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Cover Sheet for In-State Institutions
New Program or Substantial Modification to Existing Program

Institution Submitting Proposal	University of Maryland, College Park

Each action below requires a separate proposal and cover sheet.

- (•) New Academic Program
- ( ) New Area of Concentration
- ( ) New Degree Level Approval
- ( ) New Stand-Alone Certificate
- ( ) Off Campus Program
- ( ) Substantial Change to a Degree Program
- ( ) Substantial Change to an Area of Concentration
- ( ) Substantial Change to a Certificate Program
- ( ) Cooperative Degree Program
- ( ) Offer Program at Regional Higher Education Center

Payment Submitted:	Payment Type:	Payment Amount:	Date Submitted:
( ) Yes (•) No	( ) R*STARS (•) Check		

Department Proposing Program	Departments of Psychology and Biology (jointly sponsored program)	
Degree Level and Degree Type	Bachelor of Science	
Title of Proposed Program	Neuroscience	
Total Number of Credits	120	
Suggested Codes	HEGIS:	CIP: 26.15 01
Program Modality	(•) On-campus ( ) Distance Education (*fully online*) ( ) Both	
Program Resources	(•) Using Existing Resources ( ) Requiring New Resources	
Projected Implementation Date	(•) Fall ( ) Spring ( ) Summer	Year: 2019
Provide Link to Most Recent Academic Catalog	URL: https://academiccatalog.umd.edu	
Preferred Contact for this Proposal	Name: Katherine Russell	
	Title: Associate Dean, College of Behavioral and Social Sciences	
	Phone: (301) 405-1692	
	Email: krussell@umd.edu	
President/Chief Executive	Type Name: Wallace D. Loh	
	Signature: Wala D Loh	Date: 11-27-2018
	Date of Approval/Endorsement by Governing Board:	

Revised 11/2018

A. Centrality to the University's Mission and Planning Priorities

Description. The Bachelor of Science in Neuroscience will offer rigorous training in the interdisciplinary study of brain and behavior. Students will complete a required set of neuroscience courses as well as a supporting sequence of coursework in mathematics, biology, chemistry, physics, and psychology. Students will then choose an upper-level specialization in either (1) cellular, molecular, and physiological neuroscience or (2) behavioral and cognitive neuroscience. The Neuroscience major prepares students for a broad range of career paths including: scientific research, medicine, clinical psychology, allied health professions, or science-related government, nonprofit, or private sector employment.

Relation to Strategic Goals. The proposed Neuroscience major relates to UMD's strategic goals by adding to its STEM program offerings. UMD states the following undergraduate education objective in its *Mission and Goals Statement*: "Increase the number of STEM graduates by creating new programs."[1] Currently, individual neuroscience courses are offered by the university but students wishing to major in neuroscience do not have that option. Students interested in neuroscience must either enroll in the Biological Sciences or Psychology programs. By establishing this new major, UMD will not only add to its STEM offerings, but will also attract talented students who may not have chosen UMD because of its lack of a neuroscience major. The recruiting value of this program relates directly to UMD's strategic goal of attracting more talented students to the university, particularly from the state of Maryland.[2] The new program will also reduce the demand on two programs that are in heavy demand: Psychology (813 enrolled majors in Fall 2017) and Biological Sciences (1,664 enrolled majors in Fall 2017). This redistribution of majors is also aligned with the university's strategic goal "to create a better distribution of undergraduate students among major programs to avoid overcrowding and the resulting student dissatisfaction."[3]

Funding. Resources for the new program will be drawn from those currently used by the sponsoring departments on neuroscience undergraduate education, reallocated funds from campus, and new resources to the university provided through state legislation, for which neuroscience is an identified priority area.

Institutional Commitment. The program will be administered by the Department of Biology (within the College of Computer, Mathematical, and Natural Sciences) and the Department of Psychology (within the College of Behavioral and Social Sciences). These departments already offer courses in neuroscience and degree programs in Biological Sciences and Psychology, respectively. Accordingly, the departments have the administrative, instructional, advising, and facilities infrastructure in place to

[1] University of Maryland, College Park. (April 29, 2014). *Mission and Goals Statement.* (p. 5). Retrieved October 29, 2018 from: https://www.umd.edu/history-and-mission.
[2] University of Maryland, College Park. (May 21, 2008). *Transforming Maryland: Higher Expectations. The Strategic Plan for the University of Maryland.* (p. 13). Retrieved October 29, 2018 from: http://www.provost.umd.edu/SP07/StrategicPlanFinal.pdf.
[3] University of Maryland, College Park. (May 21, 2008). *Transforming Maryland: Higher Expectations. The Strategic Plan for the University of Maryland.* (p. 12). Retrieved October 29, 2018 from: http://www.provost.umd.edu/SP07/StrategicPlanFinal.pdf.

operate the program. The university will provide additional resources needed for administration, instruction, advising, laboratory, and office space to support the full degree program. In the event that the program is discontinued, the courses will be offered for a reasonable time period so that enrolled students can finish the program. The faculty and administrative infrastructure will still be in place to work with students who have not finished the program.

B. Critical and Compelling Regional or Statewide Need as Identified in the State Plan

Need. Understanding the brain and nervous system is a societal need that requires *integrative* studies from many disciplines, including anatomy, physiology, molecular biology and biochemistry, behavioral and cognitive science as well as computational methods. The proposed major will integrate these disciplines and provide in-depth knowledge of neuroscience and its core aspects: molecular/cellular, circuit, systems, and behavioral. Neuroscience has been recognized as a cohesive academic discipline in the United States since the 1960's. The national Society for Neuroscience was formed in 1969 and had its first conference in 1971 with 1500 attendees and now regularly includes more than 30,000 colleagues from more than 80 countries. Many peer institutions, including all but two Big 10 Universities (Illinois and Maryland), developed thriving neuroscience undergraduate majors decades ago. Some examples of universities with vibrant undergraduate neuroscience programs include Duke University, Johns Hopkins University, University of Michigan, and The Ohio State University.

At the University of Maryland, the Neuroscience and Cognitive Sciences (NACS) Ph.D. program was established in 1996, followed by an undergraduate minor in neurosciences in 2006. In 2018, there is more undergraduate interest in neuroscience and stronger campus investment in neuroscience-related education and research than ever before. The Brain & Behavior Initiative, the Maryland Neuroimaging Center, the Language Science Center, and the scientific components of the Cole Field House Project are important evidence of neuroscience as a strong focus of campus research and educational strength.

State Plan. The proposed program in Neuroscience aligns with the *Maryland State Plan for Postsecondary Education's* emphasis on career training and research. Strategy 7 of the *Maryland State Plan* is "Enhance career advising and planning services and integrate them explicitly into academic advising and planning."[4] Career advising will not only be integrated with student advising, it will also be incorporated into the program coursework. One of the learning outcomes for the program is for students to develop an appreciation of possible career paths available to students proficient in neuroscience. All of the core courses for the program will help students achieve this outcome. Furthermore, the linkages to the aforementioned research centers and other faculty researchers will provide students with a variety of options to engage in neuroscience research.

[4] Maryland Higher Education Commission. (2017). *Maryland State Plan for Postsecondary Education.* (p. 60). Retrieved October 29, 2018 from: http://www.mhec.state.md.us/About/Documents/2017.2021%20Maryland%20State%20Plan%20for%20Higher%20Education.pdf.

C. Quantifiable and Reliable Evidence and Documentation of Market Supply and Demand in the Region and State

Neuroscience itself is not a career category tracked by U.S. or State occupational projection services, but the discipline offers a strong and broad scientific background for students interested in a wide variety of careers ranging from medicine, allied health sciences, scientific research, medical technology, technology-related business, health or technology policy, public service and non-profit sector, government service, health insurance, public health, social services, psychological services, and others. The US Occupational Outlook Handbook for medical scientists alone shows a faster than average (13%) increase in jobs between 2016 and 2026.[5] The State of Maryland Occupational Projections for the category Medical Scientists, Except Epidemiologists show a 9.58% increase between 2016 and 2026 with 445 expected positions to be gained during this time.[6]

The best evidence for neuroscience program market demand comes from UMD's current program offerings in Biological Sciences and Psychology. The Biological Sciences major has a Physiology & Neurobiology specialization that has more than 700 enrolled students. The new Neuroscience major is projected to grow over a 2 or 3-year period to a steady state of approximately 500 students. This number is a conservative estimate based on the enrollments of established neuroscience majors at peer institutions. For example, the University of Michigan's neuroscience major has 500 majors. The Ohio State University has 1000 neuroscience majors. We predict that 50% (250) of neuroscience students would have previously selected Biological Sciences as a major, 20% (100) would have selected Psychology, and 30% (150) of the students would not have previously enrolled at Maryland.

D. Reasonableness of Program Duplication

The only two bachelor programs in neuroscience in the State of Maryland are at Johns Hopkins University and Notre Dame College of Maryland. Although the University of Maryland competes with Johns Hopkins University for a very small number of the most academically talented freshmen who are Maryland residents, the institutions and programs will not be duplicative or especially competitive. Even though Johns Hopkins has more than 300 students in its program, according to MHEC data, we believe there is sufficient demand for both programs based on the number of potential students already at UMD. Notre Dame College of Maryland is a very small women's college and not directly competitive with a large public flagship. Rather, the University of Maryland is more likely to compete with schools outside of Maryland, such as other Big 10 flagships and large public universities for neuroscience majors, especially but not limited to the University of Michigan, Penn State, and The Ohio State University.

[5] United States Bureau of Labor Statistics. *Occupational Outlook Handbook: Medical Scientists.* Retrieved October 31, 2018 from: https://www.bls.gov/ooh/life-physical-and-social-science/medical-scientists.htm.
[6] State of Maryland Department of Labor, Licensing & Regulation. *Maryland Occupational Projections – 2016-2026 – Workforce Information and Performance.* Retrieved October 31, 2018 from: http://www.dllr.state.md.us/lmi/iandoproj/maryland.shtml.

E . Relevance to Historically Black Institutions (HBIs)

No such program currently exists at any of Maryland's Historically Black Institutions (HBIs).

F. Relevance to the identity of Historically Black Institutions (HBIs)

UMD has already established itself in the field of neuroscience, as our Neuroscience and Cognitive Sciences graduate program has been offered for many years. UMD has also offered undergraduate coursework in neuroscience for a number of years. Accordingly, the proposed program would not have an impact on the uniqueness or institutional identity of any Maryland HBI.

G. Adequacy of Curriculum Design, Program Modality, and Related Learning Outcomes

Curricular Development. Neuroscientist and Dean of the College of Behavioral and Social Sciences Gregory Ball assembled and chaired the committee that designed the academic curriculum for this new major. The committee consisted primarily of neuroscience faculty at University of Maryland, along with knowledgeable academic administrators. This committee considered the course structure and content of a number of other neuroscience undergraduate programs to ensure the curriculum is comparable in course scope, depth, and course requirements to institutional peers.

Faculty Oversight. An oversight committee will be comprised of at least six faculty members. This committee will provide academic oversight for the major, review curricular modifications, and oversee the annual learning outcomes assessment for the major. An undergraduate director will be selected to oversee daily operations of the program.

Educational Objectives and Learning Outcomes. After completing this program, participants will:

1. Develop a knowledge base in the field of neuroscience and supporting disciplines
    a. Understand the fundamental principles of neuroscience across all levels of analysis – molecular/cellular, circuits, systems, and behavior
    b. Understand the principles of evolution, especially as they apply to the nervous system and behavior
    c. Develop additional expertise and depth of knowledge in at least one area of neuroscience (molecular/cellular, circuits, systems, and behavior)
    d. Be able to address a question in neuroscience by integrating information from multiple levels of analysis

2. Understand the current techniques and strategies in neuroscience research
    a. Understand the theory and practice of important current neuroscience research techniques, along with their strengths and limitations
    b. Acquire laboratory experience through neuroscience courses or research
    c. Develop skills in data analysis using relevant quantitative and programming methods
    d. Obtain training to work comfortably and successfully within a research team or equivalent experience

3. Develop competence in scientific reasoning and critical thinking
    a. Be able to critically evaluate scientific literature, including assessment of the problems addressed, methodology used (including statistical analyses), and conclusions drawn
    b. Demonstrate skill in innovative and integrative thinking and problem-solving
    c. Demonstrate skill in experimental design and interpretation

4. Develop effective professional communication skills
    a. Demonstrate proficiency in clear, concise, and graceful writing
    b. Demonstrate proficiency with oral communication in a range of professional situations
    c. Demonstrate proficiency in graphical presentation of information integrated into both written and oral presentations

5. Understand the role of neuroscience in social and cultural contexts as well as the influences of social and cultural context on neuroscience
    a. Understand the influences, current and potential, of neuroscience on other fields such as medicine, education, the arts, and the social sciences
    b. Recognize the relationships between scientific research and the culture(s) in which it is embedded
    c. Understand and follow ethical practices in academic study, scientific research, and professional life

6. Develop an appreciation of possible career paths available to students proficient in neuroscience
    a. Understand the activities, opportunities, and responsibilities of the individual scientist within the scientific community
    b. Recognize the range of career opportunities outside academia
    c. Develop and, as far as possible, implement plans for career development

See Appendix A for more information on learning outcomes assessment.

Institutional assessment and documentation of learning outcomes. Undergraduate programs complete annual assessments, with each learning outcome evaluated at least once in a four-year cycle. Programs report findings each fall in summary form following a template structure and are informed by a "best practices" guide and a rubric. Assessment summary reports for each college are collected by the College Coordinator, who works to promote high standards through support and guidance to programs and with continuous improvement practices.

Course requirements. The curriculum will consist of 76-80 credits organized into the following categories:

- 13 credits of neuroscience core courses
- 47 credits of supporting courses in mathematics, statistics, biological sciences, chemistry, physics, psychology, along with UNIV100.
- 16-20 credits of specialization credits (two specializations offered: Molecular, Cellular, and Physiological; and Behavioral and Cognitive).

Neuroscience Core Courses (13 credits)			
Course	Title	Credits	General Education Designation
*NEUR200	Introduction to Neuroscience	3	Natural Sciences
*NEUR305	Neuroscience Fundamentals I	3	
*NEUR306	Neuroscience Fundamentals II	3	
*NEUR405	Neurobiology Lab	4	

Required Supporting Courses (47 credits)			
Course	Title	Credits	General Education Designation
MATH135 or 140	Discrete Math for Life Sciences or Calculus I	4	Fundamental Studies Math or Analytical Reasoning
MATH136 or 141	Calculus for Life Sciences or Calculus II	4	
Statistics Course	Statistics courses from Biometrics (BIOM301), Biostatistics (EPIB300), Psychology (PSYC200), Statistics (STAT400 or STAT464)	3	
BSCI170 & 171	Principles of Molecular and Cellular Biology and Lab	4	Natural Sciences Lab
BSCI160 & 161	Principles of Ecology and Evolution and Lab	4	Natural Sciences Lab
CHEM 231 & 232	Organic Chemistry I with Lab	4	
CHEM 241 & 242	Organic Chemistry II with Lab	4	
CHEM 271 & 272	General Chemistry and Energetics with General Bioanalytical Chemistry Lab	4	
PHYS 131 or 141	Fundamentals of Physics for Life Sciences I or Principles of Physics I with Lab	4	
PHYS 132 or 142	Fundamentals of Physics for Life Sciences II or Principles of Physics II with Lab	4	
PSYC100	Introduction to Psychology	3	History and Social Sciences or Natural Sciences
UNIV100 (or equivalent)	Introduction to the University	1	

Specialization Courses (16-20 credits)

- Students must complete at least five courses, including at least three courses from within one specialization and at least one lab course.
- Up to three pre-approved Neuroscience Research credits can be applied to the major.

• Four pre-approved NEUR479 credits in the same faculty research laboratory can satisfy the lab requirement					
Molecular, Cellular, and Physiological Specialization			Behavioral & Cognitive Specialization		
Course	Title	Credits	Course	Title	Credits
*NEUR379	Neuroscience Research: Molecular and Cellular	1-3	*NEUR379	Neuroscience Research: Molecular and Cellular	1-3
*NEUR479	Advanced Neuroscience Research Lab	1-4	*NEUR479	Advanced Neuroscience Research Lab	1-4
BSCI222	Principles of Genetics	4	BSCI222	Principles of Genetics	4
BSCI330	Cell Biology & Physiology	4	BSCI330	Cell Biology & Physiology	4
BSCI339D	Biology of Chemosensory Systems	3			
BSCI339F	Neurophysiology of Cells and Circuits	3			
			BSCI360	Principles of Animal Behavior	3
			BSCI401	Animal Communication	3
BSCI402	Genomics of Sensory Systems	3			
BSCI403	Biology of Vision	3			
BSCI410	Molecular Genetics	3			
BSCI415	Molecular Genetics Lab	3			
BSCI430	Developmental Biology	3			
BSCI440 & 441	Mammalian Physiology and Lab	6			
BSCI446	Neural Systems	3	BSCI446	Neural Systems	3
BSCI452	Diseases of the Nervous System	3			
BCHM463	Biochemistry of Physiology	3			
Special Topics Courses (BSCI338 or 339) when specifically approved for the major/specialization. Check with your advisor.					
KNES370	Motor Development	3			

			KNES385	Motor Control and Learning	3
KNES462	Neural Basis of Human Movement	3			
			KNES498 C	Exercise and Brain Health	3
			PHIL209N	Know Thyself: Wisdom Through Cognitive Science (General Education: History/Social Science and Humanities)	3
			PHIL366	Introduction to Philosophy of Mind	3
			PSYC302	Fundamentals of Learning and Behavior	3
			PSYC341	Introduction to Memory and Cognition	3
			PSYC402	Neural Systems and Behavior	3
			PSYC403	Animal Behavior	3
PSYC404	Introduction to Psychopharmacology	3	PSYC404	Introduction to Psychopharmacology	3
			PSYC406	Neuroethology	3
			PSYC407	Behavioral Neurobiology Laboratory	4
			PSYC413	Developmental Cognitive/Social Neuroscience	3
			PSYC414	Science of Sleep and Biological Rhythms	3
			PSYC442	Psychology of Language	3
			PSYC455	Cognitive Development	3
			PSYC489G	Hormones and Behavior	3

*NEUR courses have not yet been created and therefore do not appear in the Undergraduate Catalog.

See Appendix B for course descriptions.

General Education. Students will complete their science and mathematics general education requirements by way of fulfilling major requirements (see the table above for which courses count for general education requirement). Students will be able to complete a history and social sciences general education requirement by taking the major requirement PSYC100. Otherwise, students will have room in their schedules to fulfill the other general education requirements. *See Appendix D Curriculum Overview for how students meet major and General Education requirements.*

Accreditation or Certification Requirements. There are no specialized accreditation or certification requirements for this program.

Other Institutions or Organizations. The department will not contract with another institution or non-collegiate organization for this program.

Student Support. Students enrolled in this program will have access to all the resources necessary in order to succeed in the program and make the most of the learning opportunity. Students entering the university as either first-time college students or transfer students will learn about the program through their orientation program. Students entering the major as internal transfers will meet with an advisor in the program when they declare the major. Two full-time advisors will be dedicated to the major.

Marketing and Admissions Information. The program will be clearly and accurately described in the university website and be marketed at university recruiting events.

H. Adequacy of Articulation

Many of the supporting courses are widely available at Maryland community colleges. Once the program is approved, the faculty will explore whether the introductory NEUR200 course could be taught at any of the community colleges.

I. Adequacy of Faculty Resources

Program faculty. Faculty will be drawn from the Departments of Psychology and Biology. Many of the courses required by the program, such as the supporting courses and specialization courses, are already offered. For the new Neuroscience courses, two new tenure-track faculty members and a minimum of two new full-time professional-track faculty members will be added to teach in the program.

See faculty biographies in Appendix C for those currently expected to teach in the program.

Faculty training. The program's Undergraduate Director will prepare a brief annual report due to the colleges that sponsor the program at the end of each academic year. This comprehensive report will include a review of learning outcomes results, enrollment trends, graduating student outcomes, updates on collaborations, opportunities, and challenges for the program. The program's

Undergraduate Director will also initiate a meeting of the Undergraduate Committee with the college deans each September to present the annual report and discuss the current and future directions of the major. Opportunities to improve teaching and learning in the program will be identified through this process.

For the learning management system, faculty teaching in this program will have access to teacher development opportunities available across campus, including those offered as part of the Teaching and Learning Transformation Center. For online elements of the coursework, instructors will work with the learning design specialists on campus to incorporate best practices when teaching in the online environment.

J. Adequacy of Library Resources

The University of Maryland Libraries has conducted an assessment of library resources required for this program. The assessment concluded that the University Libraries are able to meet, with its current resources, the curricular and research needs of the program.

K. Adequacy of Physical Facilities, Infrastructure, and Instructional Resources

The program is a collaboration between two existing departments that offer two related programs: Psychology and Biological Sciences. Much of the coursework for the program already exists. Consequently, the facilities, instructional, and administrative requirements for a new program are already largely in place. UMD is anticipating additional funding through the state legislature for this program. This funding will be used for some physical space enhancements and administrative and faculty hires. The enhancements to physical facilities include the renovation of two teaching laboratories. Two additional advisors and an undergraduate director (receiving a 12-month administrative supplement and summer salary) will be hired. There will also be four additional faculty hires, along with the addition of some graduate teaching assistantships. Existing campus resources as well as the new resources from the state will be adequate for the program.

All UMD students have access to the institutional electronic mailing system. This program is not a distance education program, however, student will have access to the campus learning management system for the elements of the courses that exist online.

L. Adequacy of Financial Resources

Tables 1 and 2 contain the details of resources and expenditures. Resources for the new program will be drawn from those currently used by the sponsoring colleges on neuroscience undergraduate education, reallocated funds from campus, and new resources to the university provided through state legislation, for which neuroscience is an identified priority area. The university is not anticipating overall enrollment growth as a result of this major, but anticipates a possible shift in major selection by matriculating students, so no new tuition revenue is assumed in identifying available resources.

Expenditures directly required for the program include two additional tenure track faculty and two professional track faculty, as well as a modest increase in support and administrative staff to manage the increased load in academic advising. Several additional graduate assistants will support the neuroscience courses as well as anticipated increases in enrollments in the core courses shared with the Psychology and Biological Sciences majors.

M. Adequacy of Program Evaluation

Formal program review is carried out according to the University of Maryland's policy for Periodic Review of Academic Units, which includes a review of the academic programs offered by, and the research and administration of, the academic unit (http://www.president.umd.edu/policies/2014-i-600a.html). Program Review is also monitored following the guidelines of the campus-wide cycle of Learning Outcomes Assessment (https://www.irpa.umd.edu/Assessment/LOA.html). Faculty within the department are reviewed according to the University's Policy on Periodic Evaluation of Faculty Performance (http://www.president.umd.edu/policies/2014-ii-120a.html). Since 2005, the University has used an online course evaluation instrument that standardizes course evaluations across campus. The course evaluation has standard, university-wide questions and also allows for supplemental, specialized questions from the academic unit offering the course.

Additionally, The Undergraduate Director will be charged with preparing a brief annual report due to the sponsoring college Associate Deans at the end of each academic year. The report will include a review of learning outcomes results, enrollment trends, graduating student outcomes, updates on collaborations, opportunities, and challenges for the program. The Undergraduate Director will also initiate a meeting of the Undergraduate Committee with the sponsoring college deans each September to present the annual report and discuss the current and future directions of the major.

N. Consistency with Minority Student Achievement goals

The Psychology Department and College of Behavioral and Social Sciences (BSOS) have ongoing strategies to recruit and retain underrepresented minority students, including the BSOS Advising Minority Retention Group, the BSOS College Summer Research Initiative, and the ongoing agenda of the Psychology Department Diversity Committee that focuses on undergraduate diversity and inclusion. This existing infrastructure will be used to recruit and retain underrepresented minority students to the Neuroscience program.

The utmost attention will be paid to ensure that both faculty and staff advisor hires for the new major include individuals who represent, and have experience working with, students from diverse backgrounds.

O. Relationship to Low Productivity Programs Identified by the Commission

N/A

P. Adequacy of Distance Education Programs

N/A

Appendix A: Learning Outcomes in NEUR Major Required & Supporting Courses

		Required Courses				
Learning outcomes (black X indicates emphasis) (red X indicates major emphasis)		**Supporting courses**	**NEUR 200**	**NEUR 305**	**NEUR 306**	**NEUR 405**
		BIOL, CHEM, PHYS, MATH	**Gateway**	**Neuro fundamentals cellular**	**Neuro fundamentals systems/cognitive**	**Neurobiology lab**
Knowledge base						
	Neuroscience breadth		X	X	X	X
	Evolution	X				
	Neuroscience depth					
	Integrating knowledge		X	X	X	X
Techniques						
	Current techniques	X	X	X	X	X
	Lab experience	X				X
	Data analysis	X				X
Critical thinking						
	Evaluate literature			X	X	
	Problem solving	X				X
	Experimental design	X		X	X	X
Communication						
	Written	X				X
	Verbal	X				X
	Graphical	X				X
Cultural relationships						
	Neuroscience contributions		X	X	X	
	Cultural effects	X	X	X	X	
	Ethical practices					X
Professional development						
	Scientific community	X	X	X	X	X
	Career paths		X	X	X	X
	Personal plan					

		Concentration Courses (representative courses)																							
Learning outcomes (black X indicates emphasis) (red X indicates major emphasis)		NEUR 379 NEUR 479	BSCI 339F	PSYC 302 PSYC 341	BSCI 370	BSCI 401	PSYC 402 BSCI 453	BSCI 402 BSCI 403 BSCI 339D	PSYC 403 BSCI 360	PSYC 404	BSCI 404	PSYC 406 BSCI 446	BSCI 410 BSCI 415	PSYC 411	PSYC 413 PSYC 455 BSCI 430	PSYC 414	BSCI 426	BSCI 440 BSCI 441	BSCI 442	PSYC 489G	PSYC 489P BIOL 600	LING 440	PHIL 280 PHIL 362	Learning outcomes (black X indicates emphasis) (red X indicates major emphasis)	
		Neuroscience research	Neural circuits	Cognitive neuro	Evolution	Animal communication	Advanced neuro	Sensory neuro	Animal behavior	Neuro-pharmacology	Cellular biophysics	Neuroethology	Molecular genetics	Functional imaging	Neural development	Biological rhythms/Sleep	Membrane biophysics	Mammalian physiology	Psychology of Language	Hormones	Ethics	Language and cognition	Philosophy of neuro		
Knowledge base																									Knowledge base
	Neuroscience breadth			**X**		**X**			**X**			**X**			**X**	**X**		**X**				**X**	**X**	Neuroscience breadth	
	Evolution				**X**	X			**X**			**X**												Evolution	
	Neuroscience depth	**X**	**X**				**X**	**X**	X	**X**	**X**	X	**X**		X	**X**	**X**		**X**	**X**		X		Neuroscience depth	
	Integrating knowledge	**X**	**X**			**X**		**X**	**X**		X	**X**			**X**	**X**	X	X	**X**			**X**	**X**	Integrating knowledge	
Techniques																									Techniques
	Current techniques	**X**		X		X	X	X	X	X		X	X	**X**	X	X		**X**	X	X		X		Current techniques	
	Lab experience	**X**																**X**						Lab experience	
	Data analysis	**X**												**X**				**X**						Data analysis	
Critical thinking																									Critical thinking
	Evaluate literature	X	**X**		**X**	X		**X**		**X**	**X**	X		X	**X**	**X**	**X**		**X**	**X**		**X**	X	Evaluate literature	
	Problem solving	**X**	X					X		X		X		**X**	X	X		**X**	X	**X**		X		Problem solving	
	Experimental design	**X**	X	X				X	X	X					X	X		**X**		X				Experimental design	
Communication																									Communication
	Written	X	**X**	X	X	X	X	**X**	X	**X**	**X**	X		X	**X**	X		**X**	**X**	**X**		X	X	Written	
	Verbal	**X**	**X**			X						X			**X**	**X**		**X**	**X**			X	X	Verbal	
	Graphical	X														X		**X**	**X**					Graphical	
Cultural relationships																									Curltural relationships
	Neuroscience contributions		X	X		**X**	X	X	**X**	X		X	X	X	**X**	**X**			X	X		X	X	Neuroscience contributions	
	Cultural effects															**X**			X		**X**	**X**	X	Cultural effects	
	Ethical practices	X							**X**	X						**X**		X			**X**		X	Ethical practices	
Professional development																									Professional development
	Scientific community	X	X	X		X	X	X	X			X			X	X					**X**			Scientific community	
	Career paths	X												X				X						Career paths	
	Personal plan	X																						Personal plan	

Appendix B: Course Descriptions

Note: Neuroscience (NEUR) courses have not yet been created and therefore are not in current undergraduate catalog. They will be created once the program proposal is approved.

Neuroscience Core Courses (13 Credits)

NEUR200 Introduction to Neuroscience (3 Credits)
Explores the anatomical and physiological systems that underlie animal behavior. Provides an introduction to the field of behavioral neuroscience.

NEUR 305 Neuroscience Fundamentals I (3 Credits)
Principles of the nervous system and neural circuits.

NEUR306 Neuroscience Fundamentals II (3 Credits)
Principles of molecular and cellular neuroscience.

NEUR405 Neurobiology Lab (4 Credits)
Laboratory course exploring the principles of nervous system function, ranging from molecular and cellular basis of neuron function through nervous system integration. Experiments use living invertebrates and cold-blooded vertebrates.

Required Supporting Courses (47 Credits)

MATH135 Discrete Mathematics for Life Sciences (4 Credits)
Basic discrete mathematics, with emphasis on relevant models and techniques to the life sciences.

Or

MATH140 Calculus I (4 Credits)
Introduction to calculus, including functions, limits, continuity, derivatives and applications of the derivative, sketching of graphs of functions, definite and indefinite integrals, and calculation of area. The course is especially recommended for science, engineering and mathematics majors.

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MATH136 Calculus for Life Sciences (4 Credits)
Continuation of MATH135, including basic ideas of differential integral calculus, with emphasis on elementary techniques and applications to the life sciences.

Or

MATH141 Calculus II (4 Credits)

Continuation of MATH140, including techniques of integration, improper integrals, applications of integration (such as volumes, work, arc length, moments), inverse functions, exponential and logarithmic functions, sequences and series.

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BIOM301 Introduction to Biometrics (3 Credits)
Descriptive statistics, introduction to probability, sampling, confidence interval estimation, hypothesis testing, simple regression and correlation. Emphasis on simple applications of statistical techniques and interpretation of statistical results.

Or

EPIB315 Biostatistics for Public Health Practice (3 Credits)
An examination of biostatistical concepts and procedures as they relate to contemporary issues in public health. Focus on applications, hands-on-experience, and interpretations of statistical findings in public health research.

Or

PSYC200 Statistical Methods in Psychology (3 Credits)
A basic introduction to quantitative methods used in psychological research.

Or

STAT400 Applied Probability and Statistics I (3 Credits)
Random variables, standard distributions, moments, law of large numbers and central limit theorem. Sampling methods, estimation of parameters, testing of hypotheses.

Or

STAT464 Introduction to Biostatistics (3 Credits)
Probabilistic models. Sampling. Some applications of probability in genetics. Experimental designs. Estimation of effects of treatments. Comparative experiments. Fisher-Irwin test. Wilcoxon tests for paired comparisons.

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BSCI160 Principles of Ecology and Evolution (3 Credits)
Basic principles of biology with special emphasis on ecological and evolutionary biology.

BSCI161 Principles of Ecology and Evolution Lab (1 Credit)
Basic laboratory principles of biology with special emphasis on ecological and evolutionary biology.

BSCI170 Principles of Molecular & Cellular Biology (3 Credits)

Basic principles of biology with special emphasis on cellular and molecular biology.

BSCI171 Principles of Molecular & Cellular Biology Laboratory (1 Credit)
Basic laboratory principles of biology with special emphasis on cellular and molecular biology.

CHEM131 Chemistry I - Fundamentals of General Chemistry (3 Credits)
An overview of the Periodic Table, inorganic substances, ionic and covalent bonding, bulk properties of materials, chemical equilibrium, and quantitative chemistry. CHEM131 is the first course in a four-semester sequence for students majoring in the sciences, other than Chemistry and Biochemistry majors.

CHEM132 General Chemistry I Laboratory (1 Credit)
Introduction to the quantification of chemical substances, including the concept of the mole and chemical stoichiometry. Additional work involves the synthesis of ionic substances and their qualitative characterization.

CHEM231 Organic Chemistry I (3 Credits)
The chemistry of carbon: aliphatic compounds, aromatic compounds, stereochemistry, arenes, halides, alcohols, esters and spectroscopy.

CHEM232 Organic Chemistry Laboratory I (1 Credit)
Provides experience in developing some basic laboratory techniques, recrystallization, distillation, extraction, chromatography.

CHEM241 Organic Chemistry II (3 Credits)
A continuation of CHEM231 with emphasis on molecular structure; substitution reactions; carbonium ions; aromaticity; synthetic processes; macromolecules.

CHEM242 Organic Chemistry Laboratory II (1 Credit)
Synthetic organic chemistry through functional group manipulation, introduction to instrumentation essential to analysis and structure elucidation.

PHYS131 Fundamentals of Physics for Life Sciences I (4 Credits)
The first part of a two-semester course in general physics specifically oriented towards applications relevant for students in biology and pre-medical programs. The course covers basic mechanics including forces and energy, properties of matter, and thermodynamics done in authentic biological contexts.

Or

PHYS141 Principles of Physics (4 Credits)
The first of a two-semester series in general physics. The first semester covers the fields of mechanics, thermodynamics, and special relativity. This survey course will use calculus and is recommended for chemistry and zoology majors. It also satisfies the requirements of medical and dental schools.

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PHYS132 Fundamentals of Physics for Life Sciences II (4 Credits)
The second part of a two-semester course in general physics specifically oriented towards applications relevant for students in biology and pre-medical programs. The course covers basic statistical physics, electricity and magnetism, and optics done in authentic biological contexts.

Or

PHYS142 Principles of Physics (4 Credits)
A continuation of PHYS141 covering waves, electricity and magnetism, optics and modern physics.

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PSYC100 Introduction to Psychology (3 Credits)
A basic introductory course, intended to bring the student into contact with the major problems confronting psychology and the more important attempts at their solution.

UNIV100 The Student in the University (1 Credit)
Introduces students to University life. In a small classroom setting, students will explore how to successfully bridge the gap between high school and college. Study skills, career decision-making, and student development processes will be explored.

Specialization Courses (16-20 Credits)

BCHM463 Biochemistry of Physiology (3 Credits)
A one-semester introduction to general biochemistry. A study of protein structure, enzyme catalysis, metabolism, and metabolic regulation with respect to their relationship to physiology.

BSCI222 Principles of Genetics (4 Credits)
Principles and mechanisms of heredity and gene expression. Considers plant, animal, and microbial organisms.

BSCI330 Cell Biology and Physiology (4 Credits)
Biochemical and physiological mechanisms underlying cellular function. Properties of cells which make life possible and mechanisms by which cells provide energy, reproduce, and regulate and integrate with each other and their environment.

BSCI339 Selected Topics in Biology (1-4 Credits)
Lectures, seminars, and other selected instruction courses in various biological subject matter.
Selected topics that will count for this major: BSCI339D Biology of Chemosensory Systems (3 Credits), BSCI339F Neurophysiology of Cells and Circuits (3 Credits).

BSCI360 Principles of Animal Behavior (3 Credits)
Study of animal behavior with emphasis on its evolution and function. Topics include genetic basis of behavior, communication, aggression, foraging, cooperation, mate selection, and relevance for conservation.

BSCI401 Animal Communication (3 Credits)
Examining the mechanisms by which animal produce and receive signals in each sensory modality; and quantifying the type and amount of information conveyed in signals and how animals attend to such information.

BSCI402 Genomics of Sensory Systems (3 Credits)
An advanced course covering topics on the molecular basis of senses and the application of genomic techniques to studies of sensory systems & sensory ecology.

BSCI403 Biology of Vision (3 Credits)
An upper level undergraduate course on the physical, molecular, and neural basis of vision.

BSCI410 Molecular Genetics (3 Credits)
An advanced genetics course emphasizing the molecular basis of gene structure and function in the context of modern approaches to the genetics of humans and model organisms.

BSCI415 Molecular Genetics Laboratory (3 Credits)
Problem solving laboratory organized around extended projects that employ different approaches toward linking gene and function.

BSCI430 Developmental Biology (3 Credits)
Structural, functional and regulatory events and mechanisms that operate during development to produce an integrated, multicellular organism composed of a multitude of differentiated cell types.

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BSCI440 Mammalian Physiology (4 Credits)
A study of the cardiovascular, hemopoietic, gastrointestinal, renal and respiratory systems. Chemical and endocrine regulation of physiological functions in mammals.

And

BSCI441 Mammalian Physiology Laboratory (2 Credits)
Laboratory exercises in experimental mammalian physiology.

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BSCI446 Neural Systems (3 Credits)
Neural development, followed by sensory, motor and integrative system organization in the central nervous system.

BSCI452 Diseases of the Nervous System (3 Credits)

An advanced course covering the neuroanatomy, function, and organization of the nervous system and its implication for pathology and disease.

KNES370 Motor Development (3 Credits)
Motor development across the life span. The developmental sequences of motor skills from birth to old age; neuromaturation of neuromuscular system; analysis of the underlying mechanisms of motor skill development; and correlates of motor development.

KNES385 Motor Control and Learning (3 Credits)
Physiological and cognitive bases for motor control and their applications to the acquisition of movement skills and understanding of movement disorders. Topics include: neurophysiology, motor control theory, sensory/perceptual processes, perception-action coupling, information processing, memory, attention, individual differences, motivation, practice organization and role of feedback.

KNES462 Neural Basis of Human Movement (3 Credits)
An introduction to the neural substrates which underlie postural and volitional movement. Neuroanatomical and neurophysiological basis of motor functioning; past and present conceptualizations of motor control and coordination; movement disorders; and maturation of the neuromuscular system.

KNES498 Special Topics in Kinesiology (3 Credits)
Topics of special interest in areas not covered by regularly scheduled courses.
Selected topics that will count for this major: KNES498C Exercise and Brain Health

NEUR379 Introductory Neuroscience Undergraduate Research (1-4 Credits)
Research in neuroscience under the direction and close supervision of a member of the faculty.

NEUR479 Advanced Neuroscience Undergraduate Research (1-4 Credits)
Advanced research in neuroscience under the direction and close supervision of a member of the faculty.

PHIL209 Philosophical Issues (3 Credits)
An examination of selected philosophical issues of general interest.
Selected topics that will count for this major: PHIL209N Know Thyself: Wisdom through Cognitive Science

PHIL366 Philosophy of Mind (3 Credits)
An introduction to core issues in the philosophy of mind, focusing especially on the basic metaphysical question of dualism versus physicalism.

PSYC302 Fundamentals of Learning and Behavior (3 Credits)
Overview of the fundamental types of learning that occur without formal instruction. The course covers fundamentals of classical and instrumental conditioning as studied in a variety of species in addition to more modern theories of learning. We will then explore how these principles influence diverse processes such as memory, attention, extinction, categorization, motivation, and in some cases, how they are implemented in the brain and disrupted in disease.

PSYC341 Introduction to Memory and Cognition (3 Credits)
An introduction to the basic concepts of cognitive psychology, the scientific study of mental processes. Topics will include perception, attention, memory, reasoning, and language, with an emphasis on how findings from cognitive psychology can inform real-life thinking (e.g., memory strategies for studying, pitfalls of multitasking, and how/why our memories can fail us).

PSYC402 Neural Systems and Behavior (3 Credits)
Research on the physiological basis of behavior, including considerations of sensory phenomenon, motor coordination, emotion, drives, and the neurological basis of memory.

PSYC403 Animal Behavior (3 Credits)
Reviews the theoretical framework underlying the study of animal behavior. The genetic, hormonal and physiological basis of behavior, and the relation to ecological and evolutionary processes will be discussed using examples that range from invertebrate animals to humans.

PSYC404 Introduction to Behavioral Pharmacology (3 Credits)
Theoretical viewpoints on the interaction of drugs and behavior. Basic principles of pharmacology, the effects of drugs on various behaviors, experimental analysis of drug dependence and abuse, and neuropharmacology and behavior.

PSYC406 Neuroethology (3 Credits)
A merger between the disciplines of neuroscience and ethology (animal behavior) studies the behavioral functions of nervous systems using a comparative and evolutionary approach. Students will learn how the nervous system controls behavioral patterns in a variety of different organisms ranging from insects to mammals.

PSYC407 Behavioral Neurobiology Laboratory (4 Credits)
How does the nervous system control behavior? We will address this question using simple behavioral experiments combined, in some exercises, with microsurgery and electrode recordings in the nervous system. Concepts studied will include CNS plasticity, the role of proprioception in controlling movement, cortical processing and the myth multitasking, sensory resolution by measuring receptive field sizes, activity of simple neural circuits controlling escape from predators, and the effects of neuromodulators on aggression. Animals used are all invertebrates.

PSYC413 Developmental Cognitive/Social Neuroscience (3 Credits)
Developmental cognitive/social neuroscience is the study of how the brain underlies the acquisition, refinement, and maintenance of complex cognitive and social abilities. The goal of this course is to gain an understanding of current research, methods, and theories in developmental cognitive/social neuroscience through lecture and discussion.

PSYC414 Science of Sleep and Biological Rhythms (3 Credits)
Sleep is a powerful, inescapable, misunderstood, and mysterious presence in our lives. The course will begin with a review of the basics of sleep and biological rhythms with a focus on the underlying neurobiology. The bulk of the semester will be in-depth discussions of topics in sleep and circadian rhythms primarily chosen by

the students. A few examples: narcolepsy, sleep in primitive cultures, lucid dreaming, racial and cultural differences in sleep and sleep disorders, the biology of sleep and circadian rhythms during adolescence, CNS control of dreaming, sleep and states of consciousness, sleeping to remember vs. sleeping to forget, legal ramifications of parasomnias, e.g. sleepwalking, and the relationships between sleep deprivation and obesity.

PSYC442 Psychology of Language (3 Credits)
Introductory survey of the psychology of language, focusing on the cognitive processes that enable us to produce and understand language. Topics include speech perception, speech production, syntactic processing, language development, language disorders, and the brain bases of language.

PSYC455 Cognitive Development (3 Credits)
Theory and research on cognition from a developmental perspective. This discussion-based seminar will emphasize readings on infancy through early childhood. Topics will include general abilities such as memory and categorization, as well as children's emerging knowledge about the physical and social worlds.

PSYC489 Advanced Special Topics in Psychology (3 Credits)
Treatment of a specialized topic in psychology.
Special topic course that will count for this major: PSYC498G Hormones & Behavior.

Appendix C: Faculty

The program requirements consist of major core courses (NEUR), supporting courses, and specialization courses. Teaching assignments for the new NEUR major core courses have not been made and will depend on four additional faculty members that will be hired. The listing of current faculty below does, however, indicate the specific faculty members who are involved in the development of these new courses. This list also includes major specialization courses that are already taught as part of established programs, such as the Biological Sciences and Psychology programs. Faculty for most of the specialization courses are listed below. Supporting courses, such as MATH, CHEM, and PHYS courses, are established courses taught in the General Education program and for other science majors. Faculty are not listed for these courses.

Name (Courses/*NEUR course development*)	**Appointment**	**Degree**	**Field of Study**	**Academic Title**	**Status**
Ricardo Araneda (BSCI446, BSCI339D, *NEUR306, NEUR379 and NEUR479*)	TTK	Ph.D.	Neuromodulation and sensory physiology of the olfactory system; mechanisms underlying the processing of olfactory information in the context of behavior	Associate Professor	FT
Hilary Bierman (BSCI441, *NEUR405, NEUR379 and NEUR479*)	PTK	Ph.D.	Comparative neurobiology of the auditory and motor systems	Senior Lecturer	FT
Daniel Butts (BSCI339F, *NEUR306, NEUR379 and NEUR479*)	TTK	Ph.D.	Information processing in the visual pathway in the context of natural vision; role of time in the sensory coding relationships between observable single-neuron physiology and system-level function	Associate Professor	FT
Melissa Caras (*NEUR306, NEUR379 and NEUR479)*	TTK	Ph.D.	The neural basis of neural plasticity	Assistant Professor	FT
Catherine Carr (*NEUR306, NEUR379 and NEUR479*)	TTK	Ph.D.	Cellular mechanisms of sound localization in birds; evolution of the auditory system	Professor	FT
Patrick Kanold (*NEUR306, NEUR379 and NEUR479)*	TTK	Ph.D.	Mechanisms and circuits involved in the maturation of the cortical	Professor	FT

			circuitry, development of the visual system, cellular and molecular basis of learning		
Elizabeth Quinlan (*NEUR306, NEUR379 and NEUR479)*	TTK	Ph.D.	Development of the vertebrate visual system, cellular and molecular basis of learning and memory	Professor	FT
David Yager (PSYC407, PSYC414, *NEUR200*, *NEUR405, NEUR379 and NEUR479*)	TTK	Ph.D.	Linkage between brain function and behavior using insect auditory systems as models	Associate Professor	FT
Anna Li (BSCI330, *NEUR305, NEUR379 and NEUR479*)	TTK	Ph.D	Neural mechanisms of drug addiction	Assistant Professor	FT
Jens Herberholz (PSYC403, PSYC406, *NEUR305, NEUR379 and NEUR479*)	TTK	Ph.D.	Role of neurochemical inhibition, including the interplay between the neurocellular effects	Associate Professor	FT
Erica Glasper (PSYC402, PSYC489G, *NEUR305, NEUR379 and NEUR479*)	TTK	Ph.D.	Structural plasticity in the adult and aging brain	Assistant Professor	FT
Matthew Roesch (PSYC302, *NEUR305, NEUR379 and NEUR479*)	TTK	Ph.D.	Neural mechanisms underlying learning and decision-making	Professor	FT
Karen Carleton (BSCI402, BSCI403)	TTK	Ph.D.	Evolution of visual systems and visual communication.	Professor	FT
Thomas Kocher (BSCI222)	TTK	Ph.D.	Molecular evolution, population genetics.	Professor	FT
Ibrahim Ades (BSCI330)	TTK	Ph.D.	Cell physiology. Biochemical mechanisms.	Associate Professor	FT
Steve Mount (BSCI410)	TTK	Ph.D.	Molecular Genetics.	Associate Professor	FT
David Straney (BSCI415)	TTK	Ph.D.	Genetics.	Associate Professor	FT
Gerald Borgia (BSCI360)	TTK	Ph.D.	Evolution. Neuroscience.	Professor	FT

Gerald Wilkinson (BSCI401)	TTK	Ph.D.	Evolution. Genetics.	Professor	FT
William Jeffery (BSCI430)	TTK	Ph.D.	Evolution of development.	Professor	FT
Colenso Speer (BSCI440)	TTK	Ph.D.	Molecular Genetics. Neural networks.	Assistant Professor	FT
Quentin Gaudry (BSCI452)	TTK	Ph.D.	Neuroscience. Genetics	Assistant Professor	FT
Bonnie Dixon (BCHM463)	PTK	Ph.D.	Learning environments.	Senior Lecturer	FT
Jonathan Beier (PSYC455)	TTK	Ph.D.	Social cognitive development. Prosocial behavior.	Assistant Professor	FT

Appendix D: Bachelor of Science in Neuroscience (120 Credits) Curriculum Overview

Category	Credits	Code
Major Requirements: 76-80 Credits		
Major Core Courses	13	MC
Major Supporting Courses[1]	47	MSU
Major Specialization Courses	16-20	MSP
[1] Courses may be used to fulfill General Education requirements (see below).		
General Education Requirements: 40 Credits Minimum		
Fundamental Studies: 15 Credits		
Fundamental Studies Academic Writing	3	FSAW
Fundamental Studies Professional Writing	3	FSPW
Fundamental Studies Oral Communication	3	FSOC
Fundamental Studies Mathematics	3	FSMA
Fundamental Studies Analytic Reasoning[2]	3	FSAR
[2] If a student passes an Analytic Reasoning course that requires a Fundamental Studies Math course as a prerequisite, then the Fundamental Studies Math course is considered to be fulfilled (e.g., students who place into and pass a calculus course, which counts for FSAR, do not need to take a less advanced Math course to fulfill the FSMA requirement).		
Distributive Studies: 25 Credits		
Distributive Studies Natural Sciences	3	DSNS
Distributive Studies Natural Science Lab Course[3]	4	DSNL
Distributive Studies History and Social Sciences	6	DSHS
Distributive Studies Humanities	6	DSHU
Distributive Studies Scholarship in Practice[4]	6	DSSP
[3] A second DSNL course can fulfill the DSNS course requirement.		
[4] Students learn and practice skills of critical evaluation and participate in the process of applying knowledge in the pursuit of a tangible goal. At least one course must be outside of the major.		
I-Series Courses: 6 Credits [5]		
The signature courses of the UMD General Education program, I-Series courses investigate a significant issue in depth and demonstrate how particular disciplines and fields of study address problems.		
I-Series Course	6	SCIS
[5] I-Series credits may be double-counted with courses taken for the Distributive Studies requirement.		
Diversity: 4-6 Credits[6]		
Diversity Understanding Plural Societies[7] Courses examine how diverse cultural and ethnic groups co-exist.	3-6	DVUP
Diversity Cultural Competence Courses help students develop skills to succeed in a diverse world.	0-3	DVCC
[6] These credits may be double-counted with courses taken for the Distributive Studies requirement.		
[7] Students may take either two DVUP courses or one DVUP course and one DVCC course.		

Bachelor of Science in Neuroscience Four-Year Plan

Course	Credits	Requirement Code		Course	Credits	Requirement Code
First Semester				**Second Semester**		
MATH135 or 140	4	MSU; FSAR&FSMA		MATH136 or 141	4	MSU
BSCI160 & 161	4	MSU; DSNL		BSCI170 & 171	4	MSU
CHEM131 & 132	4	MSU; DSNL		CHEM231 & 232	4	MSU
ENGL101	3	FSAW		PSYC100	3	MSU; DSHS
UNIV100	1	MSU				
Total	16			Total	15	
Third Semester				**Fourth Semester**		
NEUR200	3	MC		NEUR305	3	MC
CHEM241 & 242	4	MSU		CHEM271 & 272	4	MSU
Gen. Ed. Course	3	FSOC		Statistics	3	MSU
Gen. Ed. Course	3	DSHU		Gen. Ed. Course	3	DSHS
				Gen. Ed. Course	3	DSHU
Total	13			Total	16	
Fifth Semester				**Sixth Semester**		
NEUR306	3	MC		Specialization Crs.	4	MSP
PHYS131	4	MSU		ENGL39X	3	FSPW
Specialization Crs.	3	MSP		PHYS132	4	MSU
Gen. Ed. Course	3	SCIS		Gen. Ed. Course	3	DVUP
Elective	3					
Total	16			Total	14	
Seventh Semester				**Eighth Semester**		
Specialization Crs.	4	MSP		Specialization Crs.	3	MSP
NEUR405	4	MC		Specialization Crs.	3	MSP
Gen. Ed. Course	3	DSSP		Gen. Ed. Course	3	DVUP/DVCC
Gen. Ed. Course	3-4	SCIS		Gen. Ed. Course	3	DSSP
Elective	1			Elective	3	
Total	15			Total	15	

Notes:
19 credits of General Education requirements are fulfilled by major requirements (MATH135/140, BSCI160 & 161, CHEM131 & 132, and PSYC100).
General Education I-Series (SCIS) and Diversity (DVUP and DVCC) courses can overlap with General Education Distributive Studies courses (DSNS, DSNL, DSHS, DSHA) to further reduce number of courses taken for the purpose of fulfilling General Education requirements.
Other than major and General Education requirements, students will take Elective courses to meet the 120 credit degree requirement.

Table 1: Resources

Resources Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1.Reallocated Funds	$1,160,296	$1,691,099	$1,639,603	$2,107,854	$2,160,871
2. Tuition/Fee Revenue (c+g below)	$0	$0	$0	$0	$0
a. #FT Students	150	350	500	500	500
b. Annual Tuition/Fee Rate	$13,122	$13,516	$13,922	$14,339	$14,769
c. Annual FT Revenue (a x b)	$0	$0	$0	$0	$0
d. # PT Students	5	10	20	20	20
e. Credit Hour Rate	$450	$463	$477	$492	$506
f. Annual Credit Hours	16	16	16	16	16
g. Total Part Time Revenue (d x e x f)	$0	$0	$0	$0	$0
3. Grants, Contracts, & Other External Sources	$0	$0	$0	$0	$0
4. Other Sources	$0	$0	$0	$0	$0
TOTAL (Add 1 - 4)	**$1,160,296**	**$1,691,099**	**$1,639,603**	**$2,107,854**	**$2,160,871**

The university is not anticipating overall enrollment growth as a result of this major (moreso a shift in major selection by matriculating students), so no new tuition revenue is assumed in identifying resources. Reallocated resources will come from redirection of tuition revenue at the campus level, redirection of instructional resources from the collaborating departments, from enhancement funding, and from other reallocated resources within the university.

Table 2: Estimated expenditures

Expenditure Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1. TTK Faculty (b+c below)	$399,000	$410,970	$634,949	$871,996	$898,156
a. #FTE	2.0	2.0	3.0	4.0	4.0
b. Total Salary	$300,000	$309,000	$477,405	$655,636	$675,305
c. Total Benefits	$99,000	$101,970	$157,544	$216,360	$222,851
1. PTK Faculty (b+c below)	$266,000	$273,980	$282,199	$290,665	$299,385
a. #FTE	2.0	2.0	2.0	2.0	2.0
b. Total Salary	$200,000	$206,000	$212,180	$218,545	$225,102
c. Total Benefits	$66,000	$67,980	$70,019	$72,120	$74,284
1. Graduate Teaching Assistants (b+c below)	$95,760	$98,633	$203,184	$313,919	$323,336
a. #FTE	4.0	4.0	8.0	12.0	12.0
b. Total Salary	$72,000	$74,160	$152,770	$236,029	$243,110
c. Total Benefits	$23,760	$24,473	$50,414	$77,890	$80,226
2. Admin. Staff (b+c below)	$232,750	$239,733	$246,924	$254,332	$261,962
a. #FTE	2.5	2.5	2.5	2.5	2.5
b. Total Salary	$175,000	$180,250	$185,658	$191,227	$196,964
c. Total Benefits	$57,750	$59,483	$61,267	$63,105	$64,998
3. Total Support Staff (b+c below)	$33,250	$34,248	$35,275	$36,333	$37,423
a. #FTE	0.5	0.5	0.5	0.5	0.5
b. Total Salary	$25,000	$25,750	$26,523	$27,318	$28,138
c. Total Benefits	$8,250	$8,498	$8,752	$9,015	$9,285
4. Equipment	$25,000	$25,000	$25,000	$25,000	$25,000
5. Library	$5,000	$5,000	$5,000	$5,000	$5,000
6. New or Renovated Space	$0	$500,000	$0	$0	$0
7. Other Expenses: Operational Expenses	$103,536	$103,536	$207,072	$310,608	$310,608
TOTAL (Add 1 - 7)	**$1,160,296**	**$1,691,099**	**$1,639,603**	**$2,107,854**	**$2,160,871**