

Psychology 396 **Research methods in behavioural neuroscience**

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Course readings:

Vanderwolf, C. H. & Cooley, R. K. The sheep brain: A photographic series.

Nolte, J. The human brain: An introduction to functional anatomy

Original journal articles as required to complete assignments

Purpose of the course:

In this course, the content will be drawn from the particular subdiscipline of psychology known as behavioural neuroscience. Behavioural neuroscience involves the study of the relationship between structures in the nervous system and behaviour. So, in this course, you will learn some things about the structure of the nervous system (and how to study that structure) and some things about behaviour (and how to study behaviour). As behavioural neuroscientists are interested in both humans and animals, we will conduct experiments on both humans (ourselves) and animals (gerbils).

A brief note about vivisection: This is a course that involves vivisection (physiological intervention in living things). In particular, in this course we will examine anatomical structures in sheep and gerbil brains. As you may know, some people have ethical objections to the use of biological tissue for research or teaching. If you have such objections, and you have somehow found yourselves in this course, you might want to consider an alternative. If for some reason this is not possible, you should speak to me about alternatives. It might be important for you to know that your contact with animals will be limited to observation (and possibly some handling) of normal animals. We will, of course, ensure that you are properly trained in this regard. You will (hopefully) have an opportunity later in the course to observe a single-unit recording study in progress. This session, involving surgical intervention, is entirely optional.

Evaluation:

The evaluation process in the course will consist of the following:

1. Anatomy tests. This test will be 1/2 practical (January 25)(a "bell-ringer" -- I'll explain later what this means) and 1/2 written (February 1). In total, these tests will be worth 20% of your grade. (10% x 2).
2. Seminar. For the seminar, you and your group members will take over one class on an assigned topic (see syllabus). I'll say much more about the seminar, but for now remember that the main requirement is that you design the seminar as a group and that you all contribute equally to the oral presentation. I will give the class a short set of readings to do to prepare for the seminar and I will give each seminar group a set of papers to prepare. Of course, you're encouraged to go beyond these papers. The seminar will be worth 20 % of your grade.
3. Short assignment on the distance estimation experiment. This assignment will consist of written answers to a series of questions designed to guide you through the process of analyzing and presenting results. 10% Due March 3.
4. Short assignment on the animal spatial cognition experiment. This assignment will consist of written answers to a series of questions designed to guide you through the process of analyzing and presenting results. 10% Due March 17.
5. Short assignment on animal ethics. 10% Due February 15.
6. Full experimental paper on either the animal or the human experiment. This paper will be a full experimental write-up (intro, method, results, discussion) adhering to the APA format. A major goal of the course is to teach you how to write such papers. 20% Due on the last day of term (April 5).
7. UW-ACE assignments. 10%. This course includes some online learning units. These learning units are designed to help you both by guiding your readings in neuroanatomy early in the course and also by helping you to understand how to write different parts of an APA paper. In total, there are 8 online learning units and each of them contains some form of feedback (self-assessment quizzes, other kinds of short assignments) with their own deadlines and rewards. You can find more information by logging on to the UW-ACE learning environment at <http://uwace.uwaterloo.ca>. Your userid is your UW student userid and your password (unless you have changed it for another course) should be your student number.
8. Bonus assignment on one of the demonstrations. 5% If you wish to improve your grade, you may write a one page reflection paper on either the VR or the electrophysiology demonstration. This paper is to be submitted online at UW-ACE (instructions to follow). Due on the last day of term (April 5 – no extensions).

A brief note about avoidance of academic offenses: All students registered in the courses of the Faculty of Arts are expected to know what constitutes an academic offense, to avoid committing academic offenses, and to take responsibility for their academic actions. When the commission of an offense is established, disciplinary penalties will be imposed in accord with Policy #71 (Student Academic Discipline). For information on categories of offenses and types of penalties, students are directed to consult the summary of Policy #71 (Student Academic Discipline) which is supplied in the Undergraduate Calendar (p.1:11). If you need help in learning how to avoid offenses such as plagiarism, cheating, and double submission, or if you need clarification of aspects of the discipline policy, ask your course instructor for guidance. Other resources regarding the discipline policy are your academic advisor and the Undergraduate Associate Dean.

A brief note about deadlines: There are many different types of evaluation in this course and it will be very important for you to plan ahead. I will try to give you advice about *what* to be working on *when*, but the final responsibility for organizing your time rests with you. Occasionally, in extenuating circumstances, I may grant extensions of deadlines but you will need to talk to me in advance and you will need to obtain signed, written permission for the extension. If you fail to do so, late work will be assessed a penalty of 5%/day, including weekend days.

Syllabus:

January 4(C)*	Introduction, orientation to UW-ACE, discussion of goals of the course
January 6(C)	Lecture: Overview of neuroanatomy
January 11(L)	Sheep brain dissection I – external features, microscopic stuff
January 13(L)	Sheep brain dissection II – midsagittal section, other dissections
January 18(L)	Sheep brain dissection III – coronal and horizontal sections
January 20(L)	Sheep brain dissection IV – review and practice quiz
January 25(L)	Practical neuroanatomy exam (10%)
January 27(C)	Lecture/discussion: Neuroanatomical systems
February 1(C)	Systems neuroanatomy test (10%)
February 3(C)	Animal ethics and experimentation (Nancy Gibson)
February 8(C)	Animal ethics and experimentation (Nancy Gibson)
February 10(C)	Lecture: An overview of space in psychology
February 15 (L)	Experiment 1: Estimation of distance in visual and action space
February 17 (C)	Discussion of Experiment 1
March 1 (L)	Group 1: Histology 1: Making brain sections Group 2: Animal spatial cognition 1: methods

March 3 (L)	Group 1: Histology 2: Stains and photographs Group 2: Animal spatial cognition 2: data collection
March 8 (L)	Group 2: Histology 1: Making brain sections Group 1: Animal spatial cognition 1: methods
March 10 (L)	Group 2: Histology 1: Stains and photographs Group 1: Animal spatial cognition 1: data collection
March 15 (L)	Virtual reality demonstration/seminar preparation
March 17 (L)	Electrophysiology demonstration/seminar preparation
March 22 (C)	Seminar 1: Cognitive Ethology – What do animals know?
March 24 (C)	Seminar 2: Navigation and wayfinding in human beings
March 29 (C)	Seminar 3: Navigation in virtual environments
March 31 (C)	Seminar 4: Neural mechanisms of navigation: The hippocampus
April 5 (C)	Summing up

***C=meet in PAS 3026, L=meet near 2nd floor lab doors**