

**Drug Addiction**  
**NROD66 (Rm SW-316)**

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*Office hours:* Tues 1-3 pm

**COURSE DESCRIPTION**

This course is designed to provide an overview of current topics in the field of drug addiction research, with a specific focus on the neuroscience of addiction. In the first part of the course, consideration will be given to the "Disease Model" of addiction - the prevailing model in the neuroscience field - as well as to several alternative models that challenge the disease view. The second part of the course will comprise a series of student-led presentations and discussions on specific topics and recent studies in the field of addiction neuroscience.

**SUMMARY OF COURSE EVALUATION**

Mid-Term Exam	20%
Quizzes (best 3 of 5)	12% (total)
Seminar (presentation and discussion)	30%
Term Paper	30%
Class attendance	8%

**BLACKBOARD**

This course will be organized and managed using the U of T *Blackboard* system. Blackboard will be used to make class announcements, and to manage course materials.

## SCHEDULE OF CLASSES AND ASSIGNED READINGS

**Week 1**  
Jan 05                      **Introduction and overview (LECTURE)**

**Week 2**  
Jan 12                      **The Neuroscience of Addiction (LECTURE)**

*Required Readings*

Courtwright, David T., "The NIDA Brain Disease Paradigm: History, Resistance and Spinoffs" (2010). History Faculty Publications. Paper 2. [http://digitalcommons.unf.edu/ahis\\_facpub/2](http://digitalcommons.unf.edu/ahis_facpub/2)

Leshner AI. Addiction is a brain disease, and it matters. Science. 1997 Oct 3;278(5335):45-7. PubMed PMID: 9311924.

*Suggested Readings:*

Koob GF. Negative reinforcement in drug addiction: the darkness within. Curr Opin Neurobiol. 2013 Aug;23(4):559-63. doi: 10.1016/j.conb.2013.03.011. Epub 2013 Apr 27. Review. PubMed PMID: 23628232.

Robinson TE, Berridge KC. Review. The incentive sensitization theory of addiction: some current issues. Philos Trans R Soc Lond B Biol Sci. 2008 Oct 12;363(1507):3137-46. doi: 10.1098/rstb.2008.0093. Review. PubMed PMID: 18640920; PubMed Central PMCID: PMC2607325.

**Week 3**  
Jan 19                      **A Non-Medical View of Addiction (LECTURE)**

*Required Reading:*

Satel S, Lilienfeld SO. Addiction and the brain-disease fallacy. Front Psychiatry. 2014 Mar 3;4:141. doi: 10.3389/fpsy.2013.00141. eCollection 2013. Review. PubMed PMID: 24624096; PubMed Central PMCID: PMC3939769.

*Suggested Readings:*

Hall W, Carter A, Forlini C. The brain disease model of addiction: is it supported by the evidence and has it delivered on its promises? Lancet Psychiatry. 2015 Jan;2(1):105-10. doi: 10.1016/S2215-0366(14)00126-6. Epub 2015 Jan 8. PubMed PMID: 26359616.

Volkow ND, Koob G. Brain disease model of addiction: why is it so controversial? *Lancet Psychiatry*. 2015 Aug;2(8):677-9. doi: 10.1016/S2215-0366(15)00236-9. PubMed PMID: 26249284; PubMed Central PMCID: PMC4556943.

**Week 4**  
Jan 26

**Craving, relapse, and reinstatement (LECTURE)**

*Suggested Readings:*

Bossert JM, Marchant NJ, Calu DJ, Shaham Y. The reinstatement model of drug relapse: recent neurobiological findings, emerging research topics, and translational research. *Psychopharmacology (Berl)*. 2013 Oct;229(3):453-76. doi: 10.1007/s00213-013-3120-y. Epub 2013 May 18. Review. PubMed PMID: 23685858; PubMed Central PMCID: PMC3770775.

Sayette MA. The Role of Craving in Substance Use Disorders: Theoretical and Methodological Issues. *Annu Rev Clin Psychol*. 2015 Nov 11. [Epub ahead of print] PubMed PMID: 26565121.

**Week 5**  
Feb 2

**Presentation Guidelines and Group Meetings (LECTURE AND IN-CLASS MEETINGS)**

**Week 6**  
Feb 9

**MIDTERM EXAM**

**Week 7**  
Feb 16

**READING WEEK**

**Week 8**  
Feb 23

**Cues and Cocaine Craving: Human Study (STUDENT SEMINAR)**

*Assigned reading:*

Young KA, Franklin TR, Roberts DC, Jagannathan K, Suh JJ, Wetherill RR, Wang Z, Kampman KM, O'Brien CP, Childress AR. Nipping cue reactivity in the bud: baclofen prevents limbic activation elicited by subliminal drug cues. *J Neurosci*. 2014 Apr 2;34(14):5038-43. doi: 10.1523/JNEUROSCI.4977-13.2014. PubMed PMID: 24695721; PubMed Central PMCID: PMC3972727.

**Week 9**  
Mar 1

**Cues and Cocaine Craving: Rat Study (STUDENT SEMINAR)**

Assigned reading:

Saunders BT, Yager LM, Robinson TE. Cue-evoked cocaine "craving": role of dopamine in the accumbens core. *J Neurosci.* 2013 Aug 28;33(35):13989-4000. doi: 10.1523/JNEUROSCI.0450-13.2013. PubMed PMID: 23986236; PubMed Central PMCID: PMC3756749.

**Week 10**  
Mar 8

**Dopamine and Cocaine Craving: Human Study (STUDENT SEMINAR)**

Assigned reading:

Volkow ND, Tomasi D, Wang GJ, Logan J, Alexoff DL, Jayne M, Fowler JS, Wong C, Yin P, Du C. Stimulant-induced dopamine increases are markedly blunted in active cocaine abusers. *Mol Psychiatry.* 2014 Sep;19(9):1037-43. doi: 10.1038/mp.2014.58. Epub 2014 Jun 10. PubMed PMID: 24912491.

**Week 11**  
Mar 15

**Markers of Relapse Risk in Alcoholism: Human Study (STUDENT SEMINAR)**

Assigned reading:

Blaine SK, Seo D, Sinha R. Peripheral and prefrontal stress system markers and risk of relapse in alcoholism. *Addict Biol.* 2015 Nov 5. doi: 10.1111/adb.12320. [Epub ahead of print] PubMed PMID: 26537217.

**Week 12**  
Mar 22

**Nicotine and the transition to Alcohol Dependence: Rat Study (STUDENT SEMINAR)**

Assigned reading:

Leão RM, Cruz FC, Vendruscolo LF, de Guglielmo G, Logrip ML, Planeta CS, Hope BT, Koob GF, George O. Chronic nicotine activates stress/reward-related brain regions and facilitates the transition to compulsive alcohol drinking. *J Neurosci.* 2015 Apr 15;35(15):6241-53. doi: 10.1523/JNEUROSCI.3302-14.2015. Erratum in: *J Neurosci.* 2015 Aug 5;35(31):11169. PubMed PMID: 25878294; PubMed Central PMCID: PMC4397613.

**Week 13**  
Mar 29

**Preference for a sweet reward over nicotine: Rat Study  
(STUDENT SEMINAR)**

Assigned reading:

Huynh C, Fam J, Ahmed SH, Clemens KJ. Rats quit nicotine for a sweet reward following an extensive history of nicotine use. *Addict Biol.* 2015 Sep 16. doi: 10.1111/adb.12306. [Epub ahead of print] PubMed PMID: 26374708.

**COMPONENTS OF COURSE EVALUATION**

**MIDTERM EXAM**

**20%**

The test will comprise a series of multiple choice and short answer questions based on the lecture material and readings in Weeks 1-4. Readings are meant to supplement the lecture material and will reinforce ideas from lecture.

**QUIZZES**

**12% of final grade  
(3 quizzes X 4% per quiz)**

Quizzes, each consisting of 5 multiple choice questions and based on the assigned readings for that week, will be given in the first 20 min of class (i.e., before the student presentation). Students who are presenting in a given week will not write the quiz for that week. The best 3 of 5 grades (each worth 4%) will be used toward the final grade. *There will be no make-ups for missed quizzes.*

**SEMINAR**

**30%**

Scheduling

Each student will participate in giving a presentation and leading a class discussion based on one of the 6 topics and assigned readings scheduled between Weeks 7 and 12 (Feb 23 and Mar 29) of the course. Up to four students will participate in each presentation. During class on Week 2 (Jan 12), students will be asked to submit a first, second, and third choice for which week they wish to present in. Students wishing to be assigned to the same group should submit one request under all names. By Week 3 (Jan 19), group and seminar assignments will be posted on Blackboard.

Content

Each group will be responsible for giving a presentation based on the assigned topic for their week, and leading a class discussion. In addition to the assigned reading for that week (which all

students in the class will be expected to have read in advance, and will be quizzed on), presentations will be based on a literature search expanded to other papers (minimum 3) from the primary literature, relevant to the topic.

Each group will be given 90 min for their presentation, including discussion time. The presentation should be organized as a group, with an emphasis on integrating themes, concepts and questions that emerge from the published work. A component of the presentation and discussion period should address to what implications the work has for the disease model of addiction, to what degree the work can be reconciled with one or more of the models of addiction, and what challenges the work presents for the disease and/or alternate models of addiction. In other words, an critical analysis of the work in the context of the prevailing models of addiction covered in the first part of the course will contribute a component of the evaluation.

In developing their presentation, students should give plenty of time for class discussion; a minimum 20-30 minutes should be allowed. The discussion period should be structured by a series of prepared questions, and also provide opportunity for questions from the class. Another important component of the evaluation of this assignment will be on the effectiveness with which the group leads discussion and responds to questions.

## **LITERATURE REVIEW**

**30% of final grade**

Students will write a literature review, based on a specific question arising from their seminar topic. Students are encouraged to visit Prof Erb during office hours, or arrange a meeting at another time, to discuss the specific topic/question. A minimum of 10 papers from the primary literature, at least 6 of which were published in the last 5 years, must be included in the review. These papers may include the assigned article, and any additional articles reviewed in the students' presentation.

The literature review must be 8-10 double-spaced, type-written pages (12 point font, 0.75-1.0 in margins). All formatting must be according to APA style or the Journal of Neuroscience.

The first paragraph of the review should explicitly state the central thesis and organizing structure of the paper. The paper should be organized with a series of subtitles. Evaluation will focus on the student's ability to critically analyze, synthesize, and evaluate the literature.

*Students may submit one paper as a seminar group, or individual papers.* Students who decide to submit as a group should be advised that, in order to be evaluated favorably, the paper must read in a highly integrated manner, and present as a "single voice". In order to achieve this, groups will need to be well organized, and all group members will need to contribute to the paper as a whole. Although there are benefits to working as a group (including built-in peer review and greater opportunity for discussion and sharing of resources), there are also challenges. Students should recognize that this approach will not make for less work (if it is done properly), and should consider carefully what approach to take. Each student will need to have made a decision by Feb 23, and follow through with that decision.

A description of what a literature review is, and how it is written, can be found at the following link: <http://www.writing.utoronto.ca/advice/specific-types-of-writing/literature-review>. In addition, students are encouraged to visit Prof Erb during office hours for individual guidance on their reviews.

***Literature reviews must be submitted to Prof Erb by 4:30 pm April 5, 2016.***

**CLASS ATTENDANCE**

**8%**

Students can achieve this full component of their grade by attending at least 11/12 classes.