

**Cognitive Neuroscience (PSY 4140, CRN 43835)**  
**Fall 2009, Aug. 24 – Dec. 18**  
**Prof. Robert Carlson**

**Class Information**

Class Days: Tues. & Thur.  
Class Time: 1:00 – 2:15  
Class Location: McDonald 206

**Contact Information**

Office: McDonald 201  
Phone: 652-7893  
E-mail: rcarlson@dixie.edu

**Contacting Prof. Carlson**: The most effective way to contact me is by e-mail. I check my e-mail regularly, and I am much more likely to remember to respond to an e-mail than to a phone message or a verbal conversation. If you speak to me in person, **make sure to follow up any conversations with an e-mail** to remind me to promptly address the matter.

**Course Description**: “Cognitive neuroscience uses neuroimaging techniques such as PET and fMRI to examine issues related to the mind/brain. This course covers such topics as perception and encoding, cerebral lateralization and specialization, the control of action, executive function, and the problem of consciousness.” (Description from Course Catalog) In addition to studies utilizing brain imaging techniques, we will refer to neuropsychological cases resulting from traumatic brain injury to understand how cognitive functions are impaired by specific brain damage. Additional cognitive functions we will study will include language, decision-making, problem-solving and many types of memory.

**Course Objectives**: The purpose of this course is to help students learn about this emerging field, which combines techniques from classical neuroscience and traditional experimental psychology. In particular, students should understand how we can use study of the brain (which can be directly measured) to inform us about the function of mental activities (which cannot be directly measured). Students will also learn significant findings and theories developed within a variety of techniques utilized to study the mind-brain relationship. Students will demonstrate their learning through short quizzes, longer exams, and in the preparation of a literature review paper on a topic covered in the course.

**Course Requirements and Information**:

Textbook: *Cognitive Neuroscience: The Biology of the Mind*, 3<sup>rd</sup> Edition, by Gazzaniga, Ivry & Mangun. (Required)

Blackboard: We will use Blackboard Vista on a regular basis. (Required)

Office Hours: Mon. through Fri., 12:00-1:00

Prerequisites: PSY 1010 and Junior or higher standing

Course Fees: None

General Education: This course does not currently fulfill a general education requirement.

**Academic Integrity**: I don't like cheating of any kind—neither does the Dixie State College (see their official policy at <http://www.dixie.edu/humanres/policy/sec5/533.html>). In particular, **do not share quiz/test questions or answers with other students**. This is not helping, it is cheating. Also, you may not, under any circumstances, copy someone else's words for use in your research paper (not in a draft, not in an outline, not in the final version of the paper). Everything you submit to me must be in your words. If you put quotation marks around the quote and properly cite the quote it is not considered plagiarism, but this is still not allowed for purposes of this assignment. Learning how to properly cite another person's ideas and research is difficult, and we will learn more about this during the course of the semester.

**Attendance Policy:** This is a very difficult class—it is as if you are trying to learn three disciplines: Biology (Neuroscience), Psychology (Cognition) and the merger of the two, Cognitive Neuroscience. It has been my experience that senior-level students do not succeed in this class without significant class participation. However, I will not make your grade dependent on class participation. But for your benefit, both in how much you learn and how much you enjoy the course, I strongly encourage you to attend class and actively participate in class discussions. I realize that absences occur for a variety of reasons, including for approved school functions, but even with an approved school activity the student is required to find out about (ahead of time if at all possible), and make up, missed work. Arrangements to take quizzes or exams ahead of time (never after the due date) **must be made and approved prior to the absence**. It is rare for me to grant make-up exams after the exam period has ended (**make-up quizzes are never allowed**), but I am almost always willing to offer exams before the scheduled exam date.

**Classroom Policy:** As mentioned above, all students are encouraged to participate in classroom discussions (see above), but appropriate levels of maturity and respect (to the instructor and other students) must be demonstrated. Joking around with the professor is generally tolerated, and usually encouraged, but demeaning comments toward any person or group are not tolerated.

**Grading Information:** Final grades in this course will be based on a percentage-based system, and there will **not** be a “curve” used to determine grades.

**Grade Components:** Quizzes (15%), Research Paper (15%), Midterm Exams (50%), Final Exam (20%).

Grading Scale	
Grade	Range
A	>=91%
A-	89-90%
B+	86-88%
B	82-85%
B-	79-81%
C+	76-78%
C	72-75%
C-	69-71%
D+	66-68%
D	62-65%
D-	59-61%
F	<59%

**Quizzes and midterm exams will only be administered through Blackboard Vista. Midterm exams must be taken in the Testing Center, but quizzes may be taken anywhere it is convenient for the student.** Quizzes and midterm exams taken after the assigned quiz or exam period, or those that exceed the time limit, will be graded as a 0.

**Quizzes.** Quizzes must be completed at least a half-hour *before* every class period (by 12:30). All quizzes are based on the reading assignment for the coming class period, to demonstrate that you read and understand what we will be discussing in class that day. There will typically be between 5 and 8 questions on each quiz, and they will all be Multiple Choice or True/False questions. You will always be allowed at least 24 hours during which to complete a quiz (ideally, the quiz will be available immediately after the previous class period, but this may not always be the case). Your lowest three quizzes will not be used to calculate your quiz average (i.e., they will be “thrown out”). You will be allotted at least 5 minutes to complete each quiz; if there are more than 5 questions on the quiz, you will receive a total time based on 1 minute per question (7 questions will get you 7 minutes). Quizzes that are not submitted within the allotted time will receive a grade of 0 (unfortunately, I can’t know what you answered before time expired).

**Make sure you save and submit your questions before the time limit has expired.**

**Midterms.** Midterm exams will test your knowledge of an entire section of the course. Midterm test questions are often more difficult than quiz questions, and they include a wider variety of types of test questions. For example, in addition to multiple choice and true/false questions, there may be brain parts to identify on a figure; there may be fill-in-the-blank or short answer questions (answers consisting of a few words or one sentence); and there will be one essay question. You will be provided the essay question ahead of time, along with two other essay questions. You will not know ahead of time which of the three questions will appear on the exam, so you must prepare for all three. **Midterm exams will be administered in class, during class time on the date specified on the Course Schedule (see below).** The highest two midterm exam scores will each count 20% toward your final grade, and the lowest

midterm score will count half as much (10%). **Make sure you save and submit your questions before the time limit has expired.**

*Final Exam.* The final exam will be administered **in class** at the end of the semester (Tuesday, Dec. 15) and will cover material from the entire course. It is impossible to study all the material covered in this course at one time and expect to perform well on this exam. The course builds on itself in some ways (brain areas learned about in the beginning are used to explain cognitive functions in later sections of the course), so the final exam will only consist of one essay question. As with the midterm exams, this essay question will be provided ahead of time, along with two other questions. Each of these three questions will combine information from various parts of the course.

*Research Paper.* The research paper is worth 15% of your grade in the course and will consist of multiple assignments that each contribute toward this grade. Please see the Research Paper Guide handout for more information.

Grade Calculation: Grades for quizzes and exams are calculated based on percentages, not total points. For example, if you score 4 out of 4 on one quiz, that counts as a grade of 100%; if you score 4 out of 5 on another quiz, that counts as a grade of 80%. Those two quizzes would lead to a Quiz Average of 90% (average of 80% and 100%), **not** 88.9% (8 out of 9 total points). The same principle applies to midterm exam grades. **The total number of points on quizzes and exams does not matter.** For the research paper grade, the total points do matter. The later assignments contribute more toward the total research paper grade (see the Research Paper Guide for more details). Your percentage grade for the research paper is calculated by adding up the total number of points earned, subtracting all late penalties, and dividing that difference by the total number of points possible. To calculate your grade for the class, use percentage scores for each quiz and exam and the percentage score for the research paper.

### Course Reading and Exam Schedule

<u>Date</u>	<u>Reading Description</u>	<u>Ch:Pages</u>	<u>Quiz</u>
Tue., Aug. 25	Welcome to the Course!	---	None
Thu., Aug. 27	Basic Neuroanatomy	3:67-84, 101-106	1
Tue., Sep. 1	Cognitive Psychology and Neuroscience Techniques	4:110-133	2
Thu., Sep. 3	Neurology and Cognitive Neuroscience Techniques	4:133-159	3
Tue., Sep. 8	Non-vision Senses	5:164-177	4
Thu., Sep. 10	Early Vision	5:177-189	5
Tue., Sep. 15	Visual Deficits and Multimodal Perception	5:189-203	6
Thu., Sep. 17	Two Object-Recognition Pathways	6:207-225	7
Tue., Sep. 22	Visual Agnosia	6:225-237	8
Thu., Sep. 24	Face Perception and Visual Memory	6:237-254	9
Tue., Sep. 29	<b>Exam 1</b>	<b>Ch. 3-6</b>	---
Thu., Oct. 1	Movement Basics	7:257-284	10
Tue., Oct. 6	Motor Planning	7:284-307	11
Thu., Oct. 8	Cognitive Psychology View of Memory	8:312-324	12
Tue., Oct. 13	Brain and Memory	8:324-343	13

Thu., Oct. 15	Human Imaging of Memory	8:344-360	14
Tue., Oct. 20	Basic Language Input Sources	10:388-405	15
Thu., Oct. 22	Advanced Language Input and Output	10:405-422	16
Tue., Oct. 27	Aphasia and ERP Research with Language	10:423-442	17
Thu., Oct. 29	Hemispheric Specialization	11:445-465	18
Tue., Nov. 3	Functional Lateralization	11:466-488	19
Thu., Nov. 5	<b>Exam 2</b>	<b>Ch. 7-8, 10-11</b>	---
Tue., Nov. 10	Attention Theories and ERPs	12:491-511	20
Thu., Nov. 12	Neuroimaging of Attention	12:511-525	21
Tue., Nov. 17	Animal Studies and Neurophysiology of Attention	12:525-548	22
Thu., Nov. 19	Prefrontal Cortex	13:555-567	23
Tue., Nov. 24	Task-Relevant Behavior	13:567-579	24
Thu., Nov. 26	Top-Down Behavior	13:580-593	25
Tue., Dec. 1	Self-Reference	14:599-610	26
Thu., Dec. 3	Nonverbal Information	14:610-620	27
Tue., Dec. 8	Social Knowledge	14:621-631	28
Thu., Dec. 10	<b>Exam 3</b>	<b>Ch. 12-14</b>	---
Tue., Dec. 15	<b>12:30 p.m. – 2:30 p.m. Final Exam in Class (McD 206)</b>	<b>All of it</b>	---
Fri., Dec. 17	<b>Final Grades Posted</b>	---	---