Course Description. How does Red Bull keep you awake? Is Adderall the same drug as crystal meth? Is Ambien a sleeping pill? Is marijuana a medication? What happens in your brain when you black out from drinking? What’s magical about magic mushrooms? Can you be addicted to your iPhone? And – do any of the drug laws in the United States make scientific sense? Whether it’s the occasional use of Advil, a glass of wine with dinner, or a regular coffee habit – we all use drugs. The purpose of this course is to introduce you to the scientific study of psychoactive drugs (e.g., drugs that affect the mind) and to challenge what you think you know about them. We will do so through the reading of text, as well as primary journal articles. We will begin by setting a context for understanding drug use in modern society, and continue with a serious look at the basic neurobiology related to neurotransmission and drug effects. Ultimately, we will arrive at an in-depth study of the pharmacological and neurobiological mechanisms of different classes of legal, illegal, and medicinal drugs, including alcohol, caffeine, tobacco, stimulants, depressants, antidepressants, pain-killers, and hallucinogens. We will understand each drug in light of its historical background, chemical structure, route of administration, absorption, distribution, metabolism, elimination, mechanisms of action, dosing, and patterns of use and misuse. We will also understand the resulting biological, physiological, psychological, and behavioral effects – in both the short and long term. As our understanding grows, we will be able evaluate common misconceptions as well as the existing scientific evidence regarding drug use, drug effects, and addiction disorders – which are devastating conditions with staggering social costs that affect up to 35% of Americans. We will also directly investigate controversial issues such as the medical use of marijuana, psilocybin, and amphetamines, and America’s drug policies.

Class Requirements

Online Virtual Classroom Meeting Time. Tuesday & Thursday 10:30am-12pm.

You will be required to participate in two online section meetings per week in our “virtual classroom”. During these virtual classroom sections, students will participate in open discussions with Professor Kober and the TF, Rebecca Boswell. It is expected that you will have already watched the lectures and have done the readings listed before each online classroom meeting begins.

Lectures. You will be required to watch ~60 online lecture videos (each about 20 minutes long) on your own. You are expected to watch the lectures needed for each online discussion before the online meeting time. Note that some weeks, you will be expected to watch 8-10 videos, so do plan your schedule so that you can keep up with lecture viewing. Much of the information on the exams will come directly from what is presented in the lectures.
Readings. You will be required to complete a set of readings before each lecture. These will include chapters from a primary textbook (which you should purchase), chapters from a secondary textbook (which will be posted in electronic PDF format) and primary scientific articles (which will also be posted in electronic PDF format).


2) Primary Scientific Article: These readings will focus on specific issues or present a particular theoretical perspective (chapters will be posted in PDF).

Grades. I want you all to understand the material, love it like I do, and excel in this class. Therefore, I’ve devised a grading scheme that gives you opportunities to do well and improve.

Exams. There will be two exams consisting of multiple-choice, true/false, and short/medium answer questions. The midterm exams will take place during online discussion times on Tuesday July 18, and will cover about half of the lectures and associated readings. The final exam will be during the final online discussion section on Thursday August 3, will be cumulative, and will cover material from the entire course. You must take the exams during the assigned time slots.

Online Discussion Section Participation. The goal of these 1.5 hour discussions is to review the material covered in the lectures and the readings, but also to allow you to ask questions and discuss the concepts presented in lectures. Throughout the summer, you’ll receive sets of discussion problems. We will walk through these problems during section, but it’s ideal if you think through these problems on your own before class. Attendance is absolutely required, and if you have any kind of emergency, please email both of us ASAP.

Self-tests. There will be unannounced oral self-tests that will be completed during the online discussion times. They are like short quizzes designed to check up on your ongoing understanding of the material, and orient you to the kinds of questions the might be on the exams. They will consist of a short answer questions from the preceding lectures and the assigned reading for those lectures. They are called “self tests” because they will help you prepare for the kinds of questions we ask on exams, and the kind of knowledge we expect you to have. If you are not present at the time a self-test is given you will receive a zero.

Extra Credit. There will be an opportunity for extra credit. This will be explained during one of the discussions.

Percentage of grade

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Final Exam (cumulative)</td>
<td>35%</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>30%</td>
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<tr>
<td>Participation in online</td>
<td>20%</td>
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<tr>
<td>Self-tests (in session)</td>
<td>15%</td>
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A necessary note on cheating and plagiarism. Both the midterm and the final exam are closed book, which means the use of any written material or any form of collaboration is forbidden. Please don’t cheat. Seriously. Don’t. You came to Yale to learn, and exams allow us to assess your learning. Cheating on self-tests and exams will not be tolerated. Any plagiarism will be associated with a failing grade on the exam, possibly in the class, and serious disciplinary action.
DATES, TOPICS, & READING

Week 1: Introduction to drugs and the brain

Class 1

- **Topic 1**: Introduction! Why should we care about DRUGS? (short lecture)
  - Readings: None
  - Videos: 1

- **Topic 2**: Introduction to the brain. What are neurons?
  - Reading: Meyer & Quenzer p. 1-5, 41-47, 58-74
  - Videos: 3

- **Topic 3**: Neurotransmission I: How do neurons communicate? The Action Potential
  - Reading: Meyer & Quenzer p. 49-58
  - Videos: 4

Live Discussion Section 1: 7/4 with Professor Kober

Class 2

- **Topic 4**: Neurotransmission II: Synaptic transmission, Receptors, Neurotransmitters
  - Reading: Meyer & Quenzer p. 77-90
  - Videos: 3

- **Topic 5**: Neurotransmission III: Types of Neurotransmitters
  - Reading: OPTIONAL: Meyer & Quenzer Chapters 5-8
  - Videos: 3

Live Discussion Section: 7/6 with Becca Boswell

Week 2: Psychopharmacology & Drug use

Class 3

- **Topic 6**: Pharmacokinetics: how drugs work- what you do to drugs (RADME)
  - Reading: Meyer & Quenzer Chapter 1 p. 3-25 (ignore p. 13-14 ionized drugs)
  - Videos: 2

- **Topic 7**: Pharmacodynamics: drug effects on the body- what drugs do to you
  - Reading: Meyer & Quenzer p. 25-32, 93-95
  - DiChiara & Imperato, 1998
  - Videos: 3
• **Topic 8:** Drug-induced neural adaptation & LTP  
  Reading: Meyer & Quenzer p. 32-36  
  Meyer & Quenzer Box 8.1  
  Mameli & Luscher 2011 (annotated)  
  Volkow et al. 2007 (annotated)  
  Mnookin 2014 (short)  
  Videos: 5

**Live Discussion Section:** 7/11 with Professor Kober

**Class 4**

• **Topic 9:** Why do people take drugs? Measuring drug use  
  Videos: 1

• **Topic 10:** What is addiction?  
  Reading: DSM 5 (excerpt)  
  Meyer & Quenzer Chapter 9 p. 227-247  
  Lesher 1997 (short)  
  Videos: 1

• **Topic 11:** Caffeine: Helpful or harmful?  
  Reading: Meyer & Quenzer, Chapter 13 p. 393-399  
  Videos: 3

• **Topic 12:** Cigarettes & Nicotine: #1 killer  
  Reading: Meyer & Quenzer, Chapter 13 p. 373-393  
  Videos: 1

**Live Discussion Section:** 7/13 with Becca Boswell

**Week 3: More Common Drugs**

**Class 5: Midterm**

Review topics and readings as needed for midterm exam

**Live Discussion Section- Midterm Exam:** 7/18

**Class 6**

• **Topic 13:** Alcohol Part I  
  Reading: Meyer & Quenzer, Chapter 10  
  Videos: 2

• **Topic 14:** Alcohol Part II  
  Reading: Meyer & Quenzer, Chapter 10  
  Videos: 2
• **Topic 15:** Medication for Anxiety and Depression  
  Reading: Meyer & Quenzer, Chapter 19 543-550, 563-569 (Depression)  
  Reading: Meyer & Quenzer, Chapter 18 p. 509-511, 531-541 (Anxiety)  
  Turner et al. 2008  
  Videos: 3

**Live Discussion Section:** 7/20 with Becca Boswell

**Week 4: Legal and Illegal Drugs**

**Class 7**

• **Topic 16:** Marijuana: Menace or Medicine?  
  Reading: Meyer & Quenzer, Chapter 14  
  Meier et al 2012 (IQ)  
  Llosa 2011 (legalization, short)  
  Videos: 3

• **Topic 17:** Stimulants: Cocaine and Crystal Meth; Ritalin & Addarall  
  Reading: Meyer & Quenzer, Chapter 12  
  Videos: 3

• **Topic 18:** Opioids: From Heroin to Vicodin  
  Reading: Meyer & Quenzer, Chapter 11  
  Videos: 3

**Live Discussion Section:** 7/25 with Professor Kober

**Class 8**

• **Topic 19:** Hallucinogen drugs: LSD, MDMA, & magic mushrooms  
  Reading: Meyer & Quenzer, Chapter 15  
  Meyer & Quenzer Box 6.1  
  Griffiths et al 2006  
  Harris 2011 (short)  
  Videos: 2

• **Topic 20:** Behavioral Addictions: Food, Gambling, Facebook?  
  Reading: Meyer & Quenzer, Box 9.1  
  Smith & Robbins 2013  
  Optional: Tamir & Mitchell 2012  
  Videos: 3

• **Topic 21:** The War On Drugs: Does it make any sense?  
  Hart - Chapter 3 (PDF)  
  Nadelmann 2007 (short)  
  OPTIONAL: Watch the documentary: “The House We Live In”  
  Videos: 2
Live Discussion Section: 7/27 with Becca Boswell

**Week 5: Prevention, & Treatment**

**Class 9**
- **Topic 22**: Prevention & Treatment I  
  Reading: Hart - Chapter 17 (PDF)  
  Videos: 3

- **Topic 23**: What is it like to be an addict?  
  Guest Lecture  
  Meyer & Quenzer p. 260-261  
  Videos: 1

- **Topic 24**: Treatment II  
  DSM 5 Criteria (review from Topic 10)  
  Kober et al, 2010  
  AA 12 steps  
  Mindfulness exercise  
  Videos: 2

Live Discussion Section: 8/1 - Exam Review and Discussion with Hedy Kober

**Class 10**
**Review online lectures and readings as needed for final exam**

Live Discussion Section- Online Final Exam: 8/3