



# Psychology 461 Cognitive Neuroscience of Memory



Fall 2011

**Class Time:** Thursdays 12:30-2:20pm **Location:** PAS 4288

**Instructor:** Dr. Myra Fernandes

[mafernan@uwaterloo.ca](mailto:mafernan@uwaterloo.ca)

**Office Hours:** Tuesdays 10-11am

**Office:** PAS 4054

## Required Course Text

*The Oxford Handbook of Memory.* Endel Tulving and Fergus I.M. Craik (Eds.). New York, NY: Oxford University Press. 2005.

## Course Description

This course will help you better understand the cognitive and neural organization of memory. We will examine why some memories are better remembered than others, the nature of true and false memories, the effects of drugs on studying, remembering, and forgetting, and the consequences of brain injury and normal aging on memory function.

The biological basis of human memory has been examined with four methods: observations of neurological patients, investigations using neuroimaging, experiments with animals, and basic theoretical cognitive research. By reviewing and discussing classic and current research using these methods, and their findings, students will develop an understanding of how cognitive neuroscience informs current theories of memory function.

I encourage discussion between students. You will learn and retain more of the course material by asking, and answering, questions! It is important to read the assigned material as well as to attend lectures.

## Overview of Evaluation

Take-Home tests (2 X 30% each)	60%
Research Presentation	20%
Participation in 5 Research Discussions (1% each)	5%
Written Critique of 5 Research Presentations (1% each)	5%
Ideas for Future Research Presentation	10%

## Details on each Evaluation

### Tests (2 X 30%)

Test #1: You will be given a sheet of questions, in class, on October 13<sup>th</sup>; You will choose 3 of these from the set, and write a 2 page answer to each (i.e. hand in 6 pages total). **Due date is October 20<sup>th</sup>**. Questions will be based on the material presented in the text and in lectures

Test #2: You will be given a sheet of questions, in class, on November 24<sup>th</sup>; You will choose 3 of these from the set, and write a 2 page answer to each (i.e. hand in 6 pages total). **Due date is December 9<sup>th</sup>**. Questions will be based on the material presented in the text and during presentations (note: you must choose to answer questions on a topic other than that on which you presented).

Your answers for each test should be type-written, double-spaced, in 12 point font, with 2 cm margins all around; your name and ID number should appear in the header; page numbers and the course number should appear in the footer; A title page is not needed.

### Research Presentation (20%)

Each student will be given 30 minutes to review a topic in cognitive neuroscience of memory (worth 15%). Topics and presentation dates are listed in blue on the syllabus schedule below.

- During the presentation students will highlight key findings from classic studies, based on the assigned reading for that topic: you will review, in detail, the background and supporting evidence from 2-3 sections from the chapter, or from the assigned reading.
- Students must then choose 1-2 recent papers (from 2008 to present) from peer-reviewed journals, and discuss whether the findings agree or disagree with the classic work; For this, you will have to read original source articles, and highlight the added contribution of the study/studies, as well as conclusions and 'take-home message' of the work. Students must also outline the general conclusion and state of knowledge on their topic. COPIES OF ARTICLES WILL BE MADE AVAILABLE TO THE CLASS VIA UWACE. You must email the .pdf file(s) of the paper(s) to Dr. Fernandes 1 week prior to your presentation.
- A copy of your Power Point presentation must be **emailed to the instructor on the day prior to your presentation** (by 4pm Wednesday).

Following this 30 minute presentation, each student will lead a 15 minute Discussion Session (worth 5%).

- You will ask your classmates a couple of "Questions" relating to your topic, and you must engage them in a discussion of possible answers. You can bring in extra materials (newspaper clippings) or prepare demonstrations related to your prepared "Questions"; these will help engage your classmates in the Discussion Session.

*Make your "Questions" provocative, to invite discussion from your classmates, or come prepared to defend your particular "Answers" to your "Questions", if many different "Answers" are possible. Alternatively, frame your Questions such that students have to pick one side of a debate, and defend it, or have students provide examples from everyday life to support their answers.*

### Participation in Research Discussions (up to 5%)

During selected Research Presentation Discussion sessions, you will be expected to participate by providing spoken Responses to Presentation Questions (worth max. 1% per Presentation up to a total of 5%).

### Written Critique of Research Presentations (up to 5%)

Following selected Research Presentations you will provide WRITTEN feedback (due the following class) on fellow classmates' Presentations and Research Questions, using the template provided on UWACE (worth max. 1% per Presentation up to a total of 5%).

### Ideas for Future Research Presentation (10%)

Each student will prepare a short presentation (7-8 minutes in length) in which a possible future research question, and study, are outlined, based on one of the topics from this course. You will present your research question, the approach to be taken, and potential implications of the study.

- A copy of your Power Point presentation must be **emailed to Dr. Fernandes by Wednesday November 30<sup>th</sup> (by 4pm)**.

### **Course Web page / What is UW-ACE?**

UW-ACE is a web-based course management system that enables instructors to manage course materials and interact easily and efficiently with their students. Here, **I will post lecture slides online**, along with the course syllabus and course announcements. Copies of selected articles from student Research Presentations will also be posted here. UW-ACE will also be used to post marks to the grade-book, and track student progress.

### **Policy for late Tests/Participation/Written critiques/Missed Presentations**

*It is the student's responsibility to hand in late tests directly to Dr. Fernandes, **in person**, or via **email**. These will be subject to a **late penalty of -10% of the assigned grade, per day**, including weekends. Missed presentations will also be subject to a late penalty of -10% per day, including weekends, and must be re-scheduled at a date/time that will be mutually agreed upon between student and instructor. There is no 'make-up' for missed in-class Participation marks or Written Critiques, as there are more presentations than available participation marks. A medical note must accompany any late evaluation in order to be graded.*

If you feel that you have a medical or personal problem that is interfering with your work, you should contact your instructor and the Academic Counseling Office as soon as possible. Problems may then be documented and possible arrangements to assist you can be discussed at the time of occurrence rather than on a retroactive basis. In general, retroactive requests for grade revisions on medical or compassionate grounds will not be considered. For example, in the case of illness, the student must provide an official illness certificate on appropriate letterhead from their physician, which states that, due to medical reasons, it was impossible for the student to attend the course event, or hand in the written evaluation on the scheduled date. A note on a prescription pad is not an acceptable medical certificate.

## Note on avoidance of academic offences

### Academic Integrity:

**Academic Integrity:** In order to maintain a culture of academic integrity, members of the University of Waterloo are expected to promote honesty, trust, fairness, respect and responsibility. [Check <http://www.uwaterloo.ca/academicintegrity/> for more information.]

**Discipline:** A student is expected to know what constitutes academic integrity, to avoid committing academic offences, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about “rules” for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to Policy 71 - Student Discipline, <http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm>. For typical penalties check Guidelines for the Assessment of Penalties, <http://www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm>.

**Grievance:** A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70 - Student Petitions and Grievances, Section 4, <http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm>. When in doubt please be certain to contact the department’s administrative assistant who will provide further assistance.

**Appeals:** A student may appeal the finding and/or penalty in a decision made under Policy 70 - Student Petitions and Grievances (other than regarding a petition) or Policy 71 - Student Discipline if a ground for an appeal can be established. Read Policy 72 - Student Appeals, <http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm>.

### **Academic Integrity website (Arts):**

[http://arts.uwaterloo.ca/arts/ugrad/academic\\_responsibility.html](http://arts.uwaterloo.ca/arts/ugrad/academic_responsibility.html)

**Academic Integrity Office (UW):** <http://uwaterloo.ca/academicintegrity/>

## Accommodation for Students with Disabilities

**Note for students with disabilities:** The Office for Persons with Disabilities (OPD), located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the OPD at the beginning of each academic term.

## About Your Instructor

In my research I aim to understand the processes involved in higher cognitive functions such as memory, attention and language. I use a combination of behavioural tests and neuro-imaging to identify the brain basis of these functions. In addition I study how the normal aging process affects cognition, particularly one’s ability to carry out memory tasks concurrently with other tasks (dual-tasking). This work is used to test and refine current models of how memory encoding and retrieval operate.

## The following pages contain the Tentative Schedule for classes

The course syllabus is also posted on UW-ACE. If there is a discrepancy between the paper copy and the one posted on UW-ACE, the latter will be used.

Topic	Readings and Assignments	Date
<p>Syllabus UW-ACE</p> <p>Historical Approaches to Memory Research</p>	<p>Text: Ch. 2, p.33-43</p> <p>Article: Schacter., et al. (2003). The Seven Sins of Memory. <u>Ann. N.Y. Acad. Sci.</u> 1001, p 226-239</p>	<p>Sept. 15<sup>th</sup></p>
<p>Short-term and Working memory</p> <p>Encoding and Retrieval for Long-term Memory</p>	<p>Text: Ch. 5, p 77-92</p> <p>Text: Ch. 6, p. 93- 107</p>	<p>Sept. 22<sup>nd</sup></p>
<p>Methods of Assessment : Cognition, Neuropsychology, and Animal work</p> <p>Debates in Memory Research</p>	<p>Article: Moscovitch et al. (2006).The cognitive neuroscience of remote episodic, semantic and spatial memory. <u>Current Opinions in Neurobiology</u>, 16, 179-190.</p> <p>Article: Davachi et al. (2003). Multiple routes to memory: Distinct medial temporal lobe processes build item &amp; source memories. <u>PNAS</u>, 100, 2157-2162</p>	<p>Sept, 29<sup>th</sup></p>
<p>Recollection &amp; Familiarity</p> <p>Detailed Memory in the Brain</p>	<p>Text: Ch. 14, p. 215-228 and Ch. 15, p 229-244</p> <p>Article: Skinner, Grady, &amp; Fernandes (2010). Reactivation of context-specific brain regions during retrieval. <u>Neuropsychologia</u>, 48, 156-164.</p>	<p>Oct. 6<sup>th</sup></p>
<p>“Are humans special? Episodic Memory in lower animals”</p> <p>“Does your cat or dog really remember?”</p>	<p>Article: Griffiths, D, Dickinson, A, &amp; Clayton, N. (1999). Episodic memory: What can animals remember about their past? <u>Trends in Cognitive Sciences</u>, 3, 74-80.</p> <p>Article: Tulving, E. (2001). Episodic memory and common sense: how far apart? <u>Phil. Trans. R. Soc. Lond. B.</u> 356, 1505-1515.</p> <p><b>Take-Home Test #1 handed out</b></p>	<p>Oct. 13<sup>th</sup></p>
<p>“What happened?” Distortions of Memory</p> <p>“Who told me that?” Source Monitoring</p>	<p>Text: Ch 10, p 149-162</p> <p>Text: Ch 12, p 179-195</p> <p><b>Take-Home Test #1 due</b></p>	<p><b>Oct. 20<sup>th</sup></b></p>
<p>“Is the brain ready yet?” Memory in Infancy &amp; Childhood</p> <p>“He said She said” Memory &amp; Theory of Mind</p>	<p>Text: Ch 17, p 267-282</p> <p>Text: Ch 19, p 297-312</p>	<p>Oct. 27<sup>th</sup></p>

Topics	Readings and Assignments	Dates
<p>“Routes to Memory” Spatial Memory</p> <p>“I remember it like it was yesterday...” Memory for emotional events</p>	<p>Text: Ch. 23, p 363-378</p> <p>Text: Ch. 24 p 379-392</p>	<p>Nov. 3<sup>rd</sup></p>
<p>“I know a guy...” Case Studies of Memory Loss</p> <p>“Growing old” Memory Changes in healthy older adults</p>	<p>Text: Ch. 30, p 485-501</p> <p>Text: Ch. 25, p. 395-409</p>	<p>Nov. 10<sup>th</sup></p>
<p>“Can you see it?” Brain Imaging &amp; Memory</p> <p>“Drugs and Beyond” Pharmaceuticals &amp; Memory</p>	<p>Text: Ch. 31, p. 501-519</p> <p>Text: Ch. 33, p. 539-554</p>	<p>Nov. 17<sup>th</sup></p>
<p>“I think therefore I am” Consciousness &amp; Memory</p> <p>“Putting it all together” Models of Memory</p>	<p>Text: Ch. 38, p. 609-625</p> <p>Text: Ch. 39, p. 627-643</p>	<p>Nov. 24<sup>th</sup></p>
<p>Ideas for Future Research Presentations</p>	<p><b>Take-Home Test #2 handed out</b></p>	<p>Dec. 1<sup>st</sup></p>
	<p><b>Take-Home Test #2 due</b></p>	<p>Dec. 9<sup>th</sup></p>