



PSYC/NEUR 478

Behavioural Neuroscience

Fall 2023

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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 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. The work is approved by the Life and Environmental Sciences Animal Care Committee and adheres to the guidelines laid down by the Canadian Council on 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 instructor 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.	Exams (short answer format)	1, 2, 4	A, A, A
Assess the organization and complexity of rodent behaviour.	Lab reports, written assignments, presentation, exams	1,5,4	A, A, A
Implement multiple behavioural tests using a variety of behavioural apparatuses.	Lab reports, written assignments, presentation	3,4,6,7	C, C, C, C
Relate behaviours to localized regions of the brain.	Lab reports, written assignments, exam	1,3,4	A, A, A
Perform hands-on experiments with rodents	Lab reports, written assignments	3,4,6,7	C, C, C, 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 – Principles of Psychology or PSYC 300 and 301 – Research Methods and Data Analysis in Psychology I and II
 Psyc 375 – Brain and Behaviour

Recommended Text

The Behaviour of the Laboratory Rat: A handbook with tests. Edited by Ian Q. Wishaw and Bryan Kolb, Oxford University Press, 2005. Available for free online using the link below:

<https://ebookcentral-proquest-com.ezproxy.lib.ucalgary.ca/lib/ucalgary-ebooks/detail.action?pqorigsite=primo&docID=281448>

Assessment Methods

Midterm #1 (Lectures 1-9; September 29)	20%
Midterm #2 (Lectures 10-20; October 30)	20%
Short Lab Assignments (see below)	10%
Lab Reports (see below)	25%
Student Presentations (Nov 27-Dec 6)	5%
Final Exam (Lectures 21-28; TBA; 2 hours)	20%

Exams (60%)

Exams will contain short answer questions covering lecture and reading material up to the exam date. The midterms will not be cumulative. The final exam will mostly cover content past the second midterm but may contain one or two questions that span the course and focus on overarching themes and concepts. Short answer questions will be graded such that half marks will be given if it is clear you know the answer in general but have omitted specific details. Full marks will be given to those that include specific details and employ the correct terminology and concepts.

Exams in this course are closed book. The use of resources, including class notes, the textbook, online resources, and calculators is prohibited during the exams in this course. Students may not communicate with others about course material or the exam either in person or electronically during exams.

Short Lab Assignments (10%)

There are three short (2 pages in length) 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. **The short assignments are due by 11:59 pm on the day of your lab** and should be submitted via Dropbox on D2L. Without instructor approval, late assignments will be penalized 10% per day, including weekends. Due dates and weights are listed below:

1. Animal Handling (due Sept 20, 22) 2%
2. IAUTP modules (due Oct. 6) 2%
3. Maternal behaviour (due Oct 11, 13) 2%
4. Circadian (due Nov 22, 24) 2%
5. Data collection (due Nov 29, Dec 1 at 11:59PM) 2%

Lab Reports (25%)

There are two lab reports for this course. Lab reports should be approximately 15 pages in length (double spaced) and will be based on prior lab and lecture material. Assignments should be prepared and formatted according to the style of the Journal of Neuroscience (https://www.jneurosci.org/content/information-authors#Regular_Manuscripts). **Lab reports are due by 11:59 pm on the day of your lab** and should be submitted via Dropbox on D2L. Without instructor approval, late assignments will be penalized 10% per day, including weekends. Due date and weights are listed below:

- | | |
|------------------------------------|-----|
| 1. Development (due Nov 1, 3) | 10% |
| 2. Learning and Memory (due Dec 6) | 15% |

Student Presentations (5%)

Students will deliver a short (7-8 minutes) presentation (between November 27 and December 6) describing a behavioural neuroscience experiment selected and designed by them. The presentation should be in a proposal format. Due to time constraints, missed presentations cannot be made up and will receive a grade of zero unless arrangements have been made with the course instructor. A sign-up sheet will be made available. More details regarding the presentation will be provided on D2L and in class.

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

Once approved by the course instructor, and at their discretion, alternative arrangements for missed assessments may be considered <https://www.ucalgary.ca/pubs/calendar/current/g-1-2.html>. Students may be asked for documentation <https://www.ucalgary.ca/pubs/calendar/current/m-1.html>.

Policy on Assignment Extensions:

Without instructor approval, late assignments will be penalized 10% per day, including weekends. With that being said, this course has a lot of assignments. While we have attempted to spread out the work in this course as much as possible, we also appreciate that you have other demands on your time. With that in mind, all students are allowed a one-time 48-hour extension for one of their laboratory assignments. The only requirement is that you email the course instructor (mmoshir@ucalgary.ca) to indicate that you will be using your extension prior to the deadline of the assignment.

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/legal-services/sites/default/files/teams/1/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%

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)
W Sep 6	<i>First day of lectures</i> Introduction to the course
F Sep 8	History/Philosophy
M Sep 11	History/Philosophy
W Sep 13	Experimental approaches in behavioural neuroscience Recorded Zoom lecture
R Sep 14	<i>Last day to drop a class without a penalty</i>
F Sep 15	<i>Last day to add or swap a course.</i> Experimental approaches in behavioural neuroscience

M Sep 18	Motor systems
W Sep 20	Motor systems
F Sep 22	<i>Fee payment deadline for Fall Term full and half courses.</i>
	Motor systems
M Sep 25	Motor systems
W Sep 27	Motor systems
F Sep 29	Midterm #1 (20% of final grade)
S Sep 30	UNIVERSITY CLOSED National Day for Truth and Reconciliation
M Oct 2	Sex
W Oct 4	Sex
F Oct 6	Sex
M Oct 9	UNIVERSITY CLOSED Thanksgiving Day
W Oct 11	Maternal Behaviour
F Oct 13	Maternal Behaviour
M Oct 16	Maternal Behaviour
W Oct 18	Maternal Behaviour Recorded Zoom lecture
F Oct 20	Feeding/Drinking Recorded Zoom lecture
M Oct 23	Feeding/Drinking
W Oct 25	Circadian Rhythms
F Oct 27	Circadian Rhythms
M Oct 30	Midterm #2 (20% of final grade)
W Nov 1	Circadian Rhythms/ Sensation and Pain
F Nov 3	Sensation and Pain
M Nov 6	Fear and Anxiety
W Nov 8	Fear and Anxiety
F Nov 10	Fear and Anxiety/Learning and Memory
S Nov 11	UNIVERSITY CLOSED Remembrance Day (Observed Monday Nov 13).
Nov 12-18	Term Break No Classes
M Nov 20	Learning and Memory
W Nov 22	Learning and Memory
F Nov 24	Learning and Memory
M Nov 27	Student Presentations
W Nov 29	Student Presentations
F Dec 1	Student Presentations
M Dec 4	Student Presentations
W Dec 6	<i>Fall Term Lectures End. Last day to withdraw with permission from Fall Term half courses.</i>
	Student Presentations
Dec 9-20	Fall Final Exam Period

Tentative Lab Schedule

Days	Lab	Assignment Due (beginning of labs unless specified)
Sep 6, 8	NO LABS	
Sep 13,15	1. Handling	
Sep 20, 22	2. General behaviour	Handling (short assignment)
Sep 27, 29	NO LABS	Midterm #1
Oct 4, 6	3. Maternal behaviour and pup development #1	IAUTP modules (short assignment- complete by Oct 6)
Oct 11, 13	4. Pup development #2	Maternal behaviour (short assignment)
Oct 18, 20	5. Skilled behaviour	
Oct 25, 27	6. Play and robbing/dodging	
Nov 1, 3	7. Circadian rhythms	Pup motor development (full lab report)
Nov 8, 10	8. Fear and anxiety	
Nov 15, 17	Term Break- NO LABS	
Nov 22, 24	9. Spatial learning	Circadian (short assignment)
Nov 29, Dec 1	10. Object recognition/place preference	Data collection (short assignment due by 11:59 PM on your lab day)
Dec 6		Learning (full lab report due by 11:59 PM on Dec. 6)

Labs will take place in-person on campus and attendance is expected. As you will be working with live animals, proper PPE must be worn at all times both for your own health as well as the health and safety of the animals. This is not a COVID-19 protocol but rather an animal health protocol. Facemasks, gloves, and lab coats will be required. Facemasks must be properly worn for the full duration of the lab. Gloves and a limited number of facemasks will be provided. Lab coats are available to sign-out for the semester; please bring your own if you have one.

Do not attend lab if you are feeling unwell, or have 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 one or two labs 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.

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

Seating During Exams

Instructors and exam invigilators are free to ask students to move seats before an exam begins or even during an exam. Students must comply with this request and refusal to do so may warrant a charge of academic misconduct

Absence From Test/Exam

Makeup tests/exams are **NOT** an option without the approval of the instructor <https://www.ucalgary.ca/pubs/calendar/current/g-1-1.html>. 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** [Deferred Final Exams | University of Calgary \(ucalgary.ca\)](#) **Students with an exceptional extenuating circumstance (e.g., a family emergency) should contact the Department of Psychology 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/. 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/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf>.

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

(https://library.ucalgary.ca/services/copyright?_gl=1*bcjlpn*_ga*OTY1ODc0Njg0LjE2NjkxNTA1NTM.*_ga_X4GN9Y4W7D*MTY3Nzc5MjM3Ni4xNy4xLjE2Nzc3OTI4MDYuMC4wLjA) 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, September 14th, 2023**. Last day add/swap a course is **Friday, September 15th, 2023**. The last day to withdraw from this course is **Wednesday, December 6th, 2023**.