### **ASSESSMENT AREA**

Neuroscience Concentration

**ACADEMIC YEAR**

2011 - 2012

**ASSESSMENT TEAM MEMBERS**

W. Jeffrey Wilson (Psychological Science)

Barbara Keyes (Psychological Science)

Tammy Jechura (Psychological Science)

Mareike Wieth (Psychological Science)

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# **PROGRAM MISSION:**

Albion's neuroscience concentration will provide students with an understanding of the neural underpinnings of behavior and cognition. In the core courses, Neuroscience I and Neuroscience II, students will encounter a multi-disciplinary, multi-divisional introduction to the study of the mind/brain that spans all levels of current neuroscientific research. Students will pursue in the four electives those lines of inquiry they found especially attractive in the core courses. In a major research project or internship they will test their understanding in a theoretical or practical setting. This approach to neuroscience provides Albion students with the knowledge, insight and analytic skills necessary for success in graduate study or careers in the life sciences.

# **LEARNING GOALS**

Although neuroscience as a discipline entails a common goal of understanding the nervous system, the emphases of scientists from various backgrounds often differ. Students who pursue the Neuroscience Concentration will learn about all three of these ways of approaching the topic, and will focus on two of them in coursework and research:

1. Biology: Biologists often focus on the physiological principles that govern the function of the nervous system, from the systems level (e.g., how do various parts of the brain interact) to the cellular (how do neurons communicate) or the molecular (how do genes determine the structure of membrane-embedded proteins). **Students will be able to describe some aspect of the nervous system in detail at two of these three levels.**
2. Philosophy: Philosophers usually come to neuroscience out of a desire to understand some aspect of the mind (as underlain by the brain). Philosophy's long-standing interest in epistemology, or how-we-know-things, leads to a desire to understand cognition, thought, and knowledge as products of the brain. Neuroscience brings to the study of ethics interest in the way the brain processes information and in the kind of brain-states that subserve moral motivation and action along with newer understandings of self, free will, and moral responsibility.   **Students will be able to explain the mind/brain problem and to offer their own view of its solution.**
3. Psychology: Psychologists are concerned with behavior and mental activity, and examine how neural activity underlies interactions between organisms, behavior of the individual, and regulation of one's internal state. A psychologist's focus might range from the organismic down to the cellular. **Students will be able to propose an experiment that addresses the neural underpinnings of a behavior, mental process, or psychopathology.**
4. **PROGRAM COMPONENTS**

**Curriculum—**The neuroscience concentration consists of three components.

1. Three courses required of all students in the program:

Neuroscience I (covers basic systems, behavioral and cognitive neuroscience) (NEUR 241, with prerequisite Psychology 101)
Neuroscience II (covers molecular and cellular neuroscience) (NEUR 242, with prerequisites Neuroscience 241 and Biology 195)
Chemistry 121

2. Four of the following courses, selected from at least two different departments:

Biology
301 Cell Biology
314 Comparative Anatomy
317 Genetics
324 Developmental Biology
341 General Physiology
362 Molecular Biology
366 Endocrinology
368 Behavioral Ecology

Philosophy
306 Neuroscience and Ethics
315 Knowledge, Truth and Reason
318 Philosophy of Mind

Psychology
243 Psychology of Perception
245 Psychology of Learning
348 Research in Behavioral Neuroscience
378 Research in Cognitive Psychology
390 Neuropsychopharmacology

3. A major research project or internship.

1. **QUANTITATIVE MEASURES AND/OR QUALITATIVE INDICATORS**

Neuroscience is multidisciplinary. Students will be exposed to ideas from Biology, Philosophy, and Psychology. We will assess the student’s mastery of basic biological concepts in the only shared course in which the majority of students are Concentrators: Neuroscience II (NEUR 242). Performance on graded material in this course can provide an index of knowledge of the discipline, but interpretation of these data is difficult because students take this course at different stages of their undergraduate education -- some enrollees are sophomores, others are juniors and seniors.

1. **A student’s performance on his/her second classroom presentation in this course will serve as an indicator of the student’s mastery of two of the three basic biological neuroscientific approaches. By this time a student will have had at least two semesters of neuroscience-related coursework, and sometimes much more.**

Students who include a philosophical approach as one of their two mastery levels will invariably take a course that includes discussion of the mind/brain problem.

1. **The student’s final paper in this course will include consideration of the mind/brain problem and will serve as an indicator of the student’s knowledge of the issue and of his/her own solution to the problem.**

Students who include a psychological approach as one of their two mastery levels will demonstrate their ability to design a relevant neuroscience experiment via the proposal that they write for either of two courses: Research in Behavioral Neuroscience (PSY 348) or Cognitive Psychology (PSY 378).

1. **A student’s proposed experiment in one or both of these courses will serve as an indicator of the student’s mastery of the methodology that underlies the study of the neural underpinnings of a behavior, mental process, or psychopathology**

Finally, because part of our Mission is to give students the knowledge, insight and analytic skills necessary for success in graduate study or careers in the life sciences, we will track our students after graduation and poll them regarding their level of satisfaction with that preparation.

1. **All students will be surveyed 3 and 8 years post graduation to determine their opinion of the value of the Neuroscience Concentration to them.**

We are currently preparing to send the survey to the first cohort of students.