
Cognitive Neuroscience
Psychology 366 (CRN 35758)
Tue / Thu 3:30 PM – 4:45 PM
Lecture Center D4

Instructor: Eric W. Gobel, Ph.D.
Email: egobel@uic.edu
Office: BSB 2056C

Office Hours: Mon 11:30 AM – 12:30 PM
Wed 2:30 PM – 3:30 PM
or by appointment

*Please include “366” and a **brief description** in the **subject line** of any course-related emails*

Teaching Assistant

Kirk Manson (kmanso2@uic.edu)

Office Hours: by appointment in BSB 1051

Course Description

“Survey of neural basis of cognitive processes; perceptual and motor systems, attention, memory, symbolic representation, executive control of behavior.” 3 credit hours [UIC Course Catalog]. Students will take an online quiz and four exams covering the content of the course, write two short blog entries about recent cognitive neuroscience research and comment on the entries of other students, and actively participate during lecture (using iClicker2 technology).

Prerequisite: Grade of C or better in PSCH 242. Restricted to Neuroscience or Psychology major(s). It is also highly recommended, though not required, that students have taken PSCH 262, BIOS 286, or an equivalent course.

Course Objectives

Students will be able to:

Content Learning Objectives

- define common terms and explain the general approaches to relating brain and cognition (cognitive neuroscience)
- describe and explain the evolution of the field of cognitive neuroscience
- describe the basics of neuronal structure and how communication takes place within and between neurons
- identify the structures and regions of the nervous system, especially the brain and its cortex, and characterize their function (functional neuroanatomy)
- describe the methods and major techniques of cognitive neuroscience research
- describe visual processing pathways and how the brain allows us to perceive various visual features
- describe the processing and perception of sound (audition)
- explain the concept of attention and describe findings from studies of auditory and visual spatial attention
- explain what is meant by attentional control and describe attentional control networks in the brain

- briefly explain how cortical and subcortical regions of the brain and spinal cord control movement and how movement disorders arise from dysfunction in specific regions of the brain
- define executive function and identify neural correlates for different aspects of it, based primarily on neuropsychological and neuroimaging research
- define working memory and its neural correlates
- compare and contrast the characteristics of different types of memory and how different brain structures and regions support them (e.g., illustrate the taxonomy of learning and memory)
- describe processes involved in speech and language processing along with the neural bases for the language processes
- explain modern approaches to the study of choice and decision making

Skill Learning Objectives

- determine the location and cause of brain damage or neuropathology, given the impaired and preserved abilities of a neurological or psychiatric patient, and vice versa
- after reading about research in the neuroscience of cognition – as reported in both the popular press (online media) and academic journals – understand, summarize, critically evaluate, and relate to society, everyday life, and an understanding of cognitive neuroscience the reported findings
- discuss the contribution of various brain processes to everyday behavior and cognition

Materials

Required Textbook

Purves, D., Cabeza, R., Huettel, S. A., LaBar, K. S., Platt, M. L., & Woldorff, M. G. (2013). *Principles of cognitive neuroscience* (2nd ed.). Sunderland, MA: Sinauer Associates. ISBN: 978-0-87893-573-4 (hardcover), 978-1-60535-073-8 (e-book)

Note: Much of the first two chapters are viewable online at:

<http://www.coursesmart.com/9780878935734/id0002>

The entire e-textbook can be purchased using this link:

http://www.coursesmart.com/IR/4690877/9780878935734?__hdv=6.8

Textbook Website

Your textbook has a companion website at <http://sites.sinauer.com/cogneuro2e>, which includes some helpful resources, including animations, flashcards for key terms, and practice quizzes. You are encouraged to explore this site.

iClicker2

An **iClicker2 remote (ISBN: 1429280476)** is required for in-class participation in this course. If you do not already have one from a previous course, you may purchase the remote through the bookstore or online at <http://iclicker.com/purchase/>. Instructions for using the iClicker2 are on the back of the remote. The iClicker2 technology is a response system that allows you to respond to questions posed during class, and you will earn participation and performance points based on that feedback and/or your in-class participation. *Note: the iClicker2 remote (with the*

LCD screen) is highly recommended. Use the original iClicker and iClicker+ remotes, which provide little feedback about your votes being recorded, at your own risk.

In order to receive this credit, you will need to **register your iClicker2 remote on Blackboard within the first two weeks of class (by Friday, January 24th)**. To do this, simply find the iClicker Registration Module on the course Blackboard home page, type your remote ID in the text box, and click the Register button (alternatively, you can go to Tools > iClicker Remote Registration, which also includes instructions for finding your remote ID). The remote ID is the series of numbers / letters found on the bottom of the back of your iClicker2 remote. While you can register at any time, you must have come to class at least once and voted on at least one question in order to complete the registration process.

During the first two weeks of class, you should bring your iClicker2 remote and participate during “practice” clicker sessions. Following each of these sessions, you should make sure that your clicker points are recorded in the My Grades area of Blackboard. ***It is your responsibility to make sure that your iClicker2 remote is working properly and that you are using it appropriately.*** Anyone found using an iClicker2 remote unethically would lose all lecture participation points for the semester (15% of the course grade).

To ensure that you earn your participation points, be sure to bring your working iClicker2 remote with you to every class session. It will be used every day in class, and you are responsible for bringing your remote daily. If you need technical support for iClicker or iClicker2, please contact (866) 209-5698 or support@iclicker.com from 9AM-11PM EST, M-F. The iClicker website (www.iclicker.com) also has support documentation, video tutorials, and FAQs for students.

Course Website

The Blackboard course website found at <http://blackboard.uic.edu/> contains important course information and documents (including lecture slides in pdf format, additional required readings, any revisions to the course schedule, and helpful resources) and will be used for electronic submission of assignments. You are responsible for all information and material that is posted on Blackboard.

Microsoft Office Software

This course may require you to complete assignments using software in the Microsoft Office suite, such as Word, Excel, and/or PowerPoint. The on-campus computer labs will have this software, but UIC students can obtain a personal copy of Microsoft Office from the ACCC at no cost.

- Windows: <https://webstore.illinois.edu/Shop/product.aspx?zpid=1532>
- Mac: <https://webstore.illinois.edu/Shop/product.aspx?zpid=1533>

Assessment

Course Requirements

Four Exams (60%): The four exams will consist of a mixture of multiple-choice, short answer, and writing (requiring answers of several sentences in length) questions. The exams are not *formally* cumulative, but you must master concepts from earlier in the

course in order to understand later material. The first three exams are during class time on **February 6 (10%)**, **March 4 (15%)**, and **April 8 (15%)**. The **Final Exam (20%)** will be at **1:00 PM on Friday, May 9**. All exams will be in the same room as class (Lecture Center D4)

Online Quiz (5%): The online quiz will focus on the basics of neurophysiology and neuroanatomy. We will briefly cover this material in class, which is in the Appendix of the textbook, but you may have a difficult time with it if you have not taken PSCH 262, BIOS 286, or an equivalent course. However, you must master these concepts in order to understand the material in the remainder of the course. In addition, this will help you to prepare for future exams.

You will complete this quiz online (via Blackboard) and are allowed to use your textbook and notes. However, there will be a time limit and correct spelling will count, so be sure to prepare for the quiz by studying the relevant material prior to beginning the quiz. It must be taken no later than **January 29 at 11:59pm**.

Two Blog Entries and Comments (20%): The *two blog entries* are informal writing assignments that you will share, via the blogging tool on Blackboard, with the other students in the course (note that you must also upload your blog entries to Blackboard via SafeAssign as a Microsoft Word document). You will then read the posts of your peers and comment on at least five other blog entries for each assignment. More information about each blogging assignment, including a rubric, will be distributed at a later date and available on Blackboard.

The ***Cognitive Neuroscience in the Online Media (CNOM) blog entry assignment*** requires you to find an online article in the popular press that describes research relating brain structure or function to cognition, which you will then summarize, critically evaluate, and relate to course material and society. The ***CNOM Blog Entry (5%)*** is due on **February 19 at 11:59 PM** and ***Five CNOM Comments (5%)*** are due on **March 10 at 11:59 PM**.

The ***Cognitive Neuroscience Article Critique (BBAC) blog entry assignment*** requires you to find an empirical article in a peer-reviewed journal that describes research relating brain structure or function to cognition. You will then summarize and critically evaluate the article, discuss the implications of its findings, and relate the article to concepts from class, in a writing style appropriate for an educated non-scientist. The ***CNAC Blog Entry (5%)*** is due on **April 21 at 11:59 PM** and ***Five CNAC Comments (5%)*** are due on **May 2 at 11:59 PM**.

Active Lecture Participation (15%): During each class lecture session, you earn points for active participation. Usually, this will be through the use of iClicker2 (occasionally other activities or quizzes may be used). ***Therefore, be sure to bring your iClicker2 with you to every class session.*** Using the iClicker2 to participate in class will earn you ***participation points***. To maximize your ***performance points***, you should do the assigned reading *before* the corresponding lecture and *pay active attention* during class.

For each class lecture session in which points are available, you can earn up to 10 points from answering a number of questions posed to the class and participating in activities. For those questions with a correct answer, you will earn one performance

point for each question that you answer correctly. The remainder of the 10 points will come from active participation.

Of a total of 22 class lecture sessions with points available, ***your top 15 will count toward your grade; the remaining 7 lowest scores will be dropped.*** Note that these drops are primarily intended for days that you don't do as well on your performance points (thus maximizing your grade), but can be applied to days on which you absolutely must miss class or if you forgot your iClicker2 remote for that day. Again, regularly attending and participating in lecture will maximize your performance on assignments and exams.

There are an ample number of drops built into the course, so ***please do not ask for a chance to make up participation points – they cannot be made up for any reason.*** Therefore, if your schedule prohibits you from regularly attending class, you should drop this course.

Grading Scale

The grading scale shown below will be used in this course. However, a curve *may* be implemented that decreases the threshold percentage (i.e., minimum value of Net Weighted Total) for achieving the corresponding letter grade. In other words, if a curve is applied it would only improve the letter grade you receive. However, *do not assume a curve as it is not obligatory and, if one is applied, it cannot be determined until the end of the semester.*

Letter Grade	A	B	C	D	F
Minimum Percentage	90	80	70	60	0

Course Policies

Expectations

It is expected that you will:

- Show up on time to every class session with your iClicker2 remote and participate in class
- **Be respectful** of your classmates, Dr. Gobel, and the TAs
- Complete reading assignments prior to the corresponding class session
- Submit all assignments on time
- **Read all course emails thoroughly**
- Not have side conversations during lecture
- Not use your phone or computer for non-course-related activities during class
- Not pack up your materials before being dismissed
- Ensure that all writing you submit is written clearly, is grammatically correct, and follows APA format and style (when applicable)

Appropriate Classroom Behavior

College students are adults and I will grant you the respect that comes with that. Therefore, please behave like adults (at least during class) and follow these guidelines about appropriate

classroom behavior. Appropriate classroom behavior is simply a matter of *respecting the rights of others* in class and *maximizing your own learning*.

Maintain focus on class material during lecture and discussion. Research has shown that distracting yourself by multitasking during class impairs your learning and performance, and it may be disruptive or distracting to other students and is disrespectful to Dr. Gobel and TAs. Therefore, *please do not use your cell phone during class* except in extraordinary circumstances. The use of laptops or tablets for course-related purposes is perfectly fine, but please avoid using them for non-course-related activities during class. *Minimize talking* with other students during class, except when directed to discuss as part of an activity.

It likely goes without saying, but during discussion, please respect others and their opinions, and refrain from discriminatory or hateful speech. Inappropriate and/or disruptive behavior may result in you being asked to leave the room so that you are not interfering with the learning of other students. Finally, *please do not pack up before being dismissed at the end of the class period*. It is extremely disruptive to other students and disrespectful of the professor.

Email Policy

As indicated above, you are also *responsible for carefully reading all course-related emails* from the professor and the TAs. Therefore, be sure that you *check your UIC email regularly* and that you are able to receive emails sent through Blackboard.

When emailing Dr. Gobel or your TA, please indicate the *course number*, your *section time*, and a *brief description of the issue* in the subject line of all course-related emails. However, before emailing, please check this syllabus, the information on the Blackboard course site (including the FAQs section), and previous emails you have received to see if your question has already been answered. *While we will respond to emails in a timely manner, do not expect a reply to questions that have already been addressed.*

Attendance Policy

It is the student's responsibility to attend ALL class sessions ON TIME, out of respect to your classmates, Dr. Gobel, and yourself. We will begin class promptly at the course start time. *Participation points will be earned during class sessions, so attendance (and participation) will have a direct effect on your course grade.* In addition, your learning and performance in other aspects of the course will be maximized through your regular attendance.

Policy on Late Assignments

It is expected that all assignments will be fully completed and turned in on time. *Late assignments will not be accepted.*

Disability Services

“Concerning disabled students, the University of Illinois at Chicago is committed to maintaining a barrier-free environment so that individuals with disabilities can fully access programs, courses, services, and activities at UIC. Students with disabilities who require accommodations for full access and participation in UIC Programs must be registered with the Disability Resource Center (DRC). Please contact DRC at (312) 413-2183 (voice) or (312) 413- 0123 (TDD).”

If you require accommodations due to a documented disability, please bring a letter from the DRC documenting the necessary accommodations no later than the end of the second week (Friday, January 24th) or within one week of receiving new documentation.

Religious Holidays

I have tried to ensure that no major assignment due dates or exams fall on major religious holidays. However, *if there is a conflict with a religious holiday that you observe, please let me know by Friday, January 24th* and an appropriate accommodation will be made (note that you can always submit an assignment early).

Additional Information and Resources

APA Style

Papers in psychology must be written in APA (American Psychological Association) format. ***You are responsible for following APA style and citation format in all your writing assignments for this course, when applicable.*** The most complete resource for APA style is the Publication Manual of the APA, but Purdue's Online Writing Lab (OWL) is an excellent, concise, and free online reference documenting APA style:

<http://owl.english.purdue.edu/owl/section/2/10/>

Writing Center

Tutors at the writing center can help you to organize and edit your writing. All students are welcome and encouraged to make an appointment to improve their writing. The optimum use is to visit the Writing Center while preparing your draft of a writing assignment and to make several visits. More information can be found at <http://www.uic.edu/depts/engl/writing/about/>

Psi Chi Tutoring

Students in UIC's Psi Chi chapter with expertise in various psychology courses hold office hours throughout the week. The tutoring schedule is usually established a few weeks into the semester, and the relevant information will be posted on Blackboard as it becomes available.

Important Course Registration Deadlines

The deadline to add or drop the course (without a W) is the end of the 2nd week (Friday, January 24th). The deadline to withdraw from the course (with a W) is the end of the 10th week (Friday, March 21st).

Academic Honesty and Plagiarism

All work should be your own. You are allowed, and even encouraged, to seek feedback from others, but all the writing you submit should be your own. Plagiarism is representing the words or ideas of others as your own, without crediting the source, and thus also includes copying or paraphrasing from your classmates or papers on the Internet. Major writing assignments will be submitted electronically via SafeAssign to automatically screen for potentially plagiarized material and ensure academic honesty.

Familiarize yourself with violations of academic honesty and the student disciplinary policy at <http://www.uic.edu/depts/dos/studentconduct.html>. Some FAQ's about crediting others and avoiding plagiarism are available at http://tigger.uic.edu/~edelberg/crediting_others/index.htm.

Guidelines Regarding Academic Integrity

from the UIC Undergraduate Catalog (<http://www.uic.edu/ucatalog/GR.shtml>):

As an academic community, the University of Illinois at Chicago is committed to providing an environment in which research, learning, and scholarship can flourish and in which all endeavors are guided by academic and professional integrity. All members of the campus community—students, staff, faculty, administrators—share the responsibility of insuring that these standards are upheld so that such an environment exists. Instances of academic misconduct by students, and as defined herein, shall be handled pursuant to the *Student Disciplinary Policy*.

Academic dishonesty includes, but is not limited to:

- **Cheating:** Either intentionally using or attempting to use unauthorized materials, information, people, or study aids in any academic exercise, or extending to or receiving any kind of unauthorized assistance on any examination or assignment to or from another person.
- **Fabrication:** Knowing or unauthorized falsification, reproduction, lack of attribution, or invention of any information or citation in an academic exercise.
- **Facilitating Academic Dishonesty/Plagiarism:** Intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise.
- **Bribes, Favors, Threats:** Bribing or attempting to bribe, promising favors to or making threats against, any person, with the intention of affecting a record of a grade, grade, or evaluation of academic performance. Any conspiracy with another person who then takes or attempts to take action on behalf or at the direction of the student.
- **Examination by Proxy:** Taking or attempting to take an exam for someone else other than the student is a violation by both the student enrolled in the course and the proxy or substitute.
- **Grade Tampering:** Any unauthorized attempt to change, actual change of, or alteration of grades or any tampering with grades.
- **Nonoriginal Works:** Submission or attempt to submit any written work authored, in whole or part, by someone other than the student.

Tentative Course Schedule

Note that you should complete each reading assignment *prior* to the corresponding class session. *This schedule is subject to revision; any revisions will be announced and posted on Blackboard.*

Week	Day	Date	Topic Num	Topic / Activity	Reading or Assignment due
1	Tue	14-Jan	1	Course Introduction	
	Thu	16-Jan	2	Introduction to Cognitive Neuroscience	Ch. 1
2	Tue	21-Jan	3	Basic Neurophysiology	Appendix
	Thu	23-Jan	4	Basic Neuroanatomy	Appendix
3	Tue	28-Jan	5	Cognitive Neuroscience Methods: Brain Perturbations	Ch. 2 (p. 17-29)
	Wed	29-Jan	-	Online Quiz due Wed 11:59 PM	
	Thu	30-Jan	6	Cognitive Neuroscience Methods: Measuring Neural Activity	Ch. 2 (p. 29-53)
4	Tue	4-Feb	7	Visual Processing	Ch. 3 (p. 55-68)
	Thu	6-Feb	-	EXAM 1	
5	Tue	11-Feb	8	Visual Perception	Ch. 3 (p. 69-91)
	Thu	13-Feb	9	Auditory Sensation and Perception	Ch. 4 (p. 93-110)
6	Tue	18-Feb	10	The Concept of Attention and Auditory Spatial Attention	Ch. 6 (p. 167-182)
	Wed	19-Feb	-	CNOM Blog Entry due Wed 11:59 PM	
	Thu	20-Feb	11	Visual Spatial Attention	Ch. 6 (p. 182-195)
7	Tue	25-Feb	12	Attentional Control	Ch. 7 (p. 205-220)
	Thu	27-Feb	13	Visual Search and Attentional Control Networks	Ch. 7 (p. 220-231)
8	Tue	4-Mar	-	EXAM 2	
	Thu	6-Mar	14	Cortical Motor Control	Ch. 5 (p. 131-152)
9	Mon	10-Mar	-	Five CNOM Blog Comments due Mon 11:59 PM	
	Tue	11-Mar	15	Subcortical Motor Control	Ch. 5 (p. 152-165)
	Thu	13-Mar	16	Executive Function: Overview and Rules	Ch. 13 (p. 429-452)
10	Tue	18-Mar	17	Executive Function: Cognitive Control	Ch. 13 (p. 452-458)
	Thu	20-Mar	-	NO CLASS	
				SPRING BREAK	
11	Tue	1-Apr	18	Working Memory	Ch. 13 (p. 458-464)
	Thu	3-Apr	19	The Case of H.M.: Dissociating Memory Systems	Ch. 8 (p. 243-251)
12	Tue	8-Apr	-	EXAM 3	
	Thu	10-Apr	20	Nondeclarative Memory	Ch. 8 (p. 251-270)
13	Tue	15-Apr	21	Declarative Memory Storage	Ch. 9 (p. 279-300)
	Thu	17-Apr	22	Declarative Memory Encoding, Retrieval, and Consolidation	Ch. 9 (p. 300-317)
	Mon	21-Apr	-	CNAC Blog Entry due Mon 11:59 PM	
14	Tue	22-Apr	23	Speech and Language	Ch. 12 (p. 393-406)
	Thu	24-Apr	24	Neural Bases of Language	Ch. 12 (p. 406-427)
	Tue	29-Apr	25	Decision Making: Reward and Utility	Ch. 14 (p. 465-479)
15	Thu	1-May	26	Decision Making: Uncertainty, Social Aspects, and Heuristics	Ch. 14 (p. 479-489, 495-501)
	Fri	2-May	-	Five CNAC Blog Comments due Fri 11:59 PM	
FIN	Fri	9-May	1:00pm	FINAL EXAM	