



Department of Psychology
Psychology PSYC 511.08 - Special Topics Seminar
Behavioral Neuroscience
Fall 2009

Instructor:	Brian H. Bland	Lecture Location:	EDT920
Phone:	(403) 220-4948	Lecture Days/Time:	MWF 13:00-13:50
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Office:	Admin 032		
Office Hours:	By Appointment		

Course Description and Goals

The course will be a survey of our current understanding of the functions of the hippocampus and related structures such as spatial processing, sensorimotor integration and memory. The goal of the course is provide a contemporary overview of the functions of the hippocampus and related structures. The following topics will be covered by the instructor:

1. Electrophysiological Recording theory
 - i) basic electrical concepts
 - ii) field potential analysis (sources and sinks)
 - iii) extracellular recording
 - iv) intracellular recording
 - v) patch clamp

2. Cellular basis of theta band oscillation and synchrony
 - i) hippocampal field activity (theta and large amplitude irregular activity (LIA))
 - ii) theta related cellular activity

3. The ascending brainstem hippocampal synchronizing pathways
 - i) the rostral pontine region
 - ii) the diencephalic region
 - iii) the medial septum

4. The ascending brainstem desynchronizing pathways
 - i) the median raphe

5. The sensorimotor integration model of hippocampal function
 - i) Type 2 and type 1 theta
 - ii) Behavioural correlates

The following readings will be covered by the students:

Spatial Cells: The activity of hippocampal place cells

Head Direction Cells: The head direction signal: Origins and sensorimotor integration

Grid Cells: Grid cells and the brain's spatial representation.

Theta cells: Anatomical, physiological, and pharmacological properties underlying hippocampal sensorimotor integration.

The medial temporal lobe system: The medial temporal lobe (the combination of the parahippocampal region and hippocampus) and recognition memory.

Prerequisites

Psyc 205 – Principles of Psychology, Psyc 375 – Brain and Behaviour

Required Readings

Spatial Processing in the Brain: The Activity of Hippocampal Place Cells.

Phillip J. Best, Aaron M. White, and Ali Minai. *Annu. Rev. Neurosci.* 2001. 24:459–86.

The Head Direction Signal: Origins and Sensory-Motor Integration. Jeffrey S. Taube. *Annu. Rev. Neurosci.* 2007. 30:181–207.

Place Cells, Grid Cells, and the Brain's Spatial Representation System. Edvard I. Moser, Emilio Kropff, and May-Britt Moser. *Annu. Rev. Neurosci.* 2008. 31:69–89.

Anatomical, Physiological, and Pharmacological Properties Underlying Hippocampal Sensorimotor Integration. Brian H. Bland. Chapter 12, pp. 283-325, In: *Information Processing by Neuronal Populations*. Ed(s) Christian Holscher & Matthias Munk. Cambridge University Press, 2009.

The Medial Temporal Lobe and Recognition Memory. H. Eichenbaum, A.P. Yonelinas, and C. Ranganath. *Annu. Rev. Neurosci.* 2007. 30:123–52.

Evaluation

The final course grade will be based on: 1) The content and quality of oral presentations (60%), 2) Contribution to the discussion (10%; you are expected to ask questions of the presenters), and 3) Term Paper (30%; due at the end of term).

All students are expected to read the required readings. Presenters should prepare a 50 minute Powerpoint talk that describes the assigned reading. Some comment on the background, techniques, significance, strengths, weaknesses etc. are expected from the presenter and the discussants (after the presentation is completed).

Term Paper

Term papers are to be on a topic of interest to the student, within the limits of the course focus and must be approved by the instructor. The paper is due by the end of term.

Grading Scale

A+	96-100%	B+	80-84%	C+	67-71%	D+	54-58%
A	90-95%	B	76-79%	C	63-66%	D	50-53%
A-	85-89%	B-	72-75%	C-	59-62%	F	0-49%

As stated in the University Calendar, it is at the instructor’s discretion to round off either upward or downward to determine a final grade when the average of term work and final examinations is between two letter grades. To determine final letter grades, final percentage grades will be rounded up or down to the nearest whole percentage (e.g., 89.5% will be rounded up to 90% = A but 89.4% will be rounded down to 89% = A-).

Tentative Lecture Schedule

Fall Session

Date	
Sept 9	Introduction to the course
Sept 11-21	Electrophysiological recording theory
Sept 23 – Oct 2	Cellular basis of theta band oscillation and synchrony
Oct 5 - 16	The ascending brainstem hippocampal synchronizing pathways
Oct 19 -26	The ascending brainstem hippocampal desynchronizing pathways
Oct 28 – Nov 6	The sensorimotor integration model of hippocampal function
Nov 9 – Dec 7	Student presentations and discussions
Sept 21	Last day for registration/change of registration. Last day for tuition refund.
Oct 12	Thanksgiving Day. University closed.
Nov 11-15	Reading Days. No lectures.
Nov 23	Essay Due
Dec 7	Last day to participate in research and allocate research credits
Dec 8	Fall Session Lectures end. Last day to withdraw
Dec 11-21	Final exams (scheduled by the Registrar)
Dec 25-31	Holiday Observance. Session Break. University closed.

Reappraisal of Grades

A student who feels that a piece of graded term work (e.g., term paper, essay, test) has been unfairly graded, may have the work re-graded as follows. The student shall discuss the work with the instructor within 15 days of being notified about the mark or of the item's return to the class. If not satisfied, the student shall immediately take the matter to the Head of the department offering the course, who will arrange for a reassessment of the work within the next 15 days. The reappraisal of term work may cause the grade to be raised, lowered, or to remain the same. If the student is not satisfied with the decision and wishes to appeal, the student shall address a letter of appeal to the Dean of the faculty offering the course within 15

days of the unfavourable decision. In the letter, the student must clearly and fully state the decision being appealed, the grounds for appeal, and the remedies being sought, along with any special circumstances that warrant an appeal of the reappraisal. The student should include as much written documentation as possible.

Plagiarism and Other Academic Misconduct

Intellectual honesty is the cornerstone of the development and acquisition of knowledge and requires that the contribution of others be acknowledged. Consequently, plagiarism or cheating on any assignment is regarded as an extremely serious academic offense. Plagiarism involves submitting or presenting work in a course as if it were the student's own work done expressly for that particular course when, in fact, it is not. Students should examine sections of the University Calendar that present a Statement of Intellectual honesty and definitions and penalties associated with Plagiarism/Cheating/Other Academic Misconduct.

Academic Accommodation

It is the student's responsibility to request academic accommodations. If you are a student with a documented disability who may require academic accommodation and have not registered with the Disability Resource Centre, please contact their office at 220-8237. Students who have not registered with the Disability Resource Centre are not eligible for formal academic accommodation. You are also required to discuss your needs with your instructor no later than 14 days after the start of this course.

Absence From A Test/Exam

Makeup tests/exams are NOT an option without an official University medical excuse (see the University Calendar). A completed Physician/Counselor Statement will be required to confirm absence from a test/exam for health reasons; the student will be required to pay any cost associated with this Statement. Students who miss a test/exam have 48 hours to contact the instructor and to schedule a makeup test/exam. Students who do not schedule a makeup test/exam with the instructor within this 48-hour period forfeit the right to a makeup test/exam. At the instructor's discretion, a makeup test/exam may differ significantly (in form and/or content) from a regularly scheduled test/exam. Except in extenuating circumstances (documented by an official University medical excuse), a makeup test/exam must be written within 2 weeks of the missed test/exam.

Course Credits for Research Participation (choose the appropriate section:)

Course Credits for Research Participation (Max 2% of final grade)

Students in most psychology courses are eligible to participate in Departmentally approved research and earn credits toward their final grades. **A maximum of two credits (2%) per course, including this course, may be applied to the student's final grade. Students earn 0.5% (0.5 credits) for each full 30 minutes of participation.** The demand for timeslots may exceed the supply in a given term. Thus, students are not guaranteed that there will be enough studies available to them to meet their credit requirements. Students should seek studies early in the term and should frequently check for open timeslots. Students can create an account and participate in Departmentally approved research studies at <http://ucalgary.sona-systems.com>. The last day to participate in studies and to assign or reassign earned credits to courses is **Dec 7th, 2009**.

Student Organizations

Psychology students may wish to join the Psychology Undergraduate Students' Association (PSYCHS). They are located in Administration 170 and may be contacted at 220-5567.

Student Union VP Academic: Phone: 220-3911 suvpaca@ucalgary.ca

Student Union Faculty Rep.: Phone: 220-3913 socialscirep@su.ucalgary.ca

Important Dates

The last day to drop this course and **still receive a fee refund** is **Sep 18th, 2009**. The last day to withdraw from this course is August **Dec 8th, 2009**.