THE UNIVERSITY OF ARIZONA

New Academic Program Workflow Form

General

Proposed Name: Neuroscience

Transaction Nbr: 00000000000195

Plan Type: Major

Academic Career: Undergraduate

Degree Offered: Bachelor of Science

Do you want to offer a minor? N

Anticipated 1st Admission Term: Fall 2024

Details

Department(s):

SCNC

DEPTMNT ID	DEPARTMENT NAME	HOST
2529	Neuroscience	Y

Campus(es):

MAIN

LOCATION	DESCRIPTION
TUCSON	Tucson

Admission application terms for this plan: Spring: Y Summer: N Fall: Y

Plan admission types:

Freshman: Y Transfer: Y Readmit: Y Graduate: N

Non Degree Certificate (UCRT only): N

Other (For Community Campus specifics): N

Plan Taxonomy: 26.1501, Neuroscience.

Program Length Type: Program Length Value: 0.00

Report as NSC Program:

SULA Special Program:

Print Option:

Diploma: Y Bachelor of Science in Neuroscience

Transcript: Y Bachelor of Science in Neuroscience

Conditions for Admission/Declaration for this Major:

None

Requirements for Accreditation:

NA

Program Comparisons

University Appropriateness

The new major advances pillar 1 of the strategic plan of the University of Arizona, which states: the "UA will build a diverse and high potential student body, providing students with an integrated support ecosystem, the skills and mindsets to lead in the 4th Industrial Revolution Economy, and a degree that launches them to achieve their hopes and dreams."

The new major will address the need for a competitive and stand-alone neuroscience undergraduate program at the University of Arizona. Out of the 15 peer institutions of the University, 12 institutions offer very successful majors in Neuroscience or Neurobiology that are directly comparable to the new proposed major. 2 peer institutions offer a major that is comparable to the currently offered interdisciplinary Neuroscience and Cognitive Science (NSCS) joint major. Only one institution does not offer a neuroscience or related major. In comparison, the University lags most of its peers. The new BS in Neuroscience will rectify this situation.

The proposed major is welcomed and supported by the Dean of the College of Science (CoS) and advances the strategic academic plan of CoS.

Arizona University System

NBR	PROGRAM	DEGREE	#STDNTS	LOCATION	ACCRDT
1	Neuroscience	BS	400	Arizona State University	N
2	Neuroscience & Cognitive Scien	BS	542	University of Arizona	N

Peer Comparison

All of the compared programs require a strong foundation in Mathematics, Chemistry, Physics and Biology.

The core program of the Neurobiology major at the University of Wisconsin-Madison requires both a Biology core (3 sequences ranging from 10-16 U) and a Neurobiology core (7 U), which is unique among all compared programs. The Neurobiology core includes a Neurobiology and a Behavioral Neuroscience course next to a seminar. This neuroscience core is a weakness in comparison to the other programs. 9 U of elective courses are required that can be selected from a list of course spanning from Neuroscience, Psychology, Physiology, to Biology.

The core (11 U) of the Neuroscience major at the University of Minnesota requires Human Neuroanatomy, Neurobiology I (Molecular, Cellular and Systems) and II (Perception & Behavior), and either a course in Neurodevelopment, Neuroscience of Drug Abuse, or a neurodegenerative disease course. 9 U of electives are required that can be selected from a list of course spanning from Neuroscience, Genetics, Immunology, Pharmacology, to Computational Neuroscience.

The core program at Michigan State (23 U) requires 2 Neuroscience core courses (Introduction to Neuroscience I and II), one Neuroscience Lab, one of two offered Physiology courses, one Biochemistry course, one Pharmacology course and either Fundamental Genetics or Eukaryotic Cell Biology. 15 U of electives are required to be selected from one of 3 concentrations (Cellular and Developmental, Behavioral and Systems, and Cognitive and Computational.

Like the proposed major, the majors at U Wisconsin and Minnesota require directed research or a lab experience, the major at Michigan State does not.

The core curriculum at Michigan State is comes close to to that of the proposed major (20 U), both in rigor and in breath. Both programs cover comprehensively the major pillars of the field. Overall, the compared peer programs cover similar core areas of neuroscience but less comprehensively than the proposed major.

The core of the target audience is overall similar for all programs. All market careers in one of the many rapidly growing areas in the pharmaceutical, medical, or biotechnology industries, or to pursue graduate or medical school. The program at Wisconsin-Madison includes a potential career as K-12 teacher. The proposed program is the only that prepares students for neuroscience-related careers such as public policy, science communication, journalism, or law.

Resources

Library

Acquisitions Needed:

None

Physical Facilities & Equipment

Existing Physical Facilities:

The existing training laboratory space and the training equipment (computers, microscopes, electrophysiological recording equipment, etc.) of the Department of Neuroscience is sufficient to accommodate students enrolling in NROS 415 Electrophysiology Laboratory, NROS 397 Brain Communication Networks VIP-CURE and the new CURE course NROS 3xx Neuroscience Research Experience CURE during the first 2 years. All other courses require only standard classrooms.

Additional Facilities Required & Anticipated:

With increased enrollment in years 2-3, the new CURE course NROS 3xx will likely need a larger training laboratory space. The required space is available in the department but will require renovation and new additional lab equipment. The cost is estimated to amount to $175,000 in year 2 and has been budgeted.

Other Support

Other Support Currently Available:

The Department has currently 2 academic advisor that are co-funded by the College of Science. In addition, the Department has a program coordinator and a department-funded program director next to business and accounting staff.

Other Support Needed over the Next Three Years:

In addition to existing resources, the new major will require one advisor (0.25 FTE year 1, 0.5 FTE year 2, 1.0 FTE by year 3) and one program coordinator (1 FTE by year 2). The corresponding costs are estimated to amount to $58,700 for the first year, $110,292 for the second, and $147,210 for the third year.

A new career-track faculty member will be desirable by year 2 but not essential since this need may be met through reassignments. The corresponding costs are estimated to amount to $85,000 in year 2 and $88,374 in year 3.

Operations costs are to amount to $5,000 for year 1, $8,000 for year 2, and $10,000 for year 3.

Once the program is fully established, 7 new teaching assistantships (TAs) will be required to cover 2 new core courses (2 TAs), 1 new CURE

course (2 TAs), and potentially 3 electives assuming these have a high enrollment (3 TAs; year 3 and thereafter). The corresponding costs over for the first 3 years is estimated to be $77,502 (year 1), $121,648 (year 2) and $127,358 for year 3.

Comments During Approval Process

10/23/2023 2:14 PM

KEZ4

Comments
Approved.

11/2/2023 10:41 AM

MELANIECMADDEN

Comments
Uploaded updated documents with formatting changes, minor typo corrections.

11/2/2023 11:09 AM

MELANIECMADDEN

Comments
Recommend revising program description and learning outcomes before going to academic councils for review and approval

11/2/2023 11:50 AM

MELANIECMADDEN

Comments
Approved.

THE UNIVERSITY OF ARIZONA

NEW ACADEMIC PROGRAM – MAJOR
Preliminary Proposal Form

I. Program Details
   a. Name (and Degree Type) of Proposed Academic Program: **BS in Neuroscience**
      i. **Emphases (if applicable):** 1) Neuroscience and Human Health, 2) Molecular, Cellular, and Systems Neuroscience, 3) Neuroscience, Communication, and Public Health and Policy; 4) Thematic Emphasis
   b. Academic Unit(s)/College(s): **Department of Neuroscience**
   c. Campus/Location(s): **Main**
   d. First Admission Term: Fall 2024
   e. Primary Contact and Email: *Konrad Zinsmaier* kez4@arizona.edu *and Ulises Ricoy* ricoy@arizona.edu

II. Executive Summary:

The Bachelor of Science (B.S.) in Neuroscience is an interdisciplinary degree that will provide students the opportunity to pursue an integrated course of study in Neuroscience – a unique academic field that impacts all areas of science and business and requires students to understand and utilize diverse knowledge from multiple disciplines. The major is designed for students desiring contemporary in-depth knowledge about the basic structural and functional aspects of the nervous system in health and disease. Neuroscience has grown into a multidisciplinary field that investigates the organization, development, and function of the nervous system, and its relationship to neurological and neuropsychiatric disorders. The proposed Neuroscience major prepares students for advanced training in Medical and Graduate Schools, and neuroscience- related careers in academia, industry, public policy, and science communication, for which demand is projected to grow significantly.

III. Brief Program Description:

Modern Neuroscience is the interdisciplinary study of the nervous system, from the level of individual genes and proteins that control neural activity to mechanisms that govern complex human behavior in health and disease.

Earning a degree in Neuroscience will prepare students exceptionally well for advanced training in Medical School and Graduate School in Neuroscience or related fields, careers in the pharmaceutical, biotech, biomedical or other industries, or for other science-related careers such as public policy, science communication, journalism, or patent law.

Neuroscience students can expect to gain a strong intellectual foundation and deep understanding of mechanisms underlying brain function through a core curriculum that spans molecular, genetic, and cellular mechanisms of nervous systems and is based on a robust foundation in biology, mathematics, chemistry, and physics. Four themes provide students with opportunities to gain specialized

expertise in multiple aspects of contemporary neuroscience. Students will also gain critical skills in research, critical thinking and communication through coursework addressing experimental techniques and approaches relevant to Neuroscience including their design, analysis, strengths, and limitations, as well as statistical and computational methods for data analysis through related coursework.

To further strengthen research skills, hands-on research opportunities and experiences are offered at levels ranging from molecular neuroscience, cellular neuroscience, systems neuroscience to computational neuroscience and translational neuroscience by taking advantage of the broad and multidisciplinary research expertise of more than 60 neuroscience laboratories campuswide.

IV. Program Rationale:

The new major addresses the need for a competitive and stand-alone neuroscience undergraduate program at the University of Arizona. Current offerings from the UA do not include a rigorous neuroscience program designed to prepare students for clinical, academic, and professional careers in the rapidly advancing field of neuroscience.

The Neuroscience major is designed to prepare students through a rigorous foundation in neuroscience in a structured and robust way, while creating new competitive emerging themes of study within Neuroscience. The curriculum, learning outcomes, career and employment projections of the new major partially overlap with the existing NSCS major but also differ significantly in several important aspects. In brief, the differences include a neuroscience-focused curriculum with additional core course work, a requirement for lab research, and new elective courses covering important aspects of neuroscience and neural disease, as well as neuroscience-related communication and public health issues. The learning outcomes of the new major are better aligned for admission to graduate and medical schools as well as employment in the neuroscience-related pharmaceutical and medical science field. Students are expected to have better mathematical skills, a better foundation in biochemistry, neural genetics and neural disease in humans, better expertise in neuroscience research technologies, better developed skills in scientific reasoning and critical thinking, and a better ability to work in basic, pharmaceutical, and medical research areas related to neuroscience and neurobiology.

The new major will attract students interested in exploring neuroscience foundation courses and modern course topics in current marketable areas such as healthcare, graduate school, medical school, law school, journalism, science communication, and science policy. Neuroscience is a well-established large field in the life sciences and still growing. The new streamlined and rigorous Neuroscience major will be housed in the Department of Neuroscience within the College of Sciences. This Neuroscience major and curriculum will strengthen competitive academic offerings for students interested in neuroscience and neuroscience-related careers spanning from Medical and Graduate Schools to careers in academia, industry, public policy, and science communication.

The new Neuroscience major differs from the existing Neuroscience & Cognitive Science (NSCS) program of the College of Science in several important ways:

- The existing NSCS program requires a common core curriculum including a Neuroscience-Cognitive Science gateway course, 2 core courses in Cognitive Science, and 2 core courses in Neuroscience plus a scientific programing course in Matlab. Students then choose one of two focus areas (tracks): Neuroscience (NS) or Cognitive Science (CS). Each focus requires a focus-specific core curriculum consisting of 2 core courses followed by a series of elective courses in 1 of 7 emphases. The emphases of the NSCS program include Cognition, Computation, Development and Aging, Language and Communication Science, Neurobiology, Philosophy of Mind, and Thematic. Lab research is encouraged in the NSCS program but not required.

- In contrast, the core curriculum of the proposed new major (19 to 22 units) requires 2 colloquia (1 freshman-specific) and 6 core courses plus 1 optional course, which cover molecular, biochemical, cellular, and genetic aspects of Neuroscience with greater rigor than is currently possible in the existing NSCS major. This core curriculum differs by 6 core courses from the existing NS core of the NSCS program, most notably the 2 colloquia designed to retain students and the courses covering brain anatomy, biochemistry, and genetics & genomics.
    - In contrast to the NSCS major, the new neuroscience major requires 3 units of lab research/internship.
    - The proposed major will offer 4 emphases including:
        - emphasis 1: "Neuroscience and Human Health" (absent in NSCS) prepares students for US Medical School, Dental School, and Allied Health Professions; courses address the growing area of translational and clinical research on neurological, neurodegenerative, and neuropsychiatric disease. There is no overlap with any of the NSCS emphases.
        - emphasis 2: "Integrated Neuroscience" prepares students for Graduate School and research careers in academia and industry; courses reflect the contemporary vertical approach on neuroscience, studying a problem from molecules to cells to neural circuits and networks, and vice versa. This emphasis is similar, but not identical, to the 'neurobiology' emphasis of the NSCS major (see above).
        - emphasis 3: "Neuroscience, Communication, Public Health and Policy" (absent in NSCS) will prepare students to communicate neuroscience information to the general public and advise policy makers; courses provide basic insights into public health law, policy making, and journalism. There is no overlap with any of the NSCS emphases.
        - emphasis 4: "Thematic Emphasis". Neuroscience is a broadly and rapidly advancing field and students can design their own curriculum with a qualified advisor.
    - The new program will satisfy most requirements for US Medical Schools and Graduate Schools.
- The new major in Neuroscience will be offered by the Department of Neuroscience and an advising and program coordination team that is separate from that of the NSCS program.

V. Projected Enrollment for the First Three Years:

Year 1	Year 2	Year 3
40	80	140

The estimate is based on 80% of the initial enrollment numbers of the NSCS program, which started in 2010. Enrollment in the NS focus of the existing NSCS major is still increasing. Between 2018 and 2021, the NS focus grew by 164%. Enrollment data for NCSC also support the addition of a biochemistry core course to the new major as ~35% of students in the NS focus chose a biochemistry minor.

Focus/Emphasis Data Fall Census 2018 – 2022 & Biochemistry Minors

Focus	Fall 2018	Fall 2019	Fall 2020	Fall 2021	Fall 2022
CogSci Total	**37**	**39**	**51**	**100**	**69**
CogSci/Cognition	*17*	*22*	*20*	*27*	*25*
CogSci/Neurobio	*4*	*2*	*2*	*4*	*3*
CogSci w/ Biochem Minor	*1*	*0*	*0*	*0*	*0*
Neuroscience Total	**186**	**184**	**205**	**305**	**213**
Neurosci/Cognition	*49*	*46*	*43*	*45*	*36*
Neurosci/Neurobio	*91*	*91*	*106*	*101*	*76*
Neurosci w/Biochem Minor	*64*	*75*	*94*	*119*	*76*

VI. Evidence of Market Demand:

Evidence demonstrating demand, interest and need for a stand-alone and competitive Neuroscience major in the southwest is provided by 1) a "Burning Glass" market analysis from 2021-22 and 2) a list of Neuroscience majors offered by peer institutions.

Neuroscience CIP (Classification of Instructional Programs) (26.1501) https://nces.ed.gov/ipeds/cipcode/cipdetail.aspx?y=55&cipid=87810

1) "Burning Glass" market analysis.

The Burning Glass market analysis shows a significant growth of biomedical employment in Arizona and projects significant growth in demand by up to 38% by 2028. The largest area of projected growth is predicted for research-oriented careers requiring a bachelor's degree. The proposed Neuroscience major will be able meet the projected future demand for highly educated professionals with a competitive neuroscience training. Since the new major covers molecular, biochemical, cellular, and genetic aspects of neuroscience more rigorously, graduates are expected to be more competitive for the majority of mapped career outcomes than those students in the existing NSCS major. The market analysis identified numerous technical job opportunities for neuroscience bachelors:

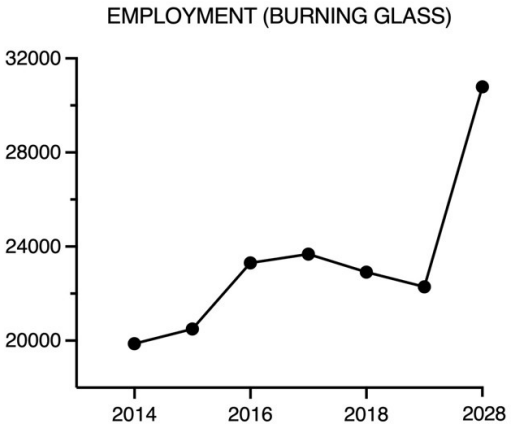
Career outcomes mapped to Neuroscience: Laboratory Technician, Medical Scientist, Biological Technician, Researcher / Research Associate, Laboratory Technologist, Laboratory Manager, Clinical Research Coordinator / Manager, Biologist.

Jobs available for graduates of the new major:
For the proposed major, there were 4,057 job postings in the 12 months prior to 2021-22 compared to:

- 1,019,379 total job postings in the selected location (entire state Arizona)
- 291,026 total job postings requesting a bachelor's and minor degree in Arizona.

Growth by Geography

Geography	Selected Occupations	Total Labour Market	Relative Growth
Arizona	38.14 %	11.87 %	High
Nationwide	-12.14 %	4.24 %	Low



Graph from market analysis: Employment data for neuroscience graduates in Arizona between years 2014 to 2019, and projection for 2028. The projection for 2028 indicates job growth from 2019 to 138% for 2028.

2) Neuroscience major programs available at the 15 official Arizona Board of Regents Peer Universities.
Out of the 15 peer institutions, 12 institutions offer a BS in Neuroscience that is comparable to the new proposed major. 2 peer institutions offer a major that is comparable to the currently offered Neuroscience and Cognitive Science (NSCS) major. one institution does offer a neuroscience or related major.

In comparison, UArizona is not competitive in regard to a streamlined neuroscience major with the majority of its peers. The new BS in Neuroscience will rectify this situation.

These are the 15 official ABOR Peer Universities:

University of California-Davis	BS in Neurobiology, Physiology and Behavior
University of California-Los Angeles	BS in Neuroscience
University of Florida	BS Behavioral and Cognitive Neuroscience
University of Illinois at Urbana-Champaign	Neuroscience, BSLAS
University of Iowa	BS in Neuroscience
University of Maryland-College Park	BS in Neuroscience
Michigan State University	BS in Neuroscience
University of Minnesota-Twin Cities	BS in Neuroscience
University of North Carolina at Chapel Hill	BS in Neuroscience
Ohio State University-Main Campus	BS in Neuroscience (Columbus campus)
Pennsylvania State University-Main Campus	none

Texas A & M University	BS in Neuroscience
The University of Texas at Austin	BS in Neuroscience
University of Washington-Seattle Campus	BS in Neuroscience
University of Wisconsin-Madison	BS in Neuroscience

VII. Similar Programs Offered at Arizona Public Universities:

The University of Arizona

At The University of Arizona, the School of Mind, Brain and Behavior (MBB) in the College of Science offers a B.S. in Neuroscience & Cognitive Science (NSCS). MBB comprises the Department of Neuroscience, the Department of Psychology, and the Department of Speech, Language and Hearing Sciences, as well as the Graduate Interdisciplinary Program (GIDP) in Neuroscience, and the Program and GIDP in Cognitive Science. The core units of MBB collaborate to offer the NSCS program which covers aspect of neuroscience, cognitive science, psychology, philosophy, sociology, and linguistics. The Departments of Psychology and of Speech, Language and Hearing Sciences also have specialized degree programs while the Department of Neuroscience does not. The Program in Cognitive Science offers a minor in Cognitive Science.

The NSCS major is jointly administered by the Program in Cognitive Science and the Department of Neuroscience. The Head and the Faculty of the Department of Neuroscience will continue to support the existing NSCS major and the neuroscience track in the major.

The proposal for the new major in Neuroscience has been shared with the Director of the Cognitive Science program who agrees that the new major is a strong degree and supports the initiative. The proposal is also welcomed and supported by the Dean of the College of Science.

The new B.S. in Neuroscience is expected to have only a modest impact on the enrollment and retention of the existing NSCS major. The major reason for this prediction is that the new major is tailored to a different target group that focuses on a detailed knowledge of the molecular and cellular mechanisms underlying nervous system function instead of being interested in a broad focus covering several fields.

Even though the new degree may attract some of the students in the NCSC major, these are likely only students in the NCSC neuroscience track. Given that the college already divides NSCS tuition revenue proportionally based on enrollment in each of the 2 NSCS tracks, the tuition revenue flow to the Program of Cognitive Science is not expected to significantly change with the addition of the new degree.

Arizona State University (ASU)

The only other institution in Arizona that offers an undergraduate degree in Neuroscience is ASU. ASU started an online major in Neuroscience in 2022 and an on-campus major in 2023.

The ASU neuroscience curriculum, courses, and targeted student populations differ from the newly proposed neuroscience program. The ASU Neuroscience B.S. is strongly aligned with Cognitive Science and Psychology and therefore much more comparable to the existing Neuroscience and Cognitive Science (NSCS) major at UArizona. Additionally, market analysis shows a need for producing more neuroscience majors than current programs can produce on their own.

VIII. Resources Summarize new resources required to offer the program:

In addition to existing resources, the new major will require one advisor (1 FTE) and one program coordinator (1 FTE). Costs are expected to be covered by revenue received from enrollments and majors, COS support for the advisor, potentially program fees.

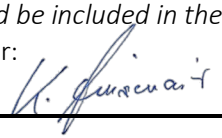
Estimate total expected cost:

Year 1 $55,284
Year 2 $205,684
Year 3 $326,383

Estimate total expected revenue of the program:

Year 1 $212,000
Year 2 $404,000
Year 3 $556,000

IX. Required Signatures *(the following should be included in the notification memo to campus after ABOR approval):*

a. Program Director/Main Proposer:
   i. Signature: 
   ii. Name and Title: Konrad Zinsmaier, Professor, Department Head, Department of Neuroscience
   iii. Date: 4/28/2023

b. Managing Unit/Department Head:
   i. Signature: _____
   ii. Name and Title:
   iii. Date:

c. College Dean/Associate Dean:
   i. Signature: Carmala Garzione
   ii. Name and Title: Carmala Garzione, Dean, College of Science
   iii. Date: 4/29/23

Preliminary_Proposal_BS_Neuroscience 2023

Interim Agreement Report 2023-04-29

Created:	2023-04-29
By:	Konrad Zinsmaier (kez4@arizona.edu)
Status:	Archived
Transaction ID:	CBJCHBCAABAAeKeRQ1nqBB859JpMQYkUxIelySWX3dQv

Agreement History

Agreement history is the list of the events that have impacted the status of the agreement prior to the final signature. A final audit report will be generated when the agreement is complete.

"Preliminary_Proposal_BS_Neuroscience 2023" History

Document created by Konrad Zinsmaier (kez4@arizona.edu)

2023-04-29 - 6:01:09 PM GMT

THE UNIVERSITY OF ARIZONA

ADDITIONAL INFORMATION FORM

To be used once preliminary proposal has been approved.

I. MAJOR REQUIREMENTS– complete the table below by listing the major requirements, including required number of units, required core, electives, and any special requirements, including emphases* (sub-plans), thesis, internships, etc. Note: information in this section must be consistent throughout the proposal documents (comparison charts, four-year plan, curricular/assessment map, etc.). Delete the EXAMPLE column before submitting/uploading. Complete the table in Appendix A if requesting a corresponding minor.

UNDERGRADUATE

Total units required to complete the degree	120
Upper-division units required to complete the degree	50
Foundation courses	
Second language	2nd Semester Proficiency
Math	S-Strand
General education requirements	Univ 101 (1 course, 1 unit) Foundations (3 courses, 9 units) -Writing - Math - Second Language Exploring Perspectives (1 course per perspective, 12 units) -Artist -Humanist -Natural Scientist -Social Scientist Building Connections (3 courses, 9 units) UNIV 301 (1 unit)
Pre-major? (Yes/No). If yes, provide requirements. Provide email(s)/letter(s) of support from home	No

THE UNIVERSITY OF ARIZONA

ADDITIONAL INFORMATION FORM

To be used once preliminary proposal has been approved.

department head(s) for courses not owned by your department.	
List any special requirements to declare or gain admission to this major (completion of specific coursework, minimum GPA, interview, application, etc.)	None
Major requirements	
Minimum # of units required in the major (units counting towards major units and major GPA)	38
Minimum # of upper-division units required in the major (upper division units counting towards major GPA)	36
Minimum # of residency units to be completed in the major	30
Required supporting coursework (courses that do not count towards major units and major GPA, but are required for the major). Courses listed must include prefix, number, units, and title. Include any limits/restrictions needed (house number limit, etc.). Provide email(s)/letter(s) of support from home department head(s) for courses not owned by your department.	- MCB 181R (3) Introductory Biology - MCB 181L (1) Introductory Lab - CHEM 151 (4) Chemical Thinking I - CHEM 152 (4) Chemical Thinking II - CHEM 241A (3) Organic Chemistry - CHEM 243A (1) Organic Chemistry Lab - PHYS 102 (3) Introductory Physics - PHYS 181 (1) Intro Lab OR PHYS 141 (4) Intro Mechanics - PHYS 103 (3) Introductory Physics II - PHYS 182 (1) Intro Lab II OR Phys 241 (4) Intro Electricity and Magnetism - MATH 125 (3) Calculus I - MATH 263 (3) Introduction to Statistics and Biostatistics OR BIOS 376 Introduction to Biostatistics (3) - MATH 129 (3) Calculus II (recommended)
Major requirements. List all major requirements including core and electives. If applicable, list the emphasis requirements for each proposed	Neuroscience Core: Complete 8 courses (20 units) - (New) NROS 19X (1) Neuroscience Colloquium - (New) NROS 2XX (1) Contemporary Approaches to Neuroscience

emphasis*. Courses listed count towards major units and major GPA. Courses listed must include prefix, number, units, and title. Mark new coursework (New). Include any limits/restrictions needed (house number limit, etc.). Provide email(s)/letter(s) of support from home department head(s) for courses not owned by your department.	- NROS 307/H (3) Cellular Neurophysiology - NROS 308 (1) Methods Neuroscience (1), optional - NROS 310/H (3) Molecular and Cellular Biology of Neurons - NROS 311 (3) Neuroinformatics and Scientific Coding - BIOC 384 (3) Foundations in Biochemistry - (New) NROS 3xx (3) Genetics & Genomics in Neuroscience - (New) NROS 3XX (3) Systems Neuroscience Neuroscience Electives: Complete 18 units from the following: *Select one emphasis and complete 3 courses (9 units; emphasis courses listed below):* - Emphasis 1, Neuroscience and Human Health - Emphasis 2, Integrated Neuroscience: Molecular, Cellular, Systems Neuroscience - Emphasis 3, Neuroscience, Communication and Public Health Policy - Emphasis 4, Thematic *Complete 1 Lab/Research/Internship/ CURE course requirement (3 units)* - NROS 397 (3) Brain Communication Networks VIP-CURE - (NEW) NROS 3xx (3) Neuroscience Research Experience CURE - NROS 392/492 (3) Directed Research - NROS 399/499 (3) Independent Study - NROS 399H/499H (3) Honors Independent Study - NROS 493 (3) Internship Complete additional required elective courses (6 units) - Complete one writing emphasis elective (3 units) - (NEW) NROS 4xx (3) Bioethics - (NEW) NROS 4xx (3) Science Writing Strategies, Skills & Ethics - NROS 498 (3) Senior Capstone - NROS 498H (3) Honors Thesis - ECOL 379 (3) Evidence Based Medicine - Complete one upper division NROS elective from emphasis 1, 2 or 3 (3 units)

	Emphasis 1, Neuroscience and Human Health: Complete 3 courses (9 units) - NROS 330 (3) Principles of Neuroanatomy: Cells to Systems - (New) NROS 4XX (3) Neural Circuits in Health and Disease - (New) NROS 4XX (3) Complex Behavioral, Cognitive and Emotional Disorder - (New) NROS 4XX (3) Neuropharmacology & Addiction - NROS 430 (3) Neurogenetics - NROS 440 (3) How to Build a Brain: Mechanisms of Neural Development - ECOL 379 (3) Evidence Based Medicine - NROS 450 (3) Neurons and Glia in Health and Disease Emphasis 2, Integrated Neuroscience: Molecular, Cellular, Systems Neuroscience: Complete 3 courses (9 units) - NROS 330 (3) Principles of Neuroanatomy: Cells to Systems - NROS 381 (3) Animal, Brains, Signals, Sex and Social Behaviors - NROS 412 (3) Molecular Mechanisms of Learning and Memory - NROS 415 (3) Electrophysiology Laboratory - NROS 420 (3) The Neuroscience of Survival - NROS 430 (3) Neurogenetics - NROS 440 (3) How to Build a Brian: Mechanisms of Neural Development - NROS 450 (3) Neurons and Glia in Health and Disease - (New) NROS 4XX (3) Neural Circuits in Health and Disease - CGSC 344 (3) Modeling the Mind: Comp. Models of Cognition - ISTA 457 (3) Neural Networks - PHYS 431 (3) Molecular Biophysics - PSY 403C (3) Introduction to Computational Neuroscience: Neural Simulations - PSY 435 (3) Computational Neuroscience: Neural Spike Data Analyses Emphasis 3, Neuroscience, Communication and Public Health Policy: Complete 3 courses (9 units) - ENGR 495A (3) Science, Health & Engineering Policy and Diplomacy - GLO 465 (3) Science Misinformation, Disinformation, Media & the Public - JOUR 305 (3) Full STEM Ahead: Science and the News - JOUR 465/565 (3) Issues in Covering Science and the Environment - LAW 415 (3) Healthcare Ethics

	- LAW 452 (3) Health Law - LAW 476A (3) Drug Discovery, Development, and Innovation to Reach the Marketplace - PHP 419 (3) Alzheimer's Disease, Other Dementias and the Role of Public Health - PHP 421 (3) Introduction to Public Health Law and Ethics - PHPM 448 (3) Addiction and Substance Use Policy - POL 206 (3) Public Policy and Administration Emphasis 4, Thematic: Complete 3 courses (9 units) - Offers all emphasis courses listed above
Internship, practicum, applied course requirements (Yes/No). If yes, provide description.	Yes - Complete 1 Lab/Research/Internship/ CURE course requirement (3 units) - NROS 397 (3) Brain Communication Networks VIP-CURE - (NEW) NROS 3xx (3) Neuroscience Research Experience CURE - NROS 392/492 (3) Directed Research - NROS 399/499 (3) Independent Study - NROS 399H/499H (3) Honors Independent Study - NROS 493 (3) Internship
Senior thesis or senior project required (Yes/No). If yes, provide description.	No
Additional requirements (provide description	- Complete one upper division elective from an emphasis (1, 2 or 3) other than the selected emphasis (3 units) - Complete one writing emphasis elective (3 units) - (NEW) NROS 4xx (3) Bioethics - (NEW) NROS 4xx (3) Science Writing Strategies, Skills & Ethics - NROS 498 (3) Senior Capstone - NROS 498H (3) Honors Thesis - ECOL 379 (3) Evidence Based Medicine
Minor (specify if optional or required)	NA

Any double-dipping restrictions (Yes/No)? If yes, provide description.	No

*Emphases are officially recognized sub-specializations within the discipline. ABOR Policy 2-221 c. Academic Degree Programs Subspecializations requires all undergraduate emphases within a major to share at least 40% curricular commonality across emphases (known as "major core"). Total units required for each emphasis must be equal. Proposed emphases having similar curriculum with other plans (within department, college, or university) may require completion of an additional comparison chart. Complete the table found in Appendix B to indicate if emphases should be printed on student transcripts and diplomas.

II. **CURRENT COURSES**–using the table below, list all existing courses included in the proposed major. You can find information to complete the table using the UA course catalog or UAnalytics (Catalog and Schedule Dashboard> "Printable Course Descriptions by Department" On Demand Report; right side of screen). If the courses listed belong to a department that is not a signed party to this implementation request, upload the department head's permission to include the courses in the proposed program and information regarding accessibility to and frequency of offerings for the course(s). Upload letters of support/emails from department heads to the "Letter(s) of Support" field on the UAccess workflow form. Add or remove rows to the table, as needed.

Course prefix and number (include cross-listings)	Units	Title	Pre-requisites	Modes of delivery (online, in-person, hybrid)	Typically Offered (F, W, Sp, Su)	Dept signed party to proposal? (Yes/No)
MCB 181R	3	Introductory Biology 1	PPL 40+ or SAT I MSS 560+ or ACT MATH 24+ or one course from Math 108, 112, 113, 119A, 120R, 124, 122B, 125, 129, or 223.	Online, In-person	F, Sp, Su	Yes
MCB 181L	1	Introductory Lab I	NA	Online, In-person	F	Yes
CHEM 151	4	Chemical Thinking I	PL 60+ or SAT I MSS 610+ or ACT MATH 26+ or one course from MATH 108, 112, 113, 119A, 120R, 122B, 125, 129, or 223. Test scores	In-person	F, Sp, Su	Yes

			expire after 2 years. Must not have taken CHEM 105A/106A, CHEM 151, or CHEM 161/163.			
CHEM 152	4	Chemical Thinking II	CHEM 151 or 141/143 or 161/163 and 1 of the following: PPL 60+ or SAT I MSS 610+ or ACT MATH 26+ or one course from MATH 108, 112, 113, 119A, 120R, 122B, 125, 129, or 223.	In-person	F, Sp, Su	Yes
CHEM 241A	3	Lectures in Organic Chemistry	CHEM 105B, CHEM 142, CHEM 152 or CHEM 162.	In-person	F, Sp, Su	Yes
CHEM 243A	1	Organic Chemistry Lab I	CHEM 105B/106B or CHEM 142/144 or CHEM 152 or CHEM 162/164, completion or concurrent enrollment in CHEM 241A, CHEM 242A or CHEM 246A.	In-person	F, Sp, Su	Yes
MATH 125	3	Calculus 1	PPL 92+ or SAT I MSS 730+ or ACT MATH 32+ or MATH 125 AP credit.	Online, In-person	F, Sp	Yes
MATH 263	3	Introduction to Statistics and Biostatistics	PPL 60+ or MCLG 88+ or SAT I MSS 640+ or ACT MATH 26+ or one recent course from MATH 108, 112, 113, 116, 119A, 122B, or 125. Test scores expire after 1 year. Some students may need to take Math 100, then Math 112 first.	In-person	F, Sp, Su	Yes
BIOS 376	3	Introduction to Biostatistics	MATH 108 or MATH 112 or higher	Online, In-person	F, Sp	Yes

MATH 129	3	Calculus II	MATH 122B or 125 with C or higher.	Online, In-person	F, Sp, Su	Yes
NROS 199/H	1-5	Independent Study	None	In-person	F, Sp, Su	Yes
NROS 299/H	1-5	Independent Study	None	In-person	F, Sp, Su	Yes
NROS 307/H	3	Cellular Neurophysiology	Introductory biology (MCB181R/L). Introductory Physics II (PHYS 103) is recommended.	Online, In-person	F, Sp	Yes
NROS 308	3	Methods in Neuroscience	Prerequisite or concurrent enrollment in NROS 307.	Online, In-person	F, Sp	Yes
NROS 311	3	Scientific Programming Using MatLab	None	Online, In-person	F, Sp	Yes
NROS 310/H	3	Molecular and Cellular Biology of Neurons	Introductory biology (MCB 181 R/L). CHEM 151/152, 241a, 241A and BIOC 384 are recommended.	Online, In-person	F, Sp	Yes
NROS 330	3	Principles of Neuroanatomy: Cells to Systems	Introductory biology (MCB 181 R/L).	Online, In-person	F, Sp	Yes
NROS 381	3	Animal Brains, Signals, Sex and Social Behaviors	Major or minor in science-related field or, for non-science majors, two courses from Tier One Natural Sciences (courses numbered 170A, B, or C).	Online, In-person	F, Sp	Yes
NROS 397	3	Brain Communication Networks VIP-CURE	Freshman Biology or equivalent OR Introductory Computer Science of Bioinformatics course or experience	In-person	F, Sp	Yes
NROS 399/H	1-5	Independent Study	None	In-person	F, Sp, Su	Yes
NROS 412	3	Molecular Mechanisms of Learning and Memory	NROS 307 or NROS 310.	Online, In-person	F, Sp	Yes

NROS 415	3	Electrophysiology Laboratory	NROS 310 or NROS 307 or consent of instructor.	Online, In-person	F, Sp	Yes
NROS 420	3	The Neuroscience of Survival	Recommended but not required: NROS 307 and NROS 310.	In-person	F, Sp	Yes
NROS 430	3	Neurogenetics	MCB 181R; NROS 310 recommended.	Online, In-person	F, Sp	Yes
NROS 440	3	How to Build a Brain: Mechanisms of Neural Development	MCB181 R/L or general biology is required. Concurrent enrollment in NROS 310 is recommended.	Online, In-Person	F, Sp	Yes
NROS 450	3	Neurons and Glia in Health and Disease	NROS 307.	In-Person	Sp	Yes
NROS 491/H	1-5	Preceptorship	None	In-person	F, Sp, Su	Yes
NROS 492/H	1-5	Directed Research	None	In-person	F, Sp, Su	Yes
NROS 493/H	1-6	Internship	None	In-person	F, Sp, Su	Yes
NROS 498	3	Senior Capstone	None	In-person	F, Sp, Su	Yes
NROS 498H	3	Senior Honors Thesis	None	In-person	F, Sp, Su	Yes
NROS 499/H	1-5	Independent Study	None	In-person	F, Sp, Su	Yes
PHYS 102	3	Introductory Physics I	PPL 60+ or SAT I MSS 610+ or ACT MATH 26+ or one course from MATH 108, 112, 113, 116, 119A, 120R, 122B, 125, 129, or 223.	Online, In-person	F, Sp, Su	Yes
PHYS 103	3	Introductory Physics II	PHYS 102 OR PHYS 140 OR PHYS 141.	Online, In-person	F, Sp, Su	Yes
PHYS 141	4	Introductory Mechanics	MATH 122B, 124, or 125, or appropriate Math Placement Level.	Online, In-person	F, Sp, Su	Yes
PHYS 241	4	Introductory Electricity and Magnetism	(PHYS 141 or PHYS 140 or PHYS 161H, including transfer and AP credit) and (MATH 129 or MATH 250A or	Online, In-person	F, Sp, Su	Yes

			appropriate Math Placement Level, including transfer and AP credit).			
PHYS 181	1	Introductory Laboratory I	PPL 60+ or SAT I MSS 610+ or ACT MATH 26+ or one course from MATH 108, 112, 113, 116, 119A, 120R, 122B, 125, 129, or 223.	Online, In-Person	F, Sp, Su	Yes
PHYS 182	1	Introductory Laboratory II	(PHYS 102 and PHYS 181) or PHYS 141. Prerequisite or concurrently enrolled in PHYS 103.	Online, In-Person	F, Sp, Su	Yes
BIOC 384	3	Foundations in Biochemistry	MCB 181R and (CHEM 142 or CHEM 152 or CHEM 105B or CHEM 162) and (CHEM 241A or CHEM 242A or CHEM 246A).	On-line, In-person	F, W, Sp, Su	Yes
ECOL 379	3	Evidence Based Medicine	PPL 60+ or MCLG 88+ or SAT I MSS 620+ or ACT MATH 26+ or one recent course from MATH 112, 113, 116, 122B, or 125.	In-person	Sp	Yes
CGSC 344	3	Modeling the Mind: Comp. Models of Cognition	CSC 127A or ISTA 130 or other programming course. MATH 263 or PSY 230 or ISTA 116 or other statistics course.	In-person	Sp	Yes
ISTA 457	3	Neural Networks	ISTA 350 or ECE 373 or CSC 335 or CSC 345 or NSCS 344 or consent of instructor.	Online, In-person	F	Yes
PHYS 431	3	Molecular Biophysics	PHYS 103 or 240 or 241 or 261H.	In-person	Sp	Yes
PSY 403C	3	Introduction to Computational Neuroscience: Neural Simulations	No information listed in catalog as of 9/14/2023	Not currently scheduled, so no	F, Sp	Yes

				information available		
PSY 435	3	Computational Neuroscience: Neural Spike Data Analyses	No information listed in catalog as of 10/5/2023	Not currently scheduled, so no information available		Yes
PHP 419	3	Alzheimer's Disease, Other Dementias, and the Role of Public Health	NA	Online, In-person	F	Yes
POL 206 Cross listed PA 206	3	Public Policy and Administration	NA	Online, In-person	F, Sp, Su	Yes
LAW 452	3	Health Law	NA	In-person	F	Yes
LAW 415	3	Healthcare Ethics	NA	Not currently scheduled, so no information available	S	Yes
LAW 476A	3	Drug Discovery, Development, and Innovation to Reach the Marketplace	NA	Not currently scheduled, so no information available	F	Yes
JOUR 465/565	3	Issues in Covering Science and the Environment	NA	In-person	F	Yes
JOUR 305	3	Full STEM Ahead: Science and the News	Gen Ed: Tier 2 Individuals and Societies Gen Ed: Building Connections Honors Contract Course	Not currently scheduled, so no information available	S	Yes

GLO 465	3	Science Misinformation, Disinformation, Media & the Public	NA	Online, In-person	F, Sp, Su	Yes
ENGR 495A	3	Science, Health & Engineering Policy & Diplomacy	Adv Stdg: Engineering and Senior only	In-person	F	Yes
PHPM 448	3	Addiction and Substance Use Policy	NA	Online, In-person	S	Yes

III. NEW COURSES NEEDED – using the table below, list any new courses that must be created for the proposed program. If the specific course number is undetermined, please provide level (i.e., CHEM 4XX). Add rows as needed.

Course prefix and number (include cross-listings)	Units	Title	Pre-requisites	Modes of delivery (online, in-person, hybrid)	Status*	Anticipated first term offered	Typically Offered (F, W, Sp, Su)	Dept signed party to proposal? (Yes/No)	Faculty members available to teach the courses
NROS 19X	1	Neuroscience Colloquium	None	In-person	D	Fall 2024	F	Yes	Ulises Ricoy
NROS 2XX	1	Contemporary Approaches to Neuroscience	None	In-person	D	Spring 2025	Sp	Yes	Ulises Ricoy
NROS 3XX	3	Genetics & Genomics in Neuroscience	MCB 181 R/L, CHEM 151 and 152, CHEM 241A and CHEM 241B recommended	In-person	D	Fall 2024	F	Yes	Konrad Zinsmaier
NROS 3XX	3	Systems Neuroscience	NROS 307	In-person	D	Spring 2025	Sp	Yes	Haijiang Cai

NROS 4XX	3	Neural Circuits in Health and Disease	NROS 330 recommended	In-person	D	Spring 2025	Sp	Yes	Marina Cholanian, Julie Miller
NROS 4XX	3	Complex Behavioral, Cognitive and Emotional Disorders	NROS 418 recommended	In-person	D	Fall 2025	F	Yes	Haijiang Cai, Julie Miller
NROS 4XX	3	Bioethics	None	In-Person	D	Fall 2025	F	No	TBD
NROS 4XX	3	Science Writing Strategies, Skills & Ethics	None	In-person	D	TBD	TBD	TBD	TBD
NROS 3XX	3	Neuroscience Research Experience CURE	MCB 181 R/L	In-person	D	Spring 2025	Sp	Yes	Charles Higgins
NROS 4XX	3	Neuropharmacology & Addiction	MCB 181 R/L NROS 310 recommended	In-person	D	Fall 2025	F	Yes	Marina Cholanian

*In development (D); submitted for approval (S); approved (A)

Click or tap here to enter text.

IV. **FACULTY INFORMATION-** complete the table below. If UA Vitae link is not provided/available, add CVs to a Box folder and provide that link. UA Vitae profiles can be found in the UA directory/phonebook. Add rows as needed. Delete the EXAMPLE rows before submitting/uploading. **NOTE: full proposals are distributed campus-wide, posted on committee agendas and should be considered "publicly visible". Contact Office of Curricular Affairs if you have concerns about CV information being "publicly visible".**

Faculty Member	Involvement	UA Vitae link or Box folder link
Bhattacharya, Martha R. C.	Teaches NROS 397, NROS 440	https://profiles.arizona.edu/person/marthab1
Bowersock, Jessica	Teaches only NROS Online courses	https://neurosci.arizona.edu/person/jessica-bowersock-phd
Cai, Haijiang	Teaches NROS 418	https://profiles.arizona.edu/person/haijiangcai
Corty, Megan	Teaches NROS 450	Starts Jan 1, 2024

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Cholanian, Marina	Teaches NROS 310, NROS 307/308, NROS 330, NROS 440	https://neurosci.arizona.edu/person/marina-cholanian-phd
Gronenberg, Wulfila	Teaches NROS 381	https://profiles.arizona.edu/person/wulfilag
Higgins, Charles M.	Teaches NROS 311, NROS 415	https://profiles.arizona.edu/person/cmh
Miller, Julie Elizabeth	Teaches NROS 307/308, NROS 330	https://profiles.arizona.edu/person/juliemiller
Ricoy, Ulises	Teaches NROS 195B	https://profiles.arizona.edu/person/ricoy
Strausfeld, Nicholas J.	Teaches NROS 381	https://profiles.arizona.edu/person/flybrain
Wohlgemuth, Melville Joseph	Teaches NROS 420	https://neurosci.arizona.edu/person/melville-wohlgemuth-phd
Zinsmaier, Konrad E.	Teaches NROS 430, NROS 412	https://profiles.arizona.edu/person/kez4

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V. **GRADUATION PLAN –** provide a sample degree plan, based on your program that includes all requirements to graduate with this major and takes into consideration course offerings and sequencing. *Undergraduate programs: please complete Addendum D: 4-Year Plan for Degree Search. Use generic title/placeholder for requirements with more than one course option (e.g., Upper Division Major Elective, Minor Course, Second Language, GE).* Add rows as needed.

Semester 1		Semester 2		Semester 3		Semester 4	
Course prefix and number	Units	Course prefix and number	Units	Course prefix and number	Units	Course prefix and number	Units
ENGL 101	3	ENGL 102	3	CHEM 241A	3	Phys 102 & 181	4
MATH 125	3	CHEM 152	4	CHEM 243A	1	Build. Connections	3
UNIV 101	1	2nd Language	4	2nd Language	4	Expl. Perspectives	3
NROS 19X	1	MATH 263	3	Expl. Perspectives	3	BIOC 384	3
CHEM 151	4	Math 129	3	NROS 3XX Genetics	3	NROS 2XX	1
MCB 181R/MCB 181L	4						
Total	16	Total	17	Total	14	Total	14

Semester 5		Semester 6		Semester 7		Semester 8	
Course prefix and number	Units	Course prefix and number	Units	Course prefix and number	Units	Course prefix and number	Units
Phys 103 & 182	4	NROS 307	3	NROS 330	3	UNIV 301	1
NROS 310	3	NROS 308	1	Elective Course	3	Emphasis: Course 3	3
Free Elective Course	3	NROS 311	3	Emphasis: Course 1	3	Free Elective Course	1
Build. Connections	3	Build. Connections	3	Emphasis: Course 2	3	Emphasis: Elective Course	3
NROS 399 Ind. Study	3	Expl. Perspectives	3	Free Elective Course	3	Emphasis: Writing Elective	3
		NROS 399 Ind. Study	3				
Total	16	Total	16	Total	15	Total	12

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VI. Curriculum Map and Assessment Map - Complete this table as a summary of your learning outcomes and assessment plan, using these examples as a model. If you need assistance completing this table and/or the Curriculum Map, please contact the University Center for Assessment, Teaching and Technology. Attach your Curriculum Map here.

Program: BS in Neuroscience

Learning Outcome 1: Demonstrate a well-founded knowledge of cellular and physiological core concepts and principles underlying neuronal communication (**Basic Knowledge**).
Concepts: Cellular and physiological core concepts and principles of neurons include structure and function of axons and dendrites, mechanisms of membrane potential, mechanisms of membrane excitability by action potentials and synaptic potentials, mechanisms of dendritic integration of synaptic potentials, and mechanisms of synaptic physiology.
Competencies: Students will apply their knowledge to explain the fundamental anatomical and functional organization of neuronal axons and dendrites, to identify neuronal structures, to explain the formation of a membrane potential as a prerequisite of membrane excitability, to calculate membrane potentials by using known ion concentrations, to explain ionic currents underlying action potentials and synaptic potentials, and to predict the consequences of genetic or drug-induced alterations of key components mediating neuronal excitability and synaptic physiology.
Assessment Methods: This outcome will be assessed in a special exam in NROS 307 (direct) and through a student exit survey (indirect).
Measures: Instructor grading of the special exam with the use of rubrics and answer keys, and responses to a student exit survey.
Learning Outcome 2: Demonstrate a comprehensive knowledge of neuroscience across all levels of analysis – molecular, cellular, circuits, systems, and behavior (**Comprehensive Knowledge**).
Concepts: Mechanisms by which proteins are expressed, assembled to mediate common cellular processes (e.g., protein synthesis trafficking, and degradation; signal detection and transduction pathways; organelle assembly and trafficking; cell division, axon growth and pathfinding). Basic organization and functional properties of neural circuits mediating vision, hearing, olfaction, and touch, as well as common behaviors such as eating, emotion, and social interactions.
Competencies: Students will apply their knowledge to explain how proteins mediate cellular processes enabling neuronal function. Students also will be able to draft experiments testing involvement of various molecular pathways in particular cellular processes. Students will be able to explain, compare, and contrast how neuronal circuits detect, process, and transduce sensory information across all modalities, and how neuronal networks enable behaviors such as eating, emotion, and social interactions. Students also will be able to predict the consequences of disease-related genetic or drug-induced alterations in these systems.
Assessment Methods: This outcome will be assessed in special exams in NROS 310 and NROS 3xx (direct) and through a student exit survey (indirect).
Measures: Instructor grading of the special exams with the use of rubrics and answer keys, and responses to a student exit survey.

Learning Outcome 3: Design and execute research experiments, evaluate experimental outcomes quantitatively and statistically, interpret their biological implications, and apply these skills in a guided research project (**Laboratory Skills**).
Concepts: Genetic, molecular, cellular and systems approaches, methodologies, and research practices.
Competencies: Students will demonstrate theoretical and practical laboratory skills common to modern neuroscience laboratories.
Assessment Methods: This outcome will be assessed through a student exit survey (indirect) and through a poster presentation, which is based on the students' individual laboratory work (direct). Students are required to present their independent research projects from a CURE course or independent study/internship at a program-wide poster session.
Measures: Grading committee evaluating performed experimental work based on presented poster using rubrics and answer keys, and responses to a student exit survey.
Learning Outcome 4: Communicate scientific knowledge, ideas, and reasoning objectively, clearly, accurately, logically, concisely, and effectively in written and oral form (**Communication Skills**)
Concepts: Communication of, often complex, neuroscientific information to other scientists and the public in a form that is appropriate for the needs of the audience. Use of terminology and phrasing that comprises accurate and complete information and is consistent with the semantic competency of the audience.
Competencies: Students will demonstrate their ability to communicate complex principles and concepts of neuroscience to others.
Assessment Methods: This outcome will be assessed through a student exit survey (indirect) and through a poster presentation, which is based on the students' individual laboratory work.
Measures: Grading committee evaluating effectiveness of (oral and written) poster presentation using rubrics and answer keys, and responses to a student exit survey.
Learning Outcome 5: Critically evaluate scientific literature, identify open questions and problems, and develop innovative and creative solutions (**Scientific Reasoning and Critical Thinking**).
Concepts: Thinking in a disciplined and evaluative manner: evaluation of information, evidence, arguments, theories, questioning of different and competing perspectives, and challenging the (sometimes hidden) assumptions and inferences that determine what will count as evidence or argument.
Competencies: Students will demonstrate critical thinking skills and scientific reasoning to analyze, interpret, and evaluate research data, and develop follow-up project-based activities.
Assessment Methods: This outcome will be assessed through a student exit survey (indirect) and through a poster presentation, which is based on the students' individual laboratory work.
Measures: Grading committee evaluating scientific reasoning skills poster presentation using rubrics and answer keys (direct), and responses to a student exit survey (indirect).
Learning Outcome 6: Apply ethical and professional standards for the practice of research (**Ethics**).
Concepts: Relevant laws, regulatory & ethical guidelines for basic, animal, and clinical neuroscience research and human subjects' protections.

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Competencies: Students will demonstrate an understanding of the ethical standards for the responsible conduct of scientific neuroscience research and its applications.
Assessment Methods: This outcome will be assessed by a (pass/fail) questionnaire (direct) and a student-self assessment in a student exit survey (indirect).
Measures: Grading of questionnaire and student-self assessment using rubrics and answer keys.

	Outcome 1: Basic Knowledge	Outcome 2: Broad Knowledge.	Outcome 3: Laboratory Skills.	Outcome 4: Communication Skills	Outcome 5: Scientific Reasoning	Outcome 6: Ethics.
NROS 19x Neuroscience Colloquium	I	I		I		I
NROS 2xx Contemporary Approaches to Neuroscience	R	R	I	R	I	R
NROS 307 Cellular Neurophysiology	R/A	R		R	R	
NROS 308 Methods in Cellular Neurophysiology			R			
NROS 310 Molecular and Cellular Biology of Neurons	R/M	R/A	R	R		R
NROS 3xx Systems Neuroscience	R/M	R/A	R	R	R	R
NROS 311 Neuroinformatics and Scientific Coding			R			
NROS 3xx Genetics & Genomics in Neuroscience			R		R	R
NROS 3xx Neuroscience Research Experience CURE, NROS 397 Brain Communication Networks VIP-CURE, and Independent Studies (NROS 199, 299, 399, 499)	R/M		R	R	R	R

Program-wide Poster Session (Required)			R/A	R/A	R/A	
Exit Survey & Questionnaire (Required)	A	A	A	A	A	A

VII. **PROGRAM ASSESSMENT PLAN-** using the table below, provide a schedule for program evaluation 1) while students are in the program and 2) after completion of the major. Add rows as needed. Delete EXAMPLE rows.

Assessment Measure	Source(s) of Evidence	Data Collection Point(s)
1) **Program assessment while students are in the program**		
-Learning Outcomes 1-2 (direct)	Exams using rubrics	Annually
-Learning Outcomes 3-5 (direct)	Poster and presenter evaluation using rubrics	Annually
-Learning Outcomes 1-6 (indirect)	Exit assessment using rubrics	Annually
2) **Program assessment after completion of the major**		
Length of time to graduate	Internally generated statistics	Annually
Student program assessment	Senior exit survey	Annually
Job placement statistics	Student/Alumni survey	At graduation and as part of alumni survey
Academic program review (APR)	Reviewer's APR report	Every 7 years

VIII. **ANTICIPATED STUDENT ENROLLMENT**-complete the table below. What concrete evidence/data was used to arrive at the numbers?

5-YEAR PROJECTED ANNUAL ENROLLMENT					
	1st Year	2nd Year	3rd Year	4th Year	5th Year
Number of Students	60	120	180	220	260

Data/evidence used to determine projected enrollment numbers:

The projected enrollment is guided by 3 data sets:
The initial enrollment of the existing NSCS program, which experienced an enrollment of 57 and 160 students in the first and second year, respectively. By year 5, the program grew to 481 students.

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Next, we considered potential interest in the new major by assessing how many NSCS students in the Neuroscience (NS) focus are currently pursuing Biochemistry courses since a required Biochemistry course is one of the major differences of the new major to the existing NSCS major. On average, 85 (39.1% ± 4.5% StDev) students of the 218 students in the NS focus pursued biochemistry in a 5-year window.

Next, we considered a most recent survey of undergraduate students in the existing NSCS major and other majors mostly in the College of Science. For students in the NSCS major, we differentiated among students that are in the Cognitive Science (CS) track, the Neuroscience (NS) track, or undecided. We asked the students 2 questions: 1) Would you be interested in the new Neuroscience major as a current student of the NSCS program? (Applies to NSCS students only). 2) In theory, would you be interested in the new Neuroscience major as an incoming freshman?

128 students were polled and responded to the first question as follows: Of the 21 polled students in the CS track, 47.6% expressed interest in the new Neuroscience major as an incoming student. Of the 74 polled students in the NS track, 87.8% expressed interest; of them, 20 polled undecided students, 90% expressed interest. A similar result was obtained for the second question (see table below).

Based on this data, being conservative and assuming steady growth and some transfer students in the initial years of the program, we project an enrollment of 60 students in the first year, 60 new students in the second year, and approximately 50 new students per year thereafter.

Focus/Emphasis Data Fall Census 2018 – 2022: Biochemistry Minors

NSCS Neuroscience Focus	Fall 2018	Fall 2019	Fall 2020	Fall 2021	Fall 2022	Average	StDev
Total students	186	184	205	305	213	218.6	49.9
Students with Biochemistry Minor	64	75	94	119	76	85.6	21.5
% Students with Biochemistry Minor	34.4%	40.8%	45.9%	39.0%	35.7%	39.1%	4.5%

Survey September 2023 of NSCS and non-NSCS students

		1) Interested as a current student of NSCS?				2) interested as an incoming freshman?		
	# Students	# Yes	# NO	% Yes		# Yes	# NO	% Yes
CogSci track	21	10	11	47.6%		15	6	71.4%
NS track	74	65	9	87.8%		68	6	91.9%
Undecided	20	18	2	90.0%		15	4	78.9%

Non-NSCS	13	11	2	84.6%		9	4	69.2%
Total	**128**	**104**	**24**	**81.3%**		**107**	**20**	**84.3%**

IX. **ANTICIPATED DEGREES AWARDED**- complete the table below, beginning with the first year in which degrees will be awarded. How did you arrive at these numbers? Take into consideration departmental retention rates. Use National Center for Education Statistics College Navigator to find program completion information of peer institutions offering the same or a similar program.

PROJECTED DEGREES AWARDED ANNUALLY					
	1st Year	2nd Year	3rd Year	4th Year	5th Year
Number of Degrees	0	0	36	42	42

Data/evidence used to determine number of anticipated degrees awarded annually:

The projected enrollment is guided by the 4-year and 6-year graduation rates of undergraduate students at the University of Arizona (4-year: 57%; 6-year: 68%), the Neuroscience program at the University of Pittsburgh (4-year: 69%; 6-year: 84%), and the existing NSCS major (4-year: 57%; 6-year: 74%).

As a more specialized major, we expect to attract higher caliber students and a graduation rate higher than the NSCS average. The projected number of annually awarded degrees is based upon the projected annual enrollment and assumes that most students (80%) will enroll in their sophomore year and some students (20%) will transfer from other programs. The projection assumes a total time to complete the degree by year 4 (60%), and 10% for years 5 and 6. We have accounted for an overall retention rate of 20%.

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Appendix A. Minor Requirements. Complete if requesting a corresponding minor. Delete EXAMPLE column and verbiage as it applies to your level degree (i.e., undergraduate vs graduate) before submitting.

Not applicable.

Appendix B. Emphasis Print Information-if applicable, complete the table below to indicate if proposed emphases should be printed on transcript and diploma. Add rows as needed. Note: emphases are displayed on transcript and diplomas as " _____ Emphasis". Delete EXAMPLE row before submitting.

Emphasis	Print on transcript	Print on diploma
Neuroscience and Human Health	Yes	Yes
Integrated Neuroscience	Yes	Yes
Communication and Public Health	Yes	Yes
Thematic	Yes	Yes

ARIZONA BOARD OF REGENTS
ASU ◆ NAU ◆ UA

Request to Establish New Academic Program in Arizona

Please complete all fields. Boxes may be expanded to accommodate longer responses. Clarifying field descriptions can be found below. Should you have any questions or concerns, please email Helen Baxendale, Director of Academic Affairs and Policy at helen.baxendale@azregents.edu

University: University of Arizona

Name of Proposed Academic Program: Neuroscience
Academic Department: The name of the academic department or unit that will primarily administer the academic program. If the proposed program will be jointly administered across more than one department, please list the(se) additional department(s). Department of Neuroscience, College of Science
Geographic Site: The physical site (campus, extended campus, etc.) or modality where the academic program will be primarily delivered or administered. Tucson, Main Campus.
Instructional Modality: The primary modality of the academic program (i.e. immersion, online, hybrid). In-person
Total Credit Hours: The number of credit hours required to complete the academic program. 120 units (33 U required for “required supporting coursework”; 20 U required for “major requirements”; 18 U required for emphasis electives).
Proposed Inception Term: The term and year in which the program will be first delivered (i.e. Spring 2021; Fall 2022). Fall 2024
Brief Program Description: A short outline of the content and skills that the proposed program will deliver. A brief description of how the program fits into the institutional mission of the university. If relevant, please provide succinct information about existing related or complementary academic programming. ***Outline of content and skills***. Modern Neuroscience is the interdisciplinary study of the nervous system, from the level of individual genes and proteins that control neural activity to mechanisms that govern complex (human) behavior in health and disease. Earning a degree in Neuroscience will prepare

students exceptionally well for advanced training in Medical School and Graduate School in Neuroscience or related fields, careers in the pharmaceutical, biotech, biomedical or other industries, or for other science-related careers such as public policy, science communication, journalism, or patent law.

Neuroscience students can expect to gain a strong intellectual foundation and deep understanding of mechanisms underlying brain function through a core curriculum, which spans molecular, genetic, and cellular mechanisms of nervous systems. The core curriculum also requires courses in Biochemistry, Genetics and Genomics, and a programming course. The core curriculum is based on a robust foundation in biology, mathematics, chemistry, and physics. Four emphases (themes) provide students with opportunities to gain specialized expertise in multiple aspects of contemporary neuroscience. Students will gain critical skills in research, critical thinking and communication through coursework addressing experimental techniques and approaches relevant to Neuroscience, including design, analysis, strengths, and limitations, as well as statistical and computational methods for data analysis through related coursework.

To further strengthen research skills, hands-on research opportunities and experiences are offered at levels ranging from molecular neuroscience, cellular neuroscience, systems neuroscience to computational neuroscience and translational neuroscience by taking advantage of the broad and multidisciplinary research expertise of more than 60 neuroscience laboratories campuswide.

Fit into the institutional mission of the University of Arizona.
The new major advances pillar 1 of the strategic plan of the University of Arizona, which states: the “UA will build a diverse and high potential student body, providing students with an integrated support ecosystem, the skills and mindsets to lead in the 4th Industrial Revolution Economy, and a degree that launches them to achieve their hopes and dreams.”

The new major will address the need for a competitive and stand-alone neuroscience undergraduate program at the University of Arizona. Out of the 15 peer institutions of the University, 12 institutions offer very successful majors in Neuroscience or Neurobiology that are directly comparable to the new proposed major. 2 peer institutions offer a major that is comparable to the currently offered interdisciplinary Neuroscience and Cognitive Science (NSCS) joint major. Only one institution does not offer a neuroscience or related major. In comparison, the University lags most of its peers. The new BS in Neuroscience will rectify this situation.

Existing related or complementary academic programs at the University of Arizona.
At the University of Arizona, the School of Mind, Brain and Behavior (MBB) in the College of Science offers an interdisciplinary B.S. in Neuroscience & Cognitive Science (NSCS). MBB comprises the Department of Neuroscience, the Department of Psychology, and the Department of Speech, Language and Hearing Sciences, as well as the Graduate Interdisciplinary Program (GIDP) in Neuroscience, and the Program and GIDP in Cognitive Science. The core units of MBB collaborate to offer the NSCS program which covers aspect of neuroscience, cognitive science, psychology, philosophy, sociology, and linguistics. The Departments of Psychology and of Speech, Language and Hearing Sciences also offer specialized degree programs while the Department of Neuroscience does not. The Program in Cognitive Science offers a graduate minor in Cognitive Science.

The NSCS major is jointly administered by the Program in Cognitive Science and the Department of Neuroscience. The Head and the Faculty of the Department of Neuroscience will continue to support the existing NSCS major and the neuroscience track in the major.

The proposal for the new major in Neuroscience has been shared with the Director of the Cognitive Science program who agrees that the new major is a strong degree and supports the initiative. The proposal is welcomed and supported by the Dean of the College of Science.

The proposed new Neuroscience major differs from the existing NSCS program in several important ways: The NSCS program requires a common core curriculum including a Neuroscience-Cognitive Science gateway course, 2 core courses in Cognitive Science, and 2 core courses in Neuroscience plus a scientific programing course. Students then choose one of two focus areas (tracks): Neuroscience (NS) or Cognitive Science (CS). Each focus requires a focus-specific core curriculum consisting of 2 core courses followed by a series of elective courses in 1 of 7 emphases. The emphases of the NSCS program include Cognition, Computation, Development and Aging, Language and Communication Science, Neurobiology, Philosophy of Mind, and Thematic.

In contrast, the core curriculum of the proposed new major requires 2 colloquia and 6 core courses (20 units) plus 1 optional course. The core courses cover molecular, biochemical, cellular, systems, and genetic aspects of Neuroscience with greater rigor than is currently possible in the existing NSCS major. This core curriculum differs from the core of the NSCS program, most notably by 2 colloquia designed to retain students and by the courses covering systems neuroscience, biochemistry, and genetics & genomics. In addition, the proposed neuroscience major requires 3 units of lab research/internship, in contrast to the existing NSCS major which requires none.

The proposed major will offer 4 emphases: Emphasis 1: “Neuroscience and Human Health” (absent in NSCS) addresses the growing area of translational and clinical research on neurological, neurodegenerative, and neuropsychiatric disease. It especially prepares students for US Medical School, Graduate School, research careers in academia and industry and Allied Health Professions.

Emphasis 2: “Integrated Neuroscience” reflects the contemporary vertical approach on neuroscience, studying a problem from molecules to cells to neural circuits and networks, and vice versa. It prepares students for Medical School, Graduate School and research careers in academia and industry. This emphasis is similar, but not identical, to the ‘neurobiology’ emphasis of the NSCS major.

Emphasis 3: “Neuroscience, Communication, Public Health and Policy” (absent in NSCS) provides basic insights into public health law, policy making, and journalism. It will prepare students to communicate neuroscience information to the general public and advise policy makers.

Emphasis 4: “Thematic Emphasis”. Neuroscience is a broadly and rapidly advancing field and students can design their own curriculum with a qualified advisor.

The new program will satisfy most requirements for US Medical Schools and Graduate Schools.

The new B.S. in Neuroscience is expected to have only a modest impact on the enrollment and retention of the existing NSCS major. The major reason for this prediction is that the new major is tailored to a different target group, one that expects to gain a detailed knowledge of the molecular, cellular and systems mechanisms underlying nervous system function instead of being interested in a broad focus covering adjacent fields (neuroscience and cognitive science).

Even though the new degree may attract some of the students in the NSCS major, these are likely limited to students in the NSCS neuroscience track.

Given that the college already divides NSCS tuition revenue proportionally based on enrollment in each of the 2 NSCS tracks, the tuition revenue flow to the Program of Cognitive Science is not expected to significantly change with the addition of the new degree.

Learning Outcomes and Assessment Plan:
Define the core concepts and competencies that the program will convey and stipulate how these key learning outcomes will be measured and assessed.

Learning Outcomes

Learning Outcome 1: Demonstrate a well-founded knowledge of cellular and physiological core conce communication (**Basic Knowledge**).
Concepts: Cellular and physiological core concepts and principles of neurons include structure and fun of membrane potential, mechanisms of membrane excitability by action potentials and synaptic poten of synaptic potentials, and mechanisms of synaptic physiology.
Competencies: Students will apply their knowledge to explain the fundamental anatomical and functio dendrites, to identify neuronal structures, to explain the formation of a membrane potential as a prere calculate membrane potentials by using known ion concentrations, to explain ionic currents underlying and to predict the consequences of genetic or drug-induced alterations of key components mediating r physiology.
Assessment Methods: This outcome will be assessed in a special exam in NROS 307 (direct) and throug
Measures: Instructor grading of the special exam with the use of rubrics and answer keys, and respons
Learning Outcome 2: Demonstrate a comprehensive knowledge of neuroscience across all levels of ar systems, and behavior (**Comprehensive Knowledge**).
Concepts: Mechanisms by which proteins are expressed, assembled to mediate common cellular proc and degradation; signal detection and transduction pathways; organelle assembly and trafficking; cell Basic organization and functional properties of neural circuits mediating vision, hearing, olfaction, and as eating, emotion, and social interactions.
Competencies: Students will apply their knowledge to explain how proteins mediate cellular processe also will be able to draft experiments testing involvement of various molecular pathways in particular to explain, compare, and contrast how neuronal circuits detect, process, and transduce sensory inforr neuronal networks enable behaviors such as eating, emotion, and social interactions. Students also w disease-related genetic or drug-induced alterations in these systems.
Assessment Methods: This outcome will be assessed in special exams in NROS 310 and NROS 3xx (dir (indirect).
Measures: Instructor grading of the special exams with the use of rubrics and answer keys, an
Learning Outcome 3: Design and execute research experiments, evaluate experimental outcomes qua biological implications, and apply these skills in a guided research project (**Laboratory Skills**).
Concepts: Genetic, molecular, cellular and systems approaches, methodologies, and research practice
Competencies: Students will demonstrate theoretical and practical laboratory skills common to mode
Assessment Methods: This outcome will be assessed through a student exit survey (indirect) and thro on the students' individual laboratory work (direct). Students are required to present their independe or independent study/internship at a program-wide poster session.
Measures: Grading committee evaluating performed experimental work based on presented poster u responses to a student exit survey.
Learning Outcome 4: Communicate scientific knowledge, ideas, and reasoning objectively, clearly, acc in written and oral form (**Communication Skills**)

Concepts: Communication of, often complex, neuroscientific information to other scientists and the public in a form th needs of the audience. Use of terminology and phrasing that comprises accurate and complete information and is cons competency of the audience.
Competencies: Students will demonstrate their ability to communicate complex principles and concepts of neuroscien
Assessment Methods: This outcome will be assessed through a student exit survey (indirect) and through a poster pre on the students' individual laboratory work.
Measures: Grading committee evaluating effectiveness of (oral and written) poster presentation using rubrics and ans to a student exit survey.
Learning Outcome 5: Critically evaluate scientific literature, identify open questions and problems, and develop innov solutions (**Scientific Reasoning and Critical Thinking**).
Concepts: Thinking in a disciplined and evaluative manner: evaluation of information, evidence, arguments, theories, and competing perspectives, and challenging the (sometimes hidden) assumptions and inferences that determine wh or argument.
Competencies: Students will demonstrate critical thinking skills and scientific reasoning to analyze, interpret, and eva develop follow-up project-based activities.
Assessment Methods: This outcome will be assessed through a student exit survey (indirect) and through a poster pr based on the students' individual laboratory work.
Measures: Grading committee evaluating scientific reasoning skills poster presentation using rubrics and answer keys to a student exit survey (indirect).
Learning Outcome 6: Apply ethical and professional standards for the practice of research (**Ethics**).
Concepts: Relevant laws, regulatory & ethical guidelines for basic, animal, and clinical neuroscience research and hum
Competencies: Students will demonstrate an understanding of the ethical standards for the responsible conduct of sci research and its applications.
Assessment Methods: This outcome will be assessed by a (pass/fail) questionnaire (direct) and a student-self assessm survey (indirect).
Measures: Grading of questionnaire and student-self assessment using rubrics and answer keys.

Assessment map

	Outcome 1	Outcome 2	Outcome 3	Outcome 4	Outcome 5	Outcome 6
NROS 19x Neuroscience Colloquium	I	I		I		I
NROS 2xx Contemporary Approaches to Neuroscience	R	R	I	R	I	R
NROS 307 Cellular Neurophysiology	R/A	R		R	R	
NROS 308 Methods in Cellular Neurophysiology			R			
NROS 310 Molecular and Cellular Biology of Neurons	R/M	R/A	R	R		R

NROS 3xx Systems Neuroscience	R/M	R/A	R	R	R	R
NROS 311 Neuroinformatics and Scientific Coding			R			
NROS 3xx Genetics & Genomics in Neuroscience			R		R	R
NROS 3xx Neuroscience Research Experience CURE, NROS 397 Brain Communication Networks VIP-CURE, and Independent Studies (NROS 199, 299, 399, 499)	R/M		R	R	R	R
Program-wide Poster Session (Required)			R/A	R/A	R/A	
Exit Survey & Questionnaire (Required)	A	A	A	A	A	A

I = Introduced; R = Reinforced; A = Assessed; M = Mastered

Program assessment plan

Assessment Measure	Source(s) of Evidence	Data Collection Point(s)
1) Program assessment while students are in the program		
- Learning Outcomes 1-2 (direct)	Exams using rubrics	Annually
- Learning Outcomes 3-5 (direct)	Poster and presenter evaluation using rubrics	Annually
- Learning Outcome 1-6 (indirect)	Exit assessment using rubrics	Annually
2) Program assessment after completion of the major		
Length of time to graduate	Internally generated statistics	Annually
Student program assessment	Senior exit survey	Annually
Job placement statistics	Student/Alumni survey	At graduate and as part of alumni survey

Academic program review (APR)	Reviewer' APR report	Every 7 years

Projected Enrollment for the First Three Years:
Please provide anticipated enrollment numbers for each of the first three years of the proposed program

3-Year Projected Enrollment		
Year 1	Year 2	Year 3
60	120	180

The projected enrollment is guided by 3 data sets: the initial 3-year enrollment in the existing NSCS program, the interest of NSCS students in pursuing Biochemistry (the proposed major requires a Biochemistry course), and a recent survey of undergraduate students in the existing NSCS major and other majors mostly in the College of Science.

Evidence of Market Demand:
Please provide an estimate of the future state-wide and national demand for graduates of the proposed academic program. Please specify the source (e.g. Burning Glass; Jobs EQ; US Department of Labor) of workforce demand data and detail the assumptions that underpin these projections. If job market data is unavailable or not applicable please explain why and elaborate another justification for the proposed program.

Evidence demonstrating demand, interest and need for the proposed Neuroscience major is provided by:
1) a “Burning Glass” market analysis from 2021-22;
2) a Program Development & Review of non-distance offered Neuroscience programs (Program Development & Review; Lightcast Q3 2023 Data Set, August 2023);
3) and a market demand report for Bachelor's degrees in Neuroscience (Program Development & Review; Lightcast Q3 2023 Data Set).

1) “Burning Glass” market analysis from 2021-22 (used in preliminary proposal).

The Burning Glass market analysis reported significant growth of biomedical employment nationwide and in Arizona. For Arizona, it projected significant growth in demand by up to 38% between 2022 and 2028. The largest area of projected growth was predicted for research-oriented careers requiring a bachelor’s degree. The career outcomes mapped to Neuroscience include Laboratory Technician, Medical Scientist, Biological Technician, Research Associate, Laboratory Technologist, Laboratory Manager, Clinical Research Coordinator/Manager, Biologist.

The analysis reported 4,057 job postings in Arizona in the 12 months prior to 2021-22 that were suitable for graduates of the proposed major. In comparison, there were a total of 1,019,379 job postings in Arizona.

2) Nationwide Program Development & Review of non-distance offered Neuroscience programs (Program Development & Review; Lightcast Q3 2023 Data Set, August 2023).

The nationwide analysis of Neuroscience programs reports growth by 305% for Bachelor's degree completions for the period from 2012 to 2021, which is indicating a high demand for a B.S. degree in Neuroscience. The top-5 programs with the largest market share are listed below. 3 of those 5 programs are offered by peer institutions (highlighted).

Institution	Bachelor's Degree Completions (2021)	Growth % YOY (2021)	Market Share (2021)
Binghamton University	258	11.7%	5.4%
University of Wisconsin-Madison	249	9.7%	5.2%
The University of Texas at Austin	241	5.7%	5.0%
Michigan State University	234	7.8%	4.9%
The University of Texas at Dallas	214	10.9%	4.5%

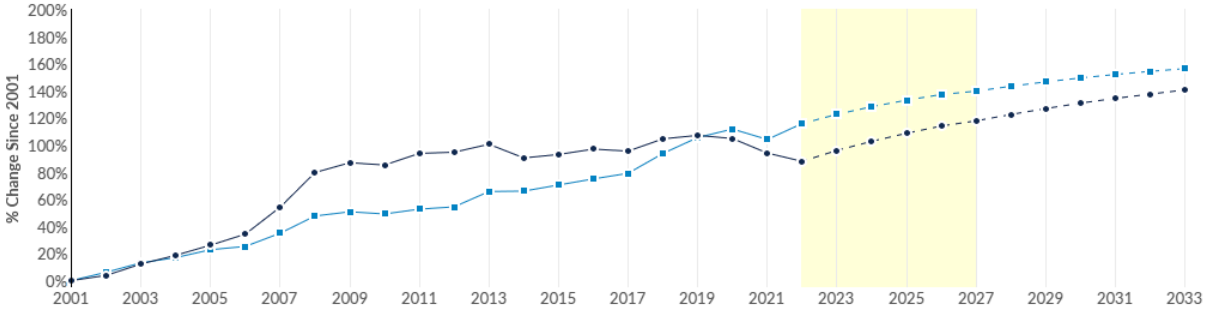
Neuroscience Completions by Institutions (source Lightcast: Q3 2023 Data Set, August 2023)

3) Lightcast market demand report for B.S degrees in Neuroscience from August 2023 (Lightcast Q3 2023 Data Set).

The analysis of the nationwide labor market demand for Neuroscience graduates with a B.S. degree reported a total of 103,399 jobs in 2022 and 93,814 unique job postings from August 2022 to July 2023 (adequate for the proposed major). The analysis reported 902 regional (Arizona) jobs and 1,590 unique job postings for the same period.

The top-10 posted job titles include Medical Laboratory Scientist, Clinical Research Coordinators, Clinical Laboratory Scientists, Clinical Research Associates, Associate Scientists, Clinical Trial Managers, Research Associates, Biologists, Clinical Research Assistants, and Research Coordinators, which is consistent with the career target groups of the proposed major. The regional top-10 posted job titles are similar to the nationwide postings. Notably, San Diego, CA is nationwide the second-largest city labor market (next to Boston), and likely attractive for Arizona neuroscience graduates. In Arizona, the largest city labor market is in Phoenix, AZ.

The analysis predicts a 11.1% nationwide growth in market demand by 2027. Regionally, it predicts a 15.9% growth, which is larger than the nation-wide projection.



Trends in nationwide and regional (Arizona) labor market demand from 2001 to 2033. Dark-blue – regional trend; light-blue nationwide trend (2023-2033 predicted; source Lightcast Q3 2023 Data Set, August 2023).

Similar Programs Offered at Arizona Public Universities:
List existing programs at Arizona public universities that deliver similar concepts and competencies to the proposed new program.

The only other institution in Arizona that offers an undergraduate degree in Neuroscience is Arizona State University (ASU). ASU started an online major in Neuroscience in 2022 and an on-campus major in 2023.

The ASU neuroscience curriculum and targeted student populations significantly differ from the newly proposed neuroscience program. The ASU Neuroscience B.S. is strongly aligned with Cognitive Science and Psychology and therefore comparable to the existing Neuroscience and Cognitive Science (NSCS) major at the University of Arizona.

Objection(s) Raised by Another Arizona Public University? NO
Has another Arizona public university lodged a written objection to the proposed program with the proposing university and the Board of Regents within seven days of receiving notice of the proposed program?

If Yes, Response to Objections:
Please provide details of how the proposing university has addressed the objection. If the objection remains unresolved, please explain why it is in the best interests of the university system and the state that the Board override it.

New Resources Required? (i.e. faculty and administrative positions; infrastructure, etc.):
Please provide an estimate of the personnel and infrastructure requirements of the proposed new program and the corresponding costs. Please specify if the proposed program requires new resources (e.g. new faculty lines; a new laboratory; new teaching assistantships or scholarships) or whether resource needs may be met through the reassignment or extension of existing ones. If resource extension or reassignment will impact extant programs and/or operations, please make this clear.

In addition to existing resources, the new major will require one advisor (0.25 FTE year 1, 0.5 FTE year 2, 1.0 FTE by year 3) and one program coordinator (1 FTE by year 2). The corresponding costs are estimated to amount to $58,700 for the first year, $110,292 for the second and $147,210 for the third year.

A new career-track faculty member will be desirable by year 2 but not essential since this need may be met through reassignments. The corresponding costs are estimated to amount to $85,000 in year 2 and $88,374 in year 3.

Operations costs are to amount to $5,000 for year 1, $8,000 for year 2, and $10,000 for year 3.

Once the program is fully established, 7 new teaching assistantships will be required to cover 2 new core courses (2), 1 new CURE course (2), and potentially 3 electives assuming these have a high enrollment (3; year 3 and thereafter). The corresponding costs over for the first 3 years is estimated to be $77,502 (year 1), $121,648 (year 2) and $127,358 for year 3.

The existing training lab space of the Department of Neuroscience is expected to accommodate the new CURE course “Neuroscience Research Experience” only during the first year. This arrangement will not impact existing courses. However, as enrollment increases, the CURE course will need a larger training lab space. The required space is available but requires renovation and new lab equipment estimated to amount to $175,000 in year 2.

Costs are expected to be covered by tuition revenue received from enrollments and majors, COS support for the advisor, and potentially adjusted contributions from the planned college fees.

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Plan to Request Program Fee/Differentiated Tuition? NO **Estimated Amount:** **Program Fee Justification:** If planning to levy a program fee, please justify the estimated amount. Note: The fee setting process requires additional steps, and forms need to be completed. Please work with your university and the ABOR Finance team (Leatta.McLaughlin@azregents.edu) to complete a fee request.
Specialized Accreditation? NO **Accreditor:** The name of the agency or entity from which accreditation will be sought

THE UNIVERSITY OF ARIZONA

New Academic Program
PEER COMPARISON

Select three peers (if possible/applicable) for completing the comparison chart from ABOR-approved institutions, AAU members, and/or other relevant institutions recognized in the field. The comparison programs are not required to have the same degree type and/or title as the proposed UA program. Information for the proposed UA program must be consistent throughout the proposal documents. Minors and Certificates may opt to include only 2 peer comparisons.

Program name, degree, and institution	Neuroscience, B.S., Department of Neuroscience, University of Arizona	Peer 1 Neuroscience, B.S., College of Natural Sciences, University of Minnesota	Peer 2 Neuroscience, B.S., Department of Physiology, Michigan State University	Peer 3 Neurobiology, B.S., Department of Integrative Biology, University of Wisconsin-Madison
Current number of students enrolled	[redacted]	386 as of Fall 2022	Not published	619
Program Description	Modern Neuroscience is the interdisciplinary study of the nervous system, from the level of individual genes and proteins that control neural activity to mechanisms that govern complex human behavior in health and disease. Earning a degree in Neuroscience will prepare students exceptionally well for advanced training in Medical School and Graduate School in	The goal of neuroscience is to understand the brain and behavior, how we perceive, move, think and remember. Important aspects of the study of behavior can be examined at the level of individual nerve cells, their properties and the ways they communicate with one another. It is also possible now to address these basic issues directly at the molecular level. Many aspects of the	Neuroscience is the scientific study of the nervous system. Neuroscience seeks to understand the biological and chemical processes of the brain and nervous system. The Bachelor of Science (B.S.) in Neuroscience was established as a degree-granting program in 2012 and has since quickly become one of the most popular biological science degrees on campus. The	Neurobiology is an interdisciplinary major with the goal of preparing students for professional degrees or the job market. This major is designed for students interested in understanding how the brain functions to control behavior and physiology. This field of study has expanded rapidly in recent decades due to advances in a variety of STEAM fields. UW-Madison is a leading research university

	Neuroscience or related fields, careers in the pharmaceutical, biotech, biomedical or other industries, or for other science-related careers such as public policy, science communication, journalism, or patent law. Neuroscience students can expect to gain a strong intellectual foundation and deep understanding of mechanisms underlying brain function through a core curriculum that spans molecular, genetic, and cellular mechanisms of nervous systems and is based on a robust foundation in biology, mathematics, chemistry, and physics. Four themes provide students with opportunities to gain specialized expertise in multiple aspects of contemporary neuroscience. Students will also gain critical skills in research, critical thinking and communication through	biological basis of behavior are studied by examining specific functions of nervous systems and the behavior they produce. The neuroscience major at the University of Minnesota is designed to provide an introduction to these basic areas of investigation by emphasizing the interdisciplinary nature of the subject.	undergraduate major has its home in the Department of Physiology in the College of Natural Science since 2018, but there is also a coordinate major through the Lyman Briggs College.	with more than 90 faculty engaged in neuroscience research. Undergraduate students in our major will have access to these faculty members in formal classroom environments and through undergraduate research opportunities. The neurobiology major is a rapidly growing major that provides students with a strong background in basic science and mathematics, plus upper level study in cutting-edge neuroscience topics.

	coursework addressing experimental techniques and approaches relevant to Neuroscience including their design, analysis, strengths, and limitations, as well as statistical and computational methods for data analysis through related coursework. To further strengthen research skills, hands-on research opportunities and experiences are offered at levels ranging from molecular neuroscience, cellular neuroscience, systems neuroscience to computational neuroscience and translational neuroscience by taking advantage of the broad and multidisciplinary research expertise of more than 60 neuroscience laboratories campuswide.			
Target Careers	Earning a degree in Neuroscience will prepare students exceptionally well for advanced training	The program prepares undergraduates to pursue advanced studies in neuroscience, take a	The Bachelor of Science degree in Neuroscience is for students who wish to pursue a career in which a	The neurobiology major at UW–Madison will provide a rigorous education in neuroscience principles

	in Medical School and Graduate School in Neuroscience or related fields, careers in the pharmaceutical, biotech, biomedical or other industries, or for other science-related careers such as public policy, science communication, journalism, or patent law.	position in one of the many rapidly growing areas in the pharmaceutical, medical, or biotechnology industries, or pursue a professional degree in medicine or psychology	broad-based knowledge of the structure and function of the nervous system is necessary, including careers in research, education, healthcare or business. It is also intended for those students who seek admission to graduate study in neuroscience or health-related professional schools. In addition to core requirements, students can concentrate in cellular and developmental neuroscience; behavioral and systems neuroscience; or cognitive neuroscience	that will prepare students for health-related careers (physician, physician assistant, veterinarian, dentist, neuroimaging technician, speech-language pathologist, neuropsychologist, drug rehabilitation counselor, physical therapists), academic careers (college and university faculty, research scientists, lab technician, K-12 teachers), and careers in pharmaceutical and biotech industries, venture capital and scientific consulting firms, medical and scientific journals, intellectual property law, neuroscience-related nonprofit organizations and foundations, and government agencies.
Emphases? (Yes/No) List, if applicable	Yes (4 emphasis) 1) Neuroscience and Human Health 2) Integrated Neuroscience: Molecular, Cellular Systems Neuroscience	No	Yes (3 concentrations) 1) Cellular and Developmental 2) Behavioral and Systems 3) Cognitive and Computational	No

	3) Neuroscience, Communication and Public Health 4) Thematic			
Minimum # of units required	120	120	120	120
Level of Math required (if applicable)	S-strand; Calculus I, (Calculus II recommended)	1 semester of calculus	1 semester of calculus	Calculus
Level of Second Language required (if applicable)	2nd semester proficiency	None	None	Complete the third unit of a foreign language.
Pre-Major? (Yes/No) If yes, provide requirements.	No	No	No	No
Special requirements to declare/gain admission? (i.e. pre-requisites, GPA, application, etc.)	2.0 GPA and a meeting with an advisor	Preferred program admission GPA 2.5	Minimum GPA of 2.0 or better	Minimum GPA of 2.0 or better
Internship, practicum, or applied/experiential requirements? If yes, describe.	Yes Students must complete one independent study (research) or Internship. Alternatively, complete one a CURE or VIP/CURE course	No	Yes Students must complete 1 semester of neuroscience laboratory	Yes Students must complete 1 semester of neuroscience laboratory

Additional questions:

1. How does the proposed program align with peer programs? Briefly summarize the similarities between the proposed program and peers, which could include curriculum, overall themes, faculty expertise, intended audience, etc.

All of the compared programs require a strong foundation in Mathematics, Chemistry, Physics and Biology.

The core program of the Neurobiology major at the University of Wisconsin-Madison requires both a Biology core (3 sequences ranging from 10-16 U) and a Neurobiology core (7 U), which is unique among all compared programs. The Neurobiology core includes a Neurobiology and a Behavioral Neuroscience course next to a seminar. This neuroscience core is a weakness in comparison to the other programs. 9 U of elective courses are required that can be selected from a list of course spanning from Neuroscience, Psychology, Physiology, to Biology.

The core (11 U) of the Neuroscience major at the University of Minnesota requires Human Neuroanatomy, Neurobiology I (Molecular, Cellular and Systems) and II (Perception & Behavior), and either a course in Neurodevelopment, Neuroscience of Drug Abuse, or a neurodegenerative disease course. 9 U of electives are required that can be selected from a list of course spanning from Neuroscience, Genetics, Immunology, Pharmacology, to Computational Neuroscience.

The core program at Michigan State (23 U) requires 2 Neuroscience core courses (Introduction to Neuroscience I and II), one Neuroscience Lab, one of two offered Physiology courses, one Biochemistry course, one Pharmacology course and either Fundamental Genetics or Eukaryotic Cell Biology. 15 U of electives are required to be selected from one of 3 concentrations (Cellular and Developmental, Behavioral and Systems, and Cognitive and Computational.

Like the proposed major, the majors at U Wisconsin and Minnesota require directed research or a lab experience, the major at Michigan State does not.

The core curriculum at Michigan State is comes close to to that of the proposed major (20 U), both in rigor and in breath. Both programs cover comprehensively the major pillars of the field. Overall, the compared peer programs cover similar core areas of neuroscience but less comprehensively than the proposed major.

The core of the target audience is overall similar for all programs. All market careers in one of the many rapidly growing areas in the pharmaceutical, medical, or biotechnology industries, or to pursue graduate or medical school. The program at Wisconsin-Madison includes a potential career as K-12 teacher. The proposed program is the only that prepares students for neuroscience-related careers such as public policy, science communication, journalism, or law.

2. How does the proposed program stand out or differ from peer programs? Briefly summarize the differences between the proposed program and peers, which could include curriculum, overall themes, faculty expertise, intended audience, etc.

The core curriculum of the proposed neuroscience major appears to be the strongest in rigor and in breath. The proposed major stands out by requiring not only 3 basic neuroscience courses (Neurophysiology, Molecular & Cellular Neuroscience, and Systems Neuroscience) but also courses in Biochemistry, Genetics and Genomics, and a programming course. The latter 3 courses are essential requirements for graduate and medical school, as well as careers related to basic, translational and/or clinical research. The unique core course work of the proposed program is a critical distinction to the peer programs, especially because Neuroscience, like other life sciences, is becoming a "Big Data Science" that is based on genomics, proteomics (biochemistry), and extensive software driven analytical approaches.

In addition, none of the peer institutions highlight in their electives the link of Neuroscience to human health, or the link of Neuroscience to communication, and public health policy, which better prepares students for careers in the public health sector or careers in public policy, science communication, journalism, and/or law.

3. How do these differences make this program more applicable to the target student population and/or a better fit for the University of Arizona?

The rigorous and comprehensive curriculum of the proposed neuroscience major in combination with one of the four to be selected emphases makes it very attractive to students who intend to pursue research and/or medial careers (graduate or medical school) and equally attractive to students who are interested in neuroscience-related careers in public health, science policy, science communication, journalism, or law.

THE UNIVERSITY OF ARIZONA

BUDGET PROJECTION FORM

Name of Proposed Program or Unit: BS in Neuroscience

	Projected		
Budget Contact Person:	1st Year 2024 - 2025	2nd Year 2025-2026	3rd Year 2026-2027
METRICS			
Net increase in annual college enrollment UG	60	120	180
Net increase in college SCH UG	244,200	421,800	643,800
Net increase in annual college enrollment Grad			
Net increase in college SCH Grad			
Number of enrollments being charged a Program Fee			
New Sponsored Activity (MTDC)			
Number of Faculty FTE			
FUNDING SOURCES			
Continuing Sources			
UG AIB Revenue	286,200	505,800	877,800
Grad AIB Revenue			
Program Fee Revenue (net of revenue sharing)	35,088	70,176	105,264
F and A AIB Revenues			
Reallocation from existing College funds (attach description)			
Other Items (attach description)			
Total Continuing	**$ 321,288**	**$ 575,976**	**$ 983,064**
One-time Sources			
College fund balances			
Institutional Strategic Investment			
Gift Funding			
Other Items (attach description)			
Total One-time	**$ -**	**$ -**	**$ -**
TOTAL SOURCES	**$ 321,288**	**$ 575,976**	**$ 983,064**
EXPENDITURE ITEMS			
Continuing Expenditures			
Faculty	-	65,000	66,950
Other Personnel	44,500	91,670	119,882
Employee Related Expense	14,240	39,422	48,753
Graduate Assistantships	77,502	121,648	127,358
Other Graduate Aid			
Operations (materials, supplies, phones, etc.)	5,000	8,000	10,000
Additional Space Cost			
Other Items (attach description)			
Total Continuing	**$ 141,242**	**$ 325,741**	**$ 372,943**
One-time Expenditures			
Construction or Renovation		150,000	
Start-up Equipment		25,000	
Replace Equipment			
Library Resources			
Other Items (attach description)			
Total One-time	**$ -**	**$ 175,000**	**$ -**
TOTAL EXPENDITURES	**$ 141,242**	**$ 500,741**	**$ 372,943**
Net Projected Fiscal Effect	**$ 180,046**	**$ 75,235**	**$ 610,121**

CATALOG YEAR	CAREER	PROGRAM	PLAN	SUBPLAN
2021	UGRD	Neuroscience	BS	
Requirement Line Description	**Subject**	**Catalog**	**Units**	**Type**
SEMESTER 1				
Course Title				
First Year Composition	ENGL	101		
Calculus I	MATH	125		
Introduction to General Education	UNIV	101		
Neuroscience Colloquium	NROS	19X		
General Thinking I	CHEM	151		
Introductory Biology I	MCB	181R/181L		
SEMESTER 2				
First Year Composition	ENGL	102		
Chemical Thinking II	CHEM	152		
Second Language Course (1st Semester Proficiency)				
Introduction to Statistics & Biostatistics (recommended for Pre-Med Students) or BIOS 376	MATH	263		
Calculus II (recommended)	MATH	129		
SEMESTER 3				
Lectures in Organic Chemistry	CHEM	241A		
Organic Chemistry Laboratory I	CHEM	243A		
Second Language Course (2nd Semester Proficiency)				
GEN ED: Perspectives: Course 1				
Genetics & Genomics in Neuroscience	NROS	3XX		
SEMESTER 4				
Introductory Physics I	PHYS	102/181		
GEN ED: Connections, Course 1				
GEN ED: Perspectives: Course 2				
Foundations in Biochemistry	BIOC	384		
Contemporary Approaches to Neuroscience	NROS	2XX		
SEMESTER 5				

Introductory Physics II	PHYS	103/182		
Molecular and Cellular Biology of Neurons	NROS	310		
Free Elective Course				
GEN ED: Connections, Course 2				
Independent Study (1), or equivalent	NROS	399/499		
SEMESTER 6				
Cellular Neurophysiology (in Fall)	NROS	307		
Methods in Neuroscience (optional)	NROS	308		
Neuroinformatics and Scientific Coding	NROS	311		
GEN ED: Connections, Course 3				
GEN ED: Perpectives: Course 3				
Independent Study (2)	NROS	3XX		
SEMESTER 7				
Systems Neuroscience	NROS	3XX		
GEN ED: Perspectives, Course 4				
Emphasis Course 1				
Emphasis Course 2				
Free Elective Course				
SEMESTER 8				
General Education Portfolio	UNIV	301		
Emphasis Course 3				
Free Elective Course				
Emphasis Elective NROS Course				
Emphasis: Writing Elective (NROS)				

STUDENT GROUP	DTSR Req
Value	general notes
	Please fill in YELLOW shaded areas ONLY!!
	Add Sub and Catalog for courses if there is only ONE option

THE UNIVERSITY OF ARIZONA
Mel and Enid Zuckerman
College of Public Health

1295 N. Martin Ave.
P.O. Box 245163
Tucson, AZ 85724-5163
Tel: (520) 626-8088
Fax: (520) 626-8685
www.publichealth.arizona.edu

October 22 2023

Konrad Zinsmaier, Ph.D.
Professor and Head, Neuroscience Department

Re: Proposal Undergraduate Major in Neuroscience

The Department of Epidemiology and Biostatistics supports the newly-proposed undergraduate major in Neuroscience. We will be pleased to have the course BIOS 376 "Introduction to Biostatistics" included in the major.

The course is taught regularly, and we will make sufficient seats available to accommodate Neuroscience majors.

Kacey C. Ernst, PhD MPH
Professor
Department Head Epidemiology and Biostatistics
Distinguished Scholar
University of Arizona
Department of Epidemiology and Biostatistics
kernst@email.arizona.edu
520-626-7374

THE UNIVERSITY OF ARIZONA
College of Engineering

DEPARTMENT OF CIVIL AND ARCHITECTURAL ENGINEERING AND MECHANICS
1209 E. 2nd Street
Tucson, AZ 85721-0072
Ofc: 520-621-2266
civil.arizona.edu

October 19, 2023

Dr. Konrad Zinsmaier
Professor of Neuroscience and Molecular & Cellular Biology
Head, Department of Neuroscience
University of Arizona
Department of Neuroscience
Gould-Simpson Building 627
P.O. Box 210077
1040 E. 4th Street
Tucson, AZ 85721-0077

RE: ENGR 495A/595A

Dear Dr. Zinsmaier:

We are pleased to provide you with permission to include ENGR 495A/595A Science, Health and Engineering Policy and Diplomacy as an elective in Emphasis Area 3 within the proposed Neuroscience major.

Sincerely,

Dominic Boccelli, PhD
Department Head
Civil and Architectural Engineering and Mechanics
University of Arizona

THE UNIVERSITY OF ARIZONA
Mel & Enid Zuckerman College of Public Health

OFFICE OF THE ASSOCIATE DEAN FOR ACADEMIC AFFAIRS

Roy P. Drachman Hall
1295 N. Martin Ave., Bldg.202A
P.O. Box 245210
Tucson, AZ 85724-5210
Tel: (520) 626-8808
Fax: (520) 626-8685
www.publichealth.arizona.edu

September 19, 2023

Dear Dr. Konrad Zinsmaier,

The Mel and Enid Zuckerman College of Public Health is pleased to support the addition of the following courses to the new undergraduate major in Neuroscience curriculum:

- PHPM 448 – Addiction and Substance Use Policy
- PHP 419 – Alzheimer's Disease, Other Dementias and the Role of Public Health

Both courses are offered regularly online and will have sufficient seats to accommodate students in this major.

Sincerely,

John Ehiri, PhD
Senior Associate Dean for Academic and Faculty Affairs
Mel & Enid Zuckerman College of Public Health

Lee Ryan, Ph.D.
Professor and Head,
PSYCHOLOGY DEPARTMENT
COLLEGE OF SCIENCE
1503 East University Blvd.
P.O. Box 210068
Tucson, Arizona 85721-0068
www.psychology.arizona.edu

ryant@email.arizona.edu

October 2, 2023

Konrad Zinsmeier, Ph.D.
Professor and Head, Neuroscience Department

Dear Dr. Zinsmeier,

Re: Proposal Undergraduate Major in Neuroscience

The Psychology Department stongly supports the newly-proposed undergraduate major in Neuroscience. We would be pleased to have the two courses you listed below included as electives for the major. These courses are taught regularly and we will make sufficient seats available to accommodate Neuroscience majors.

The courses include:
PSY 403C Introduction to Computational Neuroscience: Neural Simulations
PSY 435 Computational Neuroscience: Neural Spike Data Analyses (replaces former PSY 496L)

We would be happy to contribute additional relevant courses in the future as they are developed.

I'm confident that your new major will be very popular, and will serve students well who seek in-depth knowledge of the field of neuroscience.

Sincerely,

Lee Ryan, Ph.D.
Professor and Head, Psychology Department
Associate Director, Evelyn F. McKnight Brain Institute
University of Arizona
Tucson AZ 85721
Email: ryant@email.arizona.edu
Phone: (520) 621-7443

THE UNIVERSITY OF ARIZONA

Physics Department
College of Science
www.physics.arizona.edu

1118 E. Fourth St.
P.O. Box 210081
Tucson, AZ 85721
Telephone: 520-621-6820

September 11, 2023

Prof. Zinsmaier:

The Physics department is excited that you are creating a new major in Neuroscience and that Physics courses will be a component of the major. We teach the required physics courses for the Neuroscience degree (PHYS 102/181, 103/182, 141, 241) three times each year Fall, Spring and Summer semesters. We can easily accommodate the enrollment in these courses for the 120 students expected in the major. If seats are not available in these introductory courses, we can open additional lab sections to accommodate the increased enrollment from the Neuroscience major. In addition, the Neuroscience major will have an elective course of PHYS431, Molecular Biophysics. This is a course that we are currently teaching every three semesters and plan to continue to offer on this rotation. This course can handle the expected increase in enrollment of 10 students from the new Neuroscience major.

We look forward to the new students in the Neuroscience major taking our Physics courses.

Sincerely,

Shufang Su
Department Head
Professor
Department of Physics

THE UNIVERSITY OF ARIZONA
COLLEGE OF SCIENCE
Molecular & Cellular Biology

Ryan Gutenkunst
Professor
Interim Department Head
rgutenk@arizona.edu
http://gutengroup.arizona.edu

Life Sciences South 325
1007 E. Lowell Street
Tucson, AZ 85721
Tel: (520) 626-0569

Prof. Konrad E. Zinsmaier
Professor and Department Head
Department of Neuroscience
University of Arizona

September 7, 2023

Dear Prof. Zinsmaier:

I am writing to confirm support from the Department of Molecular and Cellular Biology (MCB) for listing MCB 181R and MCB 181L as required supporting coursework in your new Neuroscience major. We teach these courses regularly (every semester), and we have sufficient seats available to serve your projected enrollment.

Good luck with your proposal.

Sincerely,

Ryan Gutenkunst
Professor and Interim Department Head
Department of Molecular and Cellular Biology
University of Arizona

THE UNIVERSITY OF ARIZONA
COLLEGE OF SCIENCE
Mathematics

617 N. Santa Rita Avenue
Tucson, Arizona 85721
www.math.arizona.edu

September 7, 2023

Pamela Coonan
Executive Director
Academic/Curricular Affairs
University of Arizona

RE: Bachelor of Science in Neuroscience

Dear Dr. Coonan:

I am writing to express the support of the Department of Mathematics for the proposed new Bachelor of Science major in Neuroscience to be offered by the Department of Neuroscience in the College of Science. In particular, the Math Department has no objections to the inclusion of the following courses as requirements for the new degree:

MATH 125 (Calculus I)
MATH 129 (Calculus II)
MATH 263 (Introduction to Statistics and Biostatistics)

We expect to offer these course each fall and spring, and we expect to be able to accomodate the additional students without any difficulties. Normal prerequisites and registration priorities will apply.

Sincerely,

D L Ulmer

Douglas Ulmer
Professor and Head

THE UNIVERSITY OF ARIZONA
James E. Rogers College of Law

James E Rogers College of Law
1201 E Speedway Blvd
PO Box 210176
Tucson AZ 85721-0176

Ofc: 520-621-1498
Fax: 520-626-2050

law.arizona.edu

September 20, 2023

Konrad E. Zinsmaier, Ph.D.
Professor of Neuroscience and Molecular & Cellular Biology
Head, Department of Neuroscience
University of Arizona

RE: Letter of Support for Bachelor of Science new Major in Neuroscience

Dear Dr. Zinsmaier:

In my role as Dean and Ralph W. Bilby Professor of Law, I am writing in strong support of the Bachelor of Science new major in Neuroscience.

Three College of Law undergraduate courses will be offered as electives in this proposed new major, within the emphasis labelled Neuroscience, Communication, Public Health, and Policy. The three courses are:

1. LAW 452 Health Law (3 credit units)
2. LAW 415 Healthcare Ethics (3 credit units)
3. LAW476A Drug Discovery, Development, & Innovation to Reach the Marketplace (3 credit units)

The College of Law regularly offers these courses, and has seats available to accommodate additional students.

This new major opens up exciting educational pathways for students across multiple disciplines. We are glad that existing College of Law courses can be leveraged in novel ways to attract interested undergraduate students to the University of Arizona.

Sincerely,

Marc J Miller

Marc L. Miller
Dean and Ralph W. Bilby Professor of Law

[redacted]

THE UNIVERSITY OF ARIZONA

School of Journalism
College of Social and Behavioral Sciences

Marshall Building
845 N Park Ave #334
PO Box 210158B
Tucson AZ 85721-0158
Tel: (520) 621-7556
Fax: (520) 621-7557
http://journalism.arizona.edu/

Sept. 21, 2023

Konrad E. Zinsmaier, Ph.D.
Professor of Neuroscience and Molecular & Cellular Biology
Head, Department of Neuroscience
University of Arizona
Department of Neuroscience

Dear Dr. Konrad Zinsmaier,

Please accept this letter of support as a Memorandum of Understanding (MOU) between the School of Journalism and the Department of Neuroscience.

The School of Journalism (SOJ) agrees to offer the classes listed below at least once per academic year. The SOJ agrees to reserve at least 10 seats in each class listed below exclusively for Neuroscience majors seeking to satisfy your new major's third emphasis: Neuroscience, Communication and Public Health and Policy.

- GLO 465/565 Science Misinformation, Disinformation, Media & the Public
- JOUR 305: Science and the News (previously named Full STEM Ahead: Science and the News)
- JOUR 465/565: Issues in Covering Science and the Environment

We look forward to educating your students and developing more partnerships with your unit in the future.

Sincerely,

Jessica M. Retis

Jessica Retis, Ph.D.
Director, School of Journalism
University of Arizona

THE UNIVERSITY OF ARIZONA
School of Information

Harvill Building
1103 E. 2nd St., Room 409
Tucson, AZ 85721
Phone: 520-621-3565
Web: ischool.arizona.edu/

September 17, 2023

Konrad E. Zinsmaier, Ph.D.
Professor of Neuroscience and Molecular & Cellular Biology
Head, Dept. of Neuroscience

Dear Dr. Zinsmaier,

I am happy to support the new proposed degree in Neuroscience. Our leadership team here in the iSchool is in full support of your using any existing courses we offer to help round out the choices for students. You are welcome to utilize ISTA 457, Neural Networks, as there are sufficient seats available. We are also quite enthusiastic about working with you and are so pleased to see you launching such an exciting opportunity for students here at the University of Arizona.

Sincerely,

Catherine F. Brooks

Dr. Catherine Brooks
iSchool Interim Dean and Professor

THE UNIVERSITY OF ARIZONA

Ecology & Evolutionary Biology
College of Science
University of Arizona

P.O. Box 210088
Tucson, Arizona 85721-0088
(520) 621-1588
FAX: (520) 621-9190
http://eebweb.arizona.edu

Date: September 11, 2023

To: Konrad E. Zinsmaier, Department Head, Neuroscience

From: Michael Worobey, Department Head, Ecology and Evolutionary Biology

Re: Permission to Use ECOL 379 for New Neuroscience Degree

Dear Konrad,

This letter is a formal expression of support for the newly proposed Bachelor of Science degree in Neuroscience, housed in the Department of Neuroscience.

We do not anticipate that this new degree program will have a negative impact on the B.S. or B.A. in Ecology and Evolutionary Biology, B.S. in Biology, or B.S. in Bioinformatics, and believe this collaboration between EEB and Neuroscience has the potential to be beneficial for both departments. Therefore, the following ECOL courses are permitted to be included as an elective option in the proposed program:

ECOL 379 Evidence-Based Medicine (offered in Spring; Instructor: Joanna Masel)

We expect that we will be able to accommodate additional students in the course listed above, and that the SCH revenue generated will cover our cost of delivery.

Sincerely,

Dr. Michael Worobey
Department Head and Professor
Ecology and Evolutionary Biology

THE UNIVERSITY OF ARIZONA

PSYCHOLOGY DEPARTMENT
COLLEGE OF SCIENCE
1503 East University Blvd.
P.O. Box 210068
Tucson, Arizona 85721-0068

www.psychology.arizona.edu

Dear Colleague,

The CogSci program supports the newly proposed undergraduate major in Neuroscience. We would be pleased to have CGSC 344 “Modeling the Mind: Computational Models of Cognition” included as electives for the major. This course is taught regularly and there will be sufficient seats available to accommodate Neuroscience majors.

Sincerely,

Robert Wilson, Ph.D.

Interim Director of Cognitive Science
Associate Professor of Psychology and Cognitive Science
University of Arizona

THE UNIVERSITY OF ARIZONA
COLLEGE OF SCIENCE
COLLEGE OF MEDICINE TUCSON
Chemistry
& Biochemistry

Craig Aspinwall, Ph.D.
Professor and Department Head
Chemistry & Biochemistry (CBC)
aspinwal@email.arizona.edu

1306 East University Blvd.
Biosciences West 368
Tucson, AZ 85721-0041
Tel: (520) 621-5672

September 7, 2023

Dr. Konrad Zinsmaier
Department Head
Department of Neuroscience
Gould-Simpson Building
Tucson, AZ 87521-0077

Dear Dr. Zinsmaier,

The Department of Chemistry & Biochemistry supports the inclusion of our general chemistry courses CHEM 151 and 152, our organic chemistry course and lab CHEM 241A and 243A, and biochemistry courses BIOC 384 in the proposed B.S. in neuroscience offered by your department. All of these courses are currently offered each academic semester and currently have the capacity to accommodate enrollments associated with this degree.

If there are any questions, please feel free to contact me directly.

Sincerely,

Craig Aspinwall, Ph.D.