



Psyc/Neur475	Drugs & Behaviour	W2016	TR11:00-12:15	SA245
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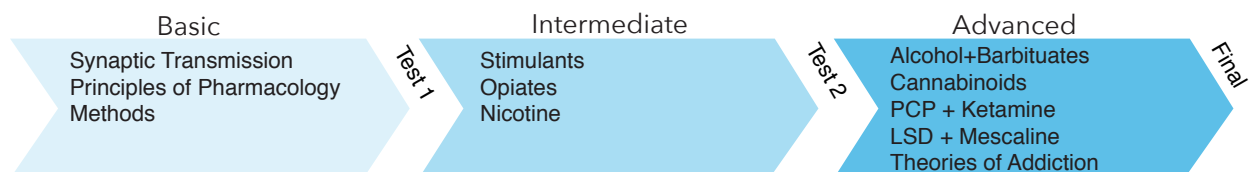
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Office Hours: by appointment

**Dr. Lovic:** I earned my doctorate at the University of Toronto where I studied the neurobiology of early development. During my first postdoctoral fellowship, at the University of Michigan, I studied preclinical models of drug addiction. During my second postdoctoral fellowship, at the Massachusetts Institute of Technology, I studied dopamine neurotransmission. I am currently an assistant professor in the Department of Psychology. My research examines the neural mechanisms of reward and reinforcement learning and preclinical models of addiction in the context of early life adversity. More information about our research can be found on our lab website: [www.loviclab.com](http://www.loviclab.com)

**Contact:** Please come to my office if you have any questions about the course or advice about your career choices or anything else that I could help you with. If you e-mail me, please include either "Psyc475" or "Neur475" in the subject line of your emails.

**Synopsis:** In this course we will examine the neuropsychopharmacology of drugs of abuse. The course will focus on different neurotransmitter systems and drugs of abuse acting on these systems. Initial lectures will be a general introduction to synaptic transmission, and principles and methods used in neuropsychopharmacology. This will be followed by lectures focusing on specific drug classes, such as stimulants and opiates, and their mechanisms of action. Throughout the course we will learn about the relationships between drugs, synaptic transmission, and behavioural effects of drugs. We will wrap up the course with a discussion of different theories of addiction.

**Objectives:** At the end of the course you will have an understanding of how a number of neurotransmitter systems are organized and how different drugs act on these systems to produce changes in affective states, cognition, and behaviour. You will also gain an appreciation of the complexity of drug addiction. In addition to acquiring knowledge in neuropsychopharmacology I hope that you will learn how scientific research is conducted. Lastly, I hope that you will further develop your scientific writing abilities and how to critically evaluate scientific evidence. The course might be of interest to a wide spectrum of students. However, students pursuing studies in behavioural neuroscience, psychology, pharmacology, or medicine will find the course particularly useful.



**Format:** Classes will consist of lectures, which will be based on the assigned textbook chapters and extra material; hence, students are strongly encouraged to attend lectures. Lectures will be done using power-point slide presentation, which will be available on the course web site before each lecture.

**Textbook:** Meyer, J.S. & Quenzer, L.F. (2013). *Psychopharmacology: Drugs, the brain, and behavior*. Sunderland, MA: Sinauer Associates Inc. Available in the bookstore.

You are encouraged to read the assigned readings *before* each lecture as this will facilitate and extend your knowledge acquired in class. The textbook is detailed and will require you to remember and integrate information. You should pay close, but not exclusive, attention to the material that overlaps with lecture material.

**Prerequisites:** Psyc312, Psy375. Students from various backgrounds (psychology or neuroscience) will have an equal opportunity to do well in the course. It is your responsibility to ensure that you have met all prerequisites listed in the University of Calgary Calendar for this course.

<b>Evaluation:</b>	Term Test 1	(Feb 4)	20%
	Term Test 2	(Mar 10; non-cumulative)	25%
	Term Paper	(Mar 29)	25%
	Final Exam	(Apr 16-27; non cumulative)	30%

**Test Format:** Term test/exam will be based on the material from the textbook and lectures. The tests will consist of multiple-choice questions (~30%), shorter answer/definitions (~30%), and longer questions, which might include a diagram (~30%). The shorter and longer questions will require you to recite information but also integrate knowledge analytically. Please see question examples below. No aids (e.g., notes, iPad, etc.) are allowed during the exam.

**Test Examples: Multiple choice (1 pt.)**

Fentanyl acts primarily on:

- a) D1 receptors
- b) Muscarinic receptors
- c)  $\mu$ -opioid receptors
- d)  $\delta$ -opioid receptors

**Short answer (2-5 pts.)**

Compare and contrast competitive and non-competitive agonists.

**Longer answer (5-10 pts.)**

Describe neural mechanisms of alcohol action.

**Make-ups:** 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 up to 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 date, during exam make-up hours provided by the department <http://psychology.ucalgary.ca/undergraduate/exam-and-course-information#mues>. 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 [http://www.ucalgary.ca/registrar/exams/deferred\\_final](http://www.ucalgary.ca/registrar/exams/deferred_final). Under no circumstances will this be accommodated by the department.

## Schedule of Lectures and Readings

<u>Date</u>	<u>Topic</u>	<u>Meyer &amp; Quenzer</u>
Jan 12	Principles of Pharmacology I: Drug nomenclature & classification	1
Jan 14	Principles of Pharmacology II: Pharmacokinetics	1
Jan 19	Principles of Pharmacology III: Pharmacodynamics	1
Jan 21	Principles of Behavioural Pharmacology	4
Jan 26	Synaptic Transmission I: Synapses and Neurotransmitters	2 & 3
Jan 28	Synaptic Transmission II: Receptors and Signal Transduction	2 & 3
Feb 2	Synaptic Transmission III: Techniques	4
Feb 4	Term Test 1 (20%, all the material covered)	
Feb 9	Psychostimulants I: Pharmacology of Amphetamine and Cocaine	5 & 12
Feb 11	Psychostimulants II: Amphetamine and Cocaine	5 & 12
Feb 14-21	Reading week (no class) ￣\_(ツ)_/￣	
Feb 23	Psychostimulants III: Catecholamines	5 & 12
Feb 25	Opiates I: Pharmacology and Behavioural Pharmacology	11
Mar 1	Opiates II: Action – Peptide transmitters	11
Mar 3	Opiates III: Action – Endogenous opioids	11
Mar 8	Nicotine and Acetylcholine	7 & 13 (nicotine)
Mar 10	Term Test 2 (25%; all the material since Term Test 1)	
Mar 15	Sedative-Hypnotics and Anxiolytics I: Alcohol	8 (GABA) & 10
Mar 17	Sedative-Hypnotics and Anxiolytics II: Barbiturates & Benzodiazepines	8 (GABA) & 10
Mar 22	Sedative-Hypnotics and Anxiolytics III: Action – GABA Neurotransmission	8 (GABA) & 10
Mar 24	Marijuana and the Cannabinoids	14
Mar 29	Phencyclidine, Ketamine, and Glutamate (Term paper 25%)	8 (Glu) & 15 (ketamine)
Mar 31	Hallucinogens I: LSD, Mescaline, etc.	6 & 15
April 5	Hallucinogens II: Actions – Serotonin Neurotransmission	6 & 15
April 7	Theories of Addiction I	9
Apr 12	Theories of Addiction II	9
TBA	Final Exam (30%; all the material since Term Test 2)	

## Term Paper

- Purpose:** The purpose of this exercise is for you to improve your writing skills and to further your knowledge about the subject matter of this course.
- Content:** The written assignment will be based on the Journal Club publications in the Journal of Neuroscience (go to: [http://www.jneurosci.org/site/misc/ifa\\_features.xhtml](http://www.jneurosci.org/site/misc/ifa_features.xhtml)). Briefly, in each issue of Journal of Neuroscience, graduate students or postdoctoral fellows (but not professors) can write a commentary about a journal article recently published in the Journal of Neuroscience. These papers have 3 general components: a) brief overview of the background of the reviewed paper, b) critical evaluation of figures and findings, and c) significance of the paper (praise or criticisms or combination of both). It is important that you go beyond authors' comments on their study. Therefore, you will almost certainly have to read beyond the journal article that is the subject of your commentary.
- Format:** The paper should be written in APA style and 1000 to 2000 words in length (not including the cover page, reference section; abstract is not necessary).
- Due date:** The paper is due Mar 29, at the beginning of the class. Papers submitted after 11:05 will be considered late. Late penalty is 5% per day (including weekends). The last day to hand in papers is April 12th. e-mail copies of your paper will not be accepted. Keep a copy of your paper (digital and physical).
- Evaluation:** Your assignment will be evaluated on both content (~65%) and style (35%).

How to go about your exercise?

- 1. Select a drug of abuse that you want to explore** (Note: do not select a psychiatric drug, such as Prozac or haloperidol or clozapine etc.): cocaine, amphetamine, heroin, fentanyl, remifentanyl, oxycodone, morphine, nicotine, marijuana, MDMA, alcohol, salvia, ketamine, PCP, mescaline, psilocybin, LSD, barbituates, etc.
- 2. Go to PubMed** (<http://www.ncbi.nlm.nih.gov/pubmed/>) and type in key word(s) (e.g., salvia).
- 3. Select an appropriate journal article.** Stipulations: a) journal article must be recently published (2010-2016), b) it has to be a primary/experimentally based article (i.e., you can not select a theoretical or review journal article) c) acceptable journals where the article is published: Journal of Neuroscience, Neuropsychopharmacology, Psychopharmacology, Neuropharmacology, Nature, Nature Neuroscience, Science, Behavioral Brain Research, European Journal of Neuroscience, Brain, Behavioral Neuroscience, PLoS One, Biological Psychiatry, Molecular Psychiatry, Translational Psychiatry, Journal of Neurochemistry, Journal of Neurophysiology, Addiction, Addiction Biology, American Journal of Psychiatry, Behavioral Pharmacology.
- 4. Read your article several times and make notes.**
- 5. Explore other relevant literature (i.e., go back to PubMed)**
- 6. Write. Edit. Write. Edit!!!**

### Plagiarism and Other Academic Misconduct (From Faculty of Arts).

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.

## Department of Psychology Grade Distribution Policy

The distribution of grades in Psychology courses (the percentage of A grades, B grades, etc.) will be similar to the distribution of grades in other courses in the Faculty of Arts. The Department monitors the grade distributions of 200-, 300-, and 400-level courses in the Faculty to ensure that the grade distributions in Psychology courses are comparable. Based on these reviews, students can expect that 1) up to 30% of grades in 200- and 300-level psychology courses will be "A" grades (A+, A, and A-), and 2) up to 40% of grades 400-level psychology courses will be "A" grades.

## Department of Psychology Criteria for Letter Grades

Psychology professors 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%

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-).

- Reappraisal** 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; no reappraisal of term work is permitted after the 15 days. 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.

### **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 [http://www.ucalgary.ca/registrar/exams/deferred\\_final](http://www.ucalgary.ca/registrar/exams/deferred_final). Under no circumstances will this be accommodated by the department.

### **Academic Accommodation**

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 [http://www.ucalgary.ca/policies/files/policies/student-accommodation-policy\\_0.pdf](http://www.ucalgary.ca/policies/files/policies/student-accommodation-policy_0.pdf).

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.

### **Freedom of Information and Protection of Privacy (FOIP) Act**

The FOIP legislation disallows the practice of having student's retrieve tests and assignments from a public place. Therefore, tests and assignments may be returned to students during class/lab, or during office hours, or via the Department Office (Admin 255), or will be made available only for viewing during exam review sessions scheduled by the Department. Tests and assignments will be shredded after one year. Instructors should take care to not link students' names with their grades, UCIDs, or other FOIP-sensitive information.

### **Evacuation Assembly Point**

In case of an emergency evacuation during class, students must gather at the designated assembly point nearest to the classroom. The list of assembly points is found at <http://www.ucalgary.ca/emergencyplan/assemblypoints>. Please check this website and note the nearest assembly point for this course.

### **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 403-220-5567.

**Student Union VP Academic:** Phone: 403-220-3911

[suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca)

**Student Union Faculty Rep.:** Phone: 403-220-3913

[socialscirep@su.ucalgary.ca](mailto:socialscirep@su.ucalgary.ca)

### **Student Ombudsman's Office**

The Office of the Student Ombudsmen provides independent, impartial and confidential support for students who require assistance and advice in addressing issues and concerns related to their academic careers. The office can be reached at 403-220-6420 or [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca) (<http://www.ucalgary.ca/provost/students/ombuds>)

### **Safewalk**

The safewalk program provides volunteers to walk students safely to their destination anywhere on campus. This service is free and available 24 hrs/day, 365 days a year.

Call 403-220-5333.

### **Important Dates**

The last day to drop this course with no "W" notation and **still receive a tuition fee refund** is **January 22, 2016**. Last day for registration/change of registration is **January 25, 2016**. The last day to withdraw from this course is **April 13, 2016**.