



PSYC/NEUR478

Behavioural Neuroscience

Winter 2022

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### Course Description

The principle function of the nervous system is to produce behaviour. Thus, the goal of most behavioural work with laboratory animals in neuroscience is to understand how the nervous system produces behaviour and how experience changes the functioning of the nervous system. Understanding the brain-behaviour relationships also offers a way to find treatments for dysfunctions of behaviour.

This course has multiple objectives that include, but are not limited to, the following;

- 1) Introduce students to the field of behavioural neuroscience.
- 2) Describe the organization and complexity of rodent behaviour.
- 3) Familiarize students with multiple behavioural apparatus and behavioural tests.
- 4) Relate behaviours to localized regions of the brain.
- 5) Provide students with hands on experiential learning opportunities with rodents.

Most students do find that taking the course is a worthwhile experience but there is no doubt that it requires real work. The course is considered as, and taught as, a senior-level course.

The laboratory component of this course involves the compassionate use of animals (rats). Most students find this hands-on learning experience valuable and exciting. This work is approved by the Life and Environmental Sciences Animal Care Committee and adheres to the guidelines laid down by the Canadian Council of Animal Care. **Intentional abuse and mistreatment of animals will not be tolerated.** Such abuse constitutes Academic Misconduct, and will result in a failing grade in the course. Students who are uncomfortable or nervous about handling animals should discuss their concerns with the professor or TA.

## Course Learning Outcomes

The Department of Psychology is committed to student knowledge and skill development. The table below lists the key learning outcomes for this course, the program-learning outcomes they facilitate (see <https://live-arts.ucalgary.ca/psychology/about#program-learning-outcomes>), and the expected level of achievement.

Course Learning Outcomes	Assessment Methods	PLO(s)	Level(s)
Compare the history and philosophy of behavioural neuroscience.	Short answer exams	1,2,4	C
Assess the organization and complexity of rodent behaviour.	Lab reports, written assignments, presentation, exams	1,5,4	A
Implement multiple behavioural tests using a variety of behavioural apparatuses.	Lab reports, written assignments, presentation	3,4,6,7	C
Relate behaviours to localized regions of the brain.	Lab reports, written assignments, exams	1,3,4	A
Perform hands-on experiments with rodents.	Lab reports, written assignments	3,4,6,7	C

Notes. PLOs = Program-Learning Outcomes: 1 = demonstrate knowledge of psychological sciences, 2 = think critically and solve problems, 3 = conduct research and analyze data, 4 = communicate effectively, 5 = demonstrate information literacy, 6 = understand and implement ethical principles in a diverse world, 7 = apply psychological knowledge and skills, 8 = Demonstrate multicultural competence and awareness of issues related to equity, diversity,\* and inclusion. Level of PLO achievement facilitated by this course: I = introductory, C = competency, A = advanced.

## Acknowledgments and Respect for Diversity

Our classrooms view diversity of identity as a strength and resource. Your experiences and different perspectives are encouraged and add to a rich learning environment that fosters critical thought through respectful discussion and inclusion. The Department of Psychology would also like to acknowledge the traditional territories of the people of the Treaty 7 region in southern Alberta. The City of Calgary is also home to Métis Nation of Alberta, Region III.

## Course Format

This is an in-person class held on campus.

## Prerequisites

Psyc 312 or Psyc 300 and 301 – Principles of Psychology  
Psyc 375 – Brain and Behaviour

**Required Text:** None

**Recommended Text:**

1. The Behaviour of the Laboratory Rat: a handbook with tests. Edited by Ian Q. Whishaw and Bryan Kolb, Oxford University Press, 2005
  - a. <http://www.oxfordscholarship.com.ezproxy.lib.ucalgary.ca/oso/public/content/neuroscience/9780195162851/toc.html>
  - b. The online license for this book limits simultaneous access, so you may be blocked if a classmate is accessing it at the same time. The license does allow downloading and printing chapters, so plan ahead. This book will only be used for the laboratory component of the course.
2. Neuroscience, 2<sup>nd</sup> edition, Edited by Dale Purves, George J Augustine, David Fitzpatrick, Lawrence C Katz, Anthony-Samuel LaMantia, James O McNamara, and S Mark Williams, Sinauer Associates, 2001
  - a. <http://www.ncbi.nlm.nih.gov/books/NBK10799/>
  - b. This is a freely available version of the textbook, however, by agreement with the publisher, this book is accessible by the search feature only, and cannot be browsed.

## Assessment Methods

### Exams (50%)

Exam	date	material	weighting
Take home Question set #1	Feb 7 <sup>th</sup>	Lectures 1-9	15%
Midterm Exam#2	March 2 <sup>nd</sup>	Lectures 10-18	15%
Final Exam	Exam Period	Lectures 19-End	20%

Take Home Questions sets:

- **This assessment will be a take home exam that will be posted on D2L at the beginning of class on January 31st and will be due via the D2L dropbox at 11:59PM on Feb 7<sup>th</sup>, 2022. The take home exam will consist of 4 short essay questions (max 1 page each).**
- Students will receive questions 1 week before they are due. Answers will be submitted through the D2L dropbox.
- Questions sets are open book. For this course, an open book exam means that the use of class notes and the textbook is permitted. The use of online resources is permitted. Students may not communicate with others about course material or the question sets either in person or electronically.
- As the questions sets are take-home open book, **answers will be graded not only for accuracy, but also for how clearly and effectively the question is answered.** To earn full marks, answers need to be correct and accurate, need to include specifics, and will employ the correct terminology and concepts. Additionally, clear and effective answers will be focused and succinct. Answers that include extraneous or tangential information will not receive full marks.

### Midterm and Final Exams

Exams will be short answer and cover lecture and reading material up to the exam date. While **the midterms and final exam are not cumulative, about 10% of the final exam will cover thematic issues that span the full course.** Short answer questions will be graded such that part-marks will be given if it is clear you know the general answer but have omitted specific details. Full marks will be given to those that include specifics, and employ the correct terminology and concepts. **No books, notes, computers, calculators, or cellular phones will be allowed during exams.**

### Class Assignment (10%)

Student presentations (March 30<sup>th</sup> to April 11<sup>th</sup>, sign up outside Dr. Antle's office) 10%

- A short (7-8) minute presentation describing a behavioural neuroscience experiment selected and designed by the student.
- The presentation should be in a proposal format.
- The proposal should apply the student's knowledge from the course in designing a behavioural neuroscience project using animals.
- The proposed project must be different than one you've worked on in a UofC neuroscience lab.
- Due to time constraints, students with valid justification will be allowed to make up presentations by uploading a video talk to D2L. Missed presentations without valid justification cannot be made up and will receive a zero.

### Brief Lab Assignments (15%)

There are five brief (approx. 2 page) assignments for this course. Each assignment will involve a question regarding the lab in which they are assigned. Specific details will be posted on D2L prior to the lab they pertain to. Assignments will be due prior to beginning of the following week's laboratory. Assignments

will be submitted to the D2L dropbox. Late assignments will be penalized 10% per day, including weekends. Due dates and weights are listed below:

1. Animal Handling Due Mar 3%

### **Full Lab Reports (25%)**

There are three full-length lab reports for this course. Lab reports should be approximately 15 pages in length (double spaced), and will be based on prior laboratory and lecture material. Assignments should be prepared according to the style of the Journal of Neuroscience, details can be found at [https://www.jneurosci.org/content/information-authors#preparing\\_a\\_manuscript](https://www.jneurosci.org/content/information-authors#preparing_a_manuscript). See D2L for more specific guidelines. Assessment emphasize what you write, not adherence to a particular publication style. Late assignments will be penalized 10% per day, including weekends. The due dates and weighting for the lab reports are as follows:

- |                        |                |     |
|------------------------|----------------|-----|
| 1. Pup development     | due Mar 16, 18 | 10% |
| 2. Learning and Memory | due Apr 16     | 15% |

Assignments will be submitted to the D2L dropbox.

**Students must achieve a passing grade on both the class and lab components to pass this course.**

### **Policy of Assignment Extensions**

This course has a lot of assignments, with something due almost every week in one form or another. I have endeavored to spread out the work here as much as possible. I acknowledge that you have a number of other courses, and in some cases the workloads in those classes may conflict with due dates in this course. The following accommodations will be provided to all students:

1. Look at all of your due dates in all of your courses and write them on a calendar. If you feel, after having looked at all of your due dates, that you would benefit from adjusting your due dates slightly in this course, then due dates on lab assignments can be adjusted by up to 72h if the request is submitted to the prof by January 28<sup>th</sup>.
2. All students are allowed an automatic one-time-only 24h extension on any lab assignment. Just email the prof before the deadline to indicate that you're using your one-time-only extension.
  - a. Students who do not use their one-time-only extension will receive 5 bonus points (out of 100) applied to their final lab report.
3. Extensions can be provided for medical and compassionate reasons. These requests must follow university policies (<https://www.ucalgary.ca/pubs/calendar/current/m-1.html>).

**Extra Research Participation Course Credit is Not Offered for this Course.**

## University of Calgary Academic Integrity Policy

Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity.

Research integrity, ethics, and principles of conduct are key to academic integrity. Members of our campus community are required to abide by our institutional code of conduct and promote academic integrity in upholding the University of Calgary's reputation of excellence. It is your responsibility to ensure that you have read and are familiar with the student academic misconduct policy: <https://www.ucalgary.ca/policies/files/policies/student-academic-misconduct-policy.pdf>.

## Department of Psychology Criteria for Letter Grades

Psychology course instructors use the following criteria when assigning letter grades:

**A+ grade: *Exceptional Performance.*** An A+ grade indicates near perfect performance on multiple choice and short answer exams. For research papers/essays/course projects/presentations, an A+ grade is awarded for exceptional work deserving of special recognition and is therefore not a common grade.

**A, A- Range: *Excellent Performance.*** Superior understanding of course material. Written work is very strong in terms of critical and original thinking, content, organization, and the expression of ideas, and demonstrates student's thorough knowledge of subject matter.

**B Range: *Good Performance.*** Above average understanding of course material. Written work shows evidence of critical thinking and attention to organization and editing but could be improved in form and/or content.

**C Range: *Satisfactory Performance.*** Adequate understanding of course material. Knowledge of basic concepts and terminology is demonstrated. Written work is satisfactory and meets essential requirements but could be improved significantly in form and content. Note: All prerequisites for courses offered by the Faculty of Arts must be met with a minimum grade of C-.

**D range: *Marginally meets standards.*** Minimal understanding of subject matter. Written work is marginally acceptable and meets basic requirements but requires substantial improvements in form and content. Student has not mastered course material at a level sufficient for advancement into more senior courses in the same or related subjects.

**F grade: *Course standards not met.*** Inadequate understanding of subject matter. Written work does not meet basic requirements. Student has not demonstrated knowledge of course material at a level sufficient for course credit.

## 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

Date	Topic/Activity/Readings/Due Date (revise and add columns & rows as necessary)
M Jan 10	Introduction <i>University Lectures begin</i>
W Jan 12	History / Philosophy
F Jan 14	History / Philosophy
M Jan 17	Motor systems
W Jan 19	Motor systems
R Jan 20	<i>Last day to drop a class without penalty</i>
F Jan 21	Motor systems <i>Last day to add/swap a class</i>
M Jan 24	Motor systems
W Jan 26	Motor systems
F Jan 28	Motor systems <i>Fee payment deadline for Fall Term full and half courses</i>
<b>M Jan 31</b>	<b>Question set #1 provided (Lecture 1-9, Jan 10<sup>th</sup> - Jan 28<sup>th</sup>)</b>
W Feb 2	Sex
F Feb 4	Sex
M Feb 7	Sex <b>Question Set #1 Due</b>
W Feb 9	Maternal Behaviour
F Feb 11	Maternal Behaviour
M Feb 14	Maternal Behaviour
W Feb 16	Feeding
F Feb 18	Drinking
M Feb 21	<b>Family Day No Classes</b>
Feb 22-26	<b>Term Break No Classes</b>
M Feb 28	Thermoregulation
<b>W Mar 2</b>	<b>Exam #2 (Lectures 10-18, Feb 2<sup>nd</sup> – Feb 28<sup>th</sup>)</b>
F Mar 4	Circadian Rhythms
M Mar 7	Circadian rhythms
W Mar 9	Circadian rhythms
F Mar 11	Support systems of the brain and headaches
M Mar 14	Pain
W Mar 16	Anxiety and Fear
F Mar 18	Depression
M Mar 21	Learning
W Mar 23	Learning
F Mar 25	Learning
M Mar 28	Super-secret mystery day
W Mar 30	Student presentations
F Apr 1	Student presentations + Course Evaluation
M Apr 4	Student presentations
W Apr 6	Student presentations
F Apr 8	Student presentations
M Apr 11	Student presentations
T Apr 12	<i>Winter Term Lectures End. Last day to withdraw with permission from Winter Term half courses.</i>
Apr 19-29	<b>Fall Final Exam Period</b>



## Tentative Lab Schedule

Week	Lab	Assignment due
Jan 19, 21	1. Online orientation 1	
Jan 26, 28	2. Online orientation 2	
Feb 2, 4	3. General behavior	
Feb 9, 11	4. Maternal Behaviour and Pup Development #1	Handling (short assignment)
Feb 16, 18	5. Pup Development #2	
Feb 21-26	<b>Reading Week – No Labs</b>	
Mar 2, 4	6. Skilled Behaviour	Maternal behaviour (short assignment)
Mar 9, 11	7. TBA	Motor behaviour (short assignment)
Mar 16, 18	8. Circadian rhythms	Pup Motor Development (full Report)
Mar 23, 25	9. Fear and Anxiety	Assignment on lab 7 (short assignment)
Mar 30, Apr 1	10. Spatial learning	Circadian (short assignment)
Apr 6, 8	11. Object Recognition / Place preference	
Apr 16		Learning (full Report)

Labs will be run **IN PERSON** on campus starting Feb 2<sup>nd</sup> according to the following guidelines.

- University COVIDSafe Campus protocols must be followed:
  - <https://www.ucalgary.ca/risk/emergency-management/covid-19-response/covidsafe-campus>
- Students in each lab session (Wednesday or Friday) will be assigned to an early (13:00) or late (14:30) timeslot, allowing for ½ capacity attendance at each lab session
- Facemasks, gloves and lab coats will be required. Facemasks must be properly worn for the full duration of the lab and KN95 or similar masks are highly recommended. Gloves will be provided. A limited number of Lab coats are available to sign-out for the semester; please bring your own if you have one.
- Maintain 2m separation when possible.
- Do not attend lab if you are feeling unwell, or have any of the following symptoms:
  - cough, fever, shortness of breath, runny nose or sore throat, or any of the other symptoms identified by Alberta Health Services (<https://www.alberta.ca/covid-19-testing-in-alberta.aspx>)
  - Missing a lab for these reasons will not affect your grade or performance in the course
  - Please let the TA know if you will be missing the lab

## Supporting Documentation

Students may be asked to provide supporting documentation for an exemption/special request. This may include, but is not limited to, a prolonged absence from a course where participation is required, a missed course assessment, a deferred examination, or an appeal. Students are encouraged to submit documentation that will support their situation. Supporting documentation may be dependent on the reason noted in their personal statement/explanation provided to explain their situation. This could be

medical certificate/documentation, references, police reports, invitation letter, or a statutory declaration, etc. The decision to provide supporting documentation that best suits the situation is at the discretion of the student. Students cannot be required to provide specific supporting documentation, such as a medical note.

Students can make a Statutory Declaration as their supporting documentation (available at [ucalgary.ca/registrar](http://ucalgary.ca/registrar)). This requires students to make a declaration in the presence of a Commissioner for Oaths. It demonstrates the importance of honest and accurate information provided and is a legally binding declaration. Several registered Commissioners for Oaths are available to students at no charge, on campus, please see [ucalgary.ca/registrar](http://ucalgary.ca/registrar).

Falsification of any supporting documentation will be taken very seriously and may result in disciplinary action through the Academic Discipline regulations or the Student Non-Academic Misconduct policy.

### **Absence From A Test/Exam**

Makeup tests/exams are **NOT** an option without the approval of the instructor. Students who miss a test/exam have up to 48 hours to contact the instructor to ask for a makeup test/exam. It's the instructor's discretion if they will allow a make-up 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. Once approved by the instructor a makeup test/exam must be written within 2 weeks of the missed test/exam on a day/time scheduled by the instructor. If a student cannot write their final exam on the date assigned by the Registrar's Office, they need to apply for a deferred exam <https://www.ucalgary.ca/registrar/exams/deferred-exams>.

### **Travel During Exams**

Consistent with University regulations, students are expected to be available to write scheduled exams at any time during the official December and April examination periods. Requests to write a make-up exam because of conflicting travel plans (e.g., flight bookings) will NOT be considered by the department. Students are advised to wait until the final examination schedule is posted before making any travel arrangements. If a student cannot write their final exam on the date assigned by the Registrar's Office, they need to apply for a deferred exam <https://www.ucalgary.ca/registrar/exams/deferred-exams>. Students with an exceptional extenuating circumstance (e.g., a family emergency) should contact the Department of Psychology ([psyugrd@ucalgary.ca](mailto:psyugrd@ucalgary.ca)).

**Reappraisal of Graded Term Work** <http://www.ucalgary.ca/pubs/calendar/current/i-2.html>

**Reappraisal of Final Grade** <http://www.ucalgary.ca/pubs/calendar/current/i-3.html>

### **Academic Accommodations**

Students seeking an accommodation based on disability or medical concerns should contact Student Accessibility Services; SAS will process the request and issue letters of accommodation to instructors.

For additional information on support services and accommodations for students with disabilities, visit [www.ucalgary.ca/access/](http://www.ucalgary.ca/access/). Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to their Instructor. The full policy on Student Accommodations is available at <https://www.ucalgary.ca/legal-services/university-policies-procedures/accommodation-students-disabilities-procedure>.

### **Academic Misconduct**

For information on academic misconduct and its consequences, please see the University of Calgary Calendar at <http://www.ucalgary.ca/pubs/calendar/current/k.html>

### **Instructor Intellectual Property**

Course materials created by professor(s) (including course outlines, presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the professor(s). These materials may NOT be reproduced, redistributed or copied without the explicit consent of the professor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course at the same time may be allowed under fair dealing.

### **Copyright Legislation**

All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright ([www.ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright.pdf](http://www.ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright.pdf)) and requirements of the copyright act (<https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html>) to ensure they are aware of the consequences of unauthorized sharing of course materials (including instructor notes, electronic versions of textbooks etc.). Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy.

### **Freedom OF Information and Protection of Privacy**

Student information will be collected in accordance with typical (or usual) classroom practice. Students' assignments will be accessible only by the authorized course faculty. Private information related to the individual student is treated with the utmost regard by the faculty at the University of Calgary

### **Student Support and Resources**

<https://www.ucalgary.ca/registrar/registration/course-outlines>

### **Important Dates**

The last day to drop this course with no "W" notation and **still receive a tuition fee refund is Thursday, Thursday, January 20, 2022**. Last day add/swap a course is **Friday, January 21, 2022**. The last day to withdraw from this course is **Tuesday, April 12, 2022**.

<https://www.ucalgary.ca/pubs/calendar/current/academic-schedule.html>