

Brothers, Sheila C

From: Schroeder, Margaret <m.mohr@uky.edu>
Sent: Monday, April 13, 2015 3:17 PM
To: Brothers, Sheila C; Hippisley, Andrew R
Subject: BS in Neuroscience

Proposed New BS: Neuroscience

This is a recommendation that the University Senate approve, for submission to the Board of Trustees, the establishment of a new BS degree: Neuroscience, in the Department of Biology within the College of Arts & Sciences.

There is not an updated/revised proposal.

Best-

Margaret

Margaret J. Mohr-Schroeder, PhD | Associate Professor of Mathematics Education | [STEM PLUS Program Co-Chair](#)
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UK
UNIVERSITY OF
KENTUCKY

College of Arts and Sciences

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MAR 31 2015 Rev

OFFICE OF THE
SENATE COUNCIL

January 26, 2013

Dear Undergraduate Council:

I am pleased to express the College's strongest support of the proposed BS degree in Neuroscience. The College of Arts and Sciences is excited for the opportunity to partner with the College of Medicine and offer this new degree that will give University of Kentucky students a chance to engage in the multidisciplinary topics of Anatomy and Neurobiology, Biology, and Psychology. The enclosed proposal has been carefully vetted by the College's Educational Policy Committee in close consultation with the Dean's office.

The proposed degree program in Neuroscience will be unique within the College of Arts and Sciences for the diverse and multidisciplinary nature of course offerings and collaborating faculty across colleges. The College of Arts & Sciences is well equipped to provide core courses for this major with a variety of faculty members contributing from both the Department of Psychology and the Department and Biology. In addition, students will be able to take advantage of relevant coursework in Neuroscience within four other Colleges. This proposed degree program is one of the first Bachelor's degree programs in Neuroscience in the state of Kentucky.

Nearly three quarters of our University benchmark institutions offer a major in Neuroscience. As an academic and scientific discipline, neurosciences clearly represent a topic of growing interest and importance, one that will attract a significant number of undergraduate students. Students in this program will develop critical thinking, communication, and independent study skills with broad, multidisciplinary training in basic and applied scientific aspects of Neuroscience. Students will also have the opportunity to receive extensive training in applied aspects of Neuroscience including such topics as, central nervous system injury, drug addiction, aging, and delivery of therapeutic agents using nanotechnologies.

The College of Arts and Sciences fully supports this proposed major and is excited to partner with the College of Medicine.

Sincerely,



Mark Lawrence Kornbluh
Dean

PROPOSAL FOR NEW UNDERGRADUATE DEGREE PROGRAM

1. This form has two sections. Section A contains information required by the University Senate and Registrar's office and Section B contains information required by two external entities, the CPE (Council on Postsecondary Education) and SACS-COC (Southern Association of Colleges and Schools Commission on Colleges). Although only Section A is required for University Senate approval, every question must be answered to receive CPE approval. Please write "not applicable" wherever that is the appropriate response, leaving no area blank.

2. The CPE requires that a pre-proposal be submitted after a proposed program has achieved approval at the college level. Answers to questions identified with a * by the question number on this form should be used for the CPE's pre-proposal. Such questions are in both Section A and Section B. More information about the CPE's pre-proposal process can be obtained by emailing institutionaleffectiveness@uky.edu.

3. Once approved at the college level, your college will send the proposal to the appropriate Senate academic council (HCCC and/or UC) for review and approval. Once approved at the academic council level, the academic council will send your proposal to the Senate Council office for additional review via a committee and then to the Senate for approval. Once approved by the Senate, the Senate Council office will send the proposal to the appropriate entities for it to be placed on an agenda for the Board of Trustees. The contact person listed on the form will be informed when the proposal has been sent to committee and other times as appropriate.

SECTION A – INFORMATION REQUIRED BY UNIVERSITY SENATE

1. Basic Information: Program Background and Overview

1a	Date of contact with the Director of Institutional Effectiveness (IE): (institutionaleffectiveness@uky.edu)	10-28-14
1b	Home College: <i>Arts And Sciences</i>	
1c	Home Educational Unit (school, department, college ¹): <i>Biology</i>	
1d*	Degree Type (BA, BS, etc.): <i>BS</i>	
1e*	Program Name (Interior Design, Social Work, etc.): <i>Neuroscience</i>	
1f*	CIP Code (provided by <u>Undergraduate Council</u> chair or Institutional Effectiveness): <i>26.1501</i>	
1g	Is there a specialized accrediting agency related to this program?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
	If "Yes," name:	
1h*	Requested effective date:	<input checked="" type="checkbox"/> Semester after approval. OR <input type="checkbox"/> Specific Date ² : _____
1i	Anticipated date for granting first degree(s): <i>Spring, 2017</i>	
1j*	Individual responsible for submission of, completion of, and answering questions about the proposal ("contact person"):	
	Name: <i>Mark Prendergast</i>	Email: <i>prender@uky.edu</i> Phone: <i>257-6120</i>

2. Program Overview

¹ Only interdisciplinary undergraduate degrees may be homed at the college level.

² Programs are typically made effective for the semester following approval. No program will be made effective unless all approvals, up through and including Board of Trustees and CPE approval, are received.

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2a*	<p>Provide a brief description of the proposed program. (300 word limit)</p> <p><i>The Bachelor of Science degree program in Neuroscience will provide undergraduate students with an opportunity to engage in the in-depth study of Neuroscience from a uniquely interdisciplinary perspective. Students will receive extensive exposure to fundamental and applied aspects of Neuroscience through classroom and laboratory-based interactions with faculty members and research staff from several departments housed in the Colleges of Arts and Sciences and Medicine, including Biology, Anatomy and Neurobiology, and Psychology. The scope of this training spans the entirety of key topics in Neuroscience and includes examination of biological systems ranging from cellular/molecular neuroscience; neurophysiology; neuroanatomy; and integrated neuroscience including behavior. Classroom-obtained Neuroscience principles will be applied in a required six credit independent research project to be conducted using state of the art technological and methodological scientific approaches in the research laboratory of a faculty member of the University. In employing this multidisciplinary, applied approach to the study of Neuroscience, this curriculum will promote development of critical thinking, communication, and independent scientific skills necessary for students to pursue lifestyles and careers in Neuroscience that are economically viable, socially desirable and of significant National and local interest.</i></p>
2b*	<p>(similar to 11a) List the program objectives. These objectives should deal with how students will benefit from the program, both tangibly and intangibly. Give evidence that they will benefit. (300 word limit)</p> <p><i>It is expected that this program will attract students specifically interested in a career in neuroscience at the research, education, health care or public policy levels. The objective of our program is to provide students with the interdisciplinary knowledge and technical skills in neuroscience needed for employment in these areas.</i></p> <p><i>Since understanding normal brain and nervous system functions and overcoming/treating their dysfunction is of growing concern to our society, many careers in neuroscience are experiencing sustained growth. To cite just a few of the many examples, the American Psychological Association has recently drawn attention to the critical shortage of both civilian and military mental health professionals needed to treat such diverse problems as post-traumatic stress syndrome and traumatic brain injury. Opportunities in regenerative medicine are increasing exponentially and currently run the gamut from research to clinical application to marketing of therapies that impact both peripheral and central nervous system repair. Finally, artificial intelligence and robotics are predicted to permeate wide segments of daily life by 2025 and advancements in both fields have benefited immensely from a neuroscience perspective.</i></p> <p><i>While all students in this major may not decide to pursue careers specifically in neuroscience after their graduation from this program, this field impinges upon many scientific, educational and public health career choices. Thus, the training and knowledge that they obtain in our program will be broadly beneficial to them. Critical thinking and development of problem solving skills is also emphasized in the program and will be an intangible benefit to our students no matter their career choice.</i></p>
2c*	<p>List the student learning outcomes (SLOs) for the proposed program and include the SLO for the Graduation Composition and Communication Requirement (GCCR). (300 word limit) (More detailed information will be addressed in a subsequent question.)</p> <p><i>Students completing the Neuroscience Major will:</i></p> <ul style="list-style-type: none"> • <i>Acquire and integrate knowledge regarding the structure and function of the nervous system at various levels including anatomical, behavioral, physiological, cellular, biochemical and molecular.</i> • <i>Describe and identify methods and tools used in neuroscience research and identify the power and limitations of various approaches and methodologies</i> • <i>Investigate challenging research questions and develop critical thinking skills.</i> • <i>Formulate hypotheses, design experiments to test the hypotheses, analyze data, interpret results, and critically evaluate the existing literature.</i> • <i>Effectively communicate results of scientific experiments in both written research papers/reports and oral presentations</i> • <i>Identify the ethical and professional standards and regulations which govern neuroscience investigations using cells, animals, and humans.</i>

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2d	Describe the rationale and motivation for the program. Give reference to national context, including equivalents in benchmark institutions. (150 word limit)
	<p><i>The University is home to more than twenty academic units demonstrating commitment to the study of Neuroscience. Despite the widespread presence of undergraduate students in laboratories conducting research in Neuroscience across campus and the enrollment of nearly seventy students in the Neuroscience minor program, no cohesive undergraduate training program in Neuroscience exists at the University. In contrast, eight of the eleven University benchmark institutions offer a major in Neuroscience. Further, in 2013 the Federal government proposed the collaborative research program termed the "Brain Initiative", which aims to map the function of every nerve cell in the human brain. Projections suggest that this initiative should provide as much as \$300 million per year in research support over the next ten years. Thus, Neuroscience as an academic and scientific discipline clearly represents a topic of burgeoning interest and importance and one that will clearly attract a significant number of undergraduate students.</i></p>
2e	Describe the proposed program's uniqueness within UK. (250 word limit)
	<p><i>The proposed degree program in Neuroscience will be highly unique given the diverse and multidisciplinary nature of course offerings, collaborating faculty and faculty of record. The many departments offering relevant coursework in Neuroscience span five Colleges, including Arts and Sciences, Medicine, Agriculture, and Engineering. The proposed degree program is the first Bachelors degree program to unify these diverse approaches to the study of Neuroscience into a single curriculum. Students in this program will develop critical thinking, communication, and independent study skills with broad, multidisciplinary training in basic and applied scientific aspects of Neuroscience. Students will also have the opportunity to receive extensive training in applied aspects of Neuroscience including such topics as, central nervous system injury, drug addiction, aging, and delivery of therapeutic agent using nanotechnologies. This training in applied aspects of Neuroscience will be achieved by completion of a required six credit independent research project completed in the laboratory of a faculty member working in the field of Neuroscience.</i></p>
2f	Describe the target audience. (150 word limit)
	<p><i>The undergraduate neuroscience degree program will educate students planning on graduate studies in neuroscience and related subdisciplines; students who plan to pursue a professional degree in a health related field such as clinical psychology, medicine, pharmacy, public health, physical therapy, and veterinary medicine; students interested in employment in academia and industry; and students who plan to enter related fields including scientific and medical publishing, science advocacy and government relations, and non-profit or professional organizations.</i></p>
2g*	Does the program allow for any tracks (a.k.a. options)? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
	If "Yes," name the track(s). (Specific course requirements will be described in a subsequent section.)
	Track #1:
	Track #2:
	Track #3:
	Track #4:
	Track #5:
	Track #6:

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2h	Does the program <u>require</u> a minor?	Yes ³ <input type="checkbox"/>	No <input checked="" type="checkbox"/>
	If "Yes," what is the name of the minor?		
2i	Are necessary resources available for the proposed new program?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
	<i>(A more detailed answer is requested in Section A, part 4.)</i>		
2j	Describe how the proposed program will be administered, including admissions, student advising, retention, etc. <i>(150 word limit)</i>		
	<i>The College of Arts and Sciences does not have selective admissions. Students will be admitted into the major upon declaring Neuroscience as their major. Freshman and sophomore students will be advised by a professional advisor in Arts and Sciences. Junior and senior students will be advised by faculty of record, who will receive training by the program directors, and through faculty advising workshops provided by the College of Arts and Sciences.</i>		
2k	Are multiple units/programs collaborating to offer this program?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
	If "Yes," please discuss the resource contribution(s) from each participating unit/program. <i>(150 word limit)</i> <i>(Letters of support will be addressed in subsequent sections.)</i>		
	<i>The Neuroscience Major reflects a multidisciplinary collaboration among several departments and colleges. Discussions for an interdisciplinary Neuroscience major have been taking place for several years among sub-groups of neuroscientists on campus. Dr. Vinnie Cassone (BIO) facilitated efforts to bring all of the neuroscientists interested in working towards this objective together. The new major is to be housed in Biology and has been designed with the input of the chairs and faculty from Anatomy and Neurobiology, Biology, Chemistry, and Psychology, as well as Physics, Biomedical Engineering, and the Director for Undergraduate Studies in Biology. The chairs of each of the above departments have agreed to offer the pre-major and major coursework required, including the faculty effort to teach the courses. The curriculum was designed by Drs. Debski (BIO), Geddes (ANA), and Prendergast (PSY), who were appointed Co-Directors of the program by the Dean of A&S.</i>		
2l	List all UK programs ⁴ which the proposed program could be perceived as replicating. Give a rationale for why this is not duplication, or is a necessary duplication. <i>(250 word limit)</i>		
	<i>This proposal represents the collaboration of several Colleges and Departments that offer a single or small number of courses that are relevant to Neuroscience. Presently, no cohesive degree program integrating these courses exists.</i>		
2m	The faculty of record is the faculty body responsible for ALL aspects of the program, including courses, credit hours, rigor, changes to the program, etc. Please identify the program's <i>faculty of record</i> by choosing ONE of the four scenarios below. For more information on each faculty of record scenario, visit http://www.uky.edu/Faculty/Senate/Forms/UndegDegPgm_Help.html .		
	<input type="checkbox"/>	Scenario 1	
			OR
	<input type="checkbox"/>	Scenario 2	
			OR

³ If "Yes," in conjunction with the submission of this form to the home unit, you must also fill out the form for a new minor and submit it to the home unit.

⁴ You must include a letter of support from any other program's home unit. Please convert the letter to a PDF and append to the end of this form.

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<input type="checkbox"/>	Scenario 3		
OR			
<input checked="" type="checkbox"/>	Scenario 4		
If Scenarios 2, 3, or 4 are chosen, please provide describe/list/name the members of the faculty of record and describe the voting rights of members of the faculty of record. Include the process and standards for identifying the program director, as well as adding and deleting members of the faculty of record. (150 word limit)			
<p><i>The faculty of record are all faculty teaching a regularly scheduled neuroscience course in the program (i.e. neuroscience electives or the required neuroscience lab). Faculty hold primary appointments in several different departments and colleges (see appended list). They will have equal voting rights and control over changes and/or additions to the major curriculum. Neuroscience course additions to the curriculum will automatically admit the instructors of those courses to the faculty of record with full voting privileges. Failure to teach any neuroscience course in a three year period will result in the forfeiture of voting rights for a faculty of record member. The Director of the Program will be appointed by the Dean of Arts & Sciences after consultation with the program's advisory boards. Currently, Drs. Mark Prendergast (Dept. of Psychology), Elizabeth Debski (Dept. of Biology) and Jim Geddes (Dept. of Anatomy and Neurobiology) serve as co-directors of the program. They were appointed to 3 year terms in July, 2014.</i></p>			
2n	Will the program have an advisory board ⁵ ?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
If "Yes," please describe the standards by which the faculty of record will select members of the advisory board, the duration of service on the board, and criteria for removal. (150 word limit)			
<p><i>The advisory board will be elected for three year terms by the faculty of record from a slate of candidates nominated by that faculty. Removal from this board will occur only if the elected member resigns their seat or fails to regularly attend/participate in board meetings. In these cases, an election will be held to fill the vacated board seat. The board will provide non-binding, informed input to the Directors on issues related to assessment, course formatting, development of new courses and evaluation of teaching faculty.</i></p>			
If "Yes," please list below the number of each type of individual (as applicable) who will be involved in the advisory board.			
2	Faculty within the college who are within the home educational unit.		
2	Faculty within the college who are outside the home educational unit.		
2	Faculty outside the college who are within the University.		
2	Faculty outside the college and outside the University who are within the United States.		
	Faculty outside the college and outside the University who are outside the United States.		
2	Students who are currently in the program.		
	Students who recently graduated from the program.		
	Members of industry.		
	Community volunteers.		
	Other. Please explain:		
10	Total Number of Advisory Board Members		
3. Delivery Mode		UK DLP and eLearning Office ⁶	
3a*	Initially, will any portion of the proposed program's core courses be offered via	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>

⁵ An advisory board includes both faculty and non-faculty who are expected to advise the faculty of record on matters related to the program, e.g. national trends and industry expectations of graduates.

⁶ For questions about alternative delivery modes, please contact UK's Distance Learning Programs and e-Learning office (URL above).

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	distance learning ⁷ ?		
	If "Yes," please indicate below the percentage of core courses that will be offered via distance learning.		
(check one)	1% - 24% <input type="checkbox"/>	25% - 49% <input type="checkbox"/>	50% - 74% <input type="checkbox"/> 75 - 99% <input type="checkbox"/> 100% <input type="checkbox"/>
	NOTE: Programs in which 25% or more of the program will be offered via distance learning may need to submit a <u>substantive change prospectus</u> to SACS. Please contact institutionaleffectiveness@uky.edu for assistance. <i>The prospectus is required by SACS, but it is NOT required for Senate review.</i>		
3b*	If <i>any</i> percentage of the program will be offered via the alternative learning formats below, check all that apply, below.		
	<input type="checkbox"/>	Distance learning.	
	<input type="checkbox"/>	Courses that combine various modes of interaction, such as face-to-face, videoconferencing, audio-conferencing, mail, telephone, fax, email, interactive television, or World Wide Web.	
	<input type="checkbox"/>	Technology-enhanced instruction.	
	<input type="checkbox"/>	Evening/weekend/early morning classes.	
	<input type="checkbox"/>	Accelerated courses.	
	<input type="checkbox"/>	Instruction at nontraditional locations, such as employer worksite.	
	<input type="checkbox"/>	Courses with multiple entry, exit, and reentry points.	
	<input type="checkbox"/>	Modularized courses.	
3c	Give pedagogical rationale for the use of alternative delivery modes in the proposed program. Consider the aspects below and elaborate as appropriate. (200 word limit)		
	<ul style="list-style-type: none"> • Synchronous and asynchronous components. • Balance between traditional and non-traditional aspects. • Hybrid elements. 		
4. UK Resources			
4a*	Will the program's home educational unit require new or additional faculty?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
	If "Yes," provide a plan to ensure that appropriate faculty resources are available, either within UK or externally, to support the program. Note whether the new and additional faculty will be part-time or full-time faculty. If "No," explain why. (150 word limit)		
	<i>The Biology courses required for the program are currently being offered and taught by faculty of record. In addition, the department of Biology is presently searching for a new, tenure-track neuroscientist faculty member. This individual will likely contribute to teaching coursework for the new major.</i>		
	If "Yes," when will the faculty be appointed? (150 word limit)		
4b	Will the program's home educational unit require additional non-faculty resources, e.g. classroom space, lab space, or equipment?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
	If "Yes," provide a brief summary of additional non-faculty resources that will be needed to implement this program over the next five (5) years. If "No," explain why. (150 word limit)		
	<i>The new degree program in Neuroscience proposes the development of a new lecture and laboratory-based course entitled "BIO 305 Introduction to Neuroscience Techniques". The Dean of the College of Arts and Sciences has committed significant, dedicated laboratory space, an annual laboratory consummables budget, and extensive capital equipment to support this course. All other courses in the curriculum will be readily scheduled in the University's existing classroom infrastructure.</i>		

⁷ Per the Southern Association of Colleges and Schools Commission on Colleges (SACS) definition of distance education, distance education is a formal educational process in which the majority of the instruction (interaction between students and instructors and among students) in a course occurs when students and instructors are not in the same place. Instruction may be synchronous or asynchronous.

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4c	Will the program include courses from another educational unit(s)?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
If "Yes," list the courses and identify the other educational units and subunits that have approved the inclusion of their courses. (150 word limit)			
<p><i>ANA 309, ANA 442G, ANA 417G, ANA 410G, ANA516, BCH 401G, BME 579, CGS 500, CSD 571, CHE 105, CHE 111, CHE 107, CHE 113, CHE230, CHE 231, CHE 232, CHE 233, CHE 550, CHE 552, CHE 556, PHY 211, PHY 213, PHY 231/241, PHY 232/242, PSY 312, PSY 456. The departments of Chemistry, Biochemistry, Anatomy and Neurobiology, Biomedical Engineering, Physics, and Psychology have been consulted and formally approved inclusion of these courses in the curriculum in the emails included as appendices to this proposal. Additionally, the programs in Cognitive Science and Communication Sciences and Disorders have also been consulted and provide letters of approval for inclusion of their courses in this proposal as appendices.</i></p>			
<p>If "Yes," append to the end of this form a letter of support from the appropriate educational unit chair/director from whose unit individual courses will be used. A letter must include the following:</p> <ul style="list-style-type: none"> • Demonstration of true collaboration between multiple units⁸; • Impact on the course's use on the home educational unit; and • Verification that the chair/director has consent from the faculty members of the unit. 			

⁸ Show evidence of detailed collaborative consultation with such units early in the process.

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ion 19) Fill out the faculty roster below for full-time and part-time faculty teaching major core courses in the proposed

FACULTY CIP CODE⁹ List the applicable CIP Code for the faculty member.	MAJOR CORE COURSES IN THE PROGRAM List the major core courses in the program that the faculty member will teach.	OTHER QUALIFICATIONS If applicable, list any other qualifications and comment on how they pertain to the courses in the program the faculty member will teach. If not applicable, mark with "n/a."
5.0101	BIO 302, BIO 305, BIO 394, BIO 426	NA
5.0101	BIO 302, BIO 394, BIO 426	NA
5.0901	BIO 394, BIO 426	NA
5.0101	BIO 394	NA
5.0204	BIO 315	NA
2.2706	PSY 393, BIO 305	NA
	BIO 305	NA
	BIO 302, BIO 394	NA
5.0202	BIO 302, BIO 305, ANA 394	NA
5.0101	ANA 394	NA
2.0501	CHE 231, CHE 232	NA
2.0501	CHE 230, CHE 232	NA
2.0501	CHE 232	NA
2.0501	CHE 230, CHE 232	NA
2.0506	CHE 550, CHE 552	NA
	please see Appendix 4d for additional roster members	

⁹ faculty affairs for specific assistance with Classification of Instructional Programs codes (CIP codes).

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5. Assessment – Program Assessment and Student Learning Outcomes (SLOs)

5a	Referring to program objectives, student benefits, and the target audience (questions 2b and 2f), explain how the <i>program</i> will be assessed, which is different from assessing student learning outcomes. Include how the faculty of record will determine whether the program is a success or a failure. List the benchmarks, the assessment tools, and the plan of action if the program does not meet its objectives. (250 word limit)
	<i>The Directors of the new program will employ an annual program assessment to collect information regarding rates of completed (earned) credits and "time-to-degree" for the student body as a unit. A benchmark goal for mean completed (earned) credits of 67% across the major will be referenced to reflect successful academic progress of the student body and competence of the curriculum. In addition, a benchmark for "time-to-degree" of no more than 150% of required credits will be referenced as an indicator of sufficient programmatic structure. For example, the proposed program will require 120 credit hours. Thus, a benchmark reference for adequate programmatic structure will be reflected as a mean "time-to-degree" of 180 credit hours, for the student body as a unit. This standard is similar to that required by Federal regulations for full-time students to receive financial aid, and is a common reference point for programmatic assessment. Failure to meet these benchmarks will initiate a review of the curriculum, by the faculty of record as a whole, to identify specific courses or programmatic experiences (eg. advising) that may be hindering progress of the student body. A plan of remediation will be generated by the Directors following drafting and a review by all faculty of record.</i>
5b	(related to 2c and 14.c) Based on the SLOs from question 2c, append a PDF of the program’s course map ¹⁰ to the end of this form. (Click HERE for a sample curricular map.)
5c	Append an assessment plan ¹¹ for the SLOs to the end of this form. (Click HERE for a sample assessment plan.)

6. Miscellaneous

6a	Is there anything else about the proposed program that should be mentioned? (150 word limit)
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7. Specific Course Requirements. [S, R]

UK Core Requirements			
		Course Prefix and Number	Number of Credit Hours
7a	I. Intellectual Inquiry (one course in each area)		
	Arts and Creativity	<i>from list</i>	3
	Humanities	<i>from list</i>	3
	Social Sciences	<i>PSY 100 or equivalent transfer</i>	3
	Natural/Physical/Mathematical	<i>CHE 105 and CHE 111</i>	5

¹⁰ Course mapping (or “curricular mapping”) is a representation of how faculty intend to approach and assess each of the student learning outcomes identified for the courses for the degree program, with an emphasis on courses required for all degree candidates. It is a master chart that indicates which objectives are being met, to what extent, and how often. This identifies whether an objective is “introduced,” “developed,” and/or “mastered” within a given course; it may be helpful also to chart any classroom-based assessment measures used to demonstrate that claim.

¹¹ An assessment plan is typically a tabular grid that illustrates the artifacts, rubrics, assessment team, and periods of assessment for the SLOs.

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7b	II. Composition and Communication		
	Composition and Communication I	CIS or WRD 110	3
	Composition and Communication II	CIS or WRD 110	3
7c	III. Quantitative Reasoning (one course in each area)		
	Quantitative Foundations	MA 137 or MA 113	4
	Statistical Inferential Reasoning	STA 296 or PSY 215/216	3 or 8
7d	IV. Citizenship (one course in each area)		
	Community, Culture and Citizenship in the USA	from list	3
	Global Dynamics	from list	3
7e	Total UK Core Hours:		33
7f	Graduation Composition and Communication Requirement (GCCR)		
7f.i	How will the GCCR be delivered in the proposed program? For each box checked, list the prefix and number for the relevant course(s), including any cross-listing(s).		
	<input type="checkbox"/> Single course within the program's home unit.		
	<input type="checkbox"/> Multiple courses within the program's home unit.		
	<input checked="" type="checkbox"/> Single course from outside ¹² the program's home unit.		WRD 204
	<input type="checkbox"/> Multiple courses from outside ¹¹ the program's home unit.		
	<input type="checkbox"/> Combination of course(s) from inside and outside ¹¹ the program's home unit.		
7f.ii	Course	Prefix & Number	Course Status ¹³
	Course #1	WRD 204	Existing
	Course #2 (<input type="checkbox"/> Not applicable.)		Select one....
	Course #3 (<input type="checkbox"/> Not applicable.)		Select one....
	Course #4 (<input type="checkbox"/> Not applicable.)		Select one....
7f.iii	Provide a narrative regarding this program's GCCR, for inclusion in the Bulletin.		
	This course is designed to promote the writing abilities of students in ways that will prepare them to meet the demands of technical writing in educational and occupational settings. A process approach will be emphasized and will involve writing drafts of all work and extensive peer reviews and workshop activities.		
7g	College-level Requirements		
	How will college-level requirements be satisfied?		
	<input checked="" type="checkbox"/> Standard University college requirement	List course(s): Humanities (3 credits), Social Sciences (3 credits), Language courses (6 credits), Free electives (6 credits). GCCR is satisfied by WRD 204.	
	OR		
	<input type="checkbox"/> Specific course(s)	List course(s):	

¹² You must include a letter of support from the other unit. The letter must address delivery mechanisms and resources allocated for the specified GCCR course(s). Please convert the letter to a PDF and append to the end of this form.

¹³ Use the drop-down list to indicate if the course is an existing course that will not be changed, if the course is an existing course that will be changed, or if the course is a new course.

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*Use the grids below to list core courses, electives, courses for a track, etc.
Use the course title from the Bulletin or from the most recent new/change course form.*

7h* Program Major Core Courses. (Required for all students in the program and includes pre-major and pre-professional courses. Check the appropriate box to describe the course as either "program core" or "pre-major/pre-professional".)				
Prefix & Number	Course Title	Type of Course	Credit Hrs	Course Status ¹³
BIO 148	<i>Introductory Biology I</i>	<input type="checkbox"/> Pgm Core <input checked="" type="checkbox"/> Pre-major/prof	3	Existing
BIO 152	<i>Principles of Biology II</i>	<input type="checkbox"/> Pgm Core <input checked="" type="checkbox"/> Pre-major/prof	3	Existing
BIO 155	<i>Introductory Biology Laboratory</i>	<input type="checkbox"/> Pgm Core <input checked="" type="checkbox"/> Pre-major/prof	1	Existing
PSY 100	<i>Introduction to Psychology</i>	<input type="checkbox"/> Pgm Core <input checked="" type="checkbox"/> Pre-major/prof	4	Existing
MA 137	<i>Calculus with Life Sciences Applications</i>	<input type="checkbox"/> Pgm Core <input checked="" type="checkbox"/> Pre-major/prof	4	Existing
CHE 105	<i>General College Chemistry I</i>	<input type="checkbox"/> Pgm Core <input checked="" type="checkbox"/> Pre-major/prof	4	Existing
CHE 111	<i>General College Chemistry Laboratory I</i>	<input type="checkbox"/> Pgm Core <input checked="" type="checkbox"/> Pre-major/prof	1	Existing
CHE 107	<i>General College Chemistry II</i>	<input type="checkbox"/> Pgm Core <input checked="" type="checkbox"/> Pre-major/prof	3	Existing
CHE 113	<i>General College Chemistry Laboratory II</i>	<input type="checkbox"/> Pgm Core <input checked="" type="checkbox"/> Pre-major/prof	2	Existing
BIO 302	<i>Introduction to Neuroscience</i>	<input checked="" type="checkbox"/> Pgm Core <input type="checkbox"/> Pre-major/prof	3	Existing
WRD 204	<i>Technical Writing</i>	<input checked="" type="checkbox"/> Pgm Core <input type="checkbox"/> Pre-major/prof	3	Existing
CHE 230	<i>Organic Chemistry I</i>	<input checked="" type="checkbox"/> Pgm Core <input type="checkbox"/> Pre-major/prof	3	Existing
CHE 231	<i>Organic Chemistry Laboratory I</i>	<input checked="" type="checkbox"/> Pgm Core <input type="checkbox"/> Pre-major/prof	1	Existing
CHE 232	<i>Organic Chemistry II</i>	<input checked="" type="checkbox"/> Pgm Core <input type="checkbox"/> Pre-major/prof	3	Existing
CHE 233	<i>Organic Chemistry Laboratory II</i>	<input checked="" type="checkbox"/> Pgm Core <input type="checkbox"/> Pre-major/prof	1	Existing
PHY 211	<i>General Physics</i>	<input checked="" type="checkbox"/> Pgm Core <input type="checkbox"/> Pre-major/prof	5	Existing

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PHY 213	General Physics	<input checked="" type="checkbox"/> Pgm Core <input type="checkbox"/> Pre-major/prof	5	Existing
BCH 401G	Fundamentals of Biochemistry	<input checked="" type="checkbox"/> Pgm Core <input type="checkbox"/> Pre-major/prof	3	Existing
BIO 315	Introduction to Cell Biology *alternative to BCH401G or CHE 550/552	<input checked="" type="checkbox"/> Pgm Core <input type="checkbox"/> Pre-major/prof	4	Existing
BIO 305	Introduction to Neuroscience Techniques	<input checked="" type="checkbox"/> Pgm Core <input type="checkbox"/> Pre-major/prof	4	New
MA 113	Calculus I *alternative to MA 137	<input type="checkbox"/> Pgm Core <input checked="" type="checkbox"/> Pre-major/prof	4	Existing
PHY 231	General University Physics *alternative to PHY 211/213	<input checked="" type="checkbox"/> Pgm Core <input type="checkbox"/> Pre-major/prof	4	Existing
PHY 241	General University Physics Laboratory *alternative to PHY 211/213	<input checked="" type="checkbox"/> Pgm Core <input type="checkbox"/> Pre-major/prof	1	Existing
PHY 232	General University Physics *alternative to PHY 211/213	<input checked="" type="checkbox"/> Pgm Core <input type="checkbox"/> Pre-major/prof	4	Existing
PHY 242	General University Physics Laboratory *alternative to PHY 211/213	<input checked="" type="checkbox"/> Pgm Core <input type="checkbox"/> Pre-major/prof	1	Existing
CHE 550/2	Biological Chemistry I and II *alternatives to BCH 401G	<input checked="" type="checkbox"/> Pgm Core <input type="checkbox"/> Pre-major/prof	3/3	Existing
BIO 394	Research in Neuroscience *alternative to ANA 394 and PSY 393	<input checked="" type="checkbox"/> Pgm Core <input type="checkbox"/> Pre-major/prof	3-12	New
BIO 426	Seminar in Neuroscience	<input checked="" type="checkbox"/> Pgm Core <input type="checkbox"/> Pre-major/prof	3	Existing
ANA 394	Independent Research in Neurobiology and Neuroscience *alternative to BIO 394 and PSY 393	<input checked="" type="checkbox"/> Pgm Core <input type="checkbox"/> Pre-major/prof	3-12	New
PSY 393	Research in Neuroscience *alternative to BIO 394 and ANA 394	<input checked="" type="checkbox"/> Pgm Core <input type="checkbox"/> Pre-major/prof	3-12	New
Total Core Courses Credit Hours:			60	
7i	Is there any narrative about pre-major or pre-professional courses for the program that should be included in the Bulletin? If "Yes," note below. (150 word limit)	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
<i>Pre-major courses also satisfy Pre-Med requirements</i>				
7j	Is there any narrative about core courses for the program that should be included in the Bulletin? If "Yes," note below.	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Program Guided Electives¹⁴ (Guided electives for all students in the program.) <input type="checkbox"/> Not Applicable				
7k*	Does the program include any guided electives? (If "No," indicate & proceed to 7n.)	Yes <input checked="" type="checkbox"/>	No ¹⁵ <input type="checkbox"/>	

¹⁴ Program guided electives are available to all students in the program and are organized as groups of elective courses, from which a student chooses one (or two, or three, etc.).

¹⁵ If "No," proceed to question 7n.

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		<i>Total Credit Hours as Guided Electives:</i>	12
7n*	Program Free Electives¹⁶. (Free electives for all students in the program, which includes general elective hours required by college and/or University (e.g. UK Core) for degree completion.)	<input checked="" type="checkbox"/> Not Applicable	
7o*	What is the total number of credit hours in free electives?		
7p	Provide a narrative, including course prefixes, about free electives courses that will be included in the Bulletin. (150 word limit)		
7q	Courses for a program's track(s). Check the appropriate box to describe the course as either "a core course for the track" or "an elective course for the track." (Click HERE for a template for additional tracks ¹⁷ .)	<input checked="" type="checkbox"/> Not Applicable	
Track name:			
Prefix & Number	Course Title	Credit Hrs	Course Status
			<input type="checkbox"/> Track Core <input type="checkbox"/> Track Elective Select one....
			<input type="checkbox"/> Track Core <input type="checkbox"/> Track Elective Select one....
			<input type="checkbox"/> Track Core <input type="checkbox"/> Track Elective Select one....
			<input type="checkbox"/> Track Core <input type="checkbox"/> Track Elective Select one....
			<input type="checkbox"/> Track Core <input type="checkbox"/> Track Elective Select one....
			<input type="checkbox"/> Track Core <input type="checkbox"/> Track Elective Select one....
			<input type="checkbox"/> Track Core <input type="checkbox"/> Track Elective Select one....
			<input type="checkbox"/> Track Core <input type="checkbox"/> Track Elective Select one....
			<input type="checkbox"/> Track Core <input type="checkbox"/> Track Elective Select one....

¹⁶ Program free electives are available to all students in the program and the choice of which course(s) to take is up to the student. The courses are not grouped and are sometimes described as "student must take three courses at the 400-level or above."

¹⁷ Append a PDF with each track's courses to the end of this form.

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<i>Total Credit Hours Track:</i>			
7r	Is there any narrative about courses for a track that should be included in the Bulletin? If "Yes," note below. (150 word limit)	Yes <input type="checkbox"/>	No <input type="checkbox"/>

7s	Total Credit Hours Required by Level. (below)				
	100-level:	200-level:	300-level:	400-level:	500-level:

7t	What is the total number of credit hours required for the degree? (e.g. 120, 126)	120
	If an explanation about the total credit hours is necessary, use the space below. (150 word limit)	

8. Degree Plan

8a Create a degree plan for the proposed program by listing in the table below the courses that a typical student would take each semester. If multiple tracks are available, click [HERE](#) for a template for additional tracks. Append a PDF with each track's semester-by-semester program of study to the end of this form.

	YEAR 1 - FALL:	<i>WRD 110</i> <i>BIO 148</i> <i>BIO 155</i> <i>CHE 105</i> <i>CHE 111</i> <i>MA 137 or MA 113</i>	YEAR 1 - SPRING:	<i>WRD 111</i> <i>BIO 152</i> <i>CHE 107</i> <i>CHE 113</i> <i>PSY 100</i>
	YEAR 2 - FALL :	<i>BIO 302</i> <i>UK Core: Arts and Creativity</i> <i>CHE 230</i> <i>CHE 231</i> <i>College Foreign Language III</i> <i>College Social Sciences, CGS 500 or major elective</i>	YEAR 2 - SPRING:	<i>College Humanities</i> <i>Major elective (ANA 209)</i> <i>CHE 232</i> <i>CHE 233</i> <i>College Foreign Language IV</i>
	YEAR 3 - FALL:	<i>PHY 211</i> <i>STA 296</i> <i>Major elective (CHE 556)</i> <i>BCH 401G</i>	YEAR 3 - SPRING:	<i>PHY 213</i> <i>Major elective (CGS 500)</i> <i>WRD 204 (GCCR course)</i> <i>BIO 305</i>
	YEAR 4 - FALL:	<i>UK CORE - Global Dynamics</i> <i>Major elective (PSY 459)</i> <i>UK CORE-Humanities</i> <i>BIO 394</i> <i>Elective</i>	YEAR 4 - SPRING:	<i>Elective</i> <i>Major elective (BIO 375)</i> <i>BIO 394</i> <i>BIO 426</i> <i>UK CORE-Community, Culture and Citizenship</i>

8b With reference to the degree plan above, explain how there is progression in rigor and complexity in the

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	courses that make up the program. (150 word limit)
	<i>The program is designed for students to progress from introductory to more advanced courses in biology, chemistry, and physics. Neuroscience courses begin with BIO 302, Introduction to Neuroscience, and progress to more specialized, advanced courses.</i>

9. Approvals/Reviews

Information below about the review process does not supersede the requirement for individual letters of support from educational unit administrators and from educational subunit administrators.

	Reviewing Group Name	Date Approved	Contact Person Name/Phone/Email
9a	(Within College)		
	<i>Department of Biology</i>	<i>4/18/14</i>	<i>Dr. Vincent Cassone / 859-257-6766 / vincent.cassone@uky.edu</i>
	<i>Department of Anatomy and Neurobiology</i>	<i>5/12/14</i>	<i>Dr. Don Gash / 859-257-5036 / dongash@uky.edu</i>
	<i>Department of Psychology</i>	<i>4/18/14</i>	<i>Dr. Bob Lorch / 859-257-6826 / rlorch@uky.edu</i>
	<i>Neuroscience Program Directors</i>	<i>1/14/15</i>	<i>Dr. Mark Prendergast / 859-257-6120 / prender@uky.edu</i>

9b	(Collaborating and/or Affected Units)		
	<i>Department of Chemistry</i>	<i>12/11/14</i>	<i>Dr. Steven Yates / 859-257-7082 / yates@uky.edu</i>
	<i>Department of Physics and Astronomy</i>	<i>12/10/14</i>	<i>Dr. Al Shapere / 859-257-8896 / shapere@pa.uky.edu</i>
	<i>Department of Molecular and Cellular Biochemistry</i>	<i>11/20/14</i>	<i>Dr. Doug Andrès / 859-257-6755 / dandres@email.uky.edu</i>
			<i>/ /</i>
			<i>/ /</i>
			<i>/ /</i>
			<i>/ /</i>
			<i>/ /</i>

9c	(Senate Academic Council)	Date Approved	Contact Person Name
	Undergraduate Council		
	Health Care Colleges Council (if applicable)		

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SECTION B – INFORMATION REQUIRED BY CPE AND SACS

10. Program Overview – Program Quality and Student Success

<p>10a</p>	<p>Highlight any distinctive qualities of the proposed program. Are any faculty nationally or internationally recognized for expertise in this field? Does this program build on the expertise of an existing locally, nationally, or internationally recognized program at UK? (300 word limit)</p> <p><i>The University of Kentucky is home to a large neuroscience research, service and outreach community comprised of nearly 300 faculty, staff and students from 5 different Colleges, including Arts and Sciences, Medicine, Pharmacy, Engineering, and Agriculture. In 2011, Ramos et al. reported findings of an expansive study of the prevalence of undergraduate degree programs in neuroscience in the United States. Of the 111 degree programs identified, only 20 of those were housed at public institutions, with the remaining 91 being offered by private, non-profit institutions. Our estimation of these patterns in 2014, based on extrapolation of trends from 1986-2008 reported by Ramos et al., suggests that nearly 150 such programs may exist currently, with less than 30 being offered by public institutions. Given the large and multi-disciplinary nature of the neuroscience community at the University, this University is ideally prepared to become one of a relatively small number of public institutions to offer an undergraduate degree in neuroscience.</i></p> <p><i>The faculty of record for this degree program are Nationally- and Internationally-recognized scientists with current fiscal year support from the National Institutes of Health of more than \$2.8 million. This group of faculty have a combined total of more than 1,300 publications in refereed scientific journals, as members of the University of Kentucky faculty. Additionally, approximately 1/2 of the faculty of record hold positions on Editorial Boards of refereed scientific journals or serve as Editors of these journals. The proposed degree program is the first Bachelors degree program at the University to unify the multidisciplinary expertise of this large neuroscience research community into a single curriculum. Students will also have the opportunity to receive extensive training in applied aspects of Neuroscience including such topics as, central nervous system injury, drug addiction, aging, and delivery of therapeutic agent using nanotechnologies, employing live animal, human subjects, and in silico models.</i></p>
<p>10b*</p>	<p>(similar to 2b) What are the intended student learning outcomes (SLOs) of the proposed program? Address one or more of the five areas of learning – broad, integrative knowledge; specialized knowledge; intellectual skills; applied learning; and civic learning. (300 word limit)</p> <p><i>Students completing the Neuroscience Major will:</i></p> <ul style="list-style-type: none"> • <i>Acquire and integrate knowledge regarding the structure and function of the nervous system at various levels including anatomical, behavioral, physiological, cellular, biochemical and molecular.</i> • <i>Describe and identify methods and tools used in neuroscience research and identify the power and limitations of various approaches and methodologies</i> • <i>Investigate challenging research questions and develop critical thinking skills.</i> • <i>Formulate hypotheses, design experiments to test the hypotheses, analyze data, interpret results, and critically evaluate the existing literature.</i> • <i>Effectively communicate results of scientific experiments in both written research papers/reports and oral presentations</i> • <i>Identify the ethical and professional standards and regulations which govern neuroscience investigations using cells, animals, and humans.</i> <p><i>The SLOs described above directly address the need for a broad, integrative knowledge base in neuroscience as it requires mastery of diverse content areas including nervous system anatomy, cellular biology, chemistry, scientific pedagogy, oral and written communication, and technical approaches employed to study how these broad content areas integrate with each other to produce function or dysfunction of the nervous system. The SLOs also address the learning goal of developing a specialized knowledge base given the very high degree of focus on a single organ system, the central nervous system. The SLOs proposed additionally address the development of intellectual skills and applied learning. This curriculum, and neuroscience in a broad sense, is focused on understanding the nervous system through the execution of critical thinking and applied research in the laboratory setting studying subjects including humans, non-human primates, rodents, and individual cells of the nervous system. Lastly, the final SLO listed above directly addresses the role that civic learning has in the responsible conduct of research and includes the study of ethical behavior in research.</i></p>

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10c	<p>Clearly state the student admission, retention, and completion standards designed to encourage high quality. (300 words)</p> <p><i>Students must meet the following requirements to gain entry into the Neuroscience major:</i></p> <ul style="list-style-type: none"> - successful completion of all UK Core curriculum coursework (30 credit hours) with a G.P.A. of at least 2.0. - Additional pre-major courses directly related to success in a Neuroscience curriculum must be completed and include 9 credit hours of introductory Biology (with a laboratory); introductory psychology (3 credit hours); mathematics (4 credit hours) and 10 credit hours of general chemistry including 2 laboratories. - Student progress and retention rates will be monitored continuously using G.P.A. (a minimum of 2.0 must be held in the major to earn the degree) and successful participation in the required independent research project in the laboratory of faculty member studying neuroscience. <p><i>The Directors of the new program will employ an annual program assesment to collect and information regarding rates of completed (earned) credits and "time-to-degree" for the student body as a unit. A benchmark goal for mean completed (earned) credits of 67% across the major will be referenced to reflect sucessful academic progress of the student body and competence of the curriculum. In addition, a benchmark for "time-to-degree" of no more than 150% of required credits will be referenced as an indicator of sufficient programmatic structure. For example, the proposed program will require 120 credit hours. Thus, a benchmark reference for adequate programmatic structure will be reflected as a mean "time-to-degree" of 180 credit hours, for the student body as a unit. These standard is similar to that required by Federal regulations for full-time students to receive financial aid, and is a common reference point for programmatic assessment.</i></p>
10d	<p>Describe how the proposed program will articulate with related programs in the state. Include the extent to which student transfer has been explored and coordinated with other institutions. Note: Convert all draft articulation agreements related to this proposed program to PDF and append to the end of this form. (300 word limit)</p> <p><i>Currently there are two neuroscience programs in the state (CIP code 26.1501): one at Transylvania University that began in the fall of 2013 and one at Morehead State University that is expected to begin in the fall of 2015. Drs. Debski, Geddes and Prendergast have examined the coursework for these programs, and both differ substantially from the curriculum that we are here proposing. Our program invests heavily in training students to be able to carry out mechanistic, scientific investigations of the nervous system and integrates biological, psychological and medical approaches to those investigations. The other two programs are course based, housed in psychology departments and have a behavioral and cognitive focus. Students transferring from these programs into ours will have their transcripts evaluated on an individual class basis for course equivalencies and transfer credit by a program director. Students will have to provide a current syllabus for each class in question to aid in this evaluation. Since all three of these programs are just in their beginning stages, we have not yet pursued transfer agreements with the other institutions. Once course syllabi have had a chance to become established at ours and the other institutions, we will do so.</i></p>
10e	<p>Identify the applicant pool and how applicants will be reached. (300 word limit)</p> <p><i>Currently, the University has nearly 70 students declared for the minor in Neuroscience degree, with nearly all being declared majors in Biology and/or Psychology. It is expected that a large majority of these students will declare a Neuroscience major once they are able to do so. Extensive outreach will be employed to inform other students of the Neuroscience major using listservs and Facebook pages generated by the departments of Biology, Psychology, and Chemistry. The University Bulletin itself will include discussion of the new program in the course description for BIO 302. Additionally, the Bluegrass Chapter of the Society for Neuroscience administers a listserv containing more than 300 recipients, many of whom are undergraduate (and even high school) students who have previously or are currently conducting research in the laboratory of a faculty member at the University. This will serve to inform a large number of current University students. Additionally, the College of Arts and Sciences Public Relations unit will disseminate an announcement of the new major, including web-based links to information about the major, using UKNow, a listserv of all University faculty, staff and students.</i></p>
<p>11. Mission: Centrality to the Institution's Mission and Consistency with State's Goals</p>	
11a*	<p>(similar to question 2b) List the objectives of the proposed program? These objectives should deal with the</p>

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	<p>specific institutional and societal needs that the program will address. (300 word limit)</p> <p><i>The objective of our program is to provide students with the interdisciplinary knowledge and technical skills in neuroscience needed for employment in these areas. Since understanding normal brain and nervous system functions and overcoming/treating their dysfunction is of growing concern to our society, many careers in neuroscience are experiencing sustained growth. To cite just a few of the many examples, the American Psychological Association has recently drawn attention to the critical shortage of both civilian and military mental health professionals needed to treat such diverse problems as post-traumatic stress syndrome and traumatic brain injury. Opportunities in regenerative medicine are increasing exponentially and currently run the gamut from research to clinical application to marketing of therapies that impact both peripheral and central nervous system repair. Finally, artificial intelligence and robotics are predicted to permeate wide segments of daily life by 2025 and advancements in both fields have benefited immensely from a neuroscience perspective. Further, in 2013 the Federal government proposed the collaborative research program termed the "Brain Initiative", which aims to map the function of every nerve cell in the human brain. The goal of this initiative is provide \$300 million in neuroscience research funding over the next 10 years. Thus, neuroscience is of significant societal interest.</i></p> <p><i>Since the inception of a minor degree in Neuroscience at the University in 2012, we have observed increasing enrollment which currently includes nearly 70 declared minors. Thus, there is a clear need to meet the specific educational desires of those students interested in neuroscience-related careers. While all students in this major may not decide to pursue careers specifically in neuroscience after their graduation from this program, this field impinges upon many scientific, educational and public health career choices. Thus, the training and knowledge that they obtain in our program will be broadly beneficial to them.</i></p>
<p>11b*</p>	<p>Explain how the program objectives above in item 11a support at least two aspects of <u>UK's institutional mission and academic strategic plan</u>? (150 word limit)</p> <p><i>The proposed program directly supports Goal 1 of Strategic Plan by providing in-depth and applied multidisciplinary training in a field that is rapidly developing highly innovative technical and theoretical approaches to understanding function and dysfunction of the nervous system. The Federal government's recent "Brain Initiative" is clear evidence of the global importance of neuroscience and our students will be given the applied and critical thinking skills needed to take leading roles as professionals in many different realms of neuroscience.</i></p> <p><i>The proposed program also directly addresses Goal 2 of the Strategic Plan with regard to promoting research (as this a research-driven field), creative thinking skills, and economic capital in a scientific discipline that is locally, nationally and internationally recognized as a field of high importance and significant economic impact.</i></p>
<p>11c*</p>	<p>How do the program objectives above in item 11a support at least two aspects of the Council on Postsecondary Education's (CPE) Strategic Agenda and the statewide implementation plan? (300 word limit)</p> <p><i>The objectives described above support several aspects of the CPE's Strategic Agenda and statewide implementation plan, particularly with regard to the use of "creative and innovative" technological approaches to address the needs of citizens in the Commonwealth and the engagement of those educated by this program with others in the community, in industry, and business to benefit the economic vitality of the Commonwealth and the quality of life of its citizens. Neuroscience as a field of study and in applied settings is multidisciplinary in nature and directly relevant to each of these 3 aspects of the Agenda. As reflected in the Federal governments "Brain Initiative", the neuroscience is a field of burgeoning importance with regard to both the quality of life of individuals and the financial sectors. The objectives guiding this new program are aimed at providing a world-class education, given by Internationally-reknowned scientists, to a large number of Kentuckians and other students in theoretical, technological and applied aspects of understanding function and dysfunction of the nervous system. Students will receive extensive and in-depth training in basic aspects of nervous system function and will employ a wide range of highly innovative technological approaches to study the nervous system in the context of normal function and disease states including Alzheimer's Disease, traumatic brain injury, Parkinson's Disease, substance abuse, stroke, and others via guided independent research activities in the laboratory of a neuroscientist at the University. In doing so, our objectives will allow us to train students in a field of rapidly expanding occupational opportunities,</i></p>

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	<i>employing state-of-the art technological approaches to study "real world" issues affecting citizens of the Commonwealth and the Nation.</i>
11d*	If an approval letter from an Education Professional Standards Board (EPSB) is required, check the box below and append a PDF version of the letter to this form. <input type="checkbox"/> (E.g. any program leading to teacher, principal, or superintendent certification, rank change, etc.)
12. Resources	
12a*	How will the program support or be supported by other programs within the institution? For example, shared faculty, shared courses, collaborative research, etc. (300 word limit) <i>The Neuroscience Major is multidisciplinary, involving several departments and colleges. The required introductory course, BIO 302, is taught by faculty from Anatomy and Neurobiology (Geddes) and Biology (Debski, O'Hara). In addition the UK Core courses involving several departments, Pre-major coursework is from Biology, Chemistry, Mathematics, Physics, and Psychology. Elective courses for the major are from Anatomy and Neurobiology, Biology, Biomedical Engineering, Chemistry, Child Development, Cognitive Sciences, and Psychology. Independent student research is offered through several departments including Anatomy (ANA 394), Biology (BIO 394), and Psychology (PSY 393). BIO 305, Introduction to Neuroscience Techniques, includes examples of methods related to anatomy, behavior (psychology), cell biology, pathology, and physiology.</i>
12b	What will be the projected "faculty-to-student in major" ratio? (150 word limit) <i>The Directors obtained 4-year enrollment statistics for undergraduate neuroscience degree programs at several benchmark institutions and have used the projected growth of the enrollment to estimate faculty-to-student ratios during the first 3 years of the new program. Our analysis demonstrated that from year 1 to year 2 of the new major, our benchmark universities saw a mean increase in enrollment of 80%, while a more modest mean increase was observed from year 2 to year 3. Based on our estimates of enrollment in the new program (which we project will mostly be current Neuroscience minors) and trends observed in benchmark institutions, we project that the "faculty-to-student in major" ratio will be 0.50 in year 1 (25/50), 0.25 in year 2 (25/100), and 0.16 (25/150) in year 3. Stated in terms of "student-to-faculty" ratio, these ratios would be 2.00, 4.00, and 6.00 in years 1, 2 and 3, respectively. Should the number of faculty of record increase in any given year, as is anticipated, these ratios will be adjusted accordingly.</i>
12c	Describe the library resources available ¹⁸ to support this program. Access to the qualitative and quantitative library resources must be appropriate for the proposed program and should meet recognized standards for study at a particular level or in a particular field where such standards are available. Adequacy of electronic access, library facilities, and human resources to service the proposed program in terms of students and faculty will be considered. (300 word limit) <i>The University of Kentucky Library System includes the main William T. Young Library which houses a life sciences collection, as well as eleven other libraries including a Science Library and Medical Center Library. Collections and information resources include 4,023,142 volumes, 588,428 electronic books, well over 400 commercial databases, approximately 27,000 linear feet of manuscripts and archives, and a broad collection of computer files, microforms, maps, film/video, audio and graphics. Annual collections expenditures total more than \$11.1 million. In FY12, 6.6 million searches were conducted in licensed databases and 2.8 million full-text articles were downloaded. UK serves as the Regional Depository for Kentucky as part of the Federal Depository Library Program. UK is also a depository for European Union publications and Canadian government publications. British Parliamentary Papers, Kentucky government publications, and technical reports from federal agencies are selectively collected.</i> <i>Access to 103 licensed health/biomedical sciences electronic databases is available and UK Libraries provides access to hundreds of other databases covering a wealth of subjects. Databases are available both from on-campus locations (designated by IP ranges) and including wireless access, plus off-campus locations.</i>

¹⁸ Please contact Institutional Effectiveness (institutionaleffectiveness@uky.edu) for more information.

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Bibliographic databases especially pertinent to biomedical research include: PubMed Medline, International Pharmaceutical Abstracts, Ageline, PsycINFO, CINAHL, Dentistry & Oral Sciences Source, BIOSIS, ToxNet, Web of Science, TRIP (Turning Research into Practice), Cochrane Database. SciFinderScholar and Beilstein provide access to the chemistry literature. STAT!Ref, ClinicalKey, PsychiatryOnline, AccessMedicine, and AccessEmergency Medicine contain bundled collections of major clinical resources that can be searched by either individual title or across all titles in the collections.

A link to interlibrary loan software is available for cases when our library doesn't have access to a title in electronic or print format.

12d

Describe the physical facilities and instructional equipment available to support this program. Physical facilities and instructional equipment must be adequate to support a high-quality program. Address the availability of classroom, laboratory, and office space, as well as any equipment needs. (300 word limit)

The College of Arts and Sciences has committed a large laboratory space in heart of the University undergraduate campus to serve as the home of a newly created laboratory-based course, entitled "Introduction to Neuroscience Techniques", that will be required of all Neuroscience majors. This 4 credit hour course is highly innovative in design as it will train students in the application of neuroscience concepts at multiple levels of analysis including behavioral, histological, analytical, biochemical and physiological levels of inquiry. The College of Arts and Sciences has committed nearly \$300,000 to the purchase of capital equipment and annual consumables to be dedicated to this highly innovative course. This equipment will include items such as behavioral testing equipment, cellular staining and imaging equipment, including microscopes capable of fluorophore detection, a freezing cryostat for brain sectioning, and "RoboRoach" electrophysiological kits to allow for the study of neural microstimulation.

In addition, the College of Arts and Sciences has authorized the hire of two tenure-track faculty members, one in Psychology and one in Biology, to service this new program and additional departmental needs. The position in Psychology is a Special Title Series line and will require a 75% distribution of effort to service the teaching needs of the new program in neuroscience, including the new laboratory-based course described. The position in Biology is a Regular Title Series line that will likely contribute to the teaching of one or more courses in the new program. The Colleges of Arts and Sciences and Medicine have committed to the continued appointment of one or more faculty of record to serve as Director(s) of the new program for a term of 3 years, which includes 10% administrative salary stipend and relief of additional administrative duties. Classrooms needed to instruct all classes listed in the curriculum are widely available on campus. Further, each faculty member has a dedicated office space.

13. Demand and Unnecessary Duplication

13a*

Provide justification and evidence to support the need and demand for this proposed program. Include any data on student demand, career opportunities at any level, or any recent trends in the discipline that necessitate a new program. (300 word limit)

- This evidence is typically in the form of surveys of potential students and enrollments in related programs at the institution.
- Anecdotal evidence is insufficient. Demonstrate a systematic collection of data, thorough study of the data, and a reasonably estimated student demand for the program.
- Provide evidence of student demand at state and national levels.

Enrollment in Neuroscience Major Programs at benchmark institutions has increased dramatically over the past few years. For example, enrollment in the Neuroscience Major at Michigan State University has increased from 132 students in 2012 to 411 students in 2014; at Ohio State University 78 students were enrolled in the Neuroscience Major in 2011 increasing to 890 students in 2014. Transylvania University first offered their Neuroscience Major in 2013 with an enrollment of 6 students, increasing to 29 students in 2014. The Neuroscience Major at Morehead State University was approved in Fall 2014, enrollment data are not yet available.

At the University of Kentucky, enrollment in the Neuroscience Minor has increased to 67 students in the two

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	<p><i>years since it was first offered. Class size in BIO 302 (Introduction to Neuroscience) has increased from 35 students in 2012 to a capped enrollment of 90 students in 2014, with enrollment anticipated to expand significantly when the cap is removed and the course is offered each semester instead of just during the Fall semester.</i></p> <p><i>In summary, all available evidence points to a significant demand for a Neuroscience Major. Anecdotal evidence indicates that the University of Kentucky is currently losing talented students to other institutions who offer a Neuroscience Major. * please see Appendix "Benchmark Neuroscience Program Enrollment Trends"</i></p>
13b	<p>Clearly state the degree completion requirements for the proposed program. (150 word limit)</p> <p><i>Awarding of the Neuroscience degree is dependent upon the completion of the UK Core, University graduation requirements and A&S College requirements as detailed in the University Bulletin and the completion of the neuroscience major curriculum described in this proposal. The student must have finished their coursework with a cumulative 2.0 GPA for classes for the major (pre-major and major classes) and a 2.0 cumulative GPA for UK core and A&S College required classes. A minimum of 30 of the last 36 credits presented for the degree must have been taken from the University in order to meet its residency requirement and the student must file a graduation application by the Bulletin-specified deadline in order to be eligible for graduation.</i></p>
13c*	<p>Will this program replace or enhance any existing program(s) or tracks (or concentrations or specializations) within an existing program? (300 word limit)</p> <p align="right">Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>
	<p><i>If "Yes," explain: The University of Kentucky has offered a minor in Neuroscience housed in the Biology department since 2012. The minor has an enrollment of approximately 70 students as of the Fall term of 2014, most of whom have declared a major in Biology and/or Psychology. This minor may be obtained by completing 18 credit hours from a list of courses offered by the departments of Biology, Chemistry, Psychology, Anatomy and Neurobiology, and the Cognitive Science program. The proposed major will require 120 credit hours of coursework taken from courses offered by these same departments and by several additional departments, such as Physics and Astronomy, Biochemistry, and Biomedical Engineering. This expanded B.S. curriculum will significantly enhance the existing minor in Neuroscience program by providing more expansive and in-depth training to interested students and has the potential to expand the list of course alternatives available to those students who wish to remain declared minors in Neuroscience.</i></p>
13d	<p>Identify the primary feeders for the program. (150 word limit)</p> <p><i>The Neuroscience Major will attract students interested in pursuing careers in professional health related fields (medicine, nursing, occupational therapy, physical therapy, veterinary medicine), students seeking advanced graduate degrees, and those seeking immediate employment following graduation as a laboratory technician in an academic or pharmaceutical research lab. The primary feeders into this program will be students currently enrolled in Biology, Chemistry, or Psychology programs, and students entering the University with a strong background in math, science, and technology.</i></p>
13e	<p>Describe the student recruitment and selection process. (300 word limit)</p> <p><i>The Neuroscience major will be advertised to students via University media and a University website that is linked to the Biology, Psychology and Anatomy and Neurobiology websites. Flyers will also be sent to A&S student advisors to inform them about this new opportunity for students and allow them to bring it to the attention of their advisees. The availability of this new major will also be announced in the neuroscience classes. The College of Arts and Sciences does not have selective admissions. Students may declare the Neuroscience major upon enrollment at the University, or upon filing paperwork with the appropriate office to change their major.</i></p>
13f*	<p>Specify any distinctive qualities of the proposed program. (300 word limit)</p> <p><i>The Neuroscience Major has three distinctive qualities which provide for significant research experience as well as broad, comprehensive training in a variety of subdisciplines.</i></p>

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1. *A laboratory course in Neuroscience Methods which introduces students to methods related to behavioral neuroscience, cellular and molecular neuroscience, neuroanatomy, neuroimaging, neuropathology, and neurophysiology.*
2. *A requirement for mentored independent laboratory research*
3. *A curriculum which includes a core introductory neuroscience course (BIO 302, Introduction to Neuroscience) and options in which students enroll in at least one course in each of the following thematic areas: 1) Cellular/Molecular Neuroscience; 2) Neurophysiology; 3) Neuroanatomy; and 4) Integrated/Multidisciplinary Neuroscience Courses. The goal of this program is provide students with a broad, comprehensive and multidisciplinary training in neuroscience.*

13g Provide any evidence of a projected net increase in total student enrollments to the campus as a result of the proposed program. (300 word limit)

*Based on the enrollment in similar programs at benchmark institutions, we anticipate a rapid growth in enrollment in the Neuroscience Major. We anticipate that approximately 70% of the enrolled students will be students who would have otherwise majored in other disciplines at the University of Kentucky (Agricultural Biotechnology, Biology, Chemistry, Health Sciences, Psychology). Approximately 30% of the students will be students who enroll at the University of Kentucky because of the Neuroscience Major, instead of enrolling in a similar program at another institution. Based on the estimated student demand shown below in 13h, we anticipate a total of 750 students enrolled in the Neuroscience Major in the first five years, including a net increase of 225 students who would not have otherwise enrolled at the University of Kentucky. * Please see appendix "Benchmark Neuroscience Program Enrollment Trends".*

13h Use table below to estimate student demand for the first five years following implementation.

Academic Year	# Degrees Conferred	Majors (headcount)	
		Fall Semester	Spring Semester
2017 - 2018	-	50	
2018 - 2019	17	100	
2019 - 2020	35	150	
2020 - 2021	70	200	
2021 - 2022	140	250	

13i Clearly describe all evidence justifying a new program based on changes in the academic discipline or other academic reasons. (300 word limit)

Neuroscience is a field of study that is expanding at a National and International level due to many factors including the rapid development of innovative technological approaches that allow for levels of analysis of the nervous system never before imagined, growing recognition of the critical role that even single cells have in influencing normal and pathological nervous system function and the increasing prevalence of neurodegenerative disease, traumatic brain injury and substance abuse, for example. The Federal government's recent "Brain Initiative", announced in 2013, is projected to provide more than \$3 billion in research funding to the field of neuroscience over the next ten years. As noted above (11a, 13a) data obtained from benchmark institutions demonstrate a mean growth rate in enrollment in the first year of establishment of new neuroscience major programs of 80%, with the mean current enrollment in these programs being 660 students for the 2014-2015 academic year. These statistics show clear and tangible evidence of demand for this type of program and evidence that student enrollment levels will be significant and supportive of the new program.

To obtain expertise in this field, a rigorous academic experience is required, such as that outlined in this proposal. Beyond in-class learning, this discipline requires the development of critical thinking abilities in the applied setting of a laboratory through the use of innovative scientific methodologies. The proposed program requires extensive "hands-on" neuroscience application, both in a 4 credit hour, semester long guided laboratory experience (BIO 305) and in a two-semester sequence of independent research (BIO 394/ANA 394/PSY 393) in the laboratory of faculty member at the University. Few such programs exist at public institutions in the United States, as noted above, our estimates suggest that less than 30 such programs may currently exist at public institutions. Thus, this program will address an unmet need of a large number of

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	<i>citizens who desire to train in this rapidly expanding field.</i>	
13j	Has the Council on Postsecondary Education identified similar programs? <i>(Please contact Institutional Effectiveness (institutionaleffectiveness@uky.edu) for help with this question.)</i> If "Yes," the following questions (5h1 – 5h5) must be answered.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
(1)	Does the program differ from existing programs in terms of curriculum, focus, objectives, etc.? <i>(150 word limit)</i>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
	<i>If "Yes," explain: Our proposed program integrates biological, psychological and medical knowledge and approaches to nervous system investigation. Electives are chosen based on these investigative approaches, not by academic departments. The program also requires students to do a year of independent research to gain experience using the techniques that they have learned. Neither Morehead State nor Transylvania University have a medical school to allow for a similar integration and independent research is not required by either program. Furthermore, the majority of neuroscience courses available at Morehead State are in the psychology department; this is not true of our program, giving it a different focus. The neuroscience major at Transylvania is also housed in a psychology department and the curriculum emphasizes behavior, and cognition. While these are elements of our program, the biological and medical school classes give it a much more mechanistic grounding.</i>	
(2)	Does the proposed program serve a different student population (e.g., students in a different geographic area or nontraditional students) from existing programs? <i>(150 word limit)</i>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
	<i>If "Yes," explain: The location of the University of Kentucky in the central part of the state would likely cause our program to attract a somewhat different group of students from the program at Morehead State. Our large University setting and state school status would also likely differentiate our student pool from that of Transylvania</i>	
(3)	Is access to existing programs limited? <i>(150 word limit)</i>	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
	<i>If "Yes," explain: The program at Transylvania only began in the fall of 2013 and the one at Morehead State was approved in the Fall of 2014 with implementation scheduled for the Fall of 2015. Therefore, at the present time they are not at their capacity. It is unclear, however, to what extent these programs can accommodate the growth expected by looking at the history of other neuroscience programs around the country</i>	
(4)	Is there excess demand for existing programs? <i>(150 word limit)</i>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
	<i>If "Yes," explain: Excess demand for classes that make up the neuroscience minor suggests that there is great interest in neuroscience at the University of Kentucky that is not being met by existing programs of study. To cite one example, the enrollment for our introductory neuroscience class when we first offered the class in 2011 was 50. We have capped enrollment at 90 students in the class in the fall of 2014. Furthermore, other biology neuroscience courses are now taught every year to accommodate demand rather than every other year as in the past.</i>	
(5)	Will there be collaboration between the proposed program and existing programs? <i>(150 word limit)</i>	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
	<i>If "yes," explain the collaborative arrangements with existing programs. If "no," explain why there is no collaboration with existing programs.</i>	
	<i>At present there are no existing collaborative arrangements with the neuroscience programs at Morehead State or Transylvania. This is in keeping with the program being a major at an existing academic institution. However, we would be happy to explore opportunities for collaboration in the future. Within the University of Kentucky, the neuroscience major represents the collaborative efforts of a number of different departments in designing and implementing the curriculum as detailed elsewhere in this application.</i>	

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13k*	Are there similar programs in other <u>Southern Regional Education Board (SREB)</u> states in the nation?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
If "Yes," please answer the questions below to demonstrate why this proposed program is needed in addition to the one(s) currently in existence.			
13k.i*	Identify similar programs in other SREC states and in the nation.		
13k.ii*	Does the program differ from existing programs in terms of curriculum, focus, objectives, etc.? If "Yes," explain. (300 word limit)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
13k.iii*	Does the proposed program serve a different student population (e.g., students in a different geographic area and non-traditional students) from existing programs? If "Yes," explain. (300 word limit)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
13k.iv*	Is access to existing programs limited? If "Yes," explain. (300 word limit)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
13k.v*	Is there excess demand for existing similar programs? If "Yes," explain. (300 word limit)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
13k.vi*	Will there be collaboration between the proposed program and existing programs? If "No," explain. (300 word limit)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
13l	Would your institution like to make this program available through the <u>Academic Common Market</u> ¹⁹ ?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
13m	Clearly describe evidence of employer demand. Such evidence may include employer surveys, current labor market analyses, and future human resources projections. Where appropriate, evidence should demonstrate employers' preferences for graduates of the proposed program over persons having alternative existing credentials and employers' willingness to pay higher salaries to graduates of the proposed program. (300 word limit)		
	<i>A survey of fifty graduates of the Neuroscience Program at Ohio State University found that 16% applied and were accepted into MD, MD/PhD, or DO programs; 8% were accepted into other professional schools (Occupational Therapy, Physical Therapy, Masters in Nursing, Physician's Assistant), and 12% applied to graduate school. The remaining students were employed in a variety of positions including laboratory technician, physician scribe, patient care associate, medical sales, mental health aid, AmeriCorps, and field marketing. Of these, 73% had plans for graduate or professional school within 1-2 years following graduation, only 12% did not plan to pursue an advanced degree. A survey conducted by the Society of Neuroscience in 2011 found that for new neuroscience graduates, 65% were employed in academic research, 15% went to medical school, 5% were employed by industry, a small percentage were employed outside the field, and approximately 2% were unemployed. Within Kentucky, employment opportunities include research</i>		

¹⁹ Please contact Institutional Effectiveness (institutionaleffectiveness@uky.edu) for more information.

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	<i>and education positions at public and private universities as well as opportunities at over 50 biotech companies.</i>
13n*	Describe the types of jobs available for graduates, average wages for these jobs, and the number of anticipated openings for each type of jobs at the regional, state, and national levels. <i>Opportunities for graduates with a BS in Neuroscience include further education in Graduate School or Professional Programs (Clinical Psychology, Medicine, Dentistry, Pharmacy, Physical Therapy Public Health, Veterinary Medicine), and employment in education (secondary and post-secondary), academic research including basic and clinical research, academic administration, and pharmaceutical research as well as related fields including scientific and medical publishing, science advocacy and government relations, and non-profit or professional organizations. Median salaries for those who move immediately into the work force range from \$30,020 to \$48,400. For those who pursue advanced academic or health profession degrees, the salary range is \$60,000 to well over \$150,000 per year. A recent search of NeuroJobs, an online service of the Society for Neuroscience, lists 194 jobs available throughout the United States. A survey conducted by the Society of Neuroscience in 2011 found that for new neuroscience graduates, 65% were employed in academic research, 15% went to medical school, 5% were employed by industry, a small percentage were employed outside the field, and approximately 2% were unemployed. Within Kentucky, employment opportunities include research and education positions at public and private universities as well as opportunities at over 50 biotech companies. Those relevant to neuroscience include Alltech (Nicholasville), Neogen (Lexington), Martek Biosciences (Winchester), i3 Statprobe (Lexington), Amgen (Louisville), Laboratory and BioDiagnostics (Lexington), Genentech (Louisville), Peptides International (Louisville), Murty Pharmaceuticals (Lexington), Potentia Pharmaceuticals (Louisville), custom KYnetics (Versailles), Transposagen Biopharmaceuticals (Lexington), PDX Biotech (Lexington), Image Analysis Inc (Columbia), ParaTechs (Lexington), and bioLOGIC Corp (Covington).</i>

14. Assessment and Oversight

14a	Describe <i>program</i> evaluation procedures for the proposed program. These procedures may include evaluation of courses and faculty by students, administrators, and departmental personnel as appropriate. Program review procedures shall include standards and guidelines for the assessment of student outcomes implied by the program objectives and consistent with the institutional mission. (300 word limit) <i>Assessment of student learning will occur at both formative and summative stages curriculum and will follow a three year assessment cycle, with two of the six student learning outcomes being assessed annually over the course of the cycle. It is the responsibility of the Directors to monitor activities of student assessment in all relevant courses and to solicit the assessment input from those course instructors. A meeting of all Directors will take place in mid-September of each year to evaluate all assessment and generate an assessment report, due no later than October 31st of each year.</i> <i>Year 1: SLOs 1 and 2 will be assessed by analysis of exams in BIO 302 Introduction to Neuroscience (formative assessments) and research competency and written research papers in BIO 394/ANA 394/PSY 393 Research in Neuroscience (summative assessments).</i> <i>Year 2: SLOs 3 and 4 will be examined by analysis of laboratory reports written in BIO 305 Introduction to Neuroscience Techniques (formative assessments) and the execution of an independent laboratory experiments in BIO 394/ANA 394/PSY 393 (summative assessments).</i> <i>Year 3: SLOs 5 and 6 will be assessed by analysis of exams in BIO 302 and laboratory reports in BIO 305 Introduction to Neuroscience Techniques (formative assessments); one oral presentation in BIO 426 Seminar in Neuroscience (summative assessments); and a poster presentation in BIO 394/ANA 394/PSY 393 (summative assessments).</i> <i>Faculty of record will be evaluated using University Teacher Course Evaluations (TCEs) completed by their student each term. All TCEs are public record and accessed via the University website. The Directors will review the relevant TCEs of faculty of record each year. Areas of concern will be summarized and communicated to the individual faculty of record and a request for a plan of remediation will be made.</i>
14b*	Identify both the direct and indirect methods by which the intended student learning outcomes (SLOs) will

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	<p>be assessed. (300 word limit)</p> <p><i>SLO1: indirect method of assessment is exam performance. The direct method of assessment is evaluation of a written research paper completed after concluding an independent research project in the laboratory of a faculty member.</i></p> <p><i>SLO2: indirect method of assessment is exam performance. The direct method of assessment is evaluation of appropriate execution of an independent research project in the laboratory of a faculty member.</i></p> <p><i>SLO3: indirect method of assessment is descriptive laboratory reports. The direct method of assessment is evaluation of appropriate execution of an independent research project in the laboratory of a faculty member.</i></p> <p><i>SLO4: indirect method of assessment is descriptive laboratory reports. The direct method of assessment is evaluation of appropriate execution of an independent research project in the laboratory of a faculty member.</i></p> <p><i>SLO5: indirect method of assessment is descriptive laboratory reports. The direct method of assessment is evaluation of a poster presentation to be given at a local meeting of a scientific society.</i></p> <p><i>SLO6: indirect method of assessment is exam performance. The direct method of assessment is evaluation of an oral presentation related to ethical conduct of research.</i></p>
14c	Procedures for Course Mapping of SLOs (related to question 5b)
14c.i	<p>Which components will be evaluated, i.e. course mapping? (300 word limit)</p> <p><i>Slo1: Indirect Method Of Assessment Is Exam Performance In Bio 302 Introduction To Neuroscience. The Direct Method Of Assessment Is Evaluation Of A Written Research Paper Upon Completion Of An Independent Research Project In Bio 394, Ana 394, Or Psy 393, All Entitled Research In Neuroscience.</i></p> <p><i>Slo2: Indirect Method Of Assessment Is Exam Performance In Bio 302. The Direct Method Of Assessment Is Evaluation Of Appropriate Execution Of An Independent Research Project In Bio 394, Ana 394, Psy 394, All Entitled Research In Neuroscience.</i></p> <p><i>Slo3: Indirect Method Of Assessment Is Descriptive Laboratory Reports In Bio 305 Introduction To Neuroscience Techniques. The Direct Method Of Assessment Is Evaluation Of Appropriate Execution Of An Independent Research Project In Bio 394, Ana 394, Psy 394, All Entitled Research In Neuroscience.</i></p> <p><i>Slo4: Indirect Method Of Assessment Is Descriptive Laboratory Reports In Bio 305 Introduction To Neuroscience Techniques. The Direct Method Of Assessment Is Evaluation Of Appropriate Execution Of An Independent Research Project In Bio 394, Ana 394, Psy 394, All Entitled Research In Neuroscience.</i></p> <p><i>Slo5: Indirect Method Of Assessment Is Descriptive Laboratory Reports In Bio 305 Introduction To Neuroscience Techniques. The Direct Method Of Assessment Is Evaluation Of A Poster Presentation To Be Made Upon Completion Of An Independent Research Project In Bio 394, Ana 394, Psy 394, All Entitled Research In Neuroscience.</i></p> <p><i>Slo6: Indirect Method Of Assessment Is Exam Performance In Bio 302 Introduction To Neuroscience. The Direct Method Of Assessment Is Evaluation Of An Oral Presentation In Bio 426 Seminar In Neuroscience.</i></p>
14c.ii	<p>When will components be evaluated? (150 word limit)</p> <p><i>Evaluation of the curriculum and student response to curricular activities, particularly with regard to the new laboratory-based course BIO 305 Introduction to Neuroscience Techniques will be monitored continuously in response to ongoing feedback from faculty of record. A formalized evaluation of outcomes will be conducted after the completion of each academic year and will include a review of SLO rubric and rubrics developed for each specific component to be assessed (eg. exams, laboratory reports, oral presentations, poster presentation), in preparation for an annual report to the University Office of Assessment no later than Oct. 31st of each year. Teaching performance of faculty of record will be examined at the end of each academic year, per 14a.</i></p>
14c.iii	<p>When will the data be collected? (150 word limit)</p> <p><i>Year 1: SLOs 1 and 2 will be assessed by analysis of exams in BIO 302 Introduction to Neuroscience (indirect, formative assessments) and research competency and written research papers in BIO 394/ANA 394/PSY 393 (direct, summative assessments).</i></p> <p><i>Year 2: SLOs 3 and 4 will be examined by analysis of laboratory reports written in BIO 305 Introduction to Neuroscience Techniques (indirect, formative assessments) and the execution of an independent laboratory</i></p>

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	<p><i>experiments in BIO 394/ANA 394/PSY 393 (direct, summative assessments).</i></p> <p><i>Year 3: SLOs 5 and 6 will be assessed by analysis of exams in BIO 302 Introduction to Neuroscience (indirect, formative assessments); one oral presentation in BIO 426 Seminar in Neuroscience (direct, summative assessments); and a poster presentation in BIO 394/ANA 394/PSY 393 (direct, summative assessments).</i></p> <p><i>All data will be collected following the end of the academic year and will be collected prior Sept. 1st of each year.</i></p>
14c.iv	<p>How will the data be collected? (150 word limit)</p> <p><i>Assessment of SLOs will occur only in classes taught by faculty of record in the Department of Biology (the home unit of the new program), with the exception of ANA 394 or PSY 393. All faculty sponsoring students in ANA 394 and PSY 394 will communicate their assessment measures directly to the new program Directors no later than Sept. 1st of each year.</i></p>
14c.v	<p>What will be the benchmarks and/or targets to be achieved? (150 word limit)</p> <p><i>The targeted grade point average reflecting satisfactory progress in the major will be a 2.00 cumulative G.P.A., as this is the University benchmark for successful completion of major coursework. With regard rubric assessment (please attached assessment plan), we have a targeted a mean rubric score for individual SLOs of 1.5 or greater. Targets for "time-to-degree" will reflect common Federal standards for adequate academic progress and will include a student body mean time of 150% of the required major credits hours of 120 (eg. 180 credit hours taken) and a completed (earned) credit ration of 67%, the Federal requirement reflecting adequate academic progress.</i></p>
14c.vi	<p>What individuals or groups will be responsible for data collection? (150 word limit)</p> <p><i>The program Directors (Drs. Debski, Geddes and Prendergast) will also act as assessment coordinators. It is the responsibility of the Directors to monitor activities of assessment in all relevant courses and to solicit the assessment input from those course instructors. A meeting of all Directors will take place in mid-September of each year to evaluate all assessment and generate an assessment report, due no later than October 31st of each year.</i></p>
14c.vii	<p>How will the data and findings be shared with faculty? (150 word limit)</p> <p><i>The faculty of record will receive a summary document detailing the specific, mean numerical outcomes (based on our rubric for assessments of each SLO) for each assessment of 2 SLOs per year. This will be an electronic communication. If areas of concern are noted (for example, if mean numerical assessments are lower than "2" on the "0-3" assessment scale of the rubric), a meeting of all relevant faculty of record will be convened and a plan of remediation will be designed and subsequently implemented.</i></p>
14c.viii	<p>How will the data be used for making programmatic improvements? (150 word limit)</p> <p><i>If targets described above in 14c.v are not achieved (eg. a mean evaluation score of lower than 1.5 is not realized on any given assessment measure), the Director(s) will initiate a review of the relevant SLO(s) and the courses in which that SLO(s) is assessed to identify areas of strength and potential weakness. If clear corrective measures or revisions are not readily identified, the Directors will convene a meeting of the faculty of record to initiate a collaborative discussion with regard to designing a remediation plan.</i></p>
14c.ix	<p>What are the measures of teaching effectiveness? (150 word limit)</p> <p><i>All faculty of record will be evaluated using University Teacher Course Evaluations (TCEs) completed by their student each term. All TCEs are public record and accessed via the University website. The Directors will review the relevant TCEs of faculty of record each year.</i></p>
14c.x	<p>What efforts to improve teaching effectiveness will be pursued based on these measures? (150 word limit)</p> <p><i>Areas of concern will be summarized and communicated to the individual faculty of record and a request for a plan of remediation will be made. Additional options aimed at improving teaching, if needed, include providing College-level support to promote scholarly activities in the area of teaching at the undergraduate</i></p>

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level and may include support for attendance at relevant conferences and symposia, such as the "Conference on Higher Education Pedagogy" offered by the Center for Instructional Development and Educational Research at Virginia Polytechnic Institute and State University.

14c.xi What are the plans to evaluate students' post-graduate success? (150 word limit)

The Directors will obtain data from the Alumni Survey annually and will additionally create a separate and brief web-based survey of educational and career outcomes to be communicated to all alumni electronically on an annual basis.

15. Cost and Funding of the Proposed Program²⁰

15a Will this program require additional resources? Yes No

If "Yes," please provide a brief summary of additional resources that will be needed to implement this program over the next five years. (300 word limit)

15b Will this program impact existing programs and/or organizational units within your institution? (300 word limit) Yes No

If "Yes, briefly describe.

The Neuroscience major is likely to obtain some proportion of its student enrollment (we estimate about 33%) from current Biology and Psychology majors who are interested in nervous system development and function. Each of these departments currently has large numbers of majors (Biology - 1600; Psychology - 950) and expects further growth in the future. This internal transfer of students from one major to another is expected to minimally impact existing courses.

However, the Neuroscience major is also expected to draw new students to the University who are currently obtaining neuroscience degrees elsewhere in the country. These students represent new enrollment accommodations that must be made. The departments involved in teaching the pre-major and major requirements in this program have agreed to meet the demands (please attached correspondences of support) that additional students will put upon their faculty and classroom resources. Those most heavily affected, such as Biology, have agreed to increasingly devote more of their teaching efforts of their neuroscience faculty to courses needed for this new major. The Dean of A&S has also given Psychology a new teaching position in part to allow for the teaching of the new neuroscience techniques lab that is an integral part of this new program.

15c Provide adequate documentation to demonstrate sufficient return on investment to the state to offset new costs and justify approval for the proposed program. (300 word limit)

A survey of fifty graduates of the Neuroscience Program at Ohio State University found that 16% applied and were accepted into MD, MD/PhD, or DO programs; 8% were accepted into other professional schools (Occupational Therapy, Physical Therapy, Masters in Nursing, Physician's Assistant), and 12% applied to graduate school. The remaining students were employed in a variety of positions including laboratory technician, physician scribe, patient care associate, medical sales, mental health aid, AmeriCorps, and field marketing. Of these, 73% had plans for graduate or professional school within 1-2 years following graduation, only 12% did not plan to pursue an advanced degree. Thus, students graduating with a Bachelor of Science in Neuroscience are highly likely to obtain advanced degrees where salaries range from approximately \$60,000 to well over \$150,000 per year. The tax revenues and other benefits from an increased number of highly educated individuals in the medical, pharmaceutical, research, and technology fields justify approval for the proposed program.

16.* Budget Funding Sources, by Year of Program (Please answer in terms of dollar amounts.)

(Please note – all the fields in number 16 are required for the CPE's pre-proposal form.)

Total Resources Available from	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year
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²⁰ For questions about cost and funding of the program, please contact your department chair, business officer, or associate dean for academic affairs.

PROPOSAL FOR NEW UNDERGRADUATE DEGREE PROGRAM

Federal Sources						
New	0	0	0	0	0	0
Existing	0	0	0	0	0	0
Narrative/Explanation:						
Total Resources Available from Other Non-State Sources:						
	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	
New	0	0	0	0	0	0
Existing	0	0	0	0	0	0
Narrative/Explanation:						
State Resources						
	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	
New	0	0	0	0	0	0
Existing	0	0	0	0	0	0
Narrative/Explanation:						
Internal						
	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	
(New) Allocated Resources	0	0	0	0	0	0
(Existing) Reallocated Resources	0	0	0	0	0	0
Narrative/Explanation:						
Student Tuition						
	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	
New	0	0	0	0	0	0
Existing	0	0	0	0	0	0
Narrative/Explanation:						
Total Funding Sources						
	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	
Total New	0	0	0	0	0	0
Total Existing	0	0	0	0	0	0
17. Breakdown of Program Expenses/Requirements⁴						
(Please note – all the fields in number 17 are required for the CPE's pre-proposal form.)						
Staff: Executive, Administrative & Managerial						
	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	
New	0	0	0	0	0	0
Existing	0	0	0	0	0	0
Narrative/Explanation:						
Faculty						
	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	
New	77250	79568	81955	84413	86946	
Existing	344251	354579	365216	376173	387458	
Narrative/Explanation: <i>The faculty cost reflect the 75% distribution of effort of the new Special Title Series</i>						

PROPOSAL FOR NEW UNDERGRADUATE DEGREE PROGRAM

		<i>line (tenure-track, no research), which will be dedicated to teaching in the new Neuroscience program. The existing faculty costs reflect the teaching efforts of the faculty of record.</i>				
Student Employees		1st Year	2nd Year	3rd Year	4th Year	5th Year
	New	0	0	0	0	0
	Existing	0	0	0	0	0
	Narrative Explanation/Justification:					
Equipment and Instructional Materials		1st Year	2nd Year	3rd Year	4th Year	5th Year
	New	296,311	12,000	12,000	12,000	12,000
	Existing	0	0	0	0	0
	Narrative Explanation/Justification:	<i>The equipment and instructional materials (eg. consummables) budget reflects capital and small equipment needed, in the first year of the new program, to adequately equip the new 4 credit hour lecture-laboratory course BIO 305 Introduction to Neuroscience Techniques. This course will be required of all majors and involves an intensive lecture and laboratory experience involving completion of a series of guided, integrated studies in neuroscience employing applied techniques that require advanced instrumentation. After year 1, we are requesting an annual consummables budget of \$12,000 to provide the laboratory supplies needed to conduct the lab.</i>				
Library		1st Year	2nd Year	3rd Year	4th Year	5th Year
	New	0	0	0	0	0
	Existing	0	0	0	0	0
	Narrative Explanation/Justification:					
Contractual Services		1st Year	2nd Year	3rd Year	4th Year	5th Year
	New	0	0	0	0	0
	Existing	0	0	0	0	0
	Narrative Explanation/Justification:					
Academic and/or Student Services		1st Year	2nd Year	3rd Year	4th Year	5th Year
	New	0	0	0	0	0
	Existing	0	0	0	0	0
	Narrative Explanation/Justification:					
Other Support Services		1st Year	2nd Year	3rd Year	4th Year	5th Year
	New	0	0	0	0	0

PROPOSAL FOR NEW UNDERGRADUATE DEGREE PROGRAM

Existing	0	0	0	0	0
Narrative Explanation/Justification:					
Faculty Development	1st Year	2nd Year	3rd Year	4th Year	5th Year
New	0	0	0	0	0
Existing	0	0	0	0	0
Narrative Explanation/Justification:					
Assessment	1st Year	2nd Year	3rd Year	4th Year	5th Year
New	0	0	0	0	0
Existing	0	0	0	0	0
Narrative Explanation/Justification:					
Other	1st Year	2nd Year	3rd Year	4th Year	5th Year
New	0	0	0	0	0
Existing	0	0	0	0	0
Narrative Explanation/Justification:					
Total Program Budgeted Expenses/Requirements	1st Year	2nd Year	3rd Year	4th Year	5th Year
New					
Existing					
TOTAL Program Budgeted Expenses/Requirements:					
GRAND TOTAL	1st Year	2nd Year	3rd Year	4th Year	5th Year
TOTAL NET COST:	717,812	446,147	459,171	472,586	486,404

18. Course Descriptions

18a	Program Core Courses (includes pre-major and pre-professional courses)
Prefix & Number	Course Description (from the Bulletin or the most recent new/change course form)
BIO 148	<i>Introduction to Biology I. BIO 148 introduces the student to the biological mechanisms operating at the molecular, cellular, and population level that contribute to the origin, maintenance, and evolution of biodiversity including the origins and history of the evolutionary process. Course material is presented within a phylogenetic context, emphasizing the shared history of all living organisms on earth through common ancestry. The first semester of an integrated one-year sequence (BIO 148 and BIO 152). Prereq: Math ACT of 23 or above or MA 109, past or concurrent enrollment in CHE 105.</i>
BIO 152	<i>Principles of Biology II. The second semester of an integrated one-year sequence (BIO 150 and 152) that is designed to develop understanding and appreciation for the diverse forms of plant and animal life, and their relationships to each other and to their environment. Structure and function relationships will be explored</i>

PROPOSAL FOR NEW UNDERGRADUATE DEGREE PROGRAM

18c Prefix & Number	Program Free Electives Courses	
	Course Description (from the Bulletin or the most recent new/change course form)	
	<i>not applicable</i>	
18d	Courses for a Track. (If multiple tracks are available, click HERE for a template for additional tracks. Append a PDF to the end of this form with each track's courses and descriptions.	
Prefix & Number	Course Type	Course Description (from the Bulletin or the most recent new/change course form)
	<input type="checkbox"/> Track Core	
	<input type="checkbox"/> Track Elective	
	<input type="checkbox"/> Track Core	
	<input type="checkbox"/> Track Elective	
	<input type="checkbox"/> Track Core	
	<input type="checkbox"/> Track Elective	
	<input type="checkbox"/> Track Core	
	<input type="checkbox"/> Track Elective	
	<input type="checkbox"/> Track Core	
	<input type="checkbox"/> Track Elective	
	<input type="checkbox"/> Track Core	
	<input type="checkbox"/> Track Elective	
	<input type="checkbox"/> Track Core	
	<input type="checkbox"/> Track Elective	
	<input type="checkbox"/> Track Core	
	<input type="checkbox"/> Track Elective	
	<input type="checkbox"/> Track Core	
	<input type="checkbox"/> Track Elective	
	<input type="checkbox"/> Track Core	
	<input type="checkbox"/> Track Elective	

Appendix 4d. Faculty Roster

	CIP CODE	COURSES IN PROGRAM	OTHER QUALIFICATIONS
Rebecca Dutch (FT)	26.0202	BCH 401G	NA
Sabire Ozcan (FT)	26.0204	BCH 401G	NA
Craig William Vander Kooi (FT)	26.0202	BCH 401G	NA
Yvonne N Fondufe-Mittendorf (FT)	26.0802	BCH 401G	NA
Nicholas L Martin (FT)	40.0801	PHY 211	NA
Gang Cao (FT)	40.0801	PHY 213	NA
Kwokwai Ng (FT)	40.0801	PHY 231, PHY 232	NA
Steven L Ellis (FT)	40.0801	PHY 241, PHY 242	Senior academic coordinator in phy

Appendix 5b. Curricular Map

Student Learning Outcomes

1. Acquire and integrate knowledge regarding the structure and function of the nervous system at various levels including anatomical, behavioral, physiological, biochemical, cellular, and molecular.
2. Describe and identify methods and tools used in neuroscience research and identify the power and limitations of various approaches and methodologies
3. Investigate challenging research questions and develop critical thinking skills.
4. Formulate hypotheses, design experiments to test the hypotheses, analyze data, interpret results, and critically evaluate the existing literature.
5. Effectively communicate results of scientific experiments in both written research papers/reports and oral presentations
6. Identify the ethical and professional standards and regulations which govern neuroscience investigations using cells, animals, and humans

Curriculum Map B.S. in Neuroscience Curricular Map

I= introduce, R = reinforce, E = emphasize

Course	SLO 1	SLO 2	SLO3	SLO 4	SLO 5	SLO 6
BIO 302	I	I	I		I	I
CHE 230	I	I	-	-	-	-
CHE 231	R	R	-	-	-	-
CHE 232	I	I	-	-	-	-
CHE 233	R	R	-	-	-	-
PHY 211 and PHY 213 or PHY 231, PHY241, PHY 232, PHY 242	I, R	I, R	-	-	-	-
BIO 305	R	R	R	I	R	R
BCH 401G or CHE 550 and 552 or BIO 315	R	I	R	-	-	-
BIO 426	R	E	E	R	E	E
BIO 394 or ANA 394 or PSY 393	E	E	E	E	E	E

Appendix 5c. Assessment Plan

1. Introduction

Unit Mission Statement

The mission of the B.S. degree program in Neuroscience is to provide students with a broad, multidisciplinary education in fundamental and applied aspects of nervous system structure and function.

Basis Assessment Approach

Assessment of student learning will occur at both formative and summative stages of the core curriculum and will follow a three year assessment cycle, with two of the six student learning outcomes being assessed annually over the course of the three year cycle.

2. Assessment Oversight, Resources

The program Directors will also act as assessment coordinators. It is the responsibility of the Directors to monitor activities of assessment in all relevant courses and to solicit the assessment input from those course instructors. A meeting of all Directors will take place in mid-September of each year to evaluate all assessment and generate an assessment report, due no later than October 31st of each year.

3. Program Level Learning Outcomes

Student Learning Outcomes

1. Acquire and integrate knowledge regarding the structure and function of the nervous system at various levels including anatomical, behavioral, physiological, biochemical, cellular, and molecular.
2. Describe and identify methods and tools used in neuroscience research and identify the power and limitations of various approaches and methodologies
3. Investigate challenging research questions and develop critical thinking skills.
4. Formulate hypotheses, design experiments to test the hypotheses, analyze data, interpret results, and critically evaluate the existing literature.
5. Effectively communicate results of scientific experiments in both written research papers/reports and oral presentations
6. Identify the ethical and professional standards and regulations which govern neuroscience investigations using cells, animals, and humans

4. Curriculum/Artifact Map B.S. in Neuroscience

I= introduce, R = reinforce, E = emphasize

Course	SLO 1	SLO 2	SLO3	SLO 4	SLO 5	SLO 6
BIO 302	I exams	I exams	I		I	I exams
CHE 230	I	I	-	-	-	-
CHE 231	R	R	-	-	-	-
CHE 232	I	I	-	-	-	-
CHE 233	R	R	-	-	-	-
PHY 211 and PHY 213 or PHY 231, PHY241, PHY 232, PHY 242	I, R	I, R	-	-	-	-
BIO 305	R	R	R Laboratory Reports	I Laboratory Reports	R Laboratory Reports	R
BCH 401G or CHE 550 and 552 or BIO 315	R	I	R	-	-	-
BIO 426	R	E	E	R	E	E Oral Presentation
BIO 394 or ANA 394 or PSY 393	E Written Research Paper	E Independent Research Study	E Independent Research Study	E Independent Research Study	E Poster Presentation	E

- Orange highlights = formative assessments
- Yellow highlights = summative assessments

5. Assessment Methods and Measures

Indirect Methods:

Exams
Laboratory reports
Grade point average

Direct Methods:

Independent research competency (ability to design, implement and interpret research)
Written research report
Oral reports/presentation
Poster presentation

6. Data Collection and Review

Year 1: SLOs 1 and 2 will be assessed by analysis of exams in BIO 302 Introduction to Neuroscience (indirect, formative assessments) and research competency and written research papers in BIO 394/ANA 394/PSY 393 Research in Neuroscience (direct, summative assessments). Data will be collected by the teaching faculty member(s) and communicated to the Directors prior to Sept 1st of each year.

Year 2: SLOs 3 and 4 will be examined by analysis of descriptive laboratory reports written in BIO 305 Introduction to Neuroscience Techniques (indirect, formative assessment) and the execution of an independent laboratory experiments in BIO 394/ANA 394/PSY 393 Research in Neuroscience (direct, summative assessment). Data will be collected by the teaching faculty member(s) and communicated to the Directors prior to Sept. 1st of each year.

Year 3: SLOs 5 and 6 will be assessed by analysis of exams in BIO 302 and descriptive laboratory reports in BIO 305 Introduction to Neuroscience Techniques (indirect, formative assessments); one oral presentation in BIO 426 Seminar in Neuroscience (direct, summative assessment); and a poster presentation in BIO 394/ANA 394/PSY 393 Research in Neuroscience (direct, summative assessment). Data will be collected by the teaching faculty member(s) and communicated to the Directors prior to Sept. 1st of each year.

7. Assessment Cycle and Data Analysis

Assessment of student learning will occur at both formative and summative stages of the core curriculum and will follow a three year assessment cycle, with two of the six student learning outcomes being assessed annually over the course of the three year cycle. Faculty teaching in courses involving assessment will be maintain records of the relevant course-level assessment tools, including documentation of in-class assessment of oral report competency. Faculty of record will provide the Directors with relevant data prior to Sept. 1st of each year.

8. Teaching Effectiveness

All faculty of record will be evaluated using University Teacher Course Evaluations (TCEs) completed by their student each term. All TCEs are public record and accessed via the University website. The Directors will review the relevant TCEs of faculty of record each year. Areas of concern will be summarized and communicated to the individual faculty of record and a request for a plan of remediation will be made.

9. Plans to evaluate students' post-graduate success ?

The Directors will obtain data from the Alumni Survey annually and will additionally create a separate and brief web-based survey of educational and career outcomes to be communicated to all alumni electronically on an annual basis.

10. Appendices

Rubric for student learning outcomes

Student name:

Evaluator name:

Date:

SLO- Ratings	0	1	2	3
<i>1. Acquire and integrate knowledge regarding the structure and function of the nervous system at various levels including anatomical, behavioral, physiological, biochemical, cellular, and molecular.</i>	Student requires remedial support in one or more of the fundamental areas, at least, or fails to obtain a minimum grade point average of 2.00	Student demonstrates basic understanding of fundamental aspects of nervous system function with prompting	Student demonstrates mastery of nervous system function and structure	Student demonstrates excellent understanding and ability to communicate principles of nervous system function
Rating and comments:				
<i>2. Describe and identify methods and tools used in neuroscience research and identify the power and limitations of various</i>	Student is unfamiliar with appropriate methods and tools and/or student is unable to interpret power and limitations of	Student demonstrates basic familiarity with methods and tools, and with power and limitations of methods and tools	Student identifies appropriate methods and tools to provide specific information about nervous system function and/or structure	Student shows excellent depth of knowledge of methods and tools and/or in-depth knowledge of complementarity

<i>approaches and methodologies.</i>	methods and tools			use of methods and tools.
Rating and comments:				
<i>3. Investigate challenging research questions and develop critical thinking skills.</i>	Student is not able to complete guided laboratory exercises or show familiarity with relevant laboratory concepts	Student shows rudimentary capability to complete guided laboratory exercises with minor impediments.	Student demonstrates mastery of guided laboratory exercises with no impediments.	Student demonstrates independence in conducting laboratory exercises and excellence in interpretation of data.
Rating and comments:				
<i>4. Formulate hypotheses, design experiments to test the hypotheses, analyze data, interpret results, and critically evaluate the existing literature.</i>	Student is unable to independently to implement and interpret guided laboratory exercises	Student shows rudimentary independence in completing guided laboratory exercises with minor impediments.	Student demonstrates mastery of guided laboratory exercises with independence no impediments.	Student demonstrates excellent in interpretation of of laboratory exercises and extrapolation of relevant concepts.
Rating and comments:				
<i>5. Effectively communicate results of scientific experiments in both written research papers/reports and oral presentations</i>	Student has inability to factually convey laboratory approach and findings in written report or oral presentation form and inability to accurately interpret laboratory data	Student shows ability to factually convey laboratory approaches and findings in written or oral presentation form, with minor impediments.	Student shows mastery of communication of laboratory approaches, findings and interpretations in written and oral form.	Student demonstrates advanced complexity of communication of scientific approaches and findings in written or oral form.
Rating and comments:				

<p><i>6. Identify the ethical and professional standards and regulations which govern neuroscience investigations using cells, animals, and humans</i></p>	<p>Student is not able to accurately identify professional standards and relevant regulations</p>	<p>Student demonstrates knowledge of standards and regulations with minor impediments</p>	<p>Student demonstrates mastery of standards and regulations</p>	<p>Student demonstrates excellence in identification of standards and depth of knowledge of regulations.</p>
<p>Rating and comments:</p>				

Appendix 7m Guided Electives:

Students will choose at least one course from each of the four thematic areas below. Some courses are listed in more than one area. However, the same course cannot be used to satisfy two thematic requirements.

A) Cellular/Molecular		Credit Hours	Course Status
ANA 442G	Molecular and Cellular Neurobiology	(3)	existing
CHE 556	Elements of Neurochemistry	(3)	existing
BIO 510*	Recombinant DNA Tec Lab	(4)	existing
B) Physiology			
BIO 446	Neurophysiology Laboratory	(3)	existing
BIO 535*	Comparative Neurobiology and Behavior	(3)	existing
C) Neuroanatomy			
BIO 440	Comparative and Functional Neuroanatomy	(4)	existing
ANA 417G	Functional Human Neuroanatomy	(3)	existing
PSY 312	Brain and Behavior	(3)	existing
ANA 209	Principles of Human Anatomy	(3)	existing
D) Integrated			
PSY 312	Brain and Behavior	(3)	existing
BIO 375	Behavioral Ecology and Sociobiology	(3)	existing
ANA 410G	Neurobiology of Brain and Spinal Cord Disorders	(3)	existing
ANA 516*	Brain, Body and Mind	(3)	existing
BIO 507*	Biology of Sleep and Circadian Rhythms	(3)	existing
CGS 500	Cognitive Science in Theory and Practice	(3)	existing
CSD 571*	Neural Bases of Speech, Language, and Hearing	(3)	existing
PSY 459	Neuropharmacology: Drugs and Behavior	(3)	existing
BIO 447	Animal Senses	(3)	new

Other neuroscience-related courses at the 200-level or above, as approved by DUS in Neuroscience

* Requires consent of instructor

Appendix 18a. Program Core Courses (includes pre-major and pre-professional courses)

<u>Prefix & Number</u>	<u>Course Description (from the Bulletin or most recent new/change course form)</u>
BIO 302	Introduction to Neuroscience. This introductory course is designed to provide students with a basic understanding, at the physiological, cellular and molecular levels, of how the nervous system functions to create behavior. It will also introduce students to the consequences of abnormal system functioning brought about by either disease or injury. Prereq: BIO 152 or equivalent or permission of instructor
WRD 204	Technical Writing. Instruction and experience in writing for science and technology. Emphasis on clarity, conciseness, and effectiveness in preparing letters, memos, and reports for specific audiences. Prereq: Completion of University Writing requirement.
CHE 230	Organic Chemistry I. Fundamental principles and theories of organic chemistry. Prereq: CHE 107 and 113
CHE 231	Organic Chemistry Laboratory I. Laboratory for CHE 230 or CHE 236. Laboratory, three hours per week. Prereq: CHE 113; prereq or concur: CHE 230 or CHE 236
CHE 232	Organic Chemistry II. A continuation of CHE 230. Prereq: CHE 230.
CHE 233	Organic Chemistry Laboratory II. Laboratory, three hours per week. Prereq: CHE 231. Prereq or concur: CHE 232.
PHY 211	General Physics. First part of a two-semester survey of classical and modern physics, focusing on the motion of solids and fluids as governed by Newton's Laws and by the conservation laws of energy, momentum, and angular momentum. Lecture, two hours; recitation, two hours; laboratory, two hours. Credit is not given to students who already have credit for PHY 231 and 241. Prereq: A working knowledge of algebra as obtainable in MA 109 or MA 110 or MA 112, or an ACT math score of 25 or above, or a SAT math score of 590 or above.
PHY 213	General Physics. Continuation of PHY 211, covering electrostatics, de circuits, magnetism, Maxwell's Equations, electromagnetic radiation, light and some modern physics. Lecture, two hours; recitation, two hours; laboratory, two hours. Credit is not given to students who already have credit for PHY 232 and 242. Prereq: PHY 211 or equivalent.
BCH 401G	Fundamentals of Biochemistry. Descriptive chemistry of amino acids and proteins, carbohydrates, lipids, and nucleic acids. Discussion of structure and function; metabolism and bioenergetics; and biological information flow. At the undergraduate level, understanding is demonstrated through hour examinations; at the graduate level, understanding is demonstrated through hour examinations and a brief paper. Lecture, three hours; one optional conference. Prereq: CHE 107, CHE 236 and BIO 152 or equivalent

- BIO 315 Introduction to Cell Biology. The structure and function of cells will be considered. Emphasis will be placed on the ultrastructure of cell organelles in plants and animals as a framework for understanding the compartmentalized nature of cell activity. Lecture, three hours; laboratory three hours/weekly. Prereq: BIO 303 and BIO 304. Coreq: CHE 230 or equivalent. Or consent of instructor.
- BIO 305 Introduction to Neuroscience. This introductory laboratory course will provide students with practical knowledge and hands-on experience in basic behavioral, anatomical and physiological techniques used by laboratory scientists in the investigation of the nervous system. It is designed as a gateway to independent research experiences in working neuroscience laboratories.
- MA 113 Calculus I. A course in one-variable calculus, including topics from analytic geometry. Derivatives and integrals of elementary functions (including the trigonometric functions) with applications. Lecture, three hours; recitation, two hours per week. Students may not receive credit for MA 113 and MA 137. Prereq: Math ACT of 27 or above, or math SAT of 620 or above, or MA 109 and MA 112, or MA 110, or consent of the department. Students who enroll in MA 113 based on their test scores should have completed a year of pre-calculus study in high school that includes the study of the trigonometric function. Note: Math placement test recommended. *an alternative to MA 137.
- PHY 231 General University Physics. First part of a two-semester survey of classical physics. Consequences of the principles of mechanics are developed conceptually, analytically and quantitatively. Lecture, three hours; recitation, one hour per week. Prereq or concur: MA 113. * an alternative to PHY 211
- PHY 241 General University Physics Laboratory. A laboratory course offering experiments in mechanics and heat, framed in a small group environment that requires coordination and team work in the development of a well-written lab report. Prereq or concur: PHY 231. * an alternative to PHY 213
- PHY 232 General University Physics. A general course covering electricity, magnetism, electromagnetic waves and physical optics. Lecture, three hours; recitation, one hour per week. Prereq: PHY 231; concur: MA 213. *an alternative to PHY 211
- PHY 242 General University Physics Laboratory. A laboratory course offering experiments in electricity, magnetism, and light, framed in a small group environment that requires coordination and team work in the development of a well written lab report. Prereq: PHY 241; concur: PHY 232. * an alternative to PHY 213
- BIO 394 Research in Neuroscience. An independent research project in an area of neuroscience under the direction of a faculty mentor. A research contract signed by the student and the faculty research mentor must be approved by the Director of Undergraduate Studies (Neuroscience). May be repeated to a maximum of 12 credits, but a maximum of only 6 credits may be used to satisfy the requirements of the minor or major in Neuroscience. Prereq: BIO 152 and BIO 302 or PSY 312

- BIO 426 Seminar in Neuroscience. This seminar course develops effective analysis, presentation and discussion skills required of science majors by exploring one neuroscience topic in detail.
- ANA 394 Independent research in Neurobiology and Neuroscience . ANA 394 is designed to provide students with an intensive experience in laboratory or field research. Participants should take an active role in the design and execution of experiments and in the analysis and interpretation of data. They should be capable of "independent research" in the sense that they can conduct the experiments with little direct supervision. Students are expected to become familiar with related research in the current literature by regularly reading scientific journals. The student is expected to devote at least 3-4 hours per week for each credit hour enrolled to laboratory work, although often more time is necessary.
- PSY 393 Research in Neuroscience. An independent research project in an area of neuroscience under the direction of a faculty mentor. A research contract must be signed by the student and the faculty research mentor. May be repeated to a maximum of 12 credits, in combination with other independent research credit hours. They should be capable of doing "independent research" in the sense that they can conduct the experiments with little direct supervision. Students are expected to become familiar with related research in the current literature by regularly reading scientific journals
- CHE 550 Biological Chemistry I. An introduction to biological chemistry. Topics include amino acids and proteins; nucleic acids and nucleotides; enzyme structure, function and energetics; metabolism including glycolysis; the tricarboxylic acid cycle; electron transport and oxidative phosphorylation; glycogen metabolism; hormone action; and other aspects of modern biological chemistry. Prereq: CHE 232 and a physical chemistry course at or above the 400 level, or consent of instructor.
- CHE 552 Biological Chemistry II. A further introduction to biological chemistry. Topics include lipid metabolism, biosynthesis and metabolism of nitrogen-containing compounds, storage and utilization of genetic information, immunochemistry, and other contemporary topics in biological chemistry Prereq: CHE 232 and a physical chemistry course at or above the 400 level, or consent of instructor.

Appendix 18b Program Guided Electives:

Students will choose at least one course from each of the four thematic areas below. Some courses are listed in more than one area. However, the same course cannot be used to satisfy two thematic requirements.

Prefix & number Course Description (from the Bulletin or most recent new/change course form)

A) Cellular/Molecular

- ANA 442G Molecular and Cellular Neurobiology. This 3-credit hour course is designed to be an introductory course for undergraduate students aimed at providing an overview of major principles and techniques associated with cellular and molecular neurobiology. Subject matter is intended to range from molecular mechanisms underlying neuronal signaling and cellular function to how these properties are invoked across simple networks, neural systems, and behavior.
- CHE 556 Elements of Neurochemistry. A course in the neurochemistry of the brain. Among topics to be covered: brain cell cytoarchitecture; chemical bases for: neuronal membrane transport, electrical excitability, and ion channels; axonal transport; energy metabolism; synaptic transmission; cellular signaling; Ca²⁺ homeostasis; neurotransmitters; oxidative stress; apoptosis and necrosis; application of neurochemical principles to the molecular bases of neurodegenerative disorders. Prereq: CHE 232 and a biological chemistry course, or consent of instructor.
- BIO 510* Recombinant DNA Technology Laboratory. An introduction to the construction, isolation, and analysis of recombinant DNA clones, with emphasis on practical experience in basic techniques. Graduate students will be given first preference in course enrollment. Lecture, one hour; laboratory, 6 hours per week. Prereq: BIO 304 and BIO 315 or equivalent with consent of instructor

B) Physiology

- BIO 446 Neurophysiology Laboratory. This course will focus on experimentation in neurophysiology. The generation of receptor potentials in sensory neurons will be measured in addition to action potentials in axons. Pharmacological experimentation of ionotropic and metabotropic receptors subtypes and second messengers signaling will be conducted. The key role of ion channels and transporters in regulation of the membrane potential will be examined. The concept of electrochemical equilibrium will be introduced and the quantitative examination of the equilibrium membrane potential will include discussion of Goldman and Nernst equations and their applications. The mechanisms of action potential generation, as a result of synaptic and receptor stimulation within a neural cell, will be measured in lecture and laboratory. Prerequisites: BIO 302 or BIO 350 or consent of Instructor

BIO 535* Comparative Neurobiology and Behavior. The course consists of an introduction to neurophysiology and study of the neural basis of sensory processing and motor patterns. A comparative analysis of the neurobiological basis of behavioral responses will be made, utilizing a broad range of vertebrates and invertebrates. Prereq: BIO 350 or consent of instructor. (Same as PGY 535.)

C) Neuroanatomy

BIO 440 Comparative and Functional Neuroanatomy. Explores the cellular bases for sensory, integrative and motor neuroscience from an evolutionary perspective, delineating common features of all nervous systems ranging from cnidarian nerve nets to ventral nerve cords of most invertebrates to the chordate/vertebrate central nervous systems. Discovery of the common features of nervous structure in model system organisms with the human brain will provide students a perspective on the value of model systems for future study. Functional analyses of nervous system structures will enable students to identify anatomical bases for neural function and behavior.

ANA 417G This course provides an introductory level of understanding of human central nervous system (CNS) anatomy and function. Lecture topics will explore the CNS based on structures that make up functional systems (e.g., motor, sensory, visual, etc.), how these systems interact, and examples of how a loss of function results in disease conditions.

PSY 312 Brain and Behavior. An introduction to structural and functional characteristics of the nervous system. The emphasis is on exploring the relationship between brain and behavior. Topics range from simple structures and behaviors to more complex functions. The biological basis of normal and abnormal behavior is explored from a multidisciplinary perspective. Prereq: PSY 100 or equivalent and PSY 215 or 216 and PSY major or minor. Registration is open only to PSY majors during the priority registration window.

ANA 209 The structure of the human body will be examined at various levels: cellular, tissues and organ systems. The gross anatomical arrangement of the body will be studied in a system-by-system format relating structure to function and the fundamentals of human embryology/ malformation with adult anatomy. The central nervous system will be emphasized. Prereq: Introductory biology or zoology.

D) Integrated

PSY 312 Brain and Behavior. An introduction to structural and functional characteristics of the nervous system. The emphasis is on exploring the relationship between brain and behavior. Topics range from simple structures and behaviors to more complex functions. The biological basis of normal and abnormal behavior is explored from a multidisciplinary perspective. Prereq: PSY 100 or equivalent and PSY 215 or 216 and PSY

major or minor. Registration is open only to PSY majors during the priority registration window.

- BIO 375** Behavioral Ecology and Sociobiology. This course will explore the selective forces influencing animal behavior, such as foraging, predator avoidance, mate choice, parental care, and social interaction. Specific phenomena to be explored include the evolution of optimal foraging and search images, extravagant male characteristics, female preferences, conflicts between the sexes, infanticide, parent-offspring conflict, dominance hierarchies, optimal group size, altruism, and eusociality. The study of these behaviors integrates ideas and approaches from ecology, genetics, physiology, and psychology. Students will be encouraged to read outside material, to think carefully, logically, and critically about ideas, and to ask questions and defend their views in class. Prereq: A year of introductory biology (BIO 150/152).
- ANA 410G** Neurobiology of Brain and Spinal Cord Disorders. ANA 410G is a multidisciplinary discussion of neurodegenerative diseases and neurologic disorders. The course objective is to provide an in depth understanding of the basic science and clinical symptoms of selected neurologic disorders and neurodegenerative diseases, current treatment strategies and new approaches for treatment and potential cure of these devastating illnesses. Included are such topics as the 1) subcellular and molecular basis of the diseases, 2) the role of genetics in aging and neurodegeneration, 3) mechanisms of cell death, and 4) the cellular/molecular basis of neurodegenerative diseases and neurologic disorders. The format of the course will consist of a series of formal lectures and informal discussion sessions. Reference materials will be recent review articles. Graduate students taking the course will present studies from the primary medical literature in a journal club format and will also prepare a paper examining one disorder in detail. This course will be of interest to advanced students from a variety of disciplines whose interests concern brain and spinal cord disorders.
- ANA 516** Brain, Body and Mind. ANA 516 will cover advanced topics in neuroscience. Topics include: neural pathways, development, neuroanatomy, neurobiochemistry, neuropharmacology, neural imaging and molecular neuroscience. Laboratory experiences will be used to complement lectures. Prereq: ANA 511, 512, 513; PGY 511; and enrollment in the College of Medicine or a graduate program in the bio-medical sciences. In addition, students from graduate programs outside of anatomy must obtain the consent of the course director before registration
- BIO 507*** Biology of Sleep and Circadian Rhythms. This course provides an introduction to the fields of sleep and circadian rhythms including the underlying neuroanatomy, neurophysiology, and the molecular and genetic underpinnings of sleep and circadian behaviors. The medical and societal relevance of these areas will also be emphasized. Considerable time will be spent reading and analyzing the primary literature in these

fields, including student presentations of selected articles. Prereq: BIO 304; BIO 315; BIO 350 (or equivalent).

- CGS 500 Cognitive Science in Theory and Practice. This course will introduce upper-level undergraduate students (and lower-level graduate students) to Cognitive Science, an interdisciplinary field that seeks to study the mind from the perspective of various disciplines: Biology, Computer Science, Linguistics, the Neurosciences, Philosophy, and Psychology. The course will consist of modules in at least four of these six disciplines. Prereq: Upper-class standing
- CD 571* Neural Bases of Speech, Language, and Hearing. Detailed investigation of the neuroanatomy and neurophysiology of speech, language, and hearing from a communication sciences perspective. Emphasis on anatomy and physiology of the central nervous system, neurodevelopment, and normal neural substrates involved in speech, language, and hearing. Prereq: CSD 378 or permission of the instructor.
- PSY 459 Neuropharmacology: Drugs and Behavior. General principles of drug action from a physiological perspective. Major emphasis is on the psychoactive drugs encountered in experimental, clinical and social settings. Prereq: PSY 215 and PSY 312, or BIO 148 or equivalent. Other neuroscience-related courses at the 200-level or above, as approved by DUS in Neuroscience
- BIO 477 Animal Senses: Advanced study of how animals use sensory abilities to communicate, navigate, and detect prey, predators and mates. We will focus on extreme and unusual sensory systems such as echolocation, electroreception, and magnetoreception, as well as vision, smell, touch, and hearing. Graduate students are required do additional research and to present their term paper orally and/or in writing.

* requires consent of instructor

ity involved in the degree program.

<u>Courses Taught</u>	<u>Academic Degree and Coursework</u>	<u>Other qualifications and comments</u>
BIO 302 Introduction to Neuroscience (3) (UN) BIO 305 Introduction to Neuroscience Techniques (3) (UN) Research in Neuroscience (3-12) (UN) BIO 426 Seminar in Neuroscience (1) (UN)	Ph.D., Univ. Virginia Biology BIO 302	Program Director
BIO 302 Introduction to Neuroscience (3) (UN) BIO 394 Research in Neuroscience (3-12) (UN) BIO 426 Seminar in Neuroscience (1) (UN)	Ph.D. Johns Hopkins Univ. Biology BIO 302	NA
BIO 394 Research in Neuroscience (3-12) (UN) BIO 426 Seminar in Neuroscience (1) (UN)	Ph.D., Texas Tech Univ. Physiology BIO 302 BIO 650 Neurophysiology Laboratory	NA
BIO 394 Research in Neuroscience (3-12) (UN)	Ph.D., Univ. of Oregon Biology BIO 380 Biology of Sex	Chair, Biology
BIO 315 Introduction to Cell Biology (4) (UT)	Ph.D., Princeton Univ. Molecular Biology BIO 315	NA
PSY 393 Research in Neuroscience (3-12) (UN) BIO 305 Introduction to Neuroscience Techniques (3) (UN)	Ph.D. Univ. Nebraska Psychobiology PSY 312, PSY 459	Program Director
BIO 302 Introduction to Neuroscience (3) (UN) BIO 394 Research in Neuroscience (3-12) (UN)		

BIO 302 Introduction to Neuroscience (3) (UN)	Ph.D., Univ.	Program Director
BIO 305 Introduction to Neuroscience Techniques (4) (UN)	Saskatchewan	
ANA 394 Independent Research in Neurobiology and Neuroscience (3-12) (UN)	Biochemistry	
	BIO 302, BIO 305	
ANA 494 Independent Research in Neurobiology and Neuroscience (3-12) (UN)	Ph.D., Dartmouth College	Chair, Anatomy and Neurobiology
	Biology	
	ANA 516 Brain, Body, and Mind	
CHE 231 Organic Chemistry Laboratory (1) (UT)	Ph.D., Univ. Kentucky	NA
CHE 232 Organic Chemistry II (3) (UT)	Chemistry	
	CHE 231, CHE 232	
CHE 230 Organic Chemistry I (3) (UT)	Ph.D., Univ. of Florida	NA
CHE 232 Organic Chemistry II (3) (UT)	Chemistry	
	CHE 230, CHE 232	
CHE 232 Organic Chemistry II (3) (UT)	Ph.D., Georgia Institute of Technology	NA
	Chemistry	
	CHE 232	
CHE 230 Organic Chemistry I (3) (UT)	Ph.D., Massachusetts Institute of Technology	
CHE 232 Organic Chemistry II (3) (UT)	Chemistry	NA
	CHE 230, 232	
BCH 401G Fundamentals of Biochemistry (3) (UT)	Ph.D., Stanford Univ.	NA
	Biochemistry	
	BCH 401G	
BCH 401G Fundamentals of Biochemistry (3) (UT)	Ph.D., Heinrich-Heine Univ.	NA
	Molecular Biology	
	BCH 401G	

(FT)	BCH 401G Fundamentals of Biochemistry (3) (UT)	Ph.D., Vanderbilt Univ. Biochemistry BCH 401G	NA
dorf (FT)	BCH 401G Fundamentals of Biochemistry (3) (UT)	Ph.D., Molecular Genetics BCH 401G	NA
	PHY 211 General Physics (5) (UT)	Ph.D., Oxford Univ. Physics PHY 211	NA
	PHY 213 General Physics (5) (UT)	Ph.D., Temple Univ. Physics PHY 213	NA
	PHY 231 General University Physics (4) (UT) PHY 232 General University Physics (4) (UT)	Ph.D., Iowa State Univ. Physics PHY 231, PHY 232	NA
	PHY 241 General University Physics Laboratory (1) (UT) PHY 242 General University Physics Laboratory (1) (UT)	M.S., St. Bonaventure Univ. Physics PHY 241, PY 242	NA
	CHE 550 Biological Chemistry I (3) (UT) CHE 552 Biological Chemistry II (3) (UT)	Ph.D., Duke Univ. Physical Chemistry CHE 550, CHE 552 CHE 556	NA

Student enrollment in the neuroscience major programs in benchmark institutions

Benchmark Institution	Major Program	2011/2012 academic year	2012/2013 academic year	2013/2014 academic year	2014/2015 academic year (Fall semester only)
Michigan State Univ.	Neuroscience	program not started yet	132	330	411
Ohio State Univ.	Neuroscience	78	237	515	890
Univ. California Davis	Neurobiology, Physiology and Behavior	938	1024	1152	1322
Univ. Michigan	Neuroscience	395	505	536	451
Univ. Minnesota	Neuroscience	178	193	219	224
Institution	Major Program	2011/2012 academic year	2012/2013 academic year	2013/2014 academic year	2014/2015 academic year (Fall semester only)
Transylvania University	Neuroscience	program not started yet	program not started yet	6	29
Morehead State University	Neuroscience			Approved Fall 2014	



Department of Anatomy and Neurobiology
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Lexington, KY 40536-0298

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www.uky.edu

15 January 2015

TO: Office of the Registrar

From: Dr. Don M. Gash
MN 220 Medical Science Building
Professor and Chair
Anatomy and Neurobiology

Re: ANA 516 Section 001 Undergraduate Enrollment

This letter verifies that ANA 516 Section 001 will be an acceptable elective for the Neuroscience major. Undergraduates will be able to enroll in the course if they have the prerequisite of BIO 302 Introduction to Neuroscience. ANA 516 Section 001 will not require any of the graduate/COM prerequisites. The course will remain under controlled enrollment to ensure spaces for the undergraduates. Students will simply need to email the instructor of record to request an override to enroll in the course. Currently, ANA 516-001 has 4 undergraduates enrolled for Spring 2015.

Please contact me if you have any further questions or concerns.

Thank you!

Prendergast, Mark A

From: Gash, Don M
Sent: Tuesday, November 18, 2014 10:49 AM
To: Prendergast, Mark A
Subject: Re: Request to respond: new program proposal

Importance: High

Mark,

As Chair of Anatomy and Neurobiology, I confirm that our department has voted unanimously to participate in the new Neuroscience Program described below. Our faculty has agreed to teach the listed courses on a periodic basis. The multidisciplinary collaboration is demonstrated in part by Jim Geddes' role in working with you and Liz Debski in developing this program. Jim's primary appointment is in Anatomy and Neurobiology.

Thank you for spearheading the development of this program. It has my full support. Let me know if any additional information is needed.

Don

Don M. Gash, Ph.D.
Alumni Endowed Chair
Professor and Chair
Anatomy & Neurobiology
MN220 Medical Science Building
University of Kentucky
Lexington, KY 40536-0098

From: "Prendergast, Mark A" <prender@uky.edu>
Date: Tue, 18 Nov 2014 10:14:52 -0500
To: Don Gash <dongash@uky.edu>
Subject: Request to respond: new program proposal

Dear Dr. Gash

I am writing on behalf of the Drs. Liz Debski, Jim Geddes and myself to inform you of a new Bachelor of Science degree in Neuroscience that is being developed at the University of Kentucky and will be housed in the Department of Biology. This proposal represents a multidisciplinary approach to education in Neurosciences and involves the participation of many colleges and departments.

We respectfully request two responses from you.

- (1) We ask that you provide, and indicate, your support for the development of this new program, and
- (2) We ask that you provide your approval in listing the following course(s), offered Department of Anatomy and Neurobiology, as part of the curriculum for a proposed Bachelor of Science major in Neuroscience. * please note that in agreeing to have this course(s) listed in the new program proposal you are not committing to provide any specific seats in this course(s) or department resources.

We believe that the courses listed below will be of value to our future majors and that the possible inclusion of Neuroscience students in your course(s) may be an asset to you. We hope that you will consent to our including this

course(s) in the Neuroscience curriculum as either a "recommended", "alternative (meaning it is one of multiple options that may satisfy a requirement)" "elective", or "required" course(s). A response in the affirmative from Department Chairs with courses listed on this proposal is required for inclusion of the course(s) in our proposal.

<u>Recommended Course</u>	<u>Alternative Course</u>	<u>Elective Course</u>	<u>Required Course</u>
		ANA 309	
		ANA 394	
		ANA 410G	
		ANA 417G	
		ANA 442G	
		ANA 516	

The proposal requires that each department address 3 components of the proposed curriculum with regard to their own courses:

1. *Demonstration of true collaboration between multiple units*
2. *Impact of the course's use on home educational unit*
3. *Verification that the chair/director has consent from the faculty members of the academic unit*

You may reply simply by responding to this email. We respectfully request that you do so at your earliest convenience. Please do not hesitate to contact me if you have any questions or concerns regarding this request.

Best regards,

Mark A. Prendergast, Ph.D.
Professor

Mark A. Prendergast, Ph.D.
University Research Professor
Director UK STAR
Department of Psychology
Spinal Cord and Brain Injury Research Center
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Prendergast, Mark A

From: Yates, Steven W
Sent: Thursday, December 11, 2014 5:09 PM
To: Prendergast, Mark A; Geddes, James
Cc: Butterfield, D A
Subject: RE: Request to respond: new program proposal

Mark and Jim,

Allan presented the neuroscience curriculum to the faculty of the Department of Chemistry at today's faculty meeting and led a discussion of the neuroscience major. At the end of the discussion, the faculty voted unanimously in support of the neuroscience major, and I am pleased to report that the three components of the proposed curriculum given below are affirmed.

1. *Demonstration of true collaboration between multiple units*
2. *Impact of the course's use on home educational unit*
3. *Verification that the chair/director has consent from the faculty members of the academic unit*

Best regards,

Steve

*Steven W. Yates, Interim Chair, Department of Chemistry
Arts and Sciences Distinguished Professor
Director, UK Accelerator Laboratory <http://www.pa.uky.edu/accelerator/>
Departments of Chemistry and Physics & Astronomy
307 Chemistry-Physics Building
University of Kentucky, Lexington, KY 40506-0055 USA
(859)257-4005 (859)323-9985 (fax) yates@uky.edu
<http://www.as.uky.edu/users/yates>*

From: Butterfield, D A
Sent: Tuesday, November 18, 2014 10:28 AM
To: Yates, Steven W
Cc: Cammers, Arthur; Meier, Mark
Subject: FW: Request to respond: new program proposal
Importance: High

Steve (copy to Arthur Cammers and Mark Meier—who championed this major in Neuroscience when chair),

Please see the email from Dr. Mark Prendergast below. I would like to reply in the affirmative to Dr. Prendergast TODAY, since I am leaving for the Society for Free Radical Biology and Medicine National Meeting tomorrow morning. Basically, the BS in Neuroscience program would like to list our General and Organic lecture and laboratory courses as those that would be required of Neuroscience majors, and CHE 550, CHE 552, and CHE 556 (Neurochemistry) as courses Neuroscience students could choose among to complete major field requirements. I see this as a win-win for Chemistry, but I believe I need Departmental Chair approval before responding.

I would appreciate your approval to respond to Dr. Prendergast today.

Thanks,
Allan

D. Allan Butterfield, Ph.D.
The Alumni Association Endowed Professor of Biological Chemistry;
Director, Center of Membrane Sciences; Director, Free Radical Biology
in Cancer Shared Resource Facility, Markey Cancer Center;
Faculty Associate, Spinal Cord and Brain Injury Research Center;
Faculty, Sanders-Brown Center on Aging; and
Fellow, Society of Free Radical Biology and Medicine
249 Chemistry-Physics Building
University of Kentucky
Lexington, KY 40506-0055
<http://chem.as.uky.edu/users/dabcns>

Chemistry Phone: (859) 257-3184
Center of Membrane Sciences Phone: (859) 257-5875
Chemistry FAX: (859) 323-1069
Center of Membrane Sciences FAX: (859) 323-1464
e-mail: dabcns@uky.edu

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From: Prendergast, Mark A
Sent: Tuesday, November 18, 2014 10:18 AM
To: Butterfield, D A
Subject: Request to respond: new program proposal
Importance: High

Dear Dr. Butterfield

I am writing on behalf of the Drs. Liz Debski, Jim Geddes and myself to inform you of a new Bachelor of Science degree in Neuroscience that is being developed at the University of Kentucky and will be housed in the Department of Biology. This proposal represents a multidisciplinary approach to education in Neurosciences and involves the participation of many colleges and departments.

We respectfully request two responses from you.

- (1) We ask that you provide, and indicate, your support for the development of this new program, and
- (2) We ask that you provide your approval in listing the following course(s), offered by the Department of Chemistry, as part of the curriculum for a proposed Bachelor of Science major in Neuroscience. * please note that in agreeing to have this course(s) listed in the new program proposal you are not committing to provide any specific seats in this course(s) or department resources.

We believe that the courses listed below will be of value to our future majors and that the possible inclusion of Neuroscience students in your course(s) may be an asset to you. We hope that you will consent to our including this course(s) in the Neuroscience curriculum as either a "recommended", "alternative (meaning it is one of multiple options that may satisfy a requirement)" "elective", or "required" course(s). A response in the affirmative from Department Chairs with courses listed on this proposal is required for inclusion of the course(s) in our proposal.

<u>Recommended Course</u>	<u>Alternative Course</u>	<u>Elective Course</u>	<u>Required Course</u>
		CHE 550	CHE 105

CHE 552
CHE 556

CHE 107
CHE 111
CHE 113
CHE 230
CHE 231
CHE 232
CHE 233

The proposal requires that each department address 3 components of the proposed curriculum with regard to their own courses:

1. *Demonstration of true collaboration between multiple units*
2. *Impact of the course's use on home educational unit*
3. *Verification that the chair/director has consent from the faculty members of the academic unit*

You may reply simply by responding to this email. We respectfully request that you do so at your earliest convenience. Please do not hesitate to contact me if you have any questions or concerns regarding this request.

Best regards,

Mark A. Prendergast, Ph.D.
Professor

Mark A. Prendergast, Ph.D.
University Research Professor
Director UK STAR
Department of Psychology
Spinal Cord and Brain Injury Research Center
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Prendergast, Mark A

From: shapere@gmail.com on behalf of Al Shapere <shapere@pa.uky.edu>
Sent: Wednesday, December 10, 2014 5:42 PM
To: Prendergast, Mark A
Subject: Re: FW: follow up on new program proposal

[Sorry this got delayed due to the end-of-semester crunch.]

Dear Mark,
The Department of Physics and Astronomy fully supports the proposed new major in Neuroscience. Although the Physics courses are listed as Alternative, we expect that they will play an important role in the Neuroscience curriculum. We should be able to accommodate the additional students that the program is expected to attract. The proposal has the consent of the Chair, Associate Chair, the Director of Undergraduate Studies, and the faculty members belonging to the Undergraduate Program Curriculum Committee. I look forward to hearing more about the program as it develops.
Sincerely,
Al Shapere
Associate Chair of Physics and Astronomy

--

Dept. of Physics and Astronomy
Chemistry-Physics Building, Room 365
University of Kentucky
Lexington KY 40506-0055
Tel: (859) 444-4534

On Wed, Dec 10, 2014 at 3:27 PM, Prendergast, Mark A <prender@uky.edu> wrote:

Hi Al

Could we possibly get your email indicating your support for the new major and the use of your courses in our proposed curriculum ?

Thanks

Mark

From: Prendergast, Mark A
Sent: Tuesday, November 25, 2014 10:20 AM
To: shapere@pa.uky.edu
Subject: follow up on new program proposal

Dear Dr. Das/Shapere

I am writing on behalf of the Drs. Liz Debski, Jim Geddes and myself to inform you of a new Bachelor of Science degree in Neuroscience that is being developed at the University of Kentucky and will be housed in the Department of Biology. This proposal represents a multidisciplinary approach to education in Neurosciences and involves the participation of many colleges and departments.

We respectfully request two responses from you.

- (1) We ask that you provide, and indicate, your support for the development of this new program, and
- (2) We ask that you provide your approval in listing the following course(s), offered Department of Physics and Astronomy, as part of the curriculum for a proposed Bachelor of Science major in Neuroscience. * please note that in agreeing to have this course(s) listed in the new program proposal you are not committing to provide any specific seats in this course(s) or department resources.

We believe that the courses listed below will be of value to our future majors and that the possible inclusion of Neuroscience students in your course(s) may be an asset to you. We hope that you will consent to our including this course(s) in the Neuroscience curriculum as either a "recommended", "alternative (meaning it is one of multiple options that may satisfy a requirement)" "elective", or "required" course(s). A response in the affirmative from Department Chairs with courses listed on this proposal is required for inclusion of the course(s) in our proposal.

<u>Recommended Course</u>	<u>Alternative Course</u>	<u>Elective Course</u>	<u>Required Course</u>
	PHY 211*		
	PHY 213*		
	PHY 231*		
	PHY 232*		
	PHY 241*		
	PHY 242*		

*please note that some combination of these courses is required

The proposal requires that each department address 3 components of the proposed curriculum with regard to their own courses:

1. *Demonstration of true collaboration between multiple units*
2. *Impact of the course's use on home educational unit*
3. *Verification that the chair/director has consent from the faculty members of the academic unit*

You may reply simply by responding to this email. We respectfully request that you do so at your earliest convenience.

Please do not hesitate to contact me if you have any questions or concerns regarding this request.

Best regards,

Mark A. Prendergast, Ph.D.

Professor

Mark A. Prendergast, Ph.D.

University Research Professor

Director UK STAR

Department of Psychology

Spinal Cord and Brain Injury Research Center

B449 BBSRB

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University of Kentucky

Lexington, KY 40536

Telephone: +1 (859) 257-6120

Prendergast, Mark A

From: Andres, Douglas A
Sent: Thursday, November 20, 2014 11:01 AM
To: Prendergast, Mark A
Subject: RE: Request to respond: new program proposal

Dr. Pendergast,

I am writing in support of the new Neuroscience program and would be pleased to have BCH401G listed as an alternative Course for students within the program.

Best regards,

Douglas A. Andres, Ph.D.
Professor and Chair
Department of Molecular & Cellular Biochemistry
University of Kentucky College of Medicine
BBSRB 283
741 S. Limestone Street
Lexington, KY 40536-0509
Tel Office: 859-257-6775
Lab: 859-257-6776
FAX: 859-323-5505
dandres@uky.edu
visit our website at <http://biochemistry.med.uky.edu/>

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From: Prendergast, Mark A
Sent: Tuesday, November 18, 2014 10:13 AM
To: Andres, Douglas A
Subject: Request to respond: new program proposal
Importance: High

Dear Dr. Andres

I am writing on behalf of the Drs. Liz Debski, Jim Geddes and myself to inform you of a new Bachelor of Science degree in Neuroscience that is being developed at the University of Kentucky and will be housed in the Department of Biology. This proposal represents a multidisciplinary approach to education in Neurosciences and involves the participation of many colleges and departments.

We respectfully request two responses from you.

- (1) We ask that you provide, and indicate, your support for the development of this new program, and

(2) We ask that you provide your approval in listing the following course(s), offered Department of Molecular and Cellular Biochemistry, as part of the curriculum for a proposed Bachelor of Science major in Neuroscience. * please note that in agreeing to have this course(s) listed in the new program proposal you are not committing to provide any specific seats in this course(s) or department resources.

We believe that the courses listed below will be of value to our future majors and that the possible inclusion of Neuroscience students in your course(s) may be an asset to you. We hope that you will consent to our including this course(s) in the Neuroscience curriculum as either a "recommended", "alternative (meaning it is one of multiple options that may satisfy a requirement)" "elective", or "required" course(s). A response in the affirmative from Department Chairs with courses listed on this proposal is required for inclusion of the course(s) in our proposal.

<u>Recommended Course</u>	<u>Alternative Course</u>	<u>Elective Course</u>	<u>Required Course</u>
	BCH 401G		

The proposal requires that each department address 3 components of the proposed curriculum with regard to their own courses:

1. *Demonstration of true collaboration between multiple units*
2. *Impact of the course's use on home educational unit*
3. *Verification that the chair/director has consent from the faculty members of the academic unit*

You may reply simply by responding to this email. We respectfully request that you do so at your earliest convenience. Please do not hesitate to contact me if you have any questions or concerns regarding this request.

Best regards,

Mark A. Prendergast, Ph.D.
Professor

Mark A. Prendergast, Ph.D.
University Research Professor
Director UK STAR
Department of Psychology
Spinal Cord and Brain Injury Research Center
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January 22, 2014

Dr. Mark Prendergast
Co-Director Neuroscience Major
College of Arts and Sciences
University of Kentucky

Dear Mark

On behalf of the Department of Biology at the University of Kentucky I am pleased to provide this letter of support for the new interdisciplinary major in neuroscience. The Biology faculty voted unanimously to support the creation of this minor and for the inclusion of BIO 148, BIO152, BIO 155, BIO 302, BIO 305, BIO 375, BIO 394, BIO 426, BIO 440, BIO 446, BIO 447, BIO 507, and BIO 535 as required and/or elective courses in the program.

Yours,

A handwritten signature in black ink, appearing to read "Vincent Cassone". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Vincent Cassone
Chair, Department of Biology