

Psyc/Neur475	Drugs & Behaviour	F2017	MWF11-12	SA247
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**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, hallucinogens, 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.

Course Learning Outcomes	Method	PLO(s)	Level
• to describe how a number of neurotransmitter systems are organized	Test + Written assignment	1	I
• to compare how different drugs act to produce changes in behaviour	Test + Written assignment	1	I
• to examine the complexity of drug addiction	Test	1	C
• to appraise how scientific research is conducted	Test + Written assignment	1	C
• develop your scientific writing abilities	Written assignment	4, 5	A
• to examine scientific evidence	Test + Written assignment	7	A

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, 7 = apply psychological knowledge and skills. Level of PLO achievement facilitated by this course: I = introductory, C = competency, A = advanced.



**Format:** Classes will consist of lectures, which will be based on the assigned textbook chapters and extra material. 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	Oct. 5, all material covered	15%
	Term Test 2	Oct. 25, all the material since Test 1	20%
	Term Test 3	Nov.16; all the material since Test 2	20%
	Short Assignment	Nov. 29 – beginning of class	15%
	Final Exam	TBD; all the material since Test 3	30%

**Test Format:** Term tests and the final 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 antagonists.

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

Describe drug X's neural mechanisms of action.

**Make-ups:** For this course there are **no Makeup tests**. If you have an official excuse for missing a term test (e.g., physician note; see the University Calendar), the value of the missed term test will be added to the value of the final exam. For example, if you miss Term Test 1, your final exam will be worth 45% of the final grade. 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. In a case of two missed term test a special arrangement will be made with the student so that the value of the final exam does not exceed 50% of the final grade (e.g., final exam could be weighted 50%, term test 30%, and short assignment 20%).

## Schedule of Lectures and Readings

<u>Date</u>	<u>Topic</u>	<u>Meyer &amp; Quenzer</u>
Sep 11	Course Dynamics and Introduction	1
Sep 13	Principles of Pharmacology I: Drug nomenclature & classification	1
Sep 15	Principles of Pharmacology II: Pharmacokinetics	1
Sep 18	Principles of Pharmacology III: Pharmacodynamics	1
Sep 20	Principles of Behavioural Pharmacology I	4
Sep 22	Principles of Behavioural Pharmacology II	4
Sep 25	Synaptic Transmission I: Synapses and Neurotransmitters	2 & 3
Sep 27	Synaptic Transmission II: Receptors and Signal Transduction	2 & 3
Sep 29	Synaptic Transmission III: Techniques	4
Oct 2	Synaptic Transmission III: Techniques Cont.	4
Oct 4	Term Test 1 (15%; all the material)	
Oct 6	Psychostimulants I: Pharmacology of Amphetamine and Cocaine	5 & 12
Oct 9	Thanksgiving Holiday (no class)	
Oct 11	Psychostimulants II: Amphetamine and Cocaine	5 & 12
Oct 13	Psychostimulants III: Catecholamines	5 & 12
Oct 16	Psychostimulants IV: Catecholamines	5 & 12
Oct 18	Nicotine and Acetylcholine	7 & 13 (nicotine)
Oct 20	Nicotine and Acetylcholine	7 & 13 (nicotine)
Oct 23	Term Test 2 (20%; all the material since Test 1)	
Oct 25	Opiates I: Pharmacology and Behavioural Pharmacology	11
Oct 27	Opiates II: Action – Peptide transmitters	11
Oct 30	Opiates III: Action – Endogenous opioids	11
Nov 1	Sedative-Hypnotics and Anxiolytics I: Alcohol	8 (GABA) & 10
Nov 3	Sedative-Hypnotics and Anxiolytics I: Alcohol	8 (GABA) & 10
Nov 6	Sedative-Hypnotics and Anxiolytics II: Barbiturates & Benzodiazepines	8 (GABA) & 10
Nov 8	Sedative-Hypnotics and Anxiolytics II: Barbiturates & Benzodiazepines	8 (GABA) & 10
Nov 9	Reading days - no class	
Nov 13	Remembrance Day – no class	
Nov 15	Term Test 3 (20 %; all the material since Term Test 2)	
Nov 17	Marijuana and the Cannabinoids	14
Nov 20	Marijuana and the Cannabinoids	14
Nov 22	Phencyclidine, Ketamine, and Glutamate	8 (Glu) & 15(ketamine)
Nov 24	Phencyclidine, Ketamine, and Glutamate	8 (Glu) & 15(ketamine)
Nov 27	Hallucinogens I: LSD, Mescaline, etc.	6 & 15
Nov 29	Hallucinogens II: Actions – Serotonin Neurotransmission (Assignment Due - 15%)	6 & 15
Dec 1	Theories of Addiction I	9
Dec 4	Theories of Addiction II	9
Dec 6	Theories of Addiction III	9
Dec 8	Theories of Addiction IV	9
TBA	Final Exam (30%; all the material since Term Test 3)	

\*see last page regarding important date on adding and dropping courses

## Short Assignment

- Purpose:** The purpose of this exercise is for you to improve your research, writing, and visual presentation skills. In addition, it will further your knowledge about the subject matter of this course.
- Content:** The assignment will take the form of a 2-page (double sided) drug pamphlet. You will be provided with an example of the pamphlet. The drug pamphlet will be about a particular drug (e.g., ephedra, khat, cocaine, d-amphetamine, methamphetamine, MDMA, opium, morphine, codine, heroin, hydromorphone, oxycodone, methadone, LAAM, fentanyl, remifentanyl, LSD, nicotine, alcohol, absinthe, ketamine, PCP, cannabis, psilocybin, DMT, 5M-DMT, salvia, benzodiazapines, barbiturates, "bath salts" etc.). The drug should be a psychoactive drug that has abuse potential (e.g., you can not choose a psychiatric drug, such as haloperidol; if you are not sure about drug selection, please get in touch with us). You should aim to have the following sections 1) Overview with a summary about the drug; 2) History (e.g., earliest records of drug being used, or when was the drug synthesized); 3) Chemical structure and description; 4) Description of behavioural and physiological effects; 5) Mechanisms of action; 6) Recently in scientific literature (briefly summarize findings from a recent scientific study about this drug). For this you will need to go to PubMed and chose a primary/experimental study (do not select a review); 7) References (everything including images should be referenced).
- Format:** Each section (see above) should be in its own box. It is up to you how you wish to arrange these boxes.
- Due date:** Due is due Nov. 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 this assignment is Dec. 8th. You are also required to e-mail us ([vedran.lovic@ucalgary.ca](mailto:vedran.lovic@ucalgary.ca)) an electronic copy of your assignment (same day; adobe illustrator file or PDF or PowerPoint).
- Evaluation:** Your assignment will be evaluated on both content (~70%) and style (30%).

### 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 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.

### **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.

### **Campus Mental Health Strategy**

The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the excellent mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, <https://www.ucalgary.ca/wellnesscentre/services/mental-health-services>) and the Campus Mental Health Strategy website (<http://www.ucalgary.ca/mentalhealth/>).

### **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.

<b>Student Union VP Academic:</b>	Phone: 403-220-3911	<a href="mailto:suvpaca@ucalgary.ca">suvpaca@ucalgary.ca</a>
<b>Student Union Faculty Rep.:</b>	Phone: 403-220-3913	<a href="mailto:socialscirep@su.ucalgary.ca">socialscirep@su.ucalgary.ca</a>

### **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 **September 22, 2017**. Last day for registration/change of registration is **September 25, 2017**. The last day to withdraw from this course is **December 8, 2017**.