ACADEMIC PROGRAM PROPOSAL FORM
(Revised: January 2021)

DIRECTIONS: *Use this form when proposing a new major or primary field of study, new emphasis (BAS only), or new degree or certificate (30+credits) program.* *For more detail on the NSHE program approval process, see the last page of this form.*

DATE SUBMITTED: February 1, 2024

INSTITUTION: University of Nevada, Las Vegas

REQUEST TYPE:
- ☐ New Degree
- ☒ New Major or Primary Field of Study
- ☐ New Emphasis (BAS only)

Date of AAC Approval:
02-28-24

Date of Board Approval:

DEGREE: Check applicable box

- ☐ Certificate: 30+ Credits
- ☐ Associate of Science (AS)
- ☐ Associate of Applied Science (AAS)
- ☐ Bachelor of Arts (BA)
- ☐ Master of Science (MS)
- ☐ Doctor of Philosophy (Ph.D.)
- ☐ Associate of Arts (AA)
- ☐ AA/AS
- ☐ Bachelor of Applied Science (BAS)
- ☒ Bachelor of Science (BS)
- ☐ Master of Arts (MA)
- ☐ Other or Named Degree:_____

MAJOR OR PRIMARY FIELD OF STUDY (i.e. Animal Science): Neuroscience

INCLUDED IN THE NSHE PLANNING REPORT: ☒ Yes   ☐ No
(Website for NSHE Planning Reports: https://nshe.nevada.edu/administration/academic-student-affairs/reporting/planning/

TOTAL NUMBER OF CREDITS TO PROGRAM COMPLETION: 120

PROPOSED SEMESTER/TERM OF IMPLEMENTATION: Spring, 2025

Action requested (specify full program title):

UNLV requests approval for a new B.S. Neuroscience to be housed in the College of Liberal Arts.

A. Brief description and purpose of proposed program. For proposed certificates (30+ credits), provide any existing degree or program under which the certificate falls.

The proposed B.S. Neuroscience program will have a curriculum that provides a broad and balanced treatment of neuroscience with courses from psychology, biology, chemistry, and other sciences. Upon completion of this course of study, students will have received instruction in both broad and specific topics from the field, as well as opportunities to participate in research activities. Thus, they will develop knowledge and skills that are important in the field. This curriculum is designed to meet the needs of both those students seeking an undergraduate degree and those intending to enter advanced training in graduate or professional schools.

B. Provide a list and description of institutionally approved expected student learning outcomes

B.S. Neuroscience Learning Objectives

1. Identify and describe the major areas of neuroscience, their primary research topics, and the primary approaches/techniques for asking research questions in each.

2. Explain and diagram fundamental principles of nervous system signaling and information processing based on research of the nervous system at the cellular, molecular, circuit, and systems levels.

3. Relate our current understanding of nervous system function and dysfunction to contemporary and historical developments in neuroscience research.

4. Describe the basis for disorders of the nervous system from cell & molecular to cognitive & systems levels, including genetic disorders of the nervous system, developmental disorders, movement disorders, mental health disorders, and neurodegenerative disorders.

5. Describe the methods used to study the nervous system, including specific experimental techniques relevant to neuroscience (immunohistochemistry, DNA & RNA sequencing, electrophysiology, behavioral assessment, neuroimaging).

6. Critically assess the design, strengths, and limitations of neuroscience methods and techniques in empirical research publications.

7. Apply skills in data analysis and interpretation, including data management, statistical assessments, and communicating and displaying data.

8. Be able to communicate effectively about biological and neuroscientific concepts, orally and in writing.

9. Be prepared for directly entering the STEM and other workforce.

C. Provide an institutionally approved plan for assessing student learning outcomes

Program assessment plans have been approved by the Office of Academic Assessment and are attached in the appendix.

D. Contribution and relationship of program objectives to

    i. NSHE Master Plan / Strategic Goals
       a. Access – *Increase participation in postsecondary education*

The proposed B.S. Neuroscience helps address the fact that many if not most current high-paying jobs, including those in neuroscience (see, for example: scijournal.org/articles/highest-paying-neuroscience-jobs) require some form of direct career-connected postsecondary education and training. An undergraduate degree in neuroscience is an excellent connector to multiple options for high-wage employment, and so increasing participation in this degree program is essential. One avenue to increase participation in this degree program involves dual enrollment opportunities available in high school. The proposed program aims to leverage these opportunities, which are rapidly expanding for UNLV purposes, to recruit students in high school dual enrollment science courses, and particularly underserved youths, for entry into the neuroscience program.

Many of our neuroscience faculty are already active with respect to linkages with high school student groups, science classes and exhibitions, and competitions and can personally recruit students into the proposed degree program and provide advising with respect to career options. Several of these faculty are also preparing training grants that are aimed to strengthen the pipeline across high school, university, and post-graduation professional development for students in neuroscience. Our faculty also assist with students who are interested in physically touring the UNLV campus, meeting with current students, spending a day in a neuroscience lab, and asking questions about a neuroscience degree.

We also plan to develop pathways for transfer students from two-year and other college settings to easily transition into and complete the proposed degree program via accelerated and innovative opportunities to earn college credit as well as real-world professional experiences. Our department is also engaged in the university's new practice of developing microcredentials that can involve neuroscience-based themes and serve as a potential springboard for those interested in the full proposed degree program. The proposed degree program will also have its own website partially devoted to recruiting potential students and providing information on possible employment opportunities.

b. Success – *Increase student success*

The proposed degree program in Neuroscience aims to increase student success by providing a robust, multi-pronged student advising experience. First, advising will include the required NS 200 course (Introduction to the Neuroscience Major) early in the course of study. This is an easily accessible 1-credit course devoted to onboarding via an overview of topics in neuroscience, careers in neuroscience, and preparation for advanced study such as graduate or professional school. Second, advising will include mandated appointments with the College of Liberal Arts' Wilson Advising Center (WAC). The WAC is already in the process of training their staff specifically for this major and will be devoting specific staff to students undertaking this major. In addition, the WAC will leverage their current working relationship with the UNLV Sciences advising center given the expectation that some current Sciences students will elect to transition to the proposed degree program. Third, the memo of understanding for the proposed degree program includes an undergraduate neuroscience major coordinator in the Department of Psychology that will be partially tasked with tracking the neuroscience majors, identifying possible curriculum bottlenecks, and coordinating course availability with the various units involved in the major. Such tracking of the neuroscience majors can include use of campus data to notify advisors and instructors when students are struggling, to link students to assistive learning agencies and opportunities, and to connect students to other campus and community resources to meet competing life challenges.

The proposed degree program in Neuroscience will also serve to augment student success by providing ample opportunities for expanded access to experiential learning activities. All of the

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core neuroscience tenured and tenure-track faculty in the Department of Psychology are active researchers with fully-functioning laboratory spaces that are well-equipped for training purposes and already include substantial numbers of undergraduate research assistants. In addition, the proposed degree program allows for independent study and independent research options across a wide array of academic units, including those in Psychology, Sciences, and Integrated Health Sciences. Such direct, applied research experiences and technique-based training represent invaluable workforce development skills for this area. Additional available opportunities include internships via external field-based/industry learning experiences.

The proposed degree program in Neuroscience will also serve to augment student success by fostering a success-oriented mindset and sense of belonging. For example, the Department of Psychology, where the proposed degree program will be housed and managed, has several active undergraduate student groups devoted to academic progress, career counseling, social interaction and activities, mentoring, and connections to academic faculty. These groups include Psi Chi, the International Honor Society in Psychology; Psychology Club, an organization for students who are interested in psychology and want to be involved, but who not yet qualify for Psi Chi. There are also other campus student groups that are associated with professional paths such as the American Medical Student Association. Finally, this proposed major will be rigorous and challenging for students. For those students who start the major but later decide that they no longer wish to continue this academic pathway, their completed courses can be counted toward a neuroscience minor or a Psychology or Science major that is already offered at UNLV.

c. Close the Achievement Gap – *Close the achievement gap among underserved populations*

The proposed B.S. Neuroscience aims to close the achievement gap among underserved populations in several ways. First, the Department of Psychology where the proposed degree program will be housed and managed, has an active Outreach Undergraduate Mentoring Program, which is an outreach program staffed by academic faculty and graduate students who mentor undergraduate students from diverse and underrepresented backgrounds who are interested in pursuing a graduate degree. Second, the proposed neuroscience degree program is highly structured and the undergraduate neuroscience coordinator and Wilson Advising Center will be tasked with making data-informed decisions about which students are straying from the curriculum and are thus at risk for lower retention and graduation. Multiple mechanisms of accountability will also be built into this process, including oversight from the lead department Chair, the Deans of the colleges associated with this degree, and the UNLV Office of Undergraduate Education. The ultimate goal of this process is to foster a collaborative and empowered environment involving open and robust communication among the participating academic units in part to encourage innovative curriculum progress and modification as needed.

Third, a key aspect of closing the achievement gap for underserved students is identifying and removing barriers to retention and graduation. Part of this is designed to be addressed via the robust student advising process described above. In addition, the undergraduate neuroscience coordinator will work closely with UNLV-based student service agencies designed to identify and support students with disabilities (Disability Resource Center); financial difficulties (e.g., Student Assistance Funding for Emergency Relief Program); mental health challenges (e.g., Student Counseling and Psychological Services); academic deficiencies (e.g., Academic Success Center); physical health concerns (e.g., Student Health Center); personal safety concerns (e.g., The Care Center); basic concerns (e.g., Student Support Spot); legal support needs (e.g., Thomas & Mack Legal Clinic); international status concerns (e.g., International Student and Scholar Services); and needs for specialized concerns (e.g., Undocumented Student Program). There is also financial support for students who are interested in research. For example, students who currently work in neuroscience research labs have been supported by funding from programs

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such as McNair Scholars and the Asian American and Native American Pacific Islander-Serving Institution programs.

The Department of Psychology, where the proposed degree program will be housed and managed, also links all majors directly to a faculty advisor who can serve as a point person for student concerns. The Department also has several other initiatives designed to improve student retention, progression, and completion. These include conducting surveys of beginning and senior students, early course contact with students to identify immediate concerns, active monitoring of DFW rates (i.e., students failing or withdrawing) in specific classes, research lab open houses, and website recommendations and FAQs for student development purposes. The Department is also an active participant with the College of Liberal Arts to identify and support students who are close to graduation but who need immediate financial support to complete their course of study. Finally, the Department also emphasizes the importance of faculty members creating a welcoming and inclusive environment for students, no matter their background or beliefs.

d. **Workforce –** *Collaboratively address the challenges of the workforce and industry education needs of Nevada*

Nevada faces a serious workforce shortage in professions and industries that require skills in science, technology, engineering, and math. In addition, many students entering the workforce require skills in critical thinking/problem-solving, communication, data analysis, teamwork, digital technology, research skill, professionalism, and career and self-development. The proposed B.S. Neuroscience is partly designed to increase the workforce capacity that is expected to needed in many professional, scientific, and technical realms. Students in the program, for example, are expected to obtain expertise in a variety of advanced techniques such as functional magnetic resonance imaging, electroencephalography, laser microscopy, and computational neuroscience, among others. See also the labor market demand information in the Lightcast report in the appendix.

Students with an undergraduate degree in Neuroscience can be eligible for job offers in a wide array of advanced industries such as biomedical engineering, pharmacology, and epidemiology, among others. In addition, such a degree can be useful for fields such as advanced manufacturing, information technology, cybersecurity, energy, public policy, teaching, and ecology. Many of these positions with a Bachelor of Science degree can include research assistant or scientist, laboratory technician, health educator, pharmaceutical sciences manager, medical writer, and biostatistician, among others. Students may also be eligible for graduate or medical school as well as professional schools in dental, law, occupational therapy, optometry, pharmacy, physical therapy, physician assistant, and veterinary medicine fields. All of these are in critical shortage in Nevada. In addition, students can be eligible for advanced industry positions such as directors of immunology, medical communications, engineering applications, innovation partnering, and drug discovery, among others.

e. **Research –** *Co-develop solutions to the critical issues facing 21ˢᵗ century Nevada and raise the overall research profile*

The proposed degree program in Neuroscience aims to help develop solutions to the critical issues currently facing Nevada and raise the overall research profile in several ways. The degree program is expected to help diversify the workforce in Nevada and help alleviate critical labor shortages in highly technical fields. The proposed degree program, particularly with its ability to stretch from high school to undergraduate school to graduate/professional schools, also helps address the lack of career and college readiness for K-12 students and adults. The proposed

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program allows Nevada to leverage existing resources, maximize economic opportunities, and sustain growth over the long term via a highly educated workforce and that can be part of a pipeline across multiple levels of education.

With respect to research, neuroscience includes the use of new technologies and methods that provide multi-level analysis and improve our understanding of brain function. These technologies and methods include those designed for the cellular level all the way to the cognitive level. Such technologies and methods can be designed to examine the interplay of genetics, cellular biology, neural circuits, and cognition and behavior with anatomy, neurological disorders, cell migration, and the immune and other systems. As noted, neuroscience is one of the most fundable areas of science and our current neuroscience faculty have already successfully pursued and received external grant and industry funding from a wide variety of sources.

The proposed degree program in Neuroscience also integrates both the development of solutions to critical issues facing Nevada and research in several ways. First, the degree program represents a holistic approach to student learning that includes formal coursework, experiential learning, and immediate work exposure via internships to develop both basic and applied workforce skills. Second, the degree program will emphasize articulating career and personal payoffs, building social capital and mobility, and providing multifaceted and complex skills for students within the context of a highly affordable UNLV framework. Third, the degree program will prepare students for multiple job changes, empower students for additional lifelong learning engagement opportunities, and help scaffold career readiness and life design practices to bolster student success across multiple economic indicators. In general, the proposed degree program is geared to maximize return on investment in higher education in numerous ways.

ii. Institutional mission and core themes

UNLV's Top Tier 2.0 Mission is that the university provides access to world-class educational experiences that are responsive to the needs of our students and stakeholders; engages in groundbreaking research, scholarship, professional, and creative activities that have impact and cross boundaries; and offers high-value, cutting-edge interdisciplinary physical and mental health care to support our community. We create value for the individuals and communities we serve by fostering a climate of innovation, stimulating economic diversification and workforce development, promoting social justice and inclusion of all voices, and enriching cultural vitality.

The proposed new B.S. Neuroscience is consistent with the UNLV Mission because the field of neuroscience has been one of the fastest growing disciplines in the sciences worldwide over the last 20 years. Neuroscience represents one of the most funded areas of research from both extramural and private foundation agencies. Further, neuroscience programs are part of nearly every clinical and medical training program (e.g., Penn Medicine Translational Neuroscience Center; https://www.med.upenn.edu/ptnc/cnst.html; Yale Neuroscience Research Training Program; https://medicine.yale.edu/psychiatry/education/residency/research/nrtp/), which is in part the reason behind the tremendous growth of neuroscience over the last 2 decades. The program proposed will add a formally grouped and extremely fundable area to UNLV that will also result in increases in publications, completion of degrees, and the overall scientific impact of UNLV scholarship. These programs will also provide a strong collaborative group within the neuroscience work at UNLV as well as with the School of Medicine and other community entities.

Core Area: Advance Student Achievement

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This proposed program will advance student achievement because neuroscience programs across the U.S. typically have rigorous curriculum with a large number of science courses, along with very high retention and completion rates. Thus, the B.S. in neuroscience will greatly enhance UNLV's ability to recruit and retain strong students. Neuroscience fits nicely as part of STEM (Science, Technology, Engineering, and Math) education, which is being emphasized at UNLV and across the nation. The curriculum was planned to include an "Introduction to the Neuroscience Major" course at the beginning where students can learn about subfields within neuroscience as well as career and post-bachelor paths - this can motivate them to succeed and help them build a plan to get the most out of the major. Students will experience academic breadth by taking courses from different science programs (e.g., psychology, biology, chemistry, and more) and depth by taking courses that build on one another and that explore specific topics from the field. Students will wrap up their studies by completing a senior capstone course that will help connect ideas learned throughout the major (and to ensure that they are prepared for the next steps after graduation). This program will provide academic and professional opportunities for our diverse population on campus, including but not limited to low-income and first-generation students, to promote career success and ultimately, upward social mobility.

Undergraduate students pursuing a degree in neuroscience can prepare themselves for a wide array of career and workforce development avenues. These avenues include medicine, psychology, nursing, law, pharmacology, engineering, education, and public policy, among others. According to projections published by the U.S. Bureau of Labor Statistics, the number of employed life scientists is expected to increase in conjunction with a low unemployment rate. The median annual salary was $83,930 in May 2022 for life scientists. A degree in neuroscience also trains graduates in skills like problem-solving, communication, data analysis, and critical thinking.

The field of neuroscience has been the fastest growing discipline for the last 20 years and students from several STEM fields tend to gravitate to the subject. This proposed program is being established to meet the demand of students interested in a program in neuroscience; despite the enormous growth of this field worldwide there exists no formal program in southern Nevada. Based on the 250 students that have registered for the minor in neuroscience, there is already a tremendous amount of interest among the undergraduate students for this major.

Core Area: Bolster Research, Scholarship, Creative Activity

The proposed program will greatly enhance research and scholarship at UNLV. Almost all Tier 1 schools have some form of a program in neuroscience. This field receives a large portion of the available grants from NIH and other federal agencies, which include both research and training grants. In addition, neuroscience-related publications appear more often in top tier journals than any other discipline. The ability to recruit strong undergraduate students into a formal neuroscience program will increase scholarly research and add to the pipeline for doctoral degrees in neuroscience being awarded at UNLV as well. In addition, a formal program in neuroscience will integrate well with established research efforts in Las Vegas such as the Cleveland Clinic Lou Ruvo Center for Brain Health and the Center of Biomedical Research Excellence (COBRE) grant currently underway between Cleveland Clinic and UNLV. There are substantial opportunities to cultivate research efforts with faculty in the Nevada Institute of Personalized Medicine, and several of the Colleges across UNLV. This combined effort offers the opportunity to better compete for both collaborative research grants, as well as training and student-centered grant opportunities. The neuroscience program will also greatly enhance collaborative research projects with the Kirk Kerkorian School of Medicine. The Neurology and Psychiatry programs of the Medical School will be well suited to collaborate with the neuroscience faculty in particular.

The proposed undergraduate program in neuroscience will stimulate research and scholarship in regionally relevant and emerging areas that build the institution's national and international reputation. Students and faculty in the proposed program will engage in basic research as well as clinical research aspects of care and then disseminate those findings through conference presentations and publications in peer-reviewed research journals. This will result in greater opportunities for undergraduate research assistants to learn research skills while also facilitating publications across the campus. It should also be noted that our current neuroscience faculty have been positively recognized for their research mentorship of undergraduates.

Core Area: Create UNLV Health

The UNLV Mission requires that only well-thought-out and focused programs be developed, creating a synergy of a stronger curriculum, stronger research, and stronger engagement with the community. The development of the proposed neuroscience program will be synergistic with the planning of the Academic Health Center and will contribute to the overall research community at UNLV, and also with the Kirk Kerkorian School of Medicine and numerous other neuroscience-related research and clinical work in Las Vegas (including the Cleveland Clinic facility and others). Clearly, the mission of the B.S. program in neuroscience is consistent with the mission of several of the doctoral programs at UNLV and will add support to the Kirk Kerkorian School of Medicine, in particular neurology and psychiatry. As such, this program can have a tremendous positive impact on the healthcare delivery system in Nevada. Neuroscience research is a vital component in a number of fields of healthcare that are central to the Kirk Kerkorian School of Medicine and the Academic Health Center.

Core Area: Foster Community Partnerships

As one of the fastest growing discipline in the sciences, neuroscience draws students from many backgrounds. The students admitted to this program and the faculty hired for this program will contribute to the campus diversity. Further, there exist a number of training grants offered from the National Institutes of Health, in particular the National Institute of Mental Health (NIMH), National Institute of Neurological Disorders and Stroke (NINDS), and National Institute of Aging (NIA) that support minority student research training and research grants. All of these institutes primarily focus on neuroscience topics and so the proposed program will allow for competitive applications from UNLV. The B.S. Neuroscience program is also expected to contribute to the economic development and diversification of the community, state and region. The proposed program is anticipated to facilitate securing extramural research and training grants. The research performed by the collective group will also impact basic and clinical research fields, adding to UNLV's reputation in research and clinical work. The program should also boost technological and economic outreach and prepare students for work in numerous STEM and related fields.

Specific community partnerships with this degree program include, as mentioned, several neurological and medical health entities in Nevada. Other likely partnerships can include mental health agencies (e.g., via improved diagnostic assessment), hospitals (e.g., via public health outreach and reducing barriers to care and increasing health equity), and community advisory boards (e.g., via bolstering equitable participation of diverse communities in scientific research). In particular, we want to emphasize relationships with the Clark County School District. The neuroscience faculty and graduate students already participate in outreach by serving as judges in local science fairs, hosting research lab tours for high school students, and participating in science education programs, especially for marginalized youth. These relationships are expected to continue and, importantly, to grow, with the development of this new major.

iii. Campus strategic plan and/or academic master plan

The proposed UNLV B.S. Neuroscience program is designed to support three key elements of the College of Liberal Arts and Department of Psychology strategic plans. First, the program is expected to support growing student enrollment, a key University metric. As noted above, there is great national demand for neuroscience as a field of undergraduate and graduate study. Our popular undergraduate neuroscience minor, which has rapidly grown to include 250 students, is expected to be a substantial pipeline for the proposed program. In addition, neuroscience students tend to have very high retention and completion rates. Upon earning a B.S. in Neuroscience from UNLV, these students may also apply for graduate programs at UNLV (e.g., interdisciplinary Neuroscience PhD) or the Kirk Kerkorian School of Medicine. Second, the proposed program is expected to enhance grant support for the University, College, and Department, in part evidenced by the fact that recent grants in the Department of Psychology have largely come from the neuroscience area. Third, the proposed program is expected to demonstrate and increase research impact. Publications by our neuroscience faculty, for example, are commonly in high-impact journals, are heavily cited, and draw considerable media interest. These faculty are highly invested in undergraduate research training (and have earned awards/recognition for their undergraduate research mentoring).

iv. Other programs in the institution

The proposed B.S. Neuroscience is a multidisciplinary, and contains courses in psychology but also biology, chemistry, physics, and other subjects. The closest current program is the neuroscience minor that currently resides in the Department of Psychology. Some students are expected to select Neuroscience from other programs such as Psychology or Sciences (biology, chemistry, physics).

v. Other related programs in the System

The University of Nevada, Reno (UNR) is the only other NSHE institution that offers a B.S. in Neuroscience. Contacts with the chairs and coordinators of the UNR neuroscience program have revealed no concerns, and indeed has yielded support, with respect to an additional neuroscience program as these two programs are not identical. The proposed program at UNLV offers students a choice of programs within Nevada that are distinctive based on curricula, faculty research areas, type of interdisciplinary courses, unique "Introduction to the Neuroscience Major" and "Capstone" courses (that are modeled from those currently offered by UNLV Psychology), and areas of focus such as computational modeling.

vi. If the program was not included in the NSHE Planning Report, please explain why.

The program was included on the NSHE Planning Report.

E. Evaluation of need for the program

i. The need for the program and the data that provides evidence of that need

Neuroscience is a broad multidisciplinary field of study that seeks to understand how the nervous system works at many different levels of function (from single cells to the whole organism) by studying many different species (e.g., invertebrates, rodents, humans) using many different types of measurements (e.g., gene expression, electrophysiology, magnetic resonance imaging). The field is one of the best supported areas of biomedical research because it is critical for

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understanding high-priority conditions such as Alzheimer's disease, psychiatric disorders, and drug addiction with around $5 billion budgeted each year for neuroscience research grants, contracts, and other funding mechanisms by the National Institutes of Health. This is in addition to the substantial neuroscience funding by other federal agencies such as the National Science Foundation (NSF) and the Department of Defense (DoD), as well as from industry and private foundations. Over the past 10 years, the Department of Psychology has established a group of core faculty, a core curriculum, research programs, and a graduate student cohort to support the existing Ph.D. and Minor in Neuroscience. Currently, there are seven full-time faculty in the Department of Psychology who identify as core neuroscientists as well as seven additional full-time faculty in the Department of Psychology who can teach neuroscience courses. As a group they have been successful at receiving funding from NIH, NSF, NASA, DoD, and industry and other sources. Continued success and growth by this group will be enhanced by an undergraduate neuroscience program.

Neuroscience has been among the most rapidly growing fields across academia over the past few decades, and is also now a very large field in absolute terms. For example, the Society for Neuroscience reports that their membership grew from around 25,000 members in 1995 to around 35,000 members in 2015. This has coincided with a large increase in the number of undergraduate neuroscience degree programs, including at peer and aspirational institutions such as University of Nevada, Reno; University of California-Los Angeles, Brigham Young University, University of Arizona, Arizona State University, University of California-Riverside, University of Southern California, University of San Diego, University of California-Santa Cruz, and Santa Clara University. There is great regional and national demand for neuroscience as a field of undergraduate study. See also the Lightcast report regarding specific regional institutions in the appendix.

ii. Student population to be served

At UNLV, the Department of Psychology has recently established an interdisciplinary neuroscience doctoral program along with an undergraduate neuroscience minor - while these have been successful, there is a gap that needs to be filled by creating this new major. This neuroscience minor has rapidly grown (approximately 250 students), demonstrating the popularity of neuroscience at UNLV and nationally. Some of our undergraduate students go on to pursue graduate studies in neuroscience. Many would like the opportunity to pursue their Ph.D. studies at UNLV, while others seek additional research opportunities while they are still undergraduates. Establishing a full undergraduate B.S. in Neuroscience at UNLV would address both of these needs. Graduates of our program are likely to pursue research and professional positions at universities, government laboratories, and in various private sector areas (pharmaceutical, biotechnology, neurocognitive rehabilitation, artificial intelligence; e.g., see https://www.biospace.com/article/neuroscience-jobs-in-the-united-states-popular-careers-in-demand/).

We also anticipate that the proposed B.S. program will be popular for students interested in healthcare, such as pre-med students. The development of the B.S. program would also solidify collaborations with the Kirk Kerkorian School of Medicine, the Nevada Institute of Personalized Medicine, the Sports Research Institute, the Cleveland Clinic Lou Ruvo Center for Brain Health, the University of Nevada Reno Center for Integrative Neuroscience, the UNLV School of Life Sciences, and the UNLV School of Integrated Health Sciences, among others. Faculty and students in the program are also likely to use and support, via indirect costs, the vivarium, UNLV National Supercomputing Institute, the UNLV Genomics Core Facility, and the UNLV Confocal and Biological Imaging core.

The internal recruitment plan is based on the expectation that a sizable number of students currently in the neuroscience minor (who are currently psychology, biology, and chemistry majors) will switch to the neuroscience major once it becomes available. The Psychology Department's undergraduate minor in neuroscience has created a pathway for local students to pursue undergraduate studies in neuroscience, and led to program demand by local students who wish to stay at UNLV to complete a Ph.D. We also have a good track record of preparing excellent undergraduates with research experience and skills, many of whom have gone on to other highly rated neuroscience programs. This pool of undergraduate students will provide a rich and well-defined source of students who will matriculate into the UNLV undergraduate neuroscience major. Recruiting from within this pool of students is also likely to result in retention and completion due to the familiarity with the proposed degree environment.

The external recruitment plan is based on associations with professional societies related to Neuroscience, Psychology and Biology. For example, the Society for Neuroscience (SfN) currently includes 40,000 members, making it one of the largest scientific organizations in the US. The 2009 survey sampled 134 SfN institution member programs, and showed that program growth and demand for the field remains very high, and that the programs recruit a very strong and diverse pool of applicants. In addition to conference promotion, we use advertisement on UNLV websites, and individual lab websites, as well as promote the program through interactions with colleagues at neuroscience-related conferences, and through our collaborations. The undergraduate neuroscience degree program will be built on the already established neuroscience emphasis area in our department, and the formal program in neuroscience is expected to robustly enhance recruitment, as suggested by student inquiries. Finally, the UNLV College of Liberal Arts is currently taking steps to dramatically increase its emphasis on student recruitment from high schools – the neuroscience program will benefit from these efforts.

iii. Procedures used in arriving at the decision to offer the program

The impetus for developing this program has largely come from student demand, particularly via exponential growth of headcount for the neuroscience minor over the past 8 years. In addition, faculty and administrative support for this program is very strong, as evidenced by the faculty approval vote, endorsement by deans and other chairs, and assistance from central administration.

In addition, we surveyed 193 current neuroscience minor students about how likely they would choose the neuroscience major (60 responded). Answers included definitely (48%), likely (27%), probably not (15%), unsure (8%), and not at all likely (2%). Current career plans among this group included medical school (25%), graduate school in psychology (20%), health or medical paths other than medical school (15%), some type of job or career after graduation (15%), graduate school in neuroscience (10%), and graduate school in biology (8%).

We also surveyed current students enrolled in Biology 190 (Introduction to Cell and Molecular Biology) about how likely they would choose the neuroscience major (26 responded). Answers included definitely (31%), likely (23%), probably not (31%), unsure (12%), and not at all likely (4%). Current career plans among this group included medical school (58%), health or medical paths other than medical school (27%), law school (4%), some type of job or career after graduation (4%), and graduate school in neuroscience (4%).

iv. Organizational arrangements required within the institution to accommodate the program

The proposed B.S Neuroscience will be housed and managed within the Department of Psychology. Considerable resources already exist for this program. The Department of

Psychology has seven core neuroscience faculty as well as seven additional faculty who can teach neuroscience courses. UNLV neuroscience graduate students can also teach undergraduate neuroscience courses. In addition, two additional faculty-in-residence with a focus on neuroscience have been approved and have an anticipated start date of July 1, 2024. No additional graduate assistantships have been requested.

The curriculum of the current neuroscience minor area of study, which was designed by current neuroscience faculty, includes undergraduate-level courses that are already fully staffed and will form the bulk of the coursework for the new full major (this includes offering most courses as both in-person and online options). Additional faculty in cognitive and developmental psychology engage in work that has substantial overlap with the neurosciences, and there are other colleges that have additional faculty who perform neuroscience-related research. These faculty will contribute to the training and mentoring of neuroscience students, including service on committees and course instruction (e.g., biology, chemistry, physics).

Existing faculty have sufficient laboratory space, equipment, and internal and external funding to support various types of animal and human neuroscience experiments. In addition, the Department of Psychology will house an undergraduate neuroscience coordinator, likely a full-time faculty member, who will receive a course release for tracking these majors, conducting assessments of student learning, identifying possible curriculum bottlenecks, and coordinating course availability with the various units involved in the major.

Current funding also includes existing grants, and a shared use laboratory for human brain stimulation research that was recently purchased with funds from the Department of Defense Minority-Serving Institution Program. Participating faculty are also actively applying for new grants to bolster and support this program. The majority of the costs already provided by the Psychology Department's sequential and concerted efforts over the prior 10 years in directing available resources to develop the currently existing neuroscience emphasis area. The Neuroscience B.S. degree program represents a very important and logical next step in the progression of neuroscience education and research at UNLV, which will further establish UNLV's reputation for excellence in neuroscience at the national level.

v. The timetable, with dates, for implementation steps

January, 2024: College of Liberal Arts Curriculum Review Committee and technical review as needed. Initial course development for NS 200 completed.

February, 2024: Faculty Senate Curriculum Review Committee.

March, 2024: NSHE AAC meeting with the degree program on its agenda.

Spring, 2024: Hiring of two additional faculty-in-residence with a focus on neuroscience.

June, 2024: Full Board of Regents meeting with the degree program on its agenda.

Fall, 2024: Entry of course and degree material into academic/communication systems and catalog. Start date of two new faculty-in-residence with a focus on neuroscience. Initial student recruitment.

Spring, 2025: Acceptance of first students.

vi. If this or a similar program already exists within the System, what is the justification for this addition? Please describe the nature and extent of the consultation with other institutions that have similar programs.

UNLV is currently one of the largest R1 universities in the nation that does not have an undergraduate degree program in neuroscience, and Las Vegas is one of the largest metropolitan areas in the country that does not currently have an undergraduate degree program in neuroscience, forcing many students interested in this degree elsewhere. Current similar programs exist at schools in this region, including University of Nevada, Reno; University of California-Los Angeles, Brigham Young University, University of Arizona, Arizona State University, University of California-Riverside, University of Southern California, University of San Diego, University of California-Santa Cruz, and Santa Clara University. Each neuroscience program differs somewhat in faculty area of focus and specific courses offered. As students navigate different options, an available neuroscience degree at UNLV would provide a cost-effective avenue of education in this area, linkage to stellar neuroscience faculty, opportunity to study key areas of neuroscience specific to our faculty (e.g., in pharmacology, neurodevelopmental disorders, spatial movement), pipeline into the graduate Neuroscience Ph.D. program at UNLV, and serve as preparation for medical school. As noted earlier, chairs and coordinators of the UNR neuroscience program have expressed support for UNLV starting a new neuroscience degree program.

vii. Evidence of employment opportunities for graduates (state and national). Include information on institutional review of the need for the program based on data from the Nevada P-20 Workforce Research Data System and/or any other applicable sources.

According to the Nevada P-20 Workforce Research Data System workforce supply and demand report, key in-demand occupations in Nevada include those that could be addressed with a graduate with a degree in neuroscience. These include various types of technicians and engineers, medical and clinical laboratory technologists, network and computer systems analysts and administrators, software developers, and teachers. In addition, according to the U.S. Bureau of Labor Statistics Occupational Outlook Handbook (https://www.bls.gov/ooh/), degrees in neuroscience may be helpful for high-demand and fast-growing occupations such as medical scientists, computer and information research scientists, and various life, physical, and social science occupations. Additional detail regarding possible end-state occupations for this degree are in Sections D.d.-e. In general, a degree in neuroscience is highly useful for populating a wide variety of technical and related fields.

F. Detailed curriculum proposal

i. Representative course of study by year (options, courses to be used with/without modification; new courses to be developed)

Representative course of (4-year) study plans for the B.S. Neuroscience is in the appendix. All courses are existing courses without modification except for two courses that are currently in development: NS 200 (Introduction to the Neuroscience Major) and NS 490 (Capstone), which will be modeled after existing PSY 200 and PSY 490 courses, respectively.

ii. Program entrance requirements

Standard UNLV admissions requirements will apply, including 3.0 GPA in 13 core units (English, Math, Social Science, Natural Science); OR 1120 SAT (EBRW and math); OR 22 ACT (composite score); OR Nevada Advanced High School Diploma OR Nevada College and

Career Ready High School Diploma. Entering freshmen, transfer students from within UNLV or transfer students from other institutions must have a minimum 2.5 GPA.

    iii. **Program completion requirements (credit hours, grade point average; subject matter distribution, preprogram requirements)**

Total number of minimum credits is 120. All neuroscience course work must be completed with a grade of C or higher. Students who have a GPA sufficient for admission to the college, but not for their particular major will be admitted as a pre-major. University policy states that a candidate for a bachelor's degree must complete the last 30 semester credits in uninterrupted residence as a major in the college from which the degree is expected. See degree worksheets and 4-year plans of study in appendix with respect to general education requirements listed in the left columns as well as neuroscience core courses, neuroscience electives, science requirements, and general electives listed in the right columns.

    iv. **Accreditation consideration (organization (if any) which accredits program, requirements for accreditation, plan for attaining accreditation - include costs and time frame)**

No additional accreditation consideration is needed for this proposed degree.

    v. **<u>For certificates only:</u> Name of any state, national and/or industry recognized certification(s) or licensing examination(s) for which certificate prepares the student, if applicable**

Not applicable.

G. **Method of Delivery (for the purpose of state authorization [NC-SARA])**

    i. **How will this academic program be delivered when the program begins? (mark all that apply)**
- ☐ **100% face-to-face courses**
- ☒ **Hybrid (some online courses, some face-to-face courses)**
- ☐ **100% online courses**

    ii. **Learning Placements**
Does the academic program have learning placements (e.g. internships, externships, clinical placements, student teaching, etc.) that *may take place outside the state of Nevada?*
- ☐ **Yes**
- ☒ **No.**

H. **Institutional Review Process**

    i. **Date of Faculty Review (may include additional information, as needed)**

Department of Psychology faculty review and approval of curriculum, 4-year plans of study, and learning objectives on October 11, 2023 (vote: 30-1-0).

    ii. **Describe the process for review and approval by the appropriate academic policy body of the institution**

The concept of the lead department model for undergraduate interdisciplinary program development was initiated by the UNLV Vice Provost's Office for Undergraduate and High-Impact Education and approved by the UNLV Faculty Senate in 2023. The neuroscience pre-proposal was approved on November 6, 2023. Next steps include review by the College of Liberal Arts Curriculum Review Committee and the Faculty Senate Curriculum Committee (see Section E.v.).

I. Readiness to begin program

i. List the educational and professional qualifications of the faculty relative to their individual teaching assignments

The existing core neuroscience and neuroscience-adjacent faculty mentioned in Section E have advanced degrees (Ph.D.) in Neuroscience and/or related fields (e.g., Psychology), are active researchers, and are instructors for the current neuroscience minor and interdisciplinary doctoral program in neuroscience.

Within the Department of Psychology, the following faculty represent core neuroscience members (area of specialization listed):

a. Professor, auditory cognition and cognitive neuroscience
b. Associate Professor, inhibitory signaling, neurodevelopmental disorders.
c. Associate Professor, cognitive control and the prefrontal cortex.
d. Assistant Professor, glia, depression, sleep, neuroinflammation, stroke, brain injury.
e. Assistant Professor, systems and behavioral neuroscience, sensory perception.
f. Assistant Professor, sensorimotor, spatial, neuropathology, treatment.
g. Faculty-in-Residence, neurobiology of stress, brain circuitry, neurotransmitters.

Within the Department of Psychology, the following additional faculty teach or can teach neuroscience courses (area of specialization listed):

a. Professor, neuropsychology, schizophrenia, early severe mental disorder
b. Professor, perceptual development, auditory cognition, music perception.
c. Associate Professor, psychophysiology of emotion and reward, psychopathy
d. Assistant Professor, cognition, language, event-related brain potentials, aging.
e. Faculty-in-Residence, sensation and perception, learning, music, language.
f. Faculty-in-Residence, social neuroscience
g. Faculty-in-Residence, cognitive science, pedagogical effectiveness

Recall as well that two additional faculty-in-residence with a focus on neuroscience have been approved for search and are expected to start July 1, 2024; additionally, faculty from the Departments of Biology, Brain Health, Chemistry, and Physics will participate via course instruction and research advising.

ii. List the anticipated sources or plans to secure qualified faculty and staff

The College of Liberal Arts submitted and received approval for a hiring request for the Department of Psychology that includes two additional faculty-in-residence positions that can be devoted to neuroscience. This will allow sufficient class sizes so that core neuroscience courses can be taught on a regular basis and allow students to graduate in a timely manner. These new faculty members will also further diversify the types of neuroscience research conducted within

the program, which will broaden the appeal to students interested in applying to neuroscience PhD and other professional programs, allow for greater research collaboration among those with neuroscience interests across the university, and increase competitiveness for external funding from a variety of governmental, corporate, and foundation sources. It is important to note as well that tenure-track and tenured neuroscience faculty regularly apply for and earn externally funded grants, some of which allow these faculty to engage in course buyouts. As such, additional funding for new faculty-in-residence positions would be helpful. These positions will be requested in FY2025.

iii. Contribution of new program to department's existing programs (both graduate and undergraduate) and contribution to existing programs throughout the college or university

The proposed B.S. Neuroscience contributes to the Department of Psychology's undergraduate and graduate programs in several ways. First, the proposed major offers a pathway for our many current neuroscience minors (n = 250) and psychology majors (n = 1900) to pursue a full degree in neuroscience or a dual major with neuroscience. Second, the proposed major can serve as a pipeline to Department of Psychology faculty and labs that participate in the Interdisciplinary Neuroscience Ph.D. program at UNLV.

The B.S. Neuroscience also contributes to other existing undergraduate and graduate programs at UNLV. The program offers alternative degree pathways for those students in Sciences and other colleges who are particularly interested in a neuroscience focus and can serve also as a pipeline into many post-bachelor programs at UNLV. The proposed degree program is also expected to significantly boost student matriculation at UNLV and benefit departments across campus with respect to course and independent study enrollment (e.g., participating in research labs).

iv. Recommendations from prior program review and/or accreditation review teams

The UNLV Department of Psychology's B.A. Psychology program underwent its 10-year review in 2022. According to the external reviewer report, the presence of the current neuroscience minor and the addition of other courses such as a careers course "is a sign of a department that is willing to keep its curriculum timely and relevant." The report noted that these courses "will provide a variety of experiences and tasks that will help (students) find jobs and internships and prepare application materials that match their strengths and experiences with targeted opportunity."

J. Resource Analysis

i. Proposed source of funds (enrollment-generated state funds, reallocation of existing funds, grants, other state funds)

This program will be funded through tuition revenue and fees. Please see budget outline for specific tuition and fee amounts.

ii. Each new program approved must be reviewed for adequate full-time equivalent (FTE) to support the program in the fifth year. Indicate if enrollments represent 1) students formally admitted to the program, 2) declared majors in the program, or 3) course enrollments in the program.

a. (1) Full-time equivalent (FTE) enrollment in the Fall semester of the first, third, and fifth year.

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       1st Fall semester <u>180</u>

       3rd Fall semester <u>240</u>

       5th Fall semester <u>280</u>

   (2) Explain the methodology/assumptions used in determining projected FTE figures.

The projected FTE was determined using the formula documented in the NSHE Procedures and Guidelines Manual, Chapter 6, Section 2. FTE is computed by multiplying the number of students times the number of credits they will be taking (12) and then dividing that number by 15.

  b. **(1) Unduplicated headcount in the Fall semester of the first, third, and fifth year.**

       1st Fall semester <u>225</u>

       3rd Fall semester <u>300</u>

       5th Fall semester <u>350</u>

   (2) Explain the methodology/assumptions used in determining projected headcount figures.

The 1st Fall semester projection represents new headcount and is based on the fact that (a) approximately 50% of the current neuroscience minors (i.e., 125 students) will switch to the neuroscience major once available. The department expects to increase new enrollment by roughly 75 - 100 students each subsequent year, with fifth headcount target slightly smaller to account for student completions.

  iii. **Budget Projections – Complete and attach the Five-Year Program Cost Estimate and Resource Requirements Table.**

The budget worksheet is in the appendix.

K. Facilities and equipment required

  i. **Existing facilities: type of space required, number of assignable square feet, space utilization assumptions, special requirements, modifications, effect on present programs**

Existing space is adequate for the proposed degree program and includes office and laboratory space in multiple buildings. In addition, core neuroscience faculty currently have extensive lab structures with equipment, grant funding, and wet and dry lab facilities necessary to conduct research and neuroscience instruction.

  ii. **Additional facilities required: number of assignable square feet, description of space required, special requirements, time sequence assumed for securing required space**

Existing space is adequate for the proposed degree program.

  iii. **Existing and additional equipment required**

<div align="center">17</div>

Existing equipment is currently adequate for the proposed degree program. Current neuroscience-oriented lab equipment partly includes high-resolution electroencephalography, two-photon laser scanning microscopy, electrophoresis, patch clamp electrophysiology, cameras for videography and pupilography, fast calcium imaging, optogenetics, thermocyclers for DNA amplification, plate readers, isolated touchscreen behavioral chamber, stereotaxic surgical equipment, high-powered computer workstations, and behavioral screening apparatus for models of mental health disorders. If enrollment increases beyond the current capacity, additional equipment may be requested.

L. Describe the adequacy and availability of library and information resources

Library and information resources on the UNLV campus are considered adequate and sufficiently available for the proposed degree program. These resources include, among others, extensive journal holdings (including a wide array of neuroscience journals), databases, research and course guides, library staff liaisons, off-campus access assistance, tutorials, student assistance, open access publishing support, data management, and citation generators.

M. Student services

i. Describe the capacity of student support services to accommodate the program. Include a description of admissions, financial aid, advising, library, tutoring, and others specific to the program proposal

UNLV-based student support services are considered adequate for the proposed degree program in part because the program will be an extension of the current neuroscience minor. The current UNLV support infrastructure, including admissions, advising, library, and tutoring, is expected to be able to absorb current UNLV students who will switch to the neuroscience major as well as new students (estimated 100 per year).

In addition, as noted, the College of Liberal Arts' Wilson Advising Center (WAC) will conduct mandated appointments with students in the proposed degree program. The WAC is already in the process of training their staff specifically for this major and will be devoting specific staff to students undertaking this major. The WAC will also leverage their current working relationship with the UNLV Sciences advising center given the expectation that some current Sciences students will transition to the proposed degree program.

ii. Describe the implications of the program for services to the rest of the student body

The proposed degree program in Neuroscience is not expected to substantially impact the rest of the student body, though there may be initially somewhat fewer majors in some disciplines with respect to students that will transition to the new major. There is little-to-no expected impact on those programs, as they are typically high-enrolling (for example, as of fall 2023, the B.A. Psychology degree had over 1,800 enrolled students).

N. Consultant Reports – If a consultant was hired to assist in the development of the program, please complete subsections A through C. A copy of the consultant's final report must be on record at the requesting institution.

i. Names, qualifications and affiliations of consultant(s) used

Not applicable.

ii. **Consultant's summary comments and recommendations**

Not applicable.

iii. **Summary of proposer's response to consultants**

Not applicable.

O. Articulation Agreements

i. **Articulation agreements were successfully completed with the following NSHE institutions. (Attach copies of agreements)**

See attached.

ii. **Articulation agreements have not yet been established with the following NSHE institutions. (Indicate status)**

Not applicable.

iii. **Articulation agreements are not applicable for the following institutions. (Indicate reasons)**

Not applicable.

P. Summary Statement

The proposed degree program in Neuroscience is expected to address a longstanding and intense need among students interested in this degree who must currently seek such training elsewhere. The proposed degree program is also expected to address workforce shortages by graduating students with highly advanced technical skills and training and who may transition into graduate, medical, and professional schools.

UNLV

4-Year Plan of Study

2024-2025 Bachelor of Science: Neuroscience

First Semester (14 Credits)

Course	Credits
COLA 100LA (First-year seminar)	3
ENG 101 (Composition I)	3
MATH 127 (Precalculus II)	3
BIOL 190A & 190L (Intro Cell/Mol Bio)	4
NS 200 (Intro to the Neuroscience Maj)	1
Semester Total	**14**

Second Semester (16 Credits)

Course	Credits
ENG 102 (Composition II)	3
BIOL 191A & 191L (Intro Organismal Bio)	4
US/NV Constitution	3
PSY 101 (General Psychology)	3
Fine Arts/International	3
Semester Total	**16**

Third Semester (16 Credits)

Course	Credits
ENG 231 OR ENG 232 OR PBH 205	3
CHEM 121A& 121L (Gen Chemistry I)	4
PHIL 102 (Critical Thinking & Reasoning)	3
PSY 303 (Foundations of Neuroscience)	3
Elective	3
Semester Total	**16**

Fourth Semester (15 Credits)

Course	Credits
PHIL 101 (Introduction to Philosophy)	3
PSY 210 (Intro Statistical Methods)	4
CHEM 122A & 122L (Gen Chemistry II)	4
Humanities/Multicultural	3
Elective	1
Semester Total	**15**

Fifth Semester (15 Credits)

Course	Credits
PSY 305 (Foundations of Perception)	3
PSY 422 (Psychopharmacology Abu Drug)	3
PSY 424 (Neurobiology Learning/Memory)	3
Elective	3
Elective	3
Semester Total	**15**

Sixth Semester (16 Credits)

Course	Credits
BIOL 300 (Principles of Genetics)	4
PSY 425 (Cognitive Neuroscience)	3
UD Neuroscience Elective	3
Elective	3
Elective	3
Semester Total	**16**

Seventh Semester (15 Credits)

Course	Credits
UD Neuroscience Elective	3
UD Neuroscience Elective	3
Elective	3
Elective	3
PSY 428 (Cell/Mol Approaches to Behavior)	3
Semester Total	**15**

Eighth Semester (13 Credits)

Course	Credits
US Neuroscience Elective	3
Elective	3
Elective	3
Elective	3
NS 490 1cr. (Capstone in Neuroscience)	1
Semester Total	**13**

Notes

- Must earn a minimum of 120 total credits.
- Electives: 9 credits of upper division electives (300-400 level) and 22 credits of any electives (100-400 level).
- Use 4-year plan in conjunction with program degree worksheet.
- Please speak with your academic advisor regarding placement into MATH 127 and CHEM 121A/121L.

For additional information contact the Advising Center

UNLV | ACADEMIC AFFAIRS
Academic Assessment

3-Year Academic Assessment Plan Cover Sheet
Email to: assessment@unlv.edu

Program Information

Program Assessed: **Bachelor of Science (B.S.) in Neuroscience**

Department: **Psychology**

College: **College of Liberal Arts**

Department Chair: **Chris Kearney**

Date Submitted: **10/31/2023**

Contact Person for This Plan

Name: **David Copeland**

Phone: **702-895-5213**

Email: **david.copeland@unlv.edu**

Please address the following items:

- What are the student learning outcomes? Please provide a numbered list.

Student Learning Outcomes (SLO) for Neuroscience B.S.

1. Identify and describe the major areas of neuroscience, their primary research topics, and the primary approaches/techniques for asking research questions in each.
2. Explain and diagram fundamental principles of nervous system signaling and information processing based on research of the nervous system at the cellular, molecular, circuit, and systems levels.
3. Relate our current understanding of nervous system function and dysfunction to contemporary and historical developments in neuroscience research.
4. Describe the basis for disorders of the nervous system from cell & molecular to cognitive & systems levels, including genetic disorders of the nervous system, developmental disorders, movement disorders, mental health disorders, and neurodegenerative disorders.
5. Describe the methods used to study the nervous system, including specific experimental techniques relevant to neuroscience (immunohistochemistry, DNA & RNA sequencing, electrophysiology, behavioral assessment, neuroimaging).
6. Critically assess the design, strengths, and limitations of neuroscience methods and techniques in empirical research publications.

1

7. Apply skills in data analysis and interpretation, including data management, statistical assessments, and communicating and displaying data.
8. Be able to communicate effectively about biological and neuroscientific concepts, orally and in writing.
9. Be prepared for directly entering the STEM and other workforce.

- **Plans must include a curriculum map showing which courses will address which learning outcomes.** Examples can be found on the Curriculum Map Examples page, https://www.unlv.edu/assessment/resources/curriculum-map.

   Curriculum Map – Neuroscience B.S.

   KEY: 1 = minor emphasis, 2 = moderate emphasis, 3 = significant emphasis

Course(s)	SLO1	SLO2	SLO3	SLO4	SLO5	SLO6	SLO7	SLO8	SLO9
NS 200 (Intro to Major)	2	…	…	…	…	1	…	…	3
PSY 210 (Statistics)	…	…	…	…	…	…	3	…	…
PSY 303 (Neuroscience)	3	3	3	2	2	2	1	2	1
PSY 305 (Perception)	…	…	…	…	2	2	…	…	…
PSY 422 (Psychopharm)	…	…	…	…	2	2	…	…	…
PSY 424 (Learning & Memory)	…	…	…	…	2	2	…	…	…
PSY 425 (Cognitive Neuro)	…	…	…	…	2	2	…	…	…
PSY 428 (Cell & Molecular)	…	2	…	2	3	2	…	…	…
BIOL 300 (Genetics)	…	…	…	2	2	2	…	…	…
NS 490 (Capstone)	…	…	…	…	…	3	3	3	3

- Which learning outcomes will be assessed in each cycle year (i.e., assessment timeline)?

   Student Learning Outcomes Assessed each Year
   Year 1 = SLO 9
   Year 2 = SLO 1, SLO 2, SLO 3, and SLO 4
   Year 3 = SLO 5, SLO 6, SLO 7, and SLO 8

- How will the learning outcomes be assessed? (Programs must use at least one direct assessment of student learning.)

   How Student Learning Outcomes are Assessed
   For Student Learning Outcomes #1, #2, #3, and #4, we will compare Pre-test to Post-test data. Four different 10-question multiple-choice tests will be created by the program that addresses each of these learning outcomes. In order to demonstrate that learning occurred while completing the program courses, when creating these multiple-choice tests, the goal is to design Pre-test scores so that they are close to chance performance (i.e., close to 25% for a 4-choice question). Pre-test

2

scores will be compared to Post-test scores with the expectation that the latter scores will be 60% or higher (this threshold was selected because the exact same material may not be covered by different instructors of the same course).

Results for each of these SLOs are collected by administering the respective test to the following courses:

SLO #1 – PSY 303
SLO #2 – PSY 303
SLO #3 – PSY 303
SLO #4 – PSY 303

For Student Learning Outcome #5, we will compare Pre-test to Post-test data. A 10-question multiple-choice test will be created by the program that addresses this learning outcomes. As in the previous description, tests will be designed with a goal for Pre-test scores to be near chance and for Post-test scores to be significantly higher (60% or higher).

Results for this SLO are collected by administering the test to the following courses:

SLO #5 – NS 490

For Student Learning Outcomes #6, #7, and #8, we will use rubrics created for writing and oral presentations. A rubric will be created by the program that assesses written papers of students in NS 490 using a 1 (poor) to 4 (excellent) scale for 5 dimensions: APA style, Literature Review, Method, Results & Discussion, and Writing Quality. A rubric will also be created by the program that assesses oral presentations of students in NS 490 using a 1 (poor) to 4 (excellent) scale for 5 dimensions: APA style, Smoothness / Flow, Clear Take-Home Message, Quality of Materials / Slides, and Knowledge of Topic.

For Student Learning Outcome #9, we will collect data in NS 200 using a multiple-choice test that covers students' knowledge of neuroscience careers and post-bachelor paths. In addition, we will administer a senior survey in NS 490 that includes questions regarding students' post-graduation plans, steps that they took to prepare for it, and strengths and weaknesses of the program in terms of how it prepared them for their path.

- Undergraduate programs should assess at least one University Undergraduate Learning Outcome (UULO) each year, which may or may not overlap with a program learning outcome.

University Undergraduate Learning Outcomes Assessed Each Year for Neuroscience B.S.

UULO1: Intellectual Breadth and Lifelong Learning
UULO2: Inquiry and Critical Thinking
UULO3: Communication
UULO4: Global/Multicultural Knowledge
UULO5: Citizenship and Ethics

3

Year 1 = UULO5
Year 2 = UULO 1 and UULO4
Year 3 = UULO 2 and UULO 3

● What is your plan for sharing the assessment results and acting on them (i.e., closing the loop)?

Closing the Loop for Neuroscience B.S. (sharing results and acting on them)

All results, after being organized by the Undergraduate Director, will be shared with the program faculty. The outcomes and future plans will be discussed at program meetings. The specific plans for each year will depend on the findings from last measurement, as well as to what extent that we reached goals from previous years. As a program, a major goal is to focus on one clear improvement each year, and improvement can consist of changes that influence the scores of our measurements, or they can be changes that are inspired by assessment outcomes.

<Please limit the narrative portion of your report to no more than four pages. You may attach appendices with data, tables, charts, or other materials as needed. Please explain the relevant conclusions from any appendices in your narrative. Please contact the Office of Academic Assessment if you have questions or need assistance.>

4

NSHE Academic Program Proposal - Five-Year Program Cost Estimate and Resource Requirements
Enter N/A if the information is not applicable to the program proposal

Program Resource Requirements. Indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first, third and fifth fiscal years of the program. Include reallocation of existing personnel and resources and anticipated or requested new resources. Third and fifth year estimates should be in dollars adjusted for inflation. If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies). Note: This form reflects the NWCCU's Substantive Change Budget Worksheet as of 8/28/17.

College/University: __University of Nevada, Las Vegas_____

Program: ___B.S. Neuroscience

I. PLANNED STUDENT ENROLLMENT

Note: *Enrollment numbers (A + B) for each fiscal year should match the FTE/Headcount numbers in the Academic Program Proposal Form (Sect. I.ii.).*

	FY 1: FY ____		FY 3: FY ____		FY 5: FY _____	
	FTE	Headcount	FTE	Headcount	FTE	Headcount
A. New enrollments to the Institution	180	100	240	300	280	350
B. Enrollments from Existing Programs		125				

II. REVENUE

	FY 1: FY ____		FY 3: FY ____		FY 5: FY _____	
	On-going	One-time	On-going	One-time	On-going	One-time
1. New Appropriated Funding Request						
2. Institution Funds						
3. Federal (e.g. grant, appropriation)						
4. New Tuition Revenues (registaration fee) from Increased Enrollments*	$662,063		$780,300		$910,350	
5. Other Student Fees (associated with the program)*						
6. Other (i.e., Gifts)						
Total Revenue	$662,063	$0	$780,300	$0	$910,350	$0

Note: *Total Revenue (Section I) should match Total Expenditures (Section III)*

Revised November 2018

NSHE Academic Program Proposal - Five-Year Program Cost Estimate and Resource Requirements

Enter N/A if the information is not applicable to the program proposal

III. EXPENDITURES

	FY 1: FY ____		FY 3: FY ____		FY 5: FY _____	
	On-going	One-time	On-going	One-time	On-going	One-time
A. Personnel Costs						
1. FTE (**Total FTE for all personnel types**)	7.2	0	7.7	0	7.7	0
Faculty	4.7		4.7		4.7	
Adjunct Faculty						
Grad Assts	1		1.5		1.5	
Research Personnel	1		1		1	
Directors/Administrators						
Administrative Support Personnel	0.5		0.5		0.5	
Other: _____						
Expenditures for personnel type below must reflect FTE levels in Section A.1.						
2. Faculty	$310,248		$355,570		$396,702	
3. Adjunct Faculty						
4. Graduate Assistants	$43,000		$64,500		$64,500	
5. Research Personnel	$141,985		$146,244		$212,563	
6. Directors/Administrators						
7. Administrative Support Personnel	$24,000		$24,720		$25,956	
8. Fringe Benefits	$140,830		$152,266		$154,629	
9. Other:						
Total Personnel Costs	$660,063	$0	$743,300	$0	$854,350	$0

NSHE Academic Program Proposal - Five-Year Program Cost Estimate and Resource Requirements

Enter N/A if the information is not applicable to the program proposal

	FY 1: FY ____		FY 3: FY ____		FY 5: FY _____	
	On-going	One-time	On-going	One-time	On-going	One-time
B. Operating Expenditures						
1. Travel			$7,500		$10,000	
2. Professional Services					$5,000	
3. Other Services						
4. Communications	$1,000		$2,500		$3,000	
5. Materials and Supplies					$5,000	
6. Rentals						
7. Marketing materials and Advertising	$1,000		$3,000		$4,000	
8. Miscellaneous - equipment maintenance			$10,000		$15,000	
Total Operating Expenditures	$2,000	$0	$23,000	$0	$42,000	$0

	FY 1: FY ____		FY 3: FY ____		FY 5: FY _____	
	On-going	One-time	On-going	One-time	On-going	One-time
C. Capital Outlay						

3

1. Library Resources				$2,000		$2,000	
2. Equipment				$12,000		$12,000	
Total Capital Outlay	$0	$0	$14,000	$0	$14,000	$0
TOTAL EXPENDITURES (IIIA + IIIB + IIIC):	$662,063	$0	$780,300	$0	$910,350	$0

<u>Note</u> : Total Expenditures (Section IIIA-C total) should match Total Revenue (Section I)

Budget Notes (optional):