from the following:		4-6
<u>MATH 113</u>	Analytic Geometry and Calculus I(Mason Core)	
<u>MATH 123</u>	Calculus with Algebra/Trigonometry, Part A	
& <u>MATH 124</u>	and Calculus with Algebra/Trigonometry, Part B(Mason Core)	
Statistics		
Select one course (3 or 4 credits) from the following:		3-4
<u>BIOL 214</u>	Biostatistics for Biology Majors	
<u>STAT 250</u>	Introductory Statistics I(Mason Core)	
<u>PSYC 300</u>	Statistics in Psychology	
<u>MATH 352</u>	Statistics	
Physics		
Select one of the following sequences:		8
<u>PHYS 243</u>	College Physics I(Mason Core)	
& <u>PHYS 244</u>	and College Physics I Lab(Mason Core)	
& <u>PHYS 245</u>	and College Physics II(Mason Core)	
& <u>PHYS 246</u>	and College Physics II Lab(Mason Core)	
<u>PHYS 160</u>	University Physics I(Mason Core)	
& <u>PHYS 161</u>	and University Physics I Laboratory(Mason Core)	
& <u>PHYS 260</u>	and University Physics II(Mason Core)	
& <u>PHYS 261</u>	and University Physics II Laboratory(Mason Core)	
Psychology ^{1,3}		
<u>PSYC 100</u>	Introduction to Psychology(Mason Core)	3
<u>PSYC 375</u>	Brain and Sensory Processes	3

<u>PSYC 376</u>	Brain and Behavior	3
Computer Science		
<u>CDS 130</u>	Computing for Scientists (Mason Core)	3
Core Courses in Neuroscience ¹		
<u>NEUR 327</u>	Cellular Neuroscience	5
& <u>NEUR 328</u>	and Cellular Neuroscience Lab	
<u>NEUR 335</u>	Developmental and Systems Neuroscience	3
Technical Writing ^{1,2,4}		
<u>NEUR 411</u>	Seminar in Neuroscience (Mason Core)	3
Required Psychology Lab Course ¹		
<u>PSYC 373</u>	Biopsychology Laboratory	2
Total Credits		55-59

¹

Students must earn a minimum grade of 1.67 (C-) in these courses.

²

The course chosen to fulfill this requirement cannot be applied as a Major Elective.

³Transfer students who have earned transfer credit for PSYC 372 Biopsychology may substitute this course for PSYC 375 Brain and Sensory Processes.⁴

This course fulfills the writing intensive requirement.

Computational Concentration

<u>Required Courses</u>		
<u>NEUR 430</u>	<u>Introduction to Computational Neuroscience</u>	3
<u>NEUR 431</u>	<u>Neuroinformatics Methods</u>	3
<u>Elective Courses</u>		
<u>NEUR 440</u>	<u>Independent Study in Neuroscience</u>	
<u>NEUR 450</u>	<u>Honors Thesis Proposal ¹</u>	
<u>NEUR 451</u>	<u>Honors Thesis ¹</u>	
<u>NEUR 461</u>	<u>Special Topics in Neuroscience (when the topic is "Computational and Social Neuroscience")</u>	
<u>BENG 350</u>	<u>Neural System Designs</u>	

<u>BENG 360</u>	<u>Biomedical Imaging(Mason Core)</u>
<u>BENG 434</u>	<u>Computational Modelling of Neurons and Networks</u>
<u>BINF 450</u>	<u>Bioinformatics for Life Sciences</u>
<u>CDS 301</u>	<u>Scientific Information and Data Visualization</u>
<u>CDS 303</u>	<u>Scientific Data Mining</u>

Students seeking to take elective courses not listed above must first obtain approval from their academic advisor.

Total Credits	12
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1

Must be in neuroinformatics and approved by undergrad director or chair.

Major Electives

Students should consult with an advisor to choose elective courses. The list below includes pre-approved courses. Elective courses not on the list must be approved by an advisor. Only courses not already taken in the degree will apply as electives, with the exception of seminar and topics courses; a different topic must be addressed in the second instance of a seminar or topics course. Students may apply no more than 6 credits of courses with a grade of 'D' to this requirement.

Students intending to pursue a doctorate in neuroscience or a medical degree are advised to take CHEM 313 Organic Chemistry I and CHEM 315 Organic Chemistry Lab I, and consult an advisor for other elective recommendations.

~~Select 22 credits of major electives. The list below includes pre-approved courses. Elective courses not on the list must be approved by an advisor.~~ 22

Select 10-22 credits of major electives. The list below includes pre-approved courses. Elective courses not on the list must be approved by an advisor. 10-22

<u>BENG 101</u>	Introduction to Bioengineering
<u>BENG 434</u>	Computational Modelling of Neurons and Networks
<u>BIOL 305</u>	Biology of Microorganisms
<u>BIOL 306</u>	Biology of Microorganisms Laboratory
<u>BIOL 311</u>	General Genetics
<u>BIOL 322</u>	Developmental Biology
<u>BIOL 323</u>	Environmental Effects on Embryonic Development
<u>BIOL 326</u>	Animal Physiology

<u>BIOL 417</u>	Selected Topics in Molecular and Cellular Biology (when the topic is: Foundations of the Mammalian Brain)
<u>BIOL 420</u>	Vaccines
<u>BIOL 425</u>	Human Physiology
<u>BIOL 426</u>	Mechanisms of Aging
<u>BIOL 429</u>	Biological Foundations of Pharmacology
<u>BIOL 430</u>	Advanced Human Anatomy and Physiology I
<u>BIOL 431</u>	Advanced Human Anatomy and Physiology II
<u>BIOL 432</u>	Clinical Applications in Human Physiology
<u>BIOL 452</u>	Immunology
<u>BIOL 453</u>	Immunology Laboratory
<u>BIOL 471</u>	Evolution
<u>BIOL 482</u>	Introduction to Molecular Genetics
<u>BIOL 483</u>	General Biochemistry
<u>BIOL 484</u>	Cell Signaling and Disease
<u>BIOL 515</u>	Developmental Neurobiology
<u>CDS 301</u>	Scientific Information and Data Visualization
<u>CHEM 313</u>	Organic Chemistry I
<u>CHEM 314</u>	Organic Chemistry II
<u>CHEM 315</u>	Organic Chemistry Lab I
<u>CHEM 318</u>	Organic Chemistry Lab II
<u>CHEM 321</u>	Quantitative Chemical Analysis
<u>CHEM 463</u>	General Biochemistry I
<u>CHEM 464</u>	General Biochemistry II
<u>CHEM 465</u>	Biochemistry Lab (<u>Mason Core</u>)
<u>MATH 114</u>	Analytic Geometry and Calculus II
or <u>MATH 116</u>	Analytic Geometry and Calculus II (Honors)
<u>MATH 203</u>	Linear Algebra
<u>MATH 213</u>	Analytic Geometry and Calculus III

<u>MATH 214</u>	Elementary Differential Equations
<u>NEUR 355</u>	Cross-Cultural Studies in Scientific Inquiry(Mason Core)
<u>NEUR 405</u>	RS: Laboratory Methods in Behavioral Neuroscience
<u>NEUR 406</u>	Zebrafish Neurodevelopment Laboratory
<u>NEUR 407</u>	Lab Investigations Using Voltage Clamp Electrophysiology
<u>NEUR 410</u>	Current Topics in Neuroscience (when not used to fulfill the technical writing requirement) ¹
<u>NEUR 411</u>	Seminar in Neuroscience(Mason Core). ¹
<u>NEUR 422</u>	Glutamatergic Systems
<u>NEUR 424</u>	Sleep and Circadian Rhythms(Mason Core).
<u>NEUR 430</u>	Introduction to Computational Neuroscience
<u>NEUR 431</u>	Neuroinformatics Methods
<u>NEUR 440</u>	Independent Study in Neuroscience
<u>NEUR 450</u>	Honors Thesis Proposal
<u>NEUR 451</u>	Honors Thesis
<u>NEUR 461</u>	Special Topics in Neuroscience
<u>NEUR 473</u>	Current Neuroscience Research in Germany(Mason Core).
<u>NEUR 480</u>	Biological Bases of Alzheimer's Disease
<u>PHYS 262</u>	University Physics III(Mason Core).
<u>PHYS 263</u>	University Physics III Laboratory(Mason Core).
<u>PSYC 304</u>	Principles of Learning(Mason Core).
<u>PSYC 309</u>	Sensation, Perception, and Information Processing(Mason Core).
<u>PSYC 317</u>	Cognitive Psychology
<u>PSYC 441</u>	Criminal Behavior: Psychological and Neurological Aspects
<u>PSYC 472</u>	Current Topics in Brain and Behavior
Total Credits	10-22

¹

This course fulfills the writing intensive requirement.

**Retroactive
Requirements
Updates:**

Plan of Study:

**Honors
Information:**

Honors in the Major

Highly-qualified students may apply to graduate with honors in the major.

Eligibility

To be eligible for admission, neuroscience majors must have completed at least 60 credits and have a minimum cumulative GPA of 3.25 and a minimum GPA of 3.25 in neuroscience courses.

Honors Requirements

If accepted, students must take a sequence of three courses, which culminates in the successful completion and presentation of an independent honors thesis.

<u>NEUR 410</u>	<u>Current Topics in Neuroscience</u>	3
or NEUR 411	<u>Seminar in Neuroscience (Mason Core)</u>	
<u>NEUR 411</u>	<u>Seminar in Neuroscience (Mason Core)</u>	3
<u>NEUR 450</u>	Honors Thesis Proposal	2-3
<u>NEUR 451</u>	Honors Thesis	3-4
Total Credits		8-10

To graduate with honors, students must earn a minimum GPA of 3.50 in their honors courses, maintain a minimum cumulative GPA of 3.25, and complete an honors thesis.

**Accelerated
Description/Dual
Degree
Description:**
**INTO-Mason
Requirements:**

**College
Requirements &
Policies:**

**Department /
Academic Unit
Requirements &
Policies:**

Program Outcomes

Additional Program Information

This information is required by the Office of Accreditation and Program Integrity.

Courses offered via distance (if applicable):

Indicate whether

What is the primary delivery format for the program? Face-to-Face Only

Does any portion of this program occur off-campus?

No

Are you working with a vendor / other collaborators to offer your program?

No

Related Departments

Could this program prepare students for any type of professional licensure, in Virginia or elsewhere?

No

Are you adding or removing a licensure component?

No

Additional SCHEV & SACSCOC Information

Is the content of the new program identical to the existing program? Is this new program identical to the existing program? What are the methods of delivery? Date of Program Change?

Is this change a simple retitling of an existing program, with no other changes, to any existing program content, curriculum requirements, etc?

No

Does this change represent a repackaging of content in an existing approved degree/certificate program at the same instructional level (i.e., baccalaureate, master's, or doctoral)?

No

Percentage of total credits containing new course content. ("New course content" is defined by SACSCOC as content that is not currently included in an existing approved degree/certificate program at the same instructional level. Do not exclude gen ed credits in calculations for undergraduate programs.)

0%-24%

Does this change include the addition of a distance education or face-to-face method of delivery for this program?

No

Does this change include the addition of a course/credit-based competency-based education delivery option?

No

Will any additional equipment/facilities be needed?

No

Will any additional faculty be required?

No

Will any additional financial resources be needed?

No

Additional library/learning resources needed?

No

Have you reached out to the Libraries to determine whether there are adequate resources to support your program? If not, please email Meg Meiman, Associate University Librarian for Learning, Research, and Engagement at mmeiman2@gmu.edu.

OAPI Use Only – Determination of SACSCOC Impact

Comments or Notes

Green Leaf Program Designation

Is this a Green Leaf No
program?

 Sustainability-focused academic program
 List sustainability-focused academic program
 List sustainability-focused academic program

Does this program cover material which crosses into another department?

No

**Additional
Attachments**

SCHEV Proposal

Executive Summary

**Reviewer
Comments**

**Additional
Comments**

Is this course required of all students in this degree program?

%wi_required.eschtml%



Key: 609