Integrated Behavioral Pharmacology of Substance Use and Mental Health Disorders

FALL 2014 COURSE SYLLABUS:

Class meets on Wednesdays from 6:30 pm – 9:30 pm

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Required Reading:

Course Description:

Pharmacology is the science of understanding how drugs act on the body and conversely, how the body acts on drugs. This is not to be confused with pharmacy, which deals with the preparation and dispensing of drugs. Drugs can be defined as chemical compounds with a specific therapeutic function, such as aspirin. Pharmacology focuses on how a drug gets into the body, where in the body the drug acts, and how the body gets rid of a drug. Behavioral pharmacology is the scientific study of the effects that drugs have on human behavior. Behavioral pharmacology includes addiction research which tries to understand why people become addicted to drugs like alcohol, methamphetamine or opioids.

Substance use disorders (SUD) involve changes to biological systems ("hardware" changes) that begin to reprogram those systems to increase and automate the often compulsive behavior to continue to use despite adverse consequences. These changes, in turn, promote the recruitment of related and associated cognitive, affective, and behavioral systems and resources ("software" changes) to support the SUD. This course will describe the substances, mechanisms, systems, and processes by which SUD are acquired, maintained, and extinguished. Included is a discussion of the acute and post-acute symptoms of substance use, withdrawal including pharmacotherapies developed as anticraving and withdrawal management methods.

This course will explore the neurochemical, physical and mental effects of commonly used psychoactive substances on the human biological system. Emphasis is placed on the basic pharmacology of psychoactive drugs, the medical consequences of compulsive illicit use, and
therapeutic approaches for managing SUD. This course will also review the four major classes of drugs that are of clinical significance in treating four major categories of psychiatric disorders: anxiety, depression, mania, and schizophrenia.

A lecture format using a blend of scientific information and clinical experience will be the principal method of instruction.

**Course Objectives:** Participants will be able to:
- describe how certain substances have a potential for abuse.
- develop an understanding of biological systems in predisposing, resisting, and adapting to substance use disorders.
- explain the evidence-based science on substance use disorders
- relate biological to psychological, emotional, and behavioral aspects of substance use and mental health disorders.
- understand the pharmacotherapies in the treatment of substance use and mental health disorder.

**Assumptions in Behavioral Pharmacology.**
1) Behavior is the result of neuronal activity
2) Neuron activity is chemically mediated.
3) Behavior, genes, diet and the environment produce chemical changes in neurons and glial cells.
4) Substance abuse disrupts the neurochemical balance and results in behavioral dysfunction.
5) Addiction is a chronic brain disease with biopsychosocial components
6) Drugs can be used to restore substance-induced disruption of brain neurochemistry.

These assumptions will be discussed in the format outlined below:

**CLASS #, TOPIC AND ASSIGNED READING(S).**

**Class 1: INTRODUCTION: THE SCIENCE OF ADDICTION**

- ✔ Reading assignment for next week’s class: Section 1 Introduction and Chapter 1

**Class 2: BEHAVIORAL PHARMACOLOGY: BASIC PRINCIPLES**

- ✔ Reading assignment for next week’s class: Chapters 2 and 3
Class 3: AN OVERVIEW OF THE FUNCTIONAL NERVOUS SYSTEM:

✓ Reading assignment for next week’s class: Chapter 4 and the Section II Introduction

Class 4 & 5: NEUROPHYSIOLOGY

✓ Reading assignment for next week’s class: Chapters 5, 6 and read about hepatitis in the Appendix section.

Class 6: ALCOHOL AND SEDATIVE HYPNOTICS

✓ Reading assignment for next week’s class: Chapter 7

Class 8: PSYCHOSTIMULANTS

✓ Reading assignment for next week’s class: Chapter 8 and read Drug Use and Infectious Diseases and also HIV/AIDS in the Appendix section.

Class 8: NARCOTIC ANALGESICS

✓ Reading assignment for next week’s class: Chapter 9 and read the Principles of Drug Addiction Treatment: A Research-Based Guide in the Appendix section.
Class 9: MEDICATIONS FOR MENTAL HEALTH
A discussion of the mechanism of action for antidepressant, antipsychotic and anti-mania medications.

The evolution of antipsychotic medications. New generation antipsychotics including aripiprazole (Abilify) and paliperidone (Invega). The evolution of antidepressant medications. New generation antidepressants including duloxetine (Cymbalta) and selegeline (Emsam).


Class 10: CANNABINOIDS
A discussion of the mechanism of action for cannabinoids.
Overview of the cannabinoids: pharmacologic and biobehavioral issues. Treatment considerations for cannabis abuse disorder. The human endocannabinoid system, ligands and receptor subtypes: Review the pharmacotherapy for cannabis use disorders including neurontin.

✓ Reading assignment for next week’s class: Chapters 14, 15

COURSE REQUIREMENTS

Evaluation Grading Policy & Exams:
Evaluations will be based on a combination of attendance, final exam and the essay assignment. Class attendance is weighted at 40%, the Final Exam is 40%, and the Written Essay is 20%.

ATTENDANCE. This course has 11 classes. During the last 20+ years, I have consistently found that missing even a single class generally lowers a student's overall grade by about 5%. So, missing more than 1 class can have a significant impact on the average student (drops you from an A to a B, a B to C or a C to a D). For this reason, if you know that you have a conflict with this class and plan to miss more than 2 classes, you should drop this course and take it when it fits your schedule better. I also do not require elaborate excuses to make up a class (just show up).

EXAM FORMAT. Anything is possible including TRUE/FALSE type questions. To help prepare for the exam, be sure and take the self-tests at the end of each chapter in the text.

READABILITY POLICY. On the exam, if more than one answer is circled, the question will be marked wrong. Also, if I cannot read your writing, I will not try to grade it. And, your essay response will earn a score of 0.

ESSAY
Topics must be science oriented and within the area of behavioral pharmacology. Essays are to be at least 5 type written pages of content (12 font size), double spaced with a references list at the end of the paper. The topics below are suggestions to give you an idea of the type of subject
matter to research and write about. Other topics can be used but must first be approved by the instructor prior to submitting the paper.

**Suggested Topics for Your Essay.**
1. Neurontin in the Treatment of Cannabis Use Disorder
2. The Neurobiology of Methamphetamine Induced Depression
3. Aripiprazol (Abilify) As a Novel New Antipsychotic: Is It Better Than Previous Medications?
4. Biogenetic Markers for Alcoholism
5. Prescription Medication Abuse: What gives prescription drugs abuse potential?

**Acceptable References for Essays:** All references must be primary sources from peer-reviewed journals or other credible sources. The Internet has become a popular student resource. Unfortunately, the majority of information on the Web is not peer-reviewed and therefore not very credible or accurate. The use of inappropriate references will negatively impact the grade for your paper. (see some of the acceptable Internet reference sites on the last page)

**IMPORTANT NOTE:** Wikipedia and GOOGLE are not peer-reviewed and therefore not acceptable reference sources.

**Evaluation Criteria for the Essay**
Format/Quality = 20% (deductions for poor sentence structure, organization, quality, spelling errors). Hint: Use a 12-point font and a new ribbon or laser cartridge.

Intro = 25%. The introduction must describe the topic and must use cited references to support the topic and the body of your paper. This is not a format for your personal opinion or experience with drugs or recovery. Keep the paper objective and based on the credible sources you are using.

Body = 35%. The section of this section must be clear and detailed. In addition, any portion provided by the professor must be accurately presented.

Conclusions/Discussion = 20%. This is the section for you to discuss any conclusions you have discovered. This is also the place where you can insert your personal opinion and any

**Strategies for studying:**

1) Look at your lecture notes and handouts for the main themes. Write five potential essay questions that you would ask the class to answer if you were the professor. Then try to answer them without your notes. Write them out completely and then look up the answers. Would you pass? If not, more study is required.
2) Try the above suggestion with another member of the class. They may identify an issue that you overlooked. Grade each other.
3) Take the self-study tests at the end of each chapter in the text.
4) Sentence structure and spelling are important and will influence your grade.
5) Use an extra sheet of paper to outline the main points before you write your essay.
NOTE: It is strongly recommended that you take lecture notes and maintain them in a binder along with the hand-out provided during class.

A FEW CREDIBLE INCREDIBLE WEBSITES!

Addiction Technology Transfer Center
http://www.nattc.org/asme.asp

Brookhaven Addiction Research. Center for Translational Neuroimaging

California Society of Addiction Medicine (CSAM)
http://www.csam-asam.org/

DrNeurosci: Advancement of the Neuroscience of Substance Use and Mental Health Disorders
DrNeurosci.com

Institute for Research, Education and training in Addictions (IRETA)
http://ireta.org/

National Institute on Drug Abuse (NIDA)
http://www.drugabuse.gov/

Society of Neuroscience. Advancing the Understanding of the Brain and Nervous System
http://www.sfn.org/

Substance Abuse and Mental Health Services Administration (SAMHSA)
http://www.samhsa.gov/

UCLA Integrated Substance Abuse Programs
http://www.uclaisap.org/

University of Utah. Genetic Science Learning Center
http://learn.genetics.utah.edu/