

# NEUROSCIENCE

Class Times: Tu/Th 10:10-11:30am in Olin 201 | Office Hours: Tu 5-6pm/F 3-4pm/by appointment

## Instructor

Dr. Justin Hulbert  
office: Preston 108  
phone: x4390  
e-mail: [jhulbert@bard.edu](mailto:jhulbert@bard.edu)  
(preferred contact)

## Course Materials

Kalat (2016). *Biological Psychology* (12th ed.). Boston, MA: CENGAGE Learning.

Additional materials will be posted on **Moodle2** (see footer for URL & access code).

## Prerequisites

At least one of the following: Introduction to Psychological Science, Introduction to Neurobiology, Foundations of Mind, Brain, and Behavior, or permission of the instructor.

## Assessment

- Midterms (2 exams): **200pts**
- Final exam: **100pts**
- Rough draft: **50pts**
- Final paper: **100pts**
- Participation, homework, & quizzes: **100pts**



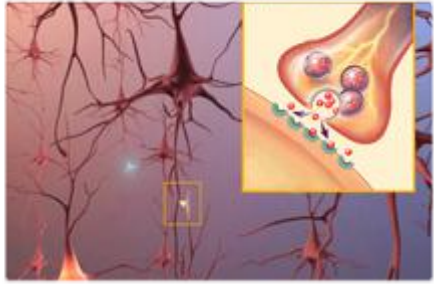
## Course Overview

The ability to express thoughts and emotions, and to interact with the environment, is largely dependent on the function of the nervous system. This course will examine basic concepts and methods in the study of brain, mind, and behavior. Topics include the structure and function of the central nervous system, brain development, learning & memory, emotion, sensory and motor systems, the assessment of brain damage, and clinical disorders.

### Joint Responsibilities

Achieving the broad aims of this course requires commitments from instructor and students alike. Below you will find an outline of some of those responsibilities.

- **Your instructor agrees to...**
  - a) Make himself available outside of class during posted office hours (and by appointment, as necessary) to answer questions, provide extra help, and discuss matters related to the course of study.



## Learning Objectives

Coming out of this course, you should have:

- An understanding of the structure and function of the nervous system, including how damage or disease can lead to disordered behavior.
  - The ability to describe neuronal structure and processing, including electrical and chemical signaling.
  - Developed an appreciation for how physiology and environment jointly influence emotions and behavior.
  - Come to recognize and understand the biological basis of human development, perception, movement, regulation, cognition, and emotions.
  - The ability to read and critically evaluate (in spoken and written form) empirical research from the field of neuroscience/biological psychology.
- b) Respond in a timely fashion (typically by the end of the next school day) to email queries. In the event that more time is required to fully address the student query, the instructor will acknowledge receipt of the email and provide the student with an estimated response time or suggest meeting in person.
  - c) Facilitate a thoughtful, considerate, and engaging learning environment.
  - d) Make available on Moodle a skeleton of lecture slides, suitable for downloading/printing prior to class (typically on or before the night prior to the relevant meeting). Note that these skeletons are intended to supplement note taking (e.g., by providing important/complicated figures) but are *not a replacement for attending class*, as they will lack critical information presented only in class.
  - e) Provide adequate time to complete assignments, minimize changes to the published schedule/ assignments, and immediately notify students about any such changes.
  - f) Provide comprehensive and fair assessments of materials presented or assigned. Assignments, with a level of feedback commensurate with the nature and aims of the task, will be returned to students in a timely fashion.
  - g) Create and welcome opportunities for students to provide feedback on the course/teaching throughout the semester.
- **You are responsible for...**
    - a) Showing up to class regularly, on time, and prepared. While formal attendance will not be taken, *no make-up quizzes will be offered, nor will late homework assignments be accepted*. If you miss a class, it is your responsibility to catch up on the relevant material.
    - b) Checking your college email regularly for important messages about the course.



## Best Practices

To make the most of office hours, it is recommended that you:

- Avoid waiting until the last minute (before an exam or due date) to attend. Seeking extra help or clarification well in advance of deadlines will leave you plenty of time to act on advice discussed.
- Email the instructor in advance or bring with you a concise list of topics/questions you wish to discuss, if possible. Itemizing in this way helps ensure all your questions are addressed and saves you time in the long run. That said, *dropping by for a spontaneous, broader chat is also most welcome*. Tea and/or coffee will be available.

When emailing the instructor, keep in mind that:

- Taking the time to draft a concise message with proper spelling/punctuation is expected and will be met with a similarly considered reply.

Writing/other academic help is available through [Bard Learning Commons](http://moodle2.bard.edu) ([lc@bard.edu](mailto:lc@bard.edu)).

- c) Keeping up with the assignments and readings. Textbooks are becoming more and more expensive; *I encourage you to shop around to find the most cost-effective solution*. The assigned (12th) edition is actually not the newest edition, meaning that there should be more used copies of the 12th edition available to buy in the bookstore and online. You could consider renting the text (in paper or digital form), sharing one with a friend, or buying a previous edition. The publisher (CENGAGE) also makes available a digital “MindTap” product that includes a mobile-ready textbook along with additional learning/study tools like flashcards at a discount price. While MindTap is NOT required, it is an option if you find yourself struggling or would like extra support. Note, however, that chapter/page numbers in previous/subsequent editions do NOT match the references in this syllabus (and some of the content has also changed). It is the responsibility of anyone using another edition to locate the relevant material. *To give students time to shop around for the textbook, the first few chapters will be made available on Moodle.*
- d) Substantively participating in class discussions (in class and/or online via Moodle). This could, for instance, involve asking/answering questions related to the offered course materials or posing extensions of learning/memory research currently under consideration. If you participate online, your identity should, at the very least, be visible to the instructor in order for you to receive credit. Note that a top-notch level of participation *does not necessitate responding to every question* raised in class or online; active or passive efforts to welcome contributions from everyone in the class are also looked upon favorably.
- e) Keeping distractions to a minimum in class. Phones should be turned off or set on vibrate (and kept out



of sight unless explicitly required for a class activity).

*Written permission to use laptops in class for note taking must be obtained in advance through the instructor and can be revoked by the instructor.*

- f) Submitting assignments on time, digitally via Moodle (unless prior arrangements have been made with the instructor). *A late paper will immediately be subject to a 10% penalty, with an additional 10% penalty leveled against that assignment's score for every 24 hours it remains late. Homework assignments are due by the beginning of the class on the specified date. No late homework assignments will be accepted, nor will there be any make-ups offered for in-class quizzes. The only paper extensions/make-up exams that will be granted involve documented cases of medical or family emergency. Students requiring alternative testing or course accommodations (e.g., due to disability) should contact the instructor privately as early as possible after the first class meeting.*
- g) Upholding academic integrity. Plagiarism (e.g., copying other's words or ideas without proper citation) will not be tolerated. You are expected to work independently on each graded assignment, unless explicitly instructed otherwise. When in doubt as to what constitutes plagiarism within the confines of this course, you are encouraged both to consult the student handbook (<http://www.bard.edu/dosa/handbook/index.php?aid=1201&sid=705>) and to contact the instructor for further guidance. There is absolutely no penalty for asking for clarification; however, failing to abide by Bard's standards for academic integrity can result in failing the course.

## Assessment Details

- **Midterms** (two in-class exams, each accounting for 100 points, totaling 200 points) will involve a combination of multiple-choice, matching, fill-in-the-blank, and short-answer questions covering material introduced during class and assigned readings. While the second one will focus on

material introduced since the first midterm, you'll still need to rely on foundational information from the beginning of the course (e.g., how neurotransmitters work) to do well.

- **Final** (*in-class exam, cumulative and accounting for 100 points*) will generally follow the format and aims of the midterm exam, while covering material introduced over the entire course.
- **Final paper** (*the rough draft is worth 50 points, and the final paper is worth another 100 points*) will involve writing a literature review that addresses a neuroscientific topic of your choice, provided that it relates to BOTH biology and psychology. That is, it should address how the functioning (or malfunctioning) of the nervous system influences behavior, perceptions, thoughts, or feelings. Examples of possible topics, good sources, and model papers will be provided later in the semester, along with further details about the assignment. It will be important to avoid waiting until the last minute to write your paper. But before you start to work on it, you will be required to obtain approval for your topic by submitting a one-paragraph summary, along with copies of your three (3) primary empirical sources (it's expected that your final paper will include additional references). See the course schedule for due dates.
  - Your final paper should (8-10 double-spaced pages; instructor will completely disregard anything after the 10th page):
    - Make explicit the overarching research question of interest and comes to a reasonable conclusion based on the cited evidence.
    - Review the relevant empirical literature by explaining, integrating, and critiquing the main findings/ conclusions in a way that is understandable to a non-specialist audience.
    - Be written in your own words (i.e., not plagiarized). *Direct quotes from the source articles are NOT permitted.* Explain them in your own words, giving proper credit to original ideas (reference the sources)!
    - Follow APA style with a reference section and page numbers, uses a 10- or 12-point font with reasonable margins, and is carefully checked for proper spelling and grammar.
    - Go through an *initial rough-draft stage*, submitted to the instructor on the specified date (see course schedule below) for instructive feedback. This rough draft is worth 50 points.
- **Participation, homework, announced quizzes** together will *account for 100 points*. While the bulk of your course grade will be dependent on exams and the final paper, your participation in class activities and contributions to discussions will also be evaluated in terms of both quality and quantity (remember: all students should be given both the opportunity to contribute and respectful consideration of their questions/comments). Your questions (and responses) may simultaneously benefit your peers' understanding and the instructor's ability to identify topics that require additional attention. The instructor recognizes that not all students feel comfortable



(at least initially) raising questions/points of discussion in class. For this reason, participation online (using Moodle's forum feature) will be given equal credit. If you participate online, your identity should, at the very least, be made visible to the instructor in order for you to receive credit. There will also be several quizzes and homework assignments—announced in advance. While I do not keep strict attendance records, there will be no opportunities to make up missed quizzes, nor will late homework assignments be accepted. Should you miss a class, it is your responsibility to find out what material you missed—preferably by contacting one of your fellow students—and to prepare for the next class session. Excessive absences will hurt your participation grade and, likely, your overall performance.

### Planning

Take the time to review all the deadlines and scheduled quiz/exam dates. Transfer them to your personal calendar immediately. Doing so will help you avoid scheduling conflicts and allow you to carve out the necessary time to perform your best. Remember, the only extensions/make-up exams that will be granted involve documented cases of medical or family emergency. ***So please plan your travel early and other outside activities accordingly.***

## Tentative Course Schedule

Date (day)	#	Topic for Class   Assignments for NEXT Class
1/30 (tu)	1	<b>Welcome</b> <ul style="list-style-type: none"> <li>• After class: Source the textbook, register on Moodle</li> </ul>
2/1 (th)	2	<b>Introduction</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Syllabus</li> <li>• Kalat, introduction (also available on Moodle)</li> <li>• Putnam, Sungkhasettee, &amp; Roediger (2016)</li> <li>• <u>Optional</u>: Kalat, appendix A ("brief, basic chemistry" -- also available on Moodle)</li> </ul> </li> <li>▶ In-class quiz (re: the syllabus)</li> </ul>
2/6 (tu)	3	<b>Nerve Cells</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Kalat, module 1.1 ("the cells of the nervous system" -- also available on Moodle)</li> </ul> </li> </ul>
2/8 (th)	4	<b>Nerve Impulses</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Kalat, module 1.2 ("the nerve impulse" -- also available on Moodle)</li> </ul> </li> </ul>
2/13 (tu)	5	<b>Synapses</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Kalat, module 2.1 ("the concept of the synapse" -- also available on Moodle)</li> </ul> </li> <li>▶ In-class quiz</li> </ul>
2/15 (th)	6	<b>Chemical Transmission &amp; Drugs</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Kalat, module 2.2 ("chemical events at the synapse" -- also available on Moodle)</li> </ul> </li> </ul>
2/20 (tu)	7	<b>Basic Anatomy</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Kalat, module 3.1 ("structure of the vertebrate nervous system" -- also on Moodle)</li> </ul> </li> </ul>
2/22 (th)	8	<b>Cerebral Cortex &amp; Research Methods</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Kalat, modules 3.2-3.3 ("the cerebral cortex; research methods" -- also on Moodle)</li> </ul> </li> </ul>
2/27 (tu)	9	<b>Midterm Review</b>
3/1 (th)	10	<b>Midterm #1</b>
3/6 (tu)	11	<b>Primer on APA Style &amp; "Visual Display of Quantitative Information"</b> <ul style="list-style-type: none"> <li>▶ Final paper assignment discussed in detail (pointers to example papers)</li> </ul>
3/8 (th)	12	<b>Genetics &amp; Evolution</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Kalat, module 4.1 ("genetics and evolution of behavior")</li> </ul> </li> </ul>

Date (day)	#	Topic for Class   Assignments for NEXT Class
3/13 (tu)	<b>13</b>	<b>Brain Development &amp; Plasticity</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Kalat, modules 4.2-4.3 ("development of the brain; plasticity after brain damage")</li> </ul> </li> </ul>
3/15 (th)	<b>14</b>	<b>How to Read Empirical Articles (QALMRI Technique)</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Vines, Nair, &amp; Schlaug (2006, NeuroReport)</li> </ul> </li> <li>▶ <u>After class:</u> <a href="#">Course feedback survey (online, anonymous)</a></li> </ul>
3/20 (tu)	--	<b>No class (Spring Break)</b>
3/22 (th)	--	<b>No class (Spring Break)</b>
3/27 (tu)	<b>15</b>	<b>Vision I</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Kalat, module 5.1 ("visual coding")</li> </ul> </li> <li>• <b>Paper proposal &amp; source copies due today (by 6pm via Moodle)</b></li> </ul>
3/29 (th)	<b>16</b>	<b>Vision II</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Kalat, module 5.2-5.3 ("how the brain processes visual information; parallel processing in the visual cortex")</li> <li>• Blakemore &amp; Cooper (1970, Nature)</li> </ul> </li> </ul>
4/3 (tu)	<b>17</b>	<b>Audition &amp; Other Mechanical Senses</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Kalat, modules 6.1-6.2 ("audition; the mechanical senses")</li> </ul> </li> </ul>
4/5 (th)	<b>18</b>	<b>Chemical Senses</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Kalat, module 6.3 ("the chemical senses")</li> </ul> </li> </ul>
4/10 (tu)	<b>19</b>	<b>Movement</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Kalat, modules 7.1-7.2 ("the control of movement; brain mechanisms of movement")</li> </ul> </li> </ul>
4/12 (th)	<b>20</b>	<b>Movement II &amp; Midterm Review</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Kalat, module 7.3 ("movement disorders")</li> </ul> </li> </ul>
4/17 (tu)	<b>21</b>	<b>Midterm #2</b>
4/19 (th)	<b>22</b>	<b>Sleep</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Kalat, modules 8.1-8.3 ("rhythms of waking and sleeping; stages of sleep and brain mechanisms; why sleep? why REM? why dreams?")</li> <li>• Rasch et al. (2009, Nature Neuroscience)</li> </ul> </li> </ul>



Date (day)	#	Topic for Class   Assignments for NEXT Class
4/24 (tu)	<b>23</b>	<b>Internal Regulation</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Kalat, modules 9.1-9.3 ("temperature regulation; thirst; hunger")</li> </ul> </li> </ul>
4/26 (th)	<b>24</b>	<b>Emotions</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Kalat, modules 11.1-11.3 ("what is emotion; attack and escape behaviors; stress and health")</li> </ul> </li> <li>• <b>Rough draft of final paper due today (by 6pm via Moodle)</b></li> </ul>
5/1 (tu)	<b>25</b>	<b>Learning &amp; Memory</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Kalat, modules 12.1-12.2 ("learning, memory, and amnesia; storing information in the nervous system")</li> </ul> </li> </ul>
5/3 (th)	<b>26</b>	<b>Psychological Disorders</b> <ul style="list-style-type: none"> <li>• Have read: <ul style="list-style-type: none"> <li>• Kalat, modules 14.1-14.4 ("substance abuse and addiction; mood disorders; mood disorders; schizophrenia; autism spectrum disorders")</li> </ul> </li> </ul>
5/8 (tu)	<b>27</b>	<b>Exam Review</b>
5/10 (th)	--	<b>No class (Psychology Board Week)</b>
5/15 (tu)	--	<b>No class (Psychology Board Week)</b>
5/17 (th)	<b>28</b>	<b>Final Exam</b>
5/22 (tu)	--	<b>No class (Completion Week)</b> <ul style="list-style-type: none"> <li>• <b>Final paper due today (by 6pm via Moodle)</b></li> </ul>

*Schedule is subject to change to improve pacing and/or accommodate unforeseen events (e.g., severe weather). However, for planning purposes, every effort will be made to maintain scheduled exam and due dates.*