



NROC61 TENTATIVE COURSE SYLLABUS

Spring 2009

NEUROSCIENCE II: LEARNING AND MOTIVATION

Instructor:

Dr J. C. LeBoutillier

Room S-557

416-287-7430

Office hours: Tues 1:30 to 2:30

Wed 11-12 am

Email: nroc61@utsc.utoronto.ca

NOTE: This is the only email account that will be monitored for this course.

Teaching Assistants:

Crystal Dykstra crystal.dykstra@gmail.com

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Lectures:

Tues 9:00 – 12:00 MW 170

Tutorials:

TUT0001	Wed	14:00	15:00	AC 332
TUT0002	Wed	14:00	15:00	AC 334
TUT0003	Wed	14:00	15:00	HW 214
TUT0004	Wed	15:00	16:00	AC 332

Course Description:

This course introduces the students to learning and motivation from a physiological and behavioral perspective. Topics covered under the category of motivation include: physiological basis of eating, drinking and sexual behavior, sleep, and the neural correlates of reward. Topics covered under learning include: learning categories, memory systems and the cell and molecular basis of learning and memory.

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the AccessAbility Services Office as soon as possible. Tina Doyle, the UTSC AccessAbility Manager 416-287-7560 is available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. The sooner you let us know about your needs, the quicker we can assist you in achieving your learning goals in this course.

Course Material:

Students will be responsible for:

1. All material covered during lectures
2. Assigned text chapters and primary readings
3. Tutorial assignments

Tutorials

The tutorials are intended to familiarize the student with the general knowledge base of neuroscience, namely the published literature. The tutorial assignments will include:

1. Using the library (or internet) referencing services to obtain a list of current references on an assigned topic.
2. A 10 minute oral presentation describing an assigned reading followed by 3-5 minutes of class discussion.
3. A mini-research proposal.

Details on each of these assignments are posted as part of the tutorial syllabus on the course Intranet.

Grading

The assignment of grades will be based upon the following:

1. One midterm examination - 25%. This test will include MCQs and written components such as definitions and long answers.
2. A final examination - 35%. The format of the final will be similar to the midterm. You will be responsible for all lecture material covered during the course, but only the assigned readings and text chapters not covered on Test 1.
3. Tutorial grade 40%
 - a. Abstract list – 10%
 - b. Oral presentation – 5%
 - c. Research proposal -15%
 - d. Class participation – 10%

Missed Tests and Presentations

Makeup exams will not be scheduled in this course. If you miss the midterm test you will be permitted to write a final cumulative exam on all course content valued at 60% of your final grade provided you meet the following criteria.

1. Notify me by email ASAP following the missed test.

2. Deliver a medical note from a physician to me within 2 weeks of the test. Please use only the official medical note available for download at www.utsc.utoronto.ca/~registrar/. No other notes will be accepted. If these criteria are not met a grade of zero will be assigned.

A grade of zero will be given if you do not give your presentation on the assigned date. Missed presentations will only be rescheduled provided an official medical note downloaded from the UTSC website indicated above is delivered to your TA ASAP. You should be prepared to give your presentation at any tutorial following the missed date. Your TA will try to give you advance notice but this may not be possible. In the event that time does not permit us to reschedule your presentation during the term, you may be required to give your presentation during the reading week before the final exams. Failure to give your presentation on the assigned date will result in a grade of zero.

Late Assignments

Late abstract lists and research proposals will be accepted with a penalty of 10% per day. All assignments are due at the start of your tutorial.

Texts

- Bear, Connors & Paradiso, **Neuroscience: Exploring the Brain** 3rd edition.

Assigned Readings

You will be required to read the following articles. Copies of these articles are available in the library and most can be downloaded in an Adobe Acrobat (pdf) format.

Adamantidis, A., & de Lecea, L. (2008). Physiological arousal: a role for hypothalamic systems. *Cellular and Molecular Life Sciences*, 65, 1475-1488.

Goldstein, I. (2000). Male sexual circuitry. *Scientific American* (August), 283, 70-75.

Gura, T. (2003). Obesity drug pipeline not so fat. *Science*, 299, 849-852.

Kinsley, C.H & Lambert, K.G. (2006). The maternal brain. *Scientific American* (January), 72-79.

LeDoux, J.E. (2003). The emotional brain, fear and the amygdala. *Cellular and Molecular Neurobiology*, 23, 727-738.

Lynch, G. (2002). Memory enhancement: the search for mechanism-based drugs. *Nature Neuroscience*, 5, 1035-1038.

McKinley, M.J., et. al. (2004). Physiological and pathophysiological influences on thirst. *Physiology and Behavior*, 81, 795-803.

Medina, J.H., Bekinschtein, P., Cammarota, M., & Izquierdo, I. (2008). Do memories consolidate to persist or do they persist to consolidate?. *Behavioural Brain Research*, 192, 61-69.

Nestler, E.J., & Malenka, R.C. (2004). The addicted brain. *Scientific American* (March), 290 78-85.

Siegel, J.M. (2001). The REM Sleep-Memory Consolidation Hypothesis. *Science*, 294, 1058-1063

Tsigos, C, & Chrousos, G.P. (2002). Hypothalamic-pituitary-adrenal axis, neuroendocrine factors and stress. *Journal of Psychosomatic Research*, 53, 865-871.

Wright, K. (2002). Times of Our Lives. *Scientific American* (September) 287, 58-65.

COURSE SCHEDULE

Week	Date	Topic	Assigned Lecture Readings	Assigned Primary Reading
1	Jan 6	Course Introduction Regulation of Internal Body States	Chapter 15 (Hypothalamus)	
2	Jan 13	Introduction to the LSS Physiology and Neurobiology of Thirst	Chapter 16	Wright
3	Jan 20	Physiology and Neurobiology of Eating Critical Reading Session I	Chapter 16	McKinley et al. Gura
4	Jan 27	Biological Clocks: Sleep and Wakefulness	Chapter 19	Siegel
5	Feb 3	Sex, Sexuality and the Brain	Chapter 17	Kinsley & Lambert Goldstein
6	Feb 10	Critical Reading Session II		Medina et al.
	Feb 17	READING WEEK		
7	Feb 24	Midterm test requested		
8	Mar 3	Learning and Memory: Biological Perspectives	Chapter 24	Lynch
9	Mar 10	Learning and Memory: Neural Mechanisms Critical Reading Session III	Chapter 25	Adamantidis & de Lecea
10	Mar 17	Learning and Memory con'd Neural Correlates of Reward	Chapter 15	Nestler & Malenka
11	Mar 24	Physiology of Emotions	Chapter 18	LeDoux
12	Mar 31	Stress Final Exam Review		Tsigos & Chrousos

Content listed for Weeks 1 to 5 inclusive and highlighted in yellow will be tested on the midterm.

Content listed for Weeks 6 to 12 AND all lecture content (Week 1-12) will be on the final exam.



**NROC61S Tutorial Syllabus: Spring 2009
TENTATIVE SCHEDULE
Neuroscience II: Learning and Motivation**

The tutorials are intended to familiarize students with the general knowledge base of neuroscience using published literature. Tutorials will be used to answer questions about assigned readings as well as develop skills in writing, presentation, and reviewing relevant research material. Students are required to attend all tutorials within their assigned tutorial section.

Tutorial Assignments

Students will be responsible for completing the following tutorial assignments:

1) ASSIGNMENT 1: List of 12 Abstracts, 5 Annotated Bibliographies

Using the library/internet referencing services, students must hand in a list of abstracts of 12 empirical articles (i.e. articles must be original research articles NOT reviews of research concepts) on an assigned topic (**SEE: Tutorial Topics.doc**). In addition, for 5 of the 12 abstracts you should submit 5 annotated bibliographies. The referencing for these abstracts will follow APA format. You will choose papers from this submitted list to comprise the reference section for your final assignment 3. Topics will be assigned in your first tutorial and this assignment is due at the start of the tutorial on **February 11, 2009**.

2) ASSIGNMENT 2: One 10 minute Class Presentation

Using the articles comprising the reading list, you will be assigned a particular subsection of an article and lead a seminar discussion (10 minutes) after which you will answer questions from the audience (5 minutes).

Your presentation date will be determined during the first two weeks of tutorials and these dates will be posted to the INTRANET.

Breakdown of Readings for Oral Presentation:

Goldstein, I. (2000). Male sexual circuitry. *Scientific American* (August), 283, 70-75.

Student 1: Introduction, Dynamic Balance, Sex and the Sexes

Student 2: The Brain's Brakes

Student 3: Inside the Brain – When Things Go Wrong (included)

Gura, T. (2003). Obesity Drug Pipeline Not So Fat. *Science*, 299, 849-852.

Student 1: Introduction – Unappetizing Options (included)

Student 2: Having It All (Box) – On a Future Menu (included)

Student 3: Leptin's Partners in Fat – The Yin and Yang of Eating (included)

Kinsley, C.H & Lambert, K.G. (2006). The maternal brain. *Scientific American* (January), 72-79.

- Student 1: Introduction - Awash in Hormones (included)
- Student 2: Brain Changes
- Student 3: The Human Connection – Conclusions (included)

LeDoux, J.E. (2003). The emotional brain, fear and the amygdala. *Cellular and Molecular Neurobiology*, 23,727-738.

- Student 1: Introduction – The Amygdala and Fear Conditioning (included)
- Student 2: Cell and Molecular Mechanisms Underlying Fear Conditioning – Memory vs. Modulation (included)
- Student 3: Fear Conditioning and the Human Amygdala – Conclusions (included)

Lynch, G. (2002). Memory enhancement: the search for mechanism-based drugs. *Nature Neuroscience*, 5, 1035-1038.

- Student 1: Introduction – Drugs That Facilitate Induction (included)
- Student 2: Drugs That Improve Consolidation – Applications (included)
- Student 3: Clinical Results – Conclusions (included)

McKinley, M.J., et. al. (2004). Physiological and pathophysiological influences on thirst. *Physiology and Behavior*, 81, 795-803.

- Student 1: Introduction – Osmoregulatory Water Intake (included)
- Student 2: Hormonal Influences on Water Intake
- Student 3: Neural Pathways Regulating Water Intake – Some Pathophysiological Influences on Water Intake (included)

Nestler, E.J., & Malenka, R.C. (2004). The addicted brain. *Scientific American* (March), 290 78-85.

- Student 1: Introduction – Rheostat of Reward (included)
- Student 2: Dopamine, Please - An Addiction is Born (included)
- Student 3: Road to Relapse – A Common Cure? (included)

Tsigos, C, & Chrousos, G.P. (2002). Hypothalamic-pituitary-adrenal axis, neuroendocrine factors and stress. *Journal of Psychosomatic Research*, 53, 865-871.

- Student 1: Physiology of the Stress Response
- Student 2: Regulation of the Stress Response
- Student 3: Body Systems Responses to Stress
- Student 4: HPA Axis Pathophysiology – Future directions (included)

3) ASSIGNMENT 3: Research Proposal

Using the topic that they have been assigned, students must complete a 5-7 page written research proposal that critically reviews one area of neuroscience and then propose an experiment that would help to address an integrative question or issue. You need not deal with the entire topic

area (e.g., Neurobiology of Attention), but choose smaller, more manageable topic (e.g., perception of living things and spatial attention).

In addition to these 5-7 pages, you must include a cover page, an abstract and a reference page. Thus, your final paper will be about 9 pages in length. A maximum of 10 pages will be accepted. **APA format is required for the submission of this paper.**

Your proposal paper is due at the start of your last tutorial. You **MUST** turn in both a hard copy to your TA, and an electronic copy through Turnitin to avoid late penalties.

Turnitin:

First, some background information on this program. Turnitin.com is a tool that assists in detecting textual similarities between compared works i.e.: it is an electronic resource that assists in the detection and deterrence of plagiarism.

Students agree that by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com web site.

As indicated on the Turnitin home page, all work submitted to Turnitin is checked against three databases of content:

- A current and archived copy of the publicly accessible Internet (more than 4.5 billion pages updated at a rate of 30-40 million pages per day);
- Millions of published works (from ABI/Inform, Periodical Abstracts, Business Dateline, ProQuest, the Gutenberg Collection of literary classics, and tens of thousands of electronic books);
- Millions of student papers submitted to Turnitin since 1996.

Students will submit all written reports to the turnitin.com site (www.turnitin.com).

Detailed instructions on setting up your account will be provided in class.

Grading Summary

Assignment 1: Abstracts – 10%

- 12 abstracts of empirical papers between 2005 and 2009. Complete reference required using APA format - 4%
- 5 annotated bibliographies prepared from the list of 12 chosen abstracts - 5%
- Identification of research question – 1%

Assignment 2: Class Presentations – 5%

- Clarity of the presentation– 3%
- Identification of key concepts – 1%
- Style of the presentation – 1%

Assignment 3: Research Proposal – 15%

- Abstract – 2%
- Clarity of proposal – 10%
- Use of stylized format –3 %

The proposal must contain the following sections:

- **Title page:**
 - APA format
 - Title, your name, name of the institution, running head, header containing the page number and word count placed in the bottom right corner. (page 1)
- **Abstract:**
 - One paragraph that briefly describes the area of interest and the research question and hypothesis that will be addressed in the proposal. (page 2)
- **Introduction:**
 - This section should describe the research area and findings from previous studies. The literature review should also discuss an issue or question that needs to be addressed in that area and provide a rationale for your proposed study. (pages 3-5)
- **Methods:**
 - This section should describe the proposed method for the experiment, including who the subjects will be (e.g. for a clinical study: mean age, sex, education level etc. of participants and where they will be recruited from), what equipment will be used, and the detailed procedure that will be followed. You should specify the variables (independent and dependent) that will be used in the experiment. (pages 6-7)
- **Discussion:**
 - This section should describe the research limitations and significance of potential findings. DO NOT create and/or include a Results section. (page 8)
- **References:**
 - You must have a **minimum of 5 and a maximum of 12 primary sources** (ONLY journal articles used for Assignment 1).
 - You must format your references using the guidelines developed by the APA Publication Manual (5th edition). (page 9)

Tutorial Participation – 10%

Assigned Course Readings

Adamantidis, A., & de Lecea, L. (2008). Physiological arousal: a role for hypothalamic systems. *Cellular and Molecular Life Sciences*, 65, 1475-1488.

Goldstein, I. (2000). Male sexual circuitry. *Scientific American* (August), 283, 70-75.

Gura, T. (2003). Obesity drug pipeline not so fat. *Science*, 299, 849-852.

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Wright, K. (2002). Times of Our Lives. *Scientific American* (September) 287, 58-65.

Critical Reading Sessions

Throughout the term, there will be three (3) critical reading sessions based on 3 empirical articles that are part of the course readings and are tested on the midterm or final exam. These sessions will run during lecture and are designed to enhance critical reading skills and improve the understanding of important concepts in the articles.

Participation in these sessions is voluntary and you will not receive credit for your attendance.

Session 1: January 26, 2009

Siegel, J.M. (2001). The REM Sleep-Memory Consolidation Hypothesis. *Science*, 294, 1058-1063

Session 2: February 10, 2009

Medina, J.H., Bekinschtein, P., Cammarota, M., & Izquierdo, I. (2008). Do memories consolidate to persist or do they persist to consolidate?. *Behavioural Brain Research*, 192, 61-69.

Session 3: March 10, 2009

Adamantidis, A., & de Lecea, L. (2008). Physiological arousal: a role for hypothalamic systems. *Cellular and Molecular Life Sciences*, 65, 1475-1488.

TOTAL = 40%

Late and Missed Assignments:

Oral presentations **MUST** be presented on the assigned date. Students who fail to give their presentations on the assigned dates will receive a grade of zero for this component of the tutorial unless a medical note is provided to the TA. **See the course syllabus for more details.**