Program Change Request

New Program Proposal

Date Submitted: 10/17/25 1:22 pm

Viewing: : Computational Neuroscience Minor

Last edit: 10/17/25 1:42 pm

Changes proposed by: jbazaz

In Workflow

1. **NEUR Chair**
2. **SC Curriculum Committee**
3. SC Assistant Dean
4. Assoc Provost-Undergraduate
5. Registrar:Create Code
6. Registrar-Programs: Duration
7. Registrar-Programs

Approval Path

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

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

Yes

Requestor:

Name	Extension	Email
Ginny Scott	4334	gscott21

Effective Catalog: 2026-2027

Program Level: Undergraduate

Program Type: Minor

Title: Computational Neuroscience Minor

Banner Title: Computational Neurosci Minor

Is this a retitling of an existing program? No

Registrar's Office Use Only – Program Start Term

Registrar/OAPI Use Only – SACSCOC Status	
College/School:	College of Science
Department / Academic Unit:	Interdisciplinary Neuroscience Program
Jointly Owned Program?	No
Is there an embedded degree as part of a program?	

Justification

What: Creating a new minor.

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 Minor in Computational Neuroscience, 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

Catalog Published Information

Total Credits Required: Total credits: 15

Registrar's Office Use Only - Program Code:

Registrar/IRR Use Only – Program CIP Code

Admission Requirements:

Program-Specific Policies:

Policies

Eight credits of coursework must be unique to the minor. For policies governing all minors, see AP.5.3.4 Minors. 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 minor.

Students must complete at least 20 credits of coursework with a minimum GPA of 2.00.

Required Courses

NEUR 101	Introduction to Neuroscience(Mason Core)	3
NEUR 430	Introduction to Computational Neuroscience	3
NEUR 431	Neuroinformatics Methods	3
Total Credits		9

Elective Courses

Select 6 credits from the following courses:		6
NEUR 440	Independent Study in Neuroscience	
NEUR 461	Special Topics in Neuroscience (when the topic is Computational Social Neuroscience.)	
BENG 350	Neural System Designs	
BENG 360	Biomedical Imaging(Mason Core)	
BENG 434	Computational Modelling of Neurons and Networks	
BINF 450	Bioinformatics for Life Sciences	
CDS 301	Scientific Information and Data Visualization	
CDS 303	Scientific Data Mining	
Students seeking to take elective courses not listed above must first obtain approval from their academic advisor.		
Total Credits		6

Retroactive Requirements Updates:

Program Outcomes

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.

No

OAPI Use Only – Determination of SACSCOC Impact

Comments or Notes

Does this program cover material which crosses into another department?

No

Additional Attachments

Reviewer Comments

Additional Comments

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

%wi_required.eschtml%

Key: 1131