The David S. Olton Behavioral Biology Program seeks to establish a greater understanding of the relations of brain and behavior through an interdisciplinary program of study. Students in the Behavioral Biology Program examine the complex interplay between environment and behavior, and the processes and mechanisms that underlie behavior. One goal of the program is for students to learn how to integrate scientific discoveries from the wide array of scientific fields of inquiry that contribute to the study of behavioral biology, from molecular biology to sociology.

The interdisciplinary characteristics of the Behavioral Biology Program provide an excellent preparation for post-graduate work. For those interested in the health professions, behavioral biology can be integrated into a premedical curriculum that will provide a broad, humanistic perspective. For those who wish to pursue scientific careers in psychopharmacology, behavioral neuroscience, and physiological psychology, the program provides excellent preparation. Students interested in the fields of organismal or integrative biology should also consider this major.

Many students ask about the similarities and differences between the behavioral biology major and the neuroscience major. Both of these programs are interdepartmental, and a majority of professors teach courses that are listed for both majors. Behavioral Biology majors can explore many aspects of the biology of behavior, including the neural mechanisms of behavior (which obviously overlaps with the neuroscience major), but also biomechanical, evolutionary, ecological, and social aspects of behavior. The behavioral biology major also has fairly liberal course requirements which provide students with an opportunity to explore more choices in their liberal arts education. Students majoring in neuroscience focus directly on the brain and on neural function/mechanisms. Generally speaking, the systems Neuroscience focus area in the neuroscience major has the most overlap with behavioral biology.

Programs
- Behavioral Biology, Bachelor of Arts (http://e-catalog.jhu.edu/arts-sciences/full-time-residential-programs/degree-programs/behavioral-biology/behavioral-biology-bachelor-arts/)

For current course information and registration go to https://sis.jhu.edu/classes/

Courses
AS.290.101. Human Origins. 3 Credits.
This course examines the origins of human structure, function and behavior from an evolutionary perspective. It includes study of the evolution, behavior and behavioral ecology of nonhuman primates, hominid evolution (including the paleontological and archaeological records), and the origins of human cognition, social behavior and culture.
Area: Natural Sciences, Social and Behavioral Sciences

AS.290.303. Animal Communication. 3 Credits.
This course examines animal communication in all modalities (especially sound, sight, and scent) across taxa. Production, perception and evolution of signals will be discussed. Students will learn how to conduct research and write scientific papers in publication form.
Prerequisite(s): AS.200.208 OR AS.200.344
Area: Natural Sciences, Social and Behavioral Sciences

AS.290.304. Comparative Neuroanatomy. 3 Credits.
This course examines the phylogenetic and developmental history of the central nervous system across the vertebrate tree of life, with emphasis on the deep history of features that characterize the human brain. We will study how our understanding of non-human vertebrates (both model and non-model organisms) can provide important insights into the structure and function of the modern human brain.
Prerequisite(s): (AS.080.305 AND AS.080.306) OR AS.200.141
Area: Natural Sciences

AS.290.420. Human Sexual Orientation. 3 Credits.
This course will examine the historical and current theories of sexual orientation and sexual variation development by examining the biological, psychological and social contributing factors that influence the development of sexual orientations and variations along with treatment and modification of problematic sexual behaviors. Students may enroll in both AS.200.204 and AS.290.420, but cannot do so in the same semester. Priority given to Behavioral Biology majors. Note: For credit towards a Psychology major, students should register for AS.200.204 Human Sexuality, rather than this course.
Corequisite(s): Students may enroll in both AS.200.204 and AS.290.420, but cannot do so in the same semester.
Area: Social and Behavioral Sciences

AS.290.490. Senior Seminar: Behavioral Biology. 1 Credit.
Great ideas in Behavioral Biology. Discussion of classic and cutting edge articles in the original literature. Student presentations and reaction papers. Capstone course for senior Behavioral Biology majors.
Prerequisite(s): AS.290.101 AND AS.200.208 AND AS.200.208 AND AS.200.208, or Instructor permission.;(AS.290.101 AND AS.200.208 AND AS.200.141) or Instructor permission.
Area: Social and Behavioral Sciences

AS.290.500. Connections in Behavioral Biology. 0.5 Credits.
A small group of students will meet two times in the semester to share experiences and information on research, internship and volunteer activities in Behavioral Biology. This course is designed to 1) help Behavioral Biology majors obtain real world experiences that can lead to opportunities after graduation, 2) provide an informal setting to develop oral and written communication skills, and 3) build community among students in the major. Students will make oral presentations to the group about activities they wish to pursue or have already completed. Students will also write a short paper/news piece or prepare a webpage on an internship, research or volunteer experience.
Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration &gt; Online Forms.

AS.290.501. Behavioral Biology Research - Freshmen. 1 - 3 Credits.
Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration &gt; Online Forms.

AS.290.502. Research-Freshmen. 1 - 3 Credits.
Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration &gt; Online Forms.
AS.290.503. Behavioral Biology Research-Behavioral Biology Majors. 1 - 3 Credits.
Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration & Online Forms.

AS.290.504. Research-Sophomores. 1 - 3 Credits.
Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration & Online Forms.

AS.290.505. Behavioral Biology DUS Approved Research. 1 - 3 Credits.
Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration & Online Forms.

AS.290.506. Research-Juniors. 1 - 3 Credits.
Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration & Online Forms.

AS.290.507. Research-Seniors. 1 - 3 Credits.
Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration & Online Forms.

AS.290.508. Research-Seniors. 1 - 3 Credits.
Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration & Online Forms.

AS.290.510. Comparative Neural Systems and Behavior Research Discussions. 0.5 Credits.
This course is required concurrently with research in the Comparative Neural Systems Research and Behavior Lab. During the scheduled meetings we will discuss scientific papers, policies and procedures, research ethics and other information related to activities in the lab. At the end of the semester, students will present their research in groups.
Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration & Online Forms.

AS.290.519. Independent Study. 1 - 3 Credits.
Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration & Online Forms.

AS.290.520. Independent Study. 1 - 3 Credits.
Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration & Online Forms.

AS.290.590. Behavioral Biology Internship. 1 - 3 Credits.
Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration & Online Forms.

AS.290.594. Behavioral Biology Internship. 1 Credit.
Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration & Online Forms.

AS.290.596. Behavioral Biology Internship. 1 - 3 Credits.
Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration & Online Forms.

AS.290.597. Research - Summer. 3 Credits.
Prerequisite(s): You must request Independent Academic Work using the Independent Academic Work form found in Student Self-Service: Registration & Online Forms.

Cross Listed Courses

Biology
AS.020.151. General Biology I. 3 Credits.
This course is an introduction to biology from an evolutionary, molecular and cellular perspective. Specific topics and themes include evolutionary theory, the structure and function of biological molecules, mechanisms of harvesting energy, cell division, classical genetics and gene expression. This section will involve in-class problem solving and the use of assigned pre-class videos and questions.
Area: Natural Sciences

AS.020.152. General Biology II. 3 Credits.
This course builds on the concepts presented and discussed in General Biology I. The primary foci of this course will be on the diversity of life and on the anatomy, physiology, and evolution of plants and animals. There will be a special emphasis on human biology.
Prerequisite(s): AS.020.151
Area: Natural Sciences

AS.020.153. General Biology Laboratory I. 1 Credit.
This course reinforces the topics covered in AS.020.151. Students participate in a semester-long project, identifying bacteria from Homewood campus soils using molecular biology techniques. Other laboratory exercises cover aspects of evolution, genomics and biochemistry. Cross-listed with Behavioral Biology. Student must have enrolled in AS.020.151 either this term or in past terms. Students who have credit for AP Biology but take General Biology Lab I will lose four credits of AP Biology credit. Cross-listed with Behavioral Biology.
Prerequisite(s): Students must have completed Lab Safety training prior to registering for this class. To access the tutorial, login to myLearning and enter 458083 in the Search box to locate the appropriate module.;AS.020.151
Area: Natural Sciences

Neuroscience
AS.080.301. Behavioral Assessment of Animal Models of Cognition and Neuropsychiatric Disorders. 3 Credits.
What does a rat exploring it's environment tell us about memory? How can a mouse help us better understand schizophrenia? This course will focus on procedures that are routinely used to study behavior in animal models of cognition and neuropsychiatric disorders. Topics will include motor function, emotional and motivational states, disorders such as dementia and schizophrenia, among others. Throughout the course, we will read and discuss original research articles to illustrate and compare some of the measures and results from the various procedures.
Prerequisite(s): Students may not have taken AS.200.302;AS.200.141 OR (AS.080.305 and AS.080.306), OR by instructor permission.
Area: Social and Behavioral Sciences
AS.080.304. Neuroscience Learning and Memory. 3 Credits.
This course is an advanced survey of the scientific study of learning and memory. Different perspectives will be used to review the science of learning and memory including the cellular-molecular basis of synaptic plasticity, the functional circuitry involved in learning and memory and memory systems in the brain. The course is designed to provide a deep understanding of the issues and current debates in learning and memory research and focuses specifically on animal models of memory and memory impairment. This is an interactive lecture course with a strong emphasis on student participation.
Prerequisite(s): AS.200.141 OR (AS.080.305 AND AS.080.306) OR (AS.020.312 AND AS.020.306) or instructor permission.
Area: Natural Sciences

AS.080.308. Neuroeconomics. 3 Credits.
Every day decisions often require us to weigh the costs and benefits of engaging in a particular course of action in order to obtain some expected outcome. Unfortunately, we often lack the information necessary to obtain our desired goal with complete certainty. Economists have long been interested in understanding human decision-making under these circumstances. In parallel, neuroscientists have made great strides at describing the underlying neural basis of simple decision-making. However, despite much progress in both fields, our understanding of how the brain makes decisions is incomplete. In order to strengthen and further research in both fields, the interdisciplinary field of Neuroeconomics arose. This course will survey the field of Neuroeconomics focusing on theoretical concepts developed by economists and the role these theories are playing in guiding current experimental neuroscience.
Prerequisite(s): AS.080.306 OR AS.200.141 OR AS.020.312
Area: Natural Sciences

AS.080.328. Behavioral Neuroscience Lab. 3 Credits.
Class designed to give students first-hand knowledge of the behavioral procedures and techniques used to study behavior in the field of neuroscience. Students will gain hands-on experience by carrying out some of the behavioral tasks used to assess animals under specific behavioral domains, discuss why certain aspects (i.e. genotype, environment conditions, group size, etc.) are important factors to consider when designing, planning, and carrying out such experiments, and learn the relevance of behavioral research in translational medicine.
Prerequisite(s): AS.200.141 OR AS.200.302 OR AS.080.301 OR (AS.080.305 AND AS.080.306) or permission by instructor.
Area: Natural Sciences

AS.080.370. The Cerebellum: Is it just for motor control?. 3 Credits.
The cerebellum is traditionally thought to be involved in movement and motor control, and observations of patients with cerebellar damage do in fact show motor deficits. However, since the proliferation of functional MRI, cerebellar activations have been observed in a surprising number of brain activation studies that were designed to investigate the neural correlates of cognitive function. Over the past 2 decades, an increasing number of investigators have tried to characterize the role of the cerebellum in cognitive function. Through lectures and reading discussions this course will survey cerebellar circuitry, neuroimaging and neuromodulatory methods for investigating the cerebellum, and traditional and non-traditional functions of the cerebellum, including cerebellar involvement in cognitive functions such as language, working memory, and executive control.
Prerequisite(s): (AS.080.306 AND AS.080.203) OR AS.050.203
Area: Natural Sciences, Social and Behavioral Sciences

Psychological Brain Sciences

AS.200.141. Foundations of Brain, Behavior and Cognition. 3 Credits.
A survey of neuropsychology relating the organization of behavior to the integrative action of the nervous system. Cross-listed with Behavioral Biology and Neuroscience.
Area: Natural Sciences, Social and Behavioral Sciences

AS.200.208. Animal Behavior. 3 Credits.
Examines basic principles of animal behavior (orientation, migration, communication, reproduction, parent-offspring relations, ontogeny of behavior and social organization). Evolution and adaptive significance of behavior will be emphasized.
Prerequisite(s): AS.200.141 OR Permission of Instructor.
Area: Natural Sciences, Social and Behavioral Sciences

AS.200.334. Human Memory Psychology. 3 Credits.
This class will survey the behavioral and biological science of human memory. Historical perspectives as well as modern controversies will be discussed. Intersections with other fields such as law, education, medicine, and technology will be highlighted. The course will be a mixture of lectures and group discussions.
Area: Social and Behavioral Sciences

AS.200.344. Behavioral Endocrinology. 3 Credits.
An examination of the effects of hormones on behavior in non-human and human animals. Topics will include the effects of hormones on sexual differentiation, reproductive behavior, parental behavior, homeostasis and biological rhythms, regulation of body weight, learning and memory. Cross-listed with Behavioral Biology and Neuroscience.
Prerequisite(s): (AS.200.141 OR AS.080.306) OR (AS.020.151 AND AS.020.152) or instructor's permission
Area: Natural Sciences, Social and Behavioral Sciences

AS.200.370. Functional Human Neuroanatomy. 3 Credits.
This course examines the general organizing principles of the anatomy of the human central nervous system and how this anatomical organization relates to function, from the level of neural circuits, to systems, to behavior. Students will learn to identify neuroanatomical structures and pathways in dissections and MRI images through computerized exercises. Readings and lectures will emphasize general structure-function relationships and an understanding of the functional roles of particular structures in sensory, motor, and cognitive systems.
Prerequisite(s): AS.080.305 AND AS.080.306 or Instructor Permission
Area: Natural Sciences, Social and Behavioral Sciences

AS.200.376. Neuropsychopharmacology. 3 Credits.
Designed to provide information about how drugs affect the brain and behavior. The course focuses on biological concepts underlying structures and functions of the brain that relate to mental disorders. An introduction to neurobiology and brain function is presented as it applies to the interaction of various classes of drugs with the individual neurotransmitter systems in the brain. A brief historic review is followed by a discussion of clinical relevance. Cross-listed with Behavioral Biology and Neuroscience. Enrollment limited to juniors and seniors.
Prerequisite(s): (AS.080.305 AND AS.080.306) OR AS.020.306 AND AS.020.312 OR (AS.200.141 AND AS.020.306)
Area: Natural Sciences, Social and Behavioral Sciences
AS.200.386. Animal Cognition. 3 Credits.
Examine relations between brain, mind, and behavior in nonhuman animals, focusing on topics such as learning, memory, attention, decision-making, navigation, communication, and awareness. We will take a variety of approaches, including behavioral, computational, evolutionary, neurobiological, and psychological perspectives.

Prerequisite(s): AS.200.141 OR AS.200.208 OR AS.290.101 or Instructor permission.
Area: Social and Behavioral Sciences

For current faculty and contact information go to http://krieger.jhu.edu/behavioralbiology/faculty_directory/