

# UNIVERSITY FACULTY SENATE FORMS

## Academic Program Approval

This form is a routing document for the approval of new and revised academic programs. Proposing department should complete this form. For more information, call the Faculty Senate Office at 831-2921.

Submitted by: Brian Ackerman phone number 2385

Department: Psychology email address: bpa@psych.udel.edu

Date: February 10, 2014

Action: Request for Permanent Status

(Example: add major/minor/concentration, delete major/minor/concentration, revise major/minor/concentration, academic unit name change, request for permanent status, policy change, etc.)

Effective term 14F  
(use format 04F, 05W)

Current degree BS  
(Example: BA, BACH, BACJ, HBA, EDD, MA, MBA, etc.)

Proposed change leads to the degree of: BS  
(Example: BA, BACH, BACJ, HBA, EDD, MA, MBA, etc.)

Proposed name: Neuroscience  
Proposed new name for revised or new major / minor / concentration / academic unit (if applicable)

### Revising or Deleting:

Undergraduate major / Concentration: BS in Neuroscience  
(Example: Applied Music – Instrumental degree BMAS)

Undergraduate minor: \_\_\_\_\_  
(Example: African Studies, Business Administration, English, Leadership, etc.)

Graduate Program Policy statement change: \_\_\_\_\_  
(Must attach your Graduate Program Policy Statement)

Graduate Program of Study: \_\_\_\_\_  
(Example: Animal Science: MS Animal Science: PHD Economics: MA Economics: PHD)

Graduate minor / concentration: \_\_\_\_\_

**Note: all graduate studies proposals must include an electronic copy of the Graduate Program Policy Document, highlighting the changes made to the original policy document.**

**List new courses required for the new or revised curriculum. How do they support the overall program objectives of the major/minor/concentrations)?**

(Be aware that approval of the curriculum is dependent upon these courses successfully passing through the Course Challenge list. If there are no new courses enter "None")

**No New Courses**

**Explain, when appropriate, how this new/revised curriculum supports the 10 goals of undergraduate education:** <http://www.ugs.udel.edu/gened/>

**No new or revised Curriculum**

**Identify other units affected by the proposed changes:**

(Attach permission from the affected units. If no other unit is affected, enter "None")

**No new impact on any other Department or Unit.**

**Describe the rationale for the proposed program change(s):**

(Explain your reasons for creating, revising, or deleting the curriculum or program.)

**Provisional 5-year status of the BS major in Neuroscience is expiring. In accordance with the request by the Faculty Senate, we request permanent status.**

**Program Requirements:**

(Show the new or revised curriculum as it should appear in the Course Catalog. If this is a revision, be sure to indicate the changes being made to the current curriculum and **include a side-by-side comparison** of the credit distribution before and after the proposed change.)

**DEGREE: BACHELOR OF SCIENCE**

**MAJOR: NEUROSCIENCE**

**UNIVERSITY REQUIREMENTS:**

ENGL 110 Critical Reading and Writing

03

First Year Experience

00-04

Discovery Learning Experience

03

Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related course content.

03

**COLLEGE REQUIREMENTS:**

Foreign Language

00-12

Breadth Requirements

18

(Minimum of 6 credits each in Groups A, B & C)

**SECOND WRITING REQUIREMENT**

03

**MAJOR REQUIREMENTS:**

**Biological Sciences**

17

Take these 3 courses:

BISC 207	Introductory Biology I	04
BISC 208	Introductory Biology II	04
BISC 403	Genetics & Evolutionary Biology	03

One of these courses:

BISC305	Cell Physiology	03
BISC306	General Physiology	03
BISC401	Molecular Biology of the Cell	03

One of these laboratory courses:

BISC315	Experimental Cell Physiology	03
BISC316	Experimental Physiology	03
BISC411	Experimental Microbiology of the Cell	03
BISC413	Advanced Genetics Laboratory	03

### **Related Sciences**

**16**

CHEM 103/104	General Chemistry	08
PHYS 201/202	General Physics I & II	08

### **Psychology**

**12**

PSYC100	General Psychology	03
or		
NSCI100	Psychology and Brain Science	03
PSYC209	Psychological Statistics	03

Two of the following courses:

PSYC310	Sensation and Perception	03
PSYC312	Learning & Motivation	03
PSYC340	Cognition	03
PSYC/NSCI414	Drugs and the Brain	03
PSYC428	Nature versus Nurture	03
PSYC431	Hormones and Behavior	03
PSYC/NSCI433	Cognitive Neuroscience	03

### **Neuroscience**

**09**

NSCI320	Introduction to Neuroscience	03
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One of the following courses:

NSCI626	Advanced Neuroanatomy	03
NSCI627	Advanced Neurophysiology	03
NSCI628	Advanced Neuropharmacology	03

One of the following courses:

NSCI629	Integrative Neuroscience I	03
NSCI630	Integrative Neuroscience II	03
NSCI631	Current Topics in Neuroscience	03
NSCI634	Stress and the Brain	03
NSCI635	Neuroplasticity	03
NSCI636	Spatial Cognition	03
NSCI637	Behavioral Epigenetics	03
NSCI638	Clinical Neuropsychology	03
NSCI639	The Emotional Brain	03
NSCI640	Immune System & Behavior	03
NSCI641	Hormones and Behavior	03
NSCI642	Social Neuroscience	03
NSCI643	Body and Space	03
NSCI667	Varied Topics	03
BISC639	Developmental Neurobiology	04

**ROUTING AND AUTHORIZATION:** (Please do not remove supporting documentation.)

Department Chairperson \_\_\_\_\_ Date \_\_\_\_\_

Dean of College \_\_\_\_\_ Date \_\_\_\_\_

Chairperson, College Curriculum Committee \_\_\_\_\_ Date \_\_\_\_\_

Chairperson, Senate Com. on UG or GR Studies \_\_\_\_\_ Date \_\_\_\_\_

Chairperson, Senate Coordinating Com. \_\_\_\_\_ Date \_\_\_\_\_

Secretary, Faculty Senate \_\_\_\_\_ Date \_\_\_\_\_

Date of Senate Resolution \_\_\_\_\_ Date to be Effective \_\_\_\_\_

Registrar \_\_\_\_\_ Program Code \_\_\_\_\_ Date \_\_\_\_\_

Vice Provost for Academic Affairs & International Programs \_\_\_\_\_ Date \_\_\_\_\_

Provost \_\_\_\_\_ Date \_\_\_\_\_

Board of Trustee Notification \_\_\_\_\_ Date \_\_\_\_\_

Revised 02/09/2009 /khs

## Permanent Status Program Review: Self-Study

### Bachelor of Science in Neuroscience

#### 1. Program Description

##### a. Introduction and History

The Department of Psychology proposed a new Bachelor of Science major in Neuroscience (NSCI) in the Fall of 2008, which the Faculty Senate approved provisionally for five years in March, 2009, and which became effective in September, 2009. Prior to that date, the University offered an interdepartmental major in Neuroscience. This major began in the late 1980s and was co-sponsored continuously by the Departments of Psychology and Biological Science. The interdepartmental major attracted excellent students in Psychology and Biological Sciences, with a mean of about 8 to 10 new students participating each year (about 30 to 40 across four years).

In this interdepartmental major, students graduated with two degrees, one in Psychology and one in Biological Science. Unfortunately, the arrangement was unfocused and required coursework that had little to do with neuroscience, it overloaded the students with required coursework, and it disadvantaged students in gaining admission to graduate programs relative to students from other universities with neuroscience majors. In addition, the Department of Biological Science had no faculty dedicated to behavioral neuroscience and had little interest in continuing to sponsor the interdepartmental major.

In contrast, the Department of Psychology had a solid core of faculty members dedicated to behavioral neuroscience and had long sponsored a PhD program in behavioral neuroscience (BNS). In addition, the Department was well-situated to host a Neuroscience major that could derive strong support from other areas and programs in the Department. For instance, most faculty members in the other PhD program areas in the Department (Clinical Science, Cognitive Psychology, and Social Psychology) had neuroscience interests and many actively conducted neuroscience research. These faculty members supported the major proposal, and they and all of our new research faculty hires currently play some role in the education of undergraduate Neuroscience majors. One example is that faculty in these areas offer core courses that flesh out the behavioral aspects of brain-behavior relations. Similarly, the Department proposed a new BS in Psychology in the Fall of 2007 (in addition to our popular BA major), which formed a good complement to a new proposal for a BS in Neuroscience. We also have a new 4+1 Masters degree program in neuroscience specifically designed to enhance the graduate competitiveness of select undergraduate students.

We conceptualized the new Neuroscience major as addressing four goals in serving the University and undergraduate students. These goals continue to motivate the program. First, a dedicated major offered students the chance to achieve a systematic and sophisticated understanding of the biology of the brain and of brain-behavior relations, of current methodology in exploring these relations, and of the ever-increasing importance of neuroscience in research, health, and society. Second, the major would help meet the apparent needs of many students with interests in neuroscience. Students were deterred from participating in the prior interdepartmental major because they did not graduate with a BS in Neuroscience on their diplomas. As apparent in the dramatic growth in the number of majors since 2009, it seems we have met this goal. Third, the dedicated major would provide good preparation for graduate training in Neuroscience or in medical school, and would enhance the competitiveness of students in gaining admission to

strong graduate programs. The strong science background and training, combined with a unique focus on behavior, seems particularly attractive to students with medical school interests.

Fourth, the major helped advance the University's interdisciplinary health and educational initiatives. Neuroscience has been and will continue to be a quintessentially interdisciplinary field that increasingly stimulates new perspectives in numerous domains, including psychology, medicine, engineering, computer science, sociology, philosophy, and economics. Many of the future advances in health and medicine will be in neurological and psychological systems and disorders, and will be developed through research in neuroscience. As one concrete example, we are currently working on an undergraduate minor in neuroscience in response to an initiative from BioMedical Engineering.

At the same time, we thought that the new BS in Neuroscience would be inexpensive, as it required no new courses, and would impose no new substantive demands on faculty in the Psychology Department or in other science departments. In our view, the major continues to be relatively inexpensive. In general, the BS major requires heavy doses of courses in Biological Sciences, Psychology, and related sciences (Chemistry and Physics). However, the major imposed no new demands on these departments or their faculties, as almost all students would have been science majors without the NSCI major, and as students in the interdepartmental program were taking the courses anyway. Similarly, the 600-level graduate courses in the major were already serving graduate students in the Behavioral Neuroscience Program and in the other PhD programs in the Psychology Department.

The BS major in Neuroscience proved as popular from the outset as we anticipated, and has shown remarkable growth over the 5-year probationary period, as we will show. Most of our majors enroll as freshmen and stay with the major throughout. Many of them anticipate a medical career, which determines the course sequencing for the first two years. About half of the majors participate in undergraduate research in faculty labs. Some of those who do not are fulfilling course requirements for medical school and do not have the scheduling time or space. We also have 4 to 5 students every year transfer into the major from other science majors, typically as sophomores. Because of the physical science prerequisites, usually started in the freshman year, we get few students transferring into the major from non-science disciplines. For the same reason, sophomore transfers from other majors usually are not behind in the major and do not experience graduation delays. A relatively high percentage of our majors are in the Honors program.

We have experienced some growth difficulties over the past 5 years as the program has evolved. One difficulty has to do with the science and psychology pre-requisites for dedicated neuroscience courses. The result has been that our typical major did not take the entry-level neuroscience course (NSCI320) until the 4<sup>th</sup> or 5<sup>th</sup> semester. That delayed entry into the content courses seems too late. Our response was to create a new introductory course (NSCI100) that would be an alternative to the introductory psychology course (PSYC100) as a requirement for majors. NSCI100 also would provide a potential home for freshman PSYC and NSCI majors who received AP credit for PSYC100 but were not ready to go on to 200- and 300-level courses.

A second difficulty is that we sometimes struggle to get Honors students the 12 Honors credits in the major, and the "capstone senior seminar," needed to graduate with an Honors degree in Neuroscience. Part of the difficulty here is that the NSCI major seems to be attracting many of the Honors students who earlier might have been Psychology majors. While the Psychology major has a well-worked plan for completion of the Honors degree, the plan for NSCI majors lacks structure. For NSCI, we count Honors credits in various pre-requisite courses in

other sciences (e.g., BISC207) and we require that Honors students take NSCI320-080 offered each Spring semester. But the core 600-level classes do not count for Honors credit. One solution has been to encourage NSCI faculty to teach occasional Honors “add-on” courses. Another has been to direct students to take our Honors PSYC340 (Cognition) as a preferred “option” when it is offered every other year. A third and more structural solution, which we will enact next year, is to offer the required PSYC209 (Measurement and Statistics) as an Honors course. Finally, we do offer a capstone Honors senior seminar in Psychology (PSYC415) that is available to NSCI students. But it does not count for major credit.

A third difficulty is that we have tried to find a way to expose students to a range of laboratory experiences as part of the undergraduate major. Our solution has been to create a new course (NSCI368) that would provide a common undergraduate research experience for the students working in various faculty labs. The students come together for an hour each week, with the goals of reporting about their laboratory experiences and projects, reading and discussing important empirical papers, and other topics meant to enhance and integrate their research experiences.

A fourth difficulty, and probably the most vexatious, is that our required 600-level courses (take 2 of 3) are overenrolled. We would like to have a maximum of 15 students in each class, but we frequently have 25 and counting. The limitation clearly has to do with faculty resources, as our NSCI faculty have heavy responsibilities in offering core 300-level courses in the Psychology and Neuroscience curricula. Sabbaticals and other heavy administrative responsibilities limit faculty resources as well. The obvious solution is to hire more dedicated BNS faculty and other faculty suited to teach the 300-level service courses. What we do not want to do, yet, is constrain the growth of the NSCI major.

Finally, we anticipate future growth and change in the major in several ways. We expect the number of majors perhaps to increase by another 10%. As a response, we may need to restructure the major somewhat to offer appropriate course and laboratory experiences. We expect that the new fMRI facility coming to campus in the next two years will promote new research and laboratory experiences for undergraduates focusing on human and animal neuro-imaging. Already a couple of our majors are assisting faculty in human imaging programs in off-campus sites. Anticipated new faculty who will use the facility undoubtedly will offer new course and research opportunities for undergraduate NSCI majors. We also anticipate that a proposed new NSCI minor will create interdisciplinary opportunities for students in other colleges in the University.

#### b. Academic Priorities and General Education Goals

The focus on laboratory experiences, methodology, and the research basis of neuroscience is consistent with the University goals of fostering experiential learning (Discovery Learning Experience) and the acquisition of quantitative, writing, and critical thinking skills. In addition, the BS in Neuroscience satisfies many of the specific general education goals for undergraduate education. These include Goal 1 (skills in written communication and quantitative reasoning), Goal 2 (critical thinking), Goal 3 (independent and collaborative work), Goal 4 (ethics—in research), Goal 5 (diverse methods of knowledge acquisition), Goal 6 (intellectual curiosity and engagement), and Goal 7 (outside classroom experiences). Similarly, the requirement of background courses in physical science (e.g., BISC207 and 209, CHEM103 and 104, etc.) and calculus easily satisfies the College of Arts and Sciences (CAS) and breadth

requirement for the natural sciences and mathematics group. Satisfying this requirement, however, consumes a considerable number of credit hours, and we balanced that burden by reducing to 6 the numbers of hours in each of the other three breadth areas. This solution to the credit burden is consistent with other Bachelor of Science majors in CAS. The courses in the breadth areas for CAS also satisfy the University breadth requirement, given that the students have to sample courses from two majors to meet a group requirement.

c. Curricular Requirements

The current requirements are below.

**DEGREE: BACHELOR OF SCIENCE  
MAJOR: NEUROSCIENCE**

**UNIVERSITY REQUIREMENTS:**

ENGL 110	Critical Reading and Writing	03
	First Year Experience	00-04
	Discovery Learning Experience	03
	Three credits in an approved course or courses stressing multicultural, ethnic, and/or gender-related course content.	03

**COLLEGE REQUIREMENTS:**

Foreign Language		00-12
Breadth Requirements		18
(Minimum of 6 credits each in Groups A, B & C)		

**SECOND WRITING REQUIREMENT** 03

**MAJOR REQUIREMENTS:**

**Biological Sciences** 17  
Take these 3 courses:

BISC 207	Introductory Biology I	04
BISC 208	Introductory Biology II	04
BISC 403	Genetics & Evolutionary Biology	03

One of these courses:

BISC305	Cell Physiology	03
BISC306	General Physiology	03
BISC401	Molecular Biology of the Cell	03

One of these laboratory courses:

BISC315	Experimental Cell Physiology	03
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BISC316	Experimental Physiology	03
BISC411	Experimental Microbiology of the Cell	03
BISC413	Advanced Genetics Laboratory	03

**Related Sciences**

**16**

CHEM 103/104	General Chemistry	08
PHYS 201/202	General Physics I & II	08

**Psychology**

**12**

PSYC100	General Psychology	03
or		
NSCI100	Psychology and Brain Science	03
PSYC209	Psychological Statistics	03

Two of the following courses:

PSYC310	Sensation and Perception	03
PSYC312	Learning & Motivation	03
PSYC340	Cognition	03
PSYC/NSCI414	Drugs and the Brain	03
PSYC428	Nature versus Nurture	03
PSYC431	Hormones and Behavior	03
PSYC/NSCI433	Cognitive Neuroscience	03

**Neuroscience**

**09**

NSCI320	Introduction to Neuroscience	03
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One of the following courses:

NSCI626	Advanced Neuroanatomy	03
NSCI627	Advanced Neurophysiology	03
NSCI628	Advanced Neuropharmacology	03

One of the following courses:

NSCI629	Integrative Neuroscience I	03
NSCI630	Integrative Neuroscience II	03
NSCI631	Current Topics in Neuroscience	03
NSCI634	Stress and the Brain	03
NSCI635	Neuroplasticity	03
NSCI636	Spatial Cognition	03
NSCI637	Behavioral Epigenetics	03
NSCI638	Clinical Neuropsychology	03
NSCI639	The Emotional Brain	03
NSCI640	Immune System & Behavior	03
NSCI641	Hormones and Behavior	03

NSCI642	Social Neuroscience	03
NSCI643	Body and Space	03
NSCI667	Varied Topics	03
BISC639	Developmental Neurobiology	04

#### d. Outcome Assessments

Given our goals for the BS degree in Neuroscience, we focus on three outcomes. A primary goal was content related, in that we wanted to offer the students the opportunity to gain a systematic and sophisticated understanding of the biology of the brain and brain-behavior relations. We do not have a direct measure of such understanding, but we can document the outstanding academic achievements of our majors as an indirect measure. Senior GPAs, for instance, have averaged about 3.33 over the last several semesters, and the number of Honors students has climbed from 17 in Fall 2009 to 64 in Fall 2013. Currently, 31% of the majors are in the Honors Program. The mean total SAT score in 2013 was 1856 for non-Honors majors and 2096 for Honors majors. For comparison purposes, the mean total SAT score in 2013 for non-Honors BS Psychology majors was 1690 and the mean for non-Honors BA psychology majors was 1520.

Another goal was to fill a niche in the University offerings and a need for students to graduate with a dedicated Neuroscience degree. The growth in majors is some evidence that we are meeting that goal. The number of majors has grown steadily from 75 in Fall of 2009 to 207 in January 2014.

The third outcome is post-graduate work in Neuroscience, Psychology, Medicine, or related fields. Here, our primary information source is a card that graduating seniors complete at the Department Convocation in late May. The information suffers from at least three kinds of systematic biases: only about  $\frac{2}{3}$  of the seniors come to Convocation in May (some graduated in January and many go to the Convocation of their other majors), many do not identify their major (BS or BA or NSCI), and many seniors either do not fill out the card or fill it out on the basis of aspiration. Nonetheless, in the 2013 Convocation, 35 seniors identified themselves as NSCI majors. Of these, 10 are in medical school, or various graduate programs (pharmacy, dentistry, neuroscience, psychology, etc.), and 5 others indicated employment in other health and research related jobs throughout the country.

Other sources of post-graduate information are faculty reports of known outcomes of prior NSCI majors working in faculty labs. At least 16 of these graduates have entered or recently been accepted into graduate or medical school.

#### e. Student Advisement

We assign each non-Honors NSCI major to a faculty member in the BNS (Behavioral Neuroscience) program and each Honors major either to a BNS faculty member or to the Director of Undergraduate Studies for the Psychology Department. That faculty person is the Honors liaison for the Department, and typically works with many of the Honors freshmen in New Student Orientation in the summer preceding matriculation. We also provide course relief for one member of the BNS faculty to serve as the undergraduate director of the NSCI major. The current director is Dr. Eric Roth. Students go to that director for help resolving scheduling conflicts and other issues. All students also have access to our Advisement Office, which is staffed by a faculty Director (Dr. Agnes Ly), a graduate student Assistant Director, and highly trained and carefully selected and paid undergraduate assistants.

f. Changes in Degree Requirements

We recently revised the major requirements slightly. We changed the number of course credits awarded in the courses designating BISC laboratories from 2 to 3, because BISC changed the course credits. Other changes were that we expanded the set of courses representing optional Psychology offerings, and we expanded the set of courses representing 600-level Neuroscience options. The reason was that new faculty joined the department who offered appropriate courses. Finally, we added an optional NSCI368 course that would provide a common experience for students working in various laboratories. This change does not affect degree requirements.

g. Recruitment

We do not do anything special to recruit students to any of the major programs in our Department. We are concerned that we perhaps have too many students, rather than too few.

2. Students

a. Enrollment History and Grades

In the table below, we provide total enrollments by semester for the BS NSCI program and enrollments and mean GPAs for seniors. For comparison purposes, we provide senior enrollment and GPA data for BS Psychology majors and BA Psychology majors. The total of NSCI majors is 207 as of January 31, 2014. Of these, 66% are female.

We note several trends. First, the number of NSCI majors has increased steadily with each academic year. Second, the Table shows larger numbers of seniors in the Spring semesters than in the Fall semesters. Our interpretation is that some seniors declare their double majors in the Spring to get a major on their diploma. Second, the mean GPAs of senior NSCI majors consistently exceed that of senior BA majors. This advantage occurs despite the fact that the BS NSCI majors are taking science courses that tend to be associated with lower course grades.

	<u>Semester</u>								
	Fall09	Spring10	Fall10	Spring11	Fall11	Spring12	Fall12	Spring13	Fall13
<u>BS NEURO</u>									
Total	75	108	127	123	136	166	172	187	193
Seniors	18	31	32	41	46	59	54	70	43
GPA	3.25	3.27	3.29	3.35	3.42	3.35	3.33	3.32	3.33
<u>BS PSYCH</u>									
Total	102	85	101	89	94	84	107	94	103
Seniors	13	10	10	24	19	20	23	20	12

GPA	3.47	3.38	3.43	3.31	3.44	3.38	3.29	3.40	3.42
<u>BA PSYCH</u>									
Total	647	657	676	682	698	703	693	684	623
Seniors	170	189	176	219	194	223	250	253	176
GPA	3.12	3.14	3.13	3.08	3.14	3.23	3.10	3.16	3.06

Other data as well document the academic quality and achievements of the NSCI majors. In Spring of 2013, for instance, 6 seniors completed an empirical thesis and won a University Degree with Distinction. In Spring of 2012, one of our seniors won the Warner Award for best graduating female student, and in Spring of 2011, one of our seniors won a Rhodes Scholarship. In each of the last three years, graduating seniors have won Sigma Xi awards (American Academy for the Advancement of Science) for outstanding undergraduate research in science. Finally, in most years, two to three of our sophomore NSCI majors win Science and Engineering Summer Fellowships.

#### b. Student Placement

The Department's placement efforts reflect a mentor approach. The approach is that laboratory supervisors, advisors, and other faculty members advise about graduate opportunities, write letters of recommendation in support of graduate applications, and help students identify and compete for BS-level laboratory jobs across the country. As noted in the outcome assessments section, self-report cards from the 2013 senior convocation suggest that at the time of graduation approximately 29% of NSCI graduates had been accepted into medical or other graduate schools and an additional 14% had employment in other health and research related jobs. Additionally, at least 16 NSCI majors who have directly worked in our faculty labs since 2009 have been placed in a variety of graduate/medical schools including Johns Hopkins University, New York Medical College, Brown University, University of Alabama Birmingham, Penn State University, Jefferson Medical College, University of Pittsburgh School of Medicine, University of Fribourg (Switzerland), Philadelphia College of Osteopathic Medicine, University of Illinois Urbana Champaign, and University of Delaware. Other NSCI majors who have worked in faculty labs have been placed in a variety of professional positions including NIH IRTA research fellowships and Teach for America.

#### 3. Demand

We are confident in the demand for Neuroscience degrees. One kind of demand is the "fit" with undergraduate student needs and aspirations here at Delaware. The growth of the NSCI major is evidence for that demand. Another kind of demand is the cultural need for strong students in the STEM disciplines. The NSCI major uniquely fits that demand, as it provides a human face to science and medicine that seems to attract students, especially those with medical school aspirations. Yet another demand reflects the cultural fascination with claims about brain structures and functions.

One final aspect of both demand and competition is that our comparator Research 1 institutions in the region all have undergraduate Neuroscience degree programs of various sorts. We would be losing a strong undergraduate recruitment tool if we did not have one of our own.

#### 4. Unique Program Features

Our program is structured so that students can have intensive laboratory experiences over several years, if they desire to do so. Indeed, the functioning of our BNS laboratories is dependent on undergraduate participation and help, with student participation usually becoming increasingly sophisticated with additional semesters in a lab. This participation enables many students to learn bench skills in neuroscience research that are critical for entrance to good graduate schools in neuroscience.

#### 5. Interdisciplinary Relationships

The BS NSCI major requires a host of credits in the physical sciences, including BISC, CHEM, and PHYS. To this extent, the major is interdisciplinary in building a strong science frame for credits in Neuroscience. Outside of NSCI, many students have double majors.

#### 6. Facilities

The upsurge in NSCI majors has put pressure on course enrollments. Similarly, we are getting to the point where we cannot provide sufficient experiences in individual faculty labs for all who want such experiences. Fortunately, we hired two new BNS faculty members two years ago, we have hired 3 faculty members in other PhD areas who perform neuroscience research, and we expect to hire more neuroscientists in the near future. These hires help relieve the pressure of a popular and rigorous major.

#### 7. Budgetary Requirements

There are no budgetary requirements beyond the typical unit and faculty expenses.

Recommendation from the Committee on Undergraduate Studies (Steve Hastings, Chair) with the concurrence of the Coordinating Committee on Education (Fred Hofstetter, Chair) and the Executive Committee (Deni Galileo, Chair) for the request for permanent status for the BS major in Neuroscience (attachment)

Whereas, the Faculty Senate granted provisional approval for five years to the BS major in Neuroscience in March, 2009, and

Whereas, the BS major has been successful in attracting excellent students and in more than doubling the numbers of students it serves, and

Whereas, the major fits well with the University's interdisciplinary education and health initiatives, be it therefore

Resolved, that the Faculty Senate recommends permanent approval for the BS degree in Neuroscience in the College of Arts and Sciences.



College of Arts & Sciences

OFFICE OF THE DEAN

4 Kent Way  
Newark, DE 19716  
Phone: 302-831-2793  
Fax: 302-831-6398

February 19, 2014

Brian Ackerman  
Department of Psychology

Dear Brian:

I strongly support granting permanent status to our Bachelor of Science major in Neuroscience. Since this major was provisionally approved, it has proven that there is strong student demand for the program, and the number of majors continues to grow. Our program attracts highly successful students, with 31% in the Honors program. These students are likely to enter the major as freshmen and are retained to graduation. They graduate with GPAs significantly higher than the average for the Psychology Department while taking challenging courses in the natural sciences. Data on student outcomes after graduation is still limited; though many Neuroscience majors have successfully gone on to attend graduate and professional schools.

The Neuroscience major is important in attracting excellent students to UD. Most research universities have similar programs. At UD, neuroscience is central to the research program in the Psychology department, and the major allows students to engage in graduate-level course work and research projects. For all of these reasons, I support granting permanent status to the program, and I recommend approval by the Faculty Senate.

I want to thank you and your colleagues for your leadership in building the Neuroscience program over the last five years. It is both rigorous and popular with students, and it is an outstanding example of faculty-led curriculum development.

Sincerely,

A handwritten signature in black ink that reads 'George H. Watson'.

George H. Watson  
Dean



Department of Psychology

108 Wolf Hall  
University of Delaware  
Newark, DE, 19716-2577  
Ph: 302/831-2271  
Fax: 302/831-3645

To the Undergraduate Studies Committee of the University Senate.

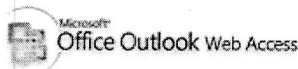
The Psychology department wholeheartedly supports granting permanent status to our Neuroscience BS major. This major attracts our very best students and has grown in stature and popularity every year. As our self-study shows, we offer a comprehensive neuroscience degree for our students and our graduates go on to competitive graduate programs and jobs. The department is committed to continuing support of the NSCI curriculum and opportunities for Neuroscience undergraduates.

Sincerely,

A handwritten signature in cursive script, appearing to read "R. Simons", with a long horizontal line extending to the right.

Robert F. Simons, Ph.D.  
Professor and Chair





Type here to search

This Folder

Address Book

Options

Log Off

- Mail
  - Calendar
  - Contacts
  - Deleted Items (20050)
  - Drafts [328]
  - Inbox (5)
  - Junk E-mail [159]
  - Sent Items
- Click to view all folders >
- Manage Folders...

Reply
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 Move
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 Junk
 Close

## Re: NSCI Permanent Status Proposal

Murray Johnston [mvj@udel.edu]

Sent: Sunday, February 09, 2014 7:36 PM

To: Brian P. Ackerman

Dear Brian,  
 On behalf of the Chemistry and Biochemistry Department, I confirm that we strongly support the request to confer permanent status to the BS Neuroscience degree. I also confirm that we are able to accommodate these students in our relevant courses into the future.

Best,  
Murray

Murray V. Johnston  
 Professor and Chair  
 Department of Chemistry and Biochemistry  
 University of Delaware  
 Newark, DE 19716

Office: Brown Laboratory, Room 102C  
 Phone: 302.831.1247  
 Fax: 302.831.6335  
 Email: mvj@udel.edu  
 Internet: [www.udel.edu/chem/johnston/](http://www.udel.edu/chem/johnston/)

On 2/6/14, 8:52 AM, Brian P. Ackerman wrote:

> Dear Professor Johnston,  
 >

> The Faculty Senate and Provost's Office approved our BS major in Neuroscience (NSCI) for provisional status for five years in the Spring of 2009. Now we have to gain approval for permanent status. To do so, we need to get a letter of support from you, the Chair of Chemistry. The reason is that CHEM103 and 104 are required courses in the major, and many majors take Organic as well (as a pre-requisite for Genetics in BISC). I have attached the Faculty Senate Web-form as a cover sheet detailing the proposal request and the self-study that represents our argument for permanent status.

> Unfortunately, we are on a short leash here, as we have to have the entire Proposal into the Faculty Senate Committee and the Provost's Office by March 1st. We were supposed to get a year's notice to prepare the proposal, but we only got about 3 months notice. Could we impose on you to write a quick letter of support or even to affirm the support of you and your Department by an e-mail message?

> Thank you,

> Brian

> Brian Ackerman

> Professor of Psychology

Connected to Microsoft Exchange

## Brian P. Ackerman

---

**From:** Nowak, Edmund R <nowak@udel.edu>  
**Sent:** Friday, February 07, 2014 11:18 AM  
**To:** Brian P. Ackerman  
**Cc:** Welch, Patricia D.  
**Subject:** RE: NSCI Permanent Status Proposal

Hi Brian, Please see my statement below. Let me know if you need me to include more information or comment on particular topics. Best, Ed

To whom it may concern:

On behalf of the Department of Physics and Astronomy, I would like to express our enthusiastic support for establishing a permanent BS major in Neuroscience. We understand that the program requirements for Neuroscience majors include PHYS201 and 202 (Introductory Physics I and II). There is no budgetary impact for Physics and Astronomy to provide such support since we have been instructing these students under the provisional status of the major. We look forward to continuing to provide these (and all) students with a solid and relevant foundation in physics that includes a significant laboratory component.

Best regards,  
Dr. Edmund Nowak  
Professor and Chair  
Physics and Astronomy

-----Original Message-----

**From:** Brian P. Ackerman [<mailto:bpa@psych.udel.edu>]  
**Sent:** Thursday, February 06, 2014 8:56 AM  
**To:** Nowak, Edmund R  
**Subject:** NSCI Permanent Status Proposal

Dear Professor Nowak,

The Faculty Senate and Provost's Office approved our BS major in Neuroscience (NSCI) for provisional status for five years in the Spring of 2009. Now we have to gain approval for permanent status. To do so, we need to get a letter of support from you, the Chair of Physics. The reason is that PHYS201 and 202 are required courses in the major. I have attached the Faculty Senate Web-form as a cover sheet detailing the proposal request and the self-study that represents our argument for permanent status.

Unfortunately, we are on a short leash here, as we have to have the entire Proposal into the Faculty Senate Committee and the Provost's Office by March 1st. We were supposed to get a year's notice to prepare the proposal, but we only got about 3 months notice. Could we impose on you to write a quick letter of support or even to affirm the support of you and your Department by an e-mail message?

Thank you,

Brian

Brian Ackerman  
Professor of Psychology

Appendix

2009 Resolution

2009 Academic Approval Form

Recommendation from the Committee on Undergraduate Studies  
(John Madsen, Chair) with the concurrence of the  
Coordinating Committee on Education (Cihan Cobanoglu,  
Chair) and the Executive Committee (Amy Johnson, Chair)  
for the request to add a new Major: BS Neuroscience  
(attachment) (attachment)

Whereas, the University of Delaware currently offers  
an interdepartmental major in  
Neuroscience and is co-sponsored by  
the Psychology Department and  
Biological Sciences. The current  
interdepartmental major attracts  
excellent students in both departments,  
with about 15 students a year, 60 across  
four years, and

Whereas, we believe a new Bachelor of Science in  
Neuroscience major will best serve the  
University and undergraduate students  
as they will now graduate with a  
dedicated degree in Neuroscience, and

Whereas, the new degree will fit well with the  
University's new interdisciplinary  
education and health initiatives, be it  
therefore

Resolved, that the Faculty Senate recommends  
approval provisionally, for five years,  
the establishment of a new major  
leading to the BS degree in  
Neuroscience in the college of Arts and  
Sciences.

# UNIVERSITY FACULTY SENATE FORMS

## Academic Program Approval

This form is a routing document for the approval of new and revised academic programs. Proposing department should complete this form. For more information, call the Faculty Senate Office at 831-2921.

Submitted by: Brian Ackerman phone number 2385

Department: Psychology email address bpa@psych.udel.edu

Action: Propose new BS in Neuroscience  
(Example: add major/minor/concentration, delete major/minor/concentration, revise major/minor/concentration, academic unit name change, request for permanent status, policy change, etc.)

Effective term 09F  
(use format 04F, 05W)

Current degree None  
(Example: BA, BACH, BACJ, HBA, EDD, MA, MBA, etc.)

Proposed change leads to the degree of: BS  
(Example: BA, BACH, BACJ, HBA, EDD, MA, MBA, etc.)

Proposed name: Neuroscience  
Proposed new name for revised or new major / minor / concentration / academic unit (if applicable)

### Revising or Deleting:

Undergraduate major / Concentration: \_\_\_\_\_  
(Example: Applied Music – Instrumental degree BMAS)

Undergraduate minor: \_\_\_\_\_  
(Example: African Studies, Business Administration, English, Leadership, etc.)

Graduate Program Policy statement change: \_\_\_\_\_  
(Must attach your Graduate Program Policy Statement)

Graduate Program of Study: \_\_\_\_\_  
(Example: Animal Science: MS Animal Science: PHD Economics: MA Economics: PHD)

Graduate minor / concentration: \_\_\_\_\_

**Note: all graduate studies proposals must include an electronic copy of the Graduate Program Policy Document, highlighting the changes made to the original policy document.**

**List new courses required for the new or revised curriculum. How do they support the overall program objectives of the major/minor/concentrations)?**

(Be aware that approval of the curriculum is dependent upon these courses successfully passing through the Course Challenge list. If there are no new courses enter "None")

When the major label (NSCI) is approved, we will propose NSCI versions of courses already on the books in Psychology or Biological Sciences. The graduate courses will be retitled. Note that there is no mechanism to propose courses in NSCI without prior approval of the NSCI program. These courses are:

PSYC320 Introduction to Neuroscience  
PSYC414 Drugs and the Brain  
PSYC433 Cognitive Neuroscience

PSYC614 Psychopharmacology (retitled Advanced Neuropharmacology)  
PSYC626 Neuroscience I (retitled Advanced Neuroanatomy)  
PSYC626 Neuroscience II (retitled Advanced Neurophysiology)

BISC439/639 Developmental Neurobiology

We will also propose three new courses:

NSCI631 Integrative Neuroscience I  
NSCI632 Integrative Neuroscience II  
NSCI633 Current Topics in Neuroscience

**Explain, when appropriate, how this new/revised curriculum supports the 10 goals of undergraduate education: <http://www.ugs.udel.edu/gened/>**

This new major supports goals 2, 5, 6, and 7 of the 10 goals of undergraduate education. Students will learn to think critically and will learn to think scientifically about the human brain.

In addition the curriculum encourages curiosity in an emerging field, will enable evaluation of claims about brain processes and their implications in the popular press, and will enable application of brain concepts to real world problems involving mental illness, psychopharmacology, etc.

**Identify other units affected by the proposed changes:**

(Attach permission from the affected units. If no other unit is affected, enter "None")

The new major reflects strong contributions from the Biological Sciences and Psychology Departments. We attach approvals from those departments.

**Describe the rationale for the proposed program change(s):**

(Explain your reasons for creating, revising, or deleting the curriculum or program.)

While neuroscience's roots are found in psychology and biology, during the last three decades, neuroscience has emerged as a coherent, independent discipline to study the brain. There are now over 38,000 members of the Society for Neuroscience worldwide and the Society continues to grow (Society for Neuroscience website:

[http://apu.sfn.org/index.cfm?pagename=membership\\_AboutMembership&section=membership](http://apu.sfn.org/index.cfm?pagename=membership_AboutMembership&section=membership)).

Currently, the University offers an interdepartmental major in Neuroscience. This major began in the late 1980s and has been co-sponsored continuously by the Departments of Psychology and Biological Sciences. The current interdepartmental major attracts excellent students in Psychology and Biological Sciences, with about 15 students participating each year (about 60 across four years). In this interdepartmental major, students graduate with two degrees, one in Psychology and one in Biological Sciences. Unfortunately, this arrangement is unfocused and requires course work that has little to do with neuroscience, it overloads the student with required course-work, and it often is an impediment for admission to graduate studies in competition with students from other universities with neuroscience majors.

We believe a new Bachelor of Science in Neuroscience major will best serve the University and undergraduate students. To keep current with the increased importance of neuroscience in research, health, and society, undergraduate students interested in neuroscience need to graduate with a dedicated degree in Neuroscience. Moreover, the lack of a diploma that specifies a Bachelor of Science in Neuroscience has deterred many students from declaring a major in Neuroscience under our current system. Students want their diploma to read BS in Neuroscience. They are proud of their education in neuroscience and want credit for it.

The new major will be administered by the Psychology Department that currently houses five neuroscientists and their laboratories. Another neuroscientist will join the faculty in 2009. In addition, many faculty members of the Department of Psychology in Cognitive Science and in Clinical Science share neuroscience perspectives and will actively support the major. The new major features heavy doses of courses in Biological Sciences, Psychology, and related sciences (Chemistry and Physics). However, the major imposes no new demands on these departments or their faculties, as the current students in the interdepartmental program are already taking relevant courses in the departments. Similarly, most of the proposed graduate classes in Neuroscience are already serving graduate students in the Behavioral Neuroscience Program in Psychology. The three new 600-level courses that will be proposed will also serve those graduate students and will constitute an integral part of that reconstituted graduate program. The new undergraduate BS major imposes no additional burden.

In regards to the University, an interdisciplinary Neuroscience major fits well with the University's new interdisciplinary educational and health initiatives. Neuroscience has been and will continue to be a quintessentially interdisciplinary field increasingly stimulating new perspectives in numerous fields, including psychology, medicine, engineering, computer science, sociology, philosophy, and economics. Many of the future advances in health and medicine will be in neurological and psychological disorders, and will be developed through research in neurosciences.

As the University moves forward with its Pathways to Prominence, and as our students demand forward-looking degree programs, we think that a restructured interdisciplinary neuroscience major with a Bachelor of Science degree will best serve both the University and its students.

### **Program Requirements:**

(Show the new or revised curriculum as it should appear in the Course Catalog. If this is a revision, be sure to indicate the changes being made to the current curriculum and **include a side-by-side comparison** of the credit distribution before and after the proposed change.)

### **Neuroscience**

Telephone: (302) 831-2271

<http://neuro.udel.edu>

Faculty Listing: <http://neuro.udel.edu/people/index.asp>

Neuroscience is an interdisciplinary major offering a curriculum leading to a Bachelor of Science degree in Neuroscience. Over the past three decades, neuroscience has emerged as a coherent, independent discipline to study the brain and all of its functional manifestations from sensation and movement to learning, cognition and emotion. Its roots are found in psychology and biology, but biochemistry, physiology and pharmacology are also important aspects of neuroscience. Neuroscientists are concerned not only with the structure and function of nerve cells, but also with the brain mechanisms of learning, memory, emotions, sensory and motor functions, perception, cognition, and other mental processes. In addition, neuroscientists explore disorders of brain function that lead to conditions such as schizophrenia, autism, Parkinson's and Alzheimer's disease.

Because of neuroscience's highly integrative nature, students first take basic neuroscience, psychology, biology, and related science courses and then more advanced neuroscience courses in neuroanatomy, neurophysiology, neuropharmacology and integrative neuroscience. Students are encouraged to participate in laboratory research at their earliest opportunity. The major prepares students for graduate programs in neuroscience, biopsychology, neuropsychology, physiology, pharmacology and anatomy, as well as for positions in the pharmaceutical and biotechnology industries. The major also provides excellent preparation for professional programs in medicine, osteopathy, dentistry, veterinary science, optometry, pharmacy and physical therapy.

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## **DEGREE: BACHELOR OF SCIENCE**

### **MAJOR: NEUROSCIENCE**

Curriculum	Credits
ENGL 110                      Critical Reading and Writing	3
First Year Experience (see page xx)	0-4
Discovery Learning Experience (see page xx)	3
Three credits in an approved course stressing multicultural, ethnic, and/or gender-related course content (see pages xx)	3

### **COLLEGE REQUIREMENTS**

Foreign Language	0-12
Breadth Requirements (Minimum of 6 credits each in Groups A, B, & C)	18

<b>Second writing requirement</b>	3
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<b>MAJOR REQUIREMENTS</b>	53/54
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<b>Biological Sciences</b>	16
BISC207                      Introductory Biology I	4
BISC208                      Introductory Biology II	4



BISC403 Genetics & Evolutionary Biology 3

Both of these courses:

BISC306 General Physiology 3

BISC316 Experimental Physiology 2

**Or** both of these courses:

BISC305 Cell Physiology 3

BISC315 Experimental Cell Physiology 2

**Or** both of these courses:

BISC401 Molecular Biology of the Cell 3

BISC411 Experimental MB of the Cell 2

Students wishing to satisfy the **pre-med** requirements are advised but not required to take BISC401 and BISC411.

**Psychology** 12

PSYC100 General Psychology 3

PSYC209 Measurement & Statistics 3

**Two** of the following courses:

PSYC310 Sensation & Perception 3

PSYC312 Learning & Motivation 3

PSYC340 Cognition 3

NSCI414/PSYC414 Drugs and the Brain 3 \*

NSCI433/PSYC433 Cognitive Neuroscience 3 \*

**Neuroscience** 9/10

NSCI320/PSYC320 Introduction to Neuroscience 3 \*

**One** of the following courses:

NSCI626/PSYC626 Advanced Neuroanatomy 3 \*

NSCI627/PSYC626 Advanced Neurophysiology 3 \*

NSCI628/PSYC614 Advanced Neuropharmacology 3 \*

**One** of the following courses:

NSCI631 Integrative Neuroscience I 3 \*

NSCI632 Integrative Neuroscience II 3 \*

NSCI633 Current Topics in Neuroscience 3 \*

NSCI/BISC439/639 Developmental Neurobiology 3/4 \*

**Related Sciences** 16

PHYS201/202 General Physics I & II 8

CHEM103/104 General Chemistry I & II 8

\* designates courses that will be proposed and redefined under the NSCI label once the major has been approved. Meanwhile, most of the courses are offered under the PSYC label by Behavioral Neuroscience faculty in the Department of Psychology.

**ROUTING AND AUTHORIZATION:** (Please do not remove supporting documentation.)

Department Chairperson \_\_\_\_\_ Date \_\_\_\_\_

Dean of College \_\_\_\_\_ Date \_\_\_\_\_

Chairperson, College Curriculum Committee \_\_\_\_\_ Date \_\_\_\_\_

Chairperson, Senate Com. on UG or GR Studies \_\_\_\_\_ Date \_\_\_\_\_

Chairperson, Senate Coordinating Com. \_\_\_\_\_ Date \_\_\_\_\_

Secretary, Faculty Senate \_\_\_\_\_ Date \_\_\_\_\_

Date of Senate Resolution \_\_\_\_\_ Date to be Effective \_\_\_\_\_

Registrar \_\_\_\_\_ Program Code \_\_\_\_\_ Date \_\_\_\_\_

Vice Provost for Academic Affairs & International Programs \_\_\_\_\_ Date \_\_\_\_\_

Provost \_\_\_\_\_ Date \_\_\_\_\_

Board of Trustee Notification \_\_\_\_\_ Date \_\_\_\_\_

Revised 10/23/2007 /khs