

Psychology 312

Learning, Memory, and Cognition

Course Syllabus, Winter 2010

Course: PSYCH 312
Call number: 20259
Credits: 4
Dates: January 04 – March 17, 2010
Times: Mondays & Wednesdays 9:30–11:18 p.m.
Room: Page Hall, Room 010
Prerequisites: Introductory Psychology (Psych100) and Introductory Statistics (Psych 219 or 220 or 320, or Stat 145 or 245)
Websites: <https://carmen.osu.edu> and <http://alexpetrov.com/teach/lmc/>
Textbook: Mark Gluck, Eduardo Mercado, & Catherine Myers (2008). *Learning and Memory: From Brain to Behavior*. New York: Worth Publishers.

Instructor:	Course Assistant:
Dr. Alexander Petrov	Christine Szostak
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200B Lazenby Hall	281 Psychology Hall
(614) 247-2734	Office hours: by appointment
Office hours: M, W 11:20–11:59 a.m. and by appointment	

Course Overview

This course surveys selected topics in modern cognitive psychology with an emphasis on learning and memory. It is intended for undergraduate students with basic knowledge of psychology and statistics (prerequisites Psych 100 and Psych 220 or equivalent). Some questions we will consider are: What is cognitive psychology? What methods do scientists use to study memory and cognition? What behavioral regularities characterize human and animal memory? What kinds of memory are there? Where does memory reside in the brain? How do neurons learn? What are some important theories and models of memory? What are their strengths and weaknesses? How does one evaluate a scientific theory? Can memory research help us study and remember better? Are the testimonies of honest eyewitnesses always reliable? The objective is that by the end of the course the students are familiar with a representative sample of empirical and theoretical results in the study of learning and memory, understand the evidence behind these findings, and are aware of their educational and legal applications. This course is a core course in the Cognitive Science minor. Information regarding the minor and its requirements may be found online at <http://artsandsciences.osu.edu/interdisciplinary>

Course Materials

The main textbook is *Learning and Memory: From Brain to Behavior* by Mark Gluck, Eduardo Mercado, and Catherine Myers (2008). New York: Worth Publishers. ISBN-10:

0-7167-8654-0. There is a companion web site at <http://www.worthpublishers.com/gluck/> It is available from the university bookstore and many other vendors. We will also use Karl Haberlandt's (1999) *Human Memory: Exploration and Application*, which was the text for previous sections of PSYCH 312, and Jerry Rudy's (2008) *The Neurobiology of Learning and Memory*. The relevant portion of the latter two books will be distributed in Xerox copy to each student free of charge. A complete reading list appears at the end of this syllabus. The Carmen website (<http://carmen.osu.edu>) is an indispensable resource. All additional readings are available for download from Carmen in PDF format, together with Lecture slides, videos, and various other materials.

Accommodations for Students with Special Needs

The policy of The Ohio State University is to provide every reasonable, appropriate, and necessary accommodation to qualified disabled students. The University's colleges and academic centers evaluate and judge applications on an individual basis and no categories of disabled individuals are automatically barred from admission. The privacy rights of each disabled person are honored to the fullest extent possible. The University's interest in a student's disabilities are only for the purpose of accommodating his/her specific disability, thereby providing an academically qualified disabled student access to programs and activities accorded all other qualified students. Whenever generally accessible facilities do not adequately accommodate a specific disability, the University makes every reasonable accommodation and program or facility adjustment to assure individual access. These policies are fully supported and practiced in this class.

If you have a disability documented with the Office of Disability Services (<http://www.ods.ohio-state.edu>, 150 Pomerene Hall, 614-292-3307), please contact Dr. Petrov privately (petrov.11@osu.edu, 200B Lazenby Hall, 614-247-2734) by the end of the second week of classes (1/14/2010) so that any accommodations (e.g., large font exams, separate examination facilities) can be made.

Tests and Homework Assignments

As we will learn in the course, people remember much better when they study on a regular basis rather than cramming for a final exam. The organization of this course capitalizes on this important property of memory. There will be five homeworks, a Midterm Exam, and a Final Exam. The homework assignments will be posted on throughout the quarter. They typically require you to write a few sentences answering two or three questions about a theoretical construct or empirical study described in the textbook, in an additional reading, and/or discussed in class. The two exams are closed-book multiple-choice tests. The Final Exam is not cumulative, except in the following sense. Each lecture contains one or more slides titled "The Least You Need to Know." These slides identify concepts, facts, and principles that are particularly important. The Final Exam may contain questions about any such need-to-know topic, including those that were introduced before the Midterm Exam. Also, concepts introduced during the first half of the course will continue to be used during the second half. Your knowledge of such concepts can also be re-tested on the Final. If an empirical study was discussed in

class at some level of detail, you need to know about it at that level of detail. If a study was mentioned just to provide a new fact, then remember the fact. If the textbook spends more than a few sentences on a study and it is related to a lecture topic, you should know the method, result, and argument. Knowledge is not just about remembering studies and facts. In any field, understanding the theoretical arguments and the proper methods is just as basic as remembering the facts. That is why you will be tested on all three. The Midterm Exam covers the facts, theories, and methods introduced during Lectures 1-9, inclusive, at the level of detail outlined above. The Final Exam covers Lectures 10-18 (75-80% of the items) and also revisits need-to-know topics from the first half (20-25%). **Please bring a photo ID, a #2 pencil, and an eraser to the test room.**

Policy on Attendance, Missing Exams and Homework Assignments

Attendance is strongly encouraged but not required, except on test dates. Come to class – it makes a difference. I give out test questions in class. I work through examples that will not be available in the notes. I answer questions. You have paid good money for a seat in this classroom. Do not waste it by skipping lectures and trying to learn it all on your own. On top of that, there is a palpable incentive for attending: you earn points by just being present during a roll call. Ten roll calls will be made during the quarter without advance notice. Each time you are present during a roll call you earn 3 points; **if you are not present there is no way to earn this credit or make it up.** Absences do not require any excuse unless a test was missed. The grading scheme is designed so that it is possible to get an A without attending a single lecture. All you have to do is write all homeworks and ace both tests.

You must get approval prior to missing an exam except in the case of a true emergency. In the event of a last-minute emergency, you **must** call Dr. Petrov (247-2734) or the office associate for the cognitive area (, 292-1123) **on the same day as the exam**, preferably before the test begins. Acceptable excuses for missing an exam are a death in your family, personal illness or the illness of your child or spouse, and unforeseen accidents like your car breaking down or getting stuck in an elevator. I will need documented proof of these events should they occur, so get a funeral card, a note from your physician (on letterhead or a form designed for this purpose), and/or an invoice from the towing company with the date on it. Makeup exams will only be given in cases of documented emergency or when prior approval has been given to miss an exam. Note that if you are not sick enough to go to the doctor, you are not sick enough to miss the exam. If you are late for the test, you will be allowed to take it but you must submit your answer sheet by the closing time like everybody else. Once the test begins, no questions about any test item are allowed. Please do not leave your seat until you are ready to turn your answer sheet in. After you turn it in, leave the test room immediately.

Homework assignments will be posted on the Carmen website with a start time and an end time at least four days later. You are responsible for checking the Carmen website for new assignments, which will appear in the Dropbox section and also on the calendar. Assignments must be uploaded to the assignment drop box in *MS Word* doc, plain text, PDF, HTML, or RTF format. Assignments in other formats are not acceptable and will not be graded. In particular, .wps, .wpd, .odt, and .docx are not supported. **The only way**

to submit your homework is to drop it in its corresponding Dropbox on Carmen. Files dropped in a wrong Dropbox, submitted by email, given to the course assistant, slipped under a door, and so on will not be accepted without prior permission. There is a two-day grace period after the deadline for each assignment. **There is no way to obtain credit for an assignment after the grace period has passed and the corresponding Dropbox has closed.** There are no exceptions to the rules printed in boldface above.

Grading

Your grade will be based on points that you earn for homework, tests, and attendance:

Homework	60 points for 5 assignments of 12 points each
Midterm Exam	90 points
Final Exam	120 points
Attendance	30 points for 10 roll calls of 3 points each
Maximum total score	300 points

To get an A, you need to score at least 260 points (86.7% of the maximum). Note that you can reach that without any attendance points if you ace the homeworks and the tests. Your total points earned from any of the four categories above determines your grade according to the following cutoffs:

Grade	Cut	Points	Grade	Cut	Points
A	86.7%	260	C+	70.0%	210
A-	83.3%	250	C	66.7%	200
B+	80.0%	240	C-	63.3%	190
B	76.7%	230	D+	60.0%	180
B-	73.3%	220	D	56.7%	170

The exams are designed to reflect the appropriate level of mastery of the material, particularly the need-to-know topics. So, if everybody gets an A, that is great! I will assume such excellent performance reflects your hard work and intelligence. On the other hand, if everybody scores poorly, I will assume it was my fault and correct your scores so that the mean of the top scores equals 250 points. The correction is multiplicative: all scores will be multiplied by a number greater than 1, so that the mean of the top corrected scores becomes exactly equal to 250. The corrected scores will be compared to the cut points above to determine the final grade. Thus, at least 3 students will get at least A-.

For example, suppose Mary has accumulated 220 points from homeworks, tests, and attendance. Also, suppose the mean of the top five scores is 260, so no correction is necessary. In this case, Mary's gets a B- according to the table above. Mary can rest assured that under no circumstance she will get less than that. She can get more, however, if the tests were generally too difficult. To extend the example, suppose the mean of the top five scores is only 228. This triggers a correction of all scores by a factor of 1.1 (=250/228). Mary's corrected score thus becomes 242 (=220*1.1), which deserves a B+.

The instructor and the course assistants make every effort to ensure that the grades are accurate, fair, and consistent. Nobody is immune to mistakes, however. If you believe that your test and/or homework results are in error, please let us know no later than one

week after the results are announced. Such notifications must be made in writing and emailed to psych312@cogmod.osu.edu. We will review your complaint carefully and answer by email or invite you to a personal meeting with Dr. Petrov to discuss the issue. **Complaints about test results, homework results, or anything else that affects your grade will not be considered or discussed unless a written statement was emailed to psych312@cogmod.osu.edu in advance.** Messages sent to any other email account will be ignored. There are no exceptions to these rules.

Academic Ethics

All students enrolled in OSU courses are bound by the Code of Student Conduct (http://studentaffairs.osu.edu/resource_csc.asp). The instructor and course assistants are committed to maintaining a fair assessment of student performance in this course. Suspected violations of the Code will be dealt with according to the procedures detailed in the Code. Specifically, any alleged cases of misconduct will be referred to the Committee on Academic Misconduct.

There are two major ethical considerations in this course. First, both exams are closed book. No notes may be used during the examinations and you may not confer with your fellow students or look at other examinations for answers during the exam period. Prior to the examinations, you are encouraged to study in small groups. However, once you enter the examination room, you are expected to work alone. Second, you are expected to work alone on your homework assignments. You may not turn in anything that you did not *completely* write. Be careful about plagiarism; attribute quotes and ideas that others have previously published where appropriate. A very comprehensive website that describes most aspects of plagiarism has been produced by Northwestern University (<http://www.northwestern.edu/uacc/plagiar.html>). We strongly encourage you to visit this site.

Please switch your cell phones off during the lectures. Random ringing distracts everybody in the room and show lack of respect to your colleagues and the instructor.

Course Calendar

1. M 1/04 – Introduction and orientation. 12 key ideas. Metaphors of memory.
2. W 1/06 – Methodological foundations. Brain Thesis. Assign HW#1, **due 1/11**.
3. M 1/11 – Information processing with neurons and networks. Neurophysiology.
4. W 1/13 – Definition of learning. Habituation and sensitization. Synaptic plasticity
M 1/18 – Martin Luther King’s Day. No classes.
5. W 1/20 – Long-term potentiation and its synaptic basis. HW#2, **due 1/25**.
6. M 1/25 – Classical and instrumental conditioning. The “cognitive revolution.”
7. W 1/27 – Neural net models. Hebbian learning. Generalization.
8. M 2/01 – Pattern associator. Distributed representations. Assign HW#3, **due 2/05**.
9. W 2/03 – Categorization. Error-correcting learning. Hidden layers.
(The Midterm Exam covers the above material: Lectures 1 through 9, inclusive.)
10. M 2/08 – Taxonomy of memory. Semantic networks. Concepts. Prototypes.
W 2/10 – Midterm Exam. Bring a photo ID, a #2 pencil, and an eraser.
11. M 2/15 – Episodic memory. Power law of practice. Very long-term memory.

12. W 2/17 – Depth of processing. Encoding specificity. Educational applications.
13. M 2/22 – Amnesia. Brain anatomy review. Assign HW#4, **due 2/26**.
14. W 2/24 – Interference. Complementary hippocampal-cortical memory systems.
15. M 3/01 – Memory span. Modal model. Working memory model.
16. W 3/03 – Executive control. Active maintenance. Prefrontal cortex. Gating.
17. M 3/08 – Tripartite cognitive architecture. Schemas. Reconstructive memory. Memory distortions. Assign HW#5, **due 3/12**.
18. W 3/10 – Eyewitness testimony. Repressed memories. “Memory Wars.” 12 key ideas revisited.
19. **W 3/17 – Final Exam: Tue, 9:30-11:18, same room.** Bring ID, pencil, & eraser.

The course calendar is subject to change at the discretion of the instructor, depending on the rate of progress through the material, student interest in alternative topics, and/or scheduling constraints. The dates for the Midterm and Final Exams are fixed.

Additional Readings (Required)

In addition to the main textbook (Gluck, Mercado, & Myers, 2008), the following additional readings supplement and amplify some topics of particular importance. All additional readings are available on Carmen in PDF format (in the *Resources* section of the Content area). The list of readings is subject to change at the discretion of the instructor, depending on the rate of progress through the material, student interest in alternative topics, and/or scheduling constraints.

1. Eichenbaum, Howard (2002). Amnesia: Learning about Memory from Memory Loss – Chapter 4 of the book *The Cognitive Neuroscience of Memory: An Introduction*. Boston, MA: Oxford University Press. Used in Lecture 13, *Amnesia*, and in homework assignment #4.
2. Haberlandt, Karl (1999). *Human Memory: Exploration and Application*. Boston, MA: Allyn and Bacon. [Used to supplement the main text in various lectures and homework assignments. Relevant excerpts will be distributed in class in Xerox copy free of charge. A PDF file is available on Carmen—check it out to see which pages are relevant for us.]
3. Kolb, Brian & Whishaw, Ian (2006). Traumatic brain injury – Excerpt from Chapter 1 of the book *Introduction to Brain and Behavior* (2nd Ed.). New York: Worth Publishers. [Used in Lecture 2, *Methodological Foundations*. Distributed in class together with: Kolb, Brian & Whishaw, Ian (2003). Impaired social and sexual behavior [after frontal-lobe damage – Excerpt from Chapter 16 of the book *Fundamentals of Human Neuropsychology* (5th Ed.). New York: Worth Publishers.]
4. Loftus, Elizabeth (2003). Make-believe memories. *American Psychologist*, 58 (11), 864-873. Used in Lecture 17, *Memory Distortions*, and in homework assignment #5.
5. Rudy, Jerry (2008). *Neurobiology of Learning and Memory*, Sunderland, MA: Sinauer Associates. [Used to supplement the main text in various lectures and homework assignments. Relevant excerpts will be distributed in class in Xerox copy free of charge. A PDF file is available on Carmen—check it out to see which pages are relevant for us.]

6. Sagan, Carl (1996). Science and hope – Chapter 2 of Sagan’s book *The Demon-Haunted World: Science as a Candle in the Dark*. New York: Random House. [Used in Lecture 2, *Methodological Foundations*, and in homework assignment #1. See also Chapter 17, The marriage of skepticism and wonder, http://alexpetrov.com/memes/sci/skept_wonder.html]

Optional Readings (Not Required)

The readings below are not required and will not be distributed in Xerox copy. For those of you who have a special interest in cognitive psychology, PDFs are available on Carmen in PDF format (in the *Resources* section of the Content area).

1. Eichenbaum, Howard (2002). Cellular mechanisms of memory: Complex circuits – Chapter 3 of the book *The Cognitive Neuroscience of Memory: An Introduction*. Boston, MA: Oxford Univ. Press. [Excellent review of long-term potentiation (LTP).]
2. Loftus, Elizabeth (2003). Our changeable memories: Legal and practical implications. *Nature Reviews: Neuroscience*, 4, 231-234.
3. McClelland, James L. (2000). Connectionist models of memory. In E. Tulving & F. Craik (Eds.), *The Oxford Handbook of Memory* (pp. 583-596). Oxford Univ. Press.
4. O’Reilly, Randall C. & Munakata, Yuko (2000). Large-scale brain area functional organization – Chapter 7 of the book *Computational Explorations in Cognitive Neuroscience: Understanding the Mind by Simulating the Brain*. Cambridge, MA: MIT Press. [Gentle introduction to the Tripartite Cognitive Architecture.]
5. Shermer, Michael (2002). Epidemics of accusations: Medieval and modern witch crazes – Excerpts from Chapter 7 of Shermer’s book *Why People Believe Weird Things: Pseudoscience, Superstition, and Other Confusions of Our Time* (Revised and expanded Ed.). New York: Henry Holt and Co.

Finally, welcome to the course. I hope that you will enjoy the class and learn valuable information and skills. I look forward to seeing you on January 04.

Alex Petrov

syllabus312-wi10.doc, last updated 1 Jan 2010