



# Independent Study | in Idaho

*Providing independent study opportunities for more than 40 years.*

**PSYC 472**  
**Introduction to the**  
**Pharmacology**  
**of Psychoactive Drugs**



The University of Idaho in statewide cooperation with  
Boise State University — Idaho State University — Lewis-Clark State College

# Course Guide

Independent  
Study | in Idaho

*Self-paced study. Anytime. Anywhere!*

## **Psychology 472 Introduction to the Pharmacology of Psychoactive Drugs**

University of Idaho  
Three Semester-Hour Credits

**Prepared by:**

Steven Meier, Ph.D.  
Associate Professor Emeritus  
University of Idaho

WR: September 2020

1 – Psyc 472

Copyright Independent Study in Idaho/Idaho State Board of Education

## **Table of Contents**

---

Welcome! .....	1
Policies and Procedures.....	1
Course Description .....	1
Course Materials .....	1
Class Overview and Overview .....	2
Exams.....	2
Written Assignments .....	3
Blackboard Learn.....	3
Grading .....	3
Optional Extra Credit .....	4
About the Course Developer .....	4
Contacting Your Instructor .....	5
Lesson 1: An Overview of Pharmacokinetics, Pharmacodynamics and Neurobiology .....	6
Writing Assignment 1 Due	
Lesson 2: Brain and Body Anatomy and Physiology.....	8
<b>Exam 1 Information: Covers Lessons 1–2 .....</b>	<b>10</b>
<b>Optional Extra Credit Information .....</b>	<b>11</b>
Lesson 3: Alcohol.....	13
Lesson 4: Barbiturates and Other Sedative/Hypnotic Drugs.....	15
Option B Extra Credit EC-1 Due (Optional)	
Lesson 5: Benzodiazepines and Other Anxiolytic Drugs.....	17
Writing Assignment 2 Due	
Option B Extra Credit EC-2 Due (Optional)	
Lesson 6: Opiates / Opioids .....	19
<b>Exam 2 Information: Covers Lessons 3–6 .....</b>	<b>21</b>
Lesson 7: Stimulants.....	22
Writing Assignment 3 Due	
Lesson 8: Psychedelics / Hallucinogens.....	24
Lesson 9: THC and THC Synthetic Products.....	26
Writing Assignment 4 Due	
Lesson 10: Other Synthetic Drugs .....	29
Option B Extra Credit EC-3 Due (Optional)	
Lesson 11: Steroids.....	30
Lesson 12: Other Drugs of Abuse/Herbal Substances.....	31
Option B Extra Credit EC-4 Due (Optional)	
Lesson 13: Geriatric and Adolescent Issues .....	33
Writing Assignment 5 Due	
Option-A Extra Credit, Term Paper Due (Optional)	
<b>Exam 3 Information: Covers Lessons 7–12.....</b>	<b>35</b>

## Psyc 472: Introduction to the Pharmacology of Psychoactive Drugs

### 3 Semester-Hour Credits: U of I

#### **Welcome!**

---

Whether you are a new or returning student, welcome to the Independent Study in Idaho (ISI) program. Below, you will find information pertinent to your course, including the course description, course materials, course objectives, as well as information about assignments, exams, and grading. If you have any questions or concerns, please contact the ISI office for clarification before beginning your course.

#### **Policies and Procedures**

---

Refer to the ISI website at [www.uidaho.edu/isi](http://www.uidaho.edu/isi) and select *Students* for the most current policies and procedures, including information on setting up accounts, student confidentiality, exams, proctors, transcripts, course exchanges, refunds, academic integrity, library resources, and disability support and other services.

#### **Course Description**

---

Overview of neural mechanisms, behavioral responses, and addictive aspects of psychoactive drugs. Additional projects/assignments required for graduate credit. UofI: Joint-listed with PSYC 572.

Prerequisite: Psyc 101 - *None, although it is strongly advised to have taken Psychology 100 before taking this class:*

*5 graded assignments, 3 exams. Available online only.*

Assignments and exams must be submitted consecutively, in the order outlined in the course; therefore, it depends on where you are in the course as to when specific items are due, including discussion topics, extra credit, and exams. Other than that, there is no limit on the number of assignments that can be submitted per week. *An instructor may take up to three weeks to grade, so plan accordingly to meet personal deadlines.*

ALL assignments and exams must be submitted to receive a final grade for the course.

#### **Course Materials**

---

##### **Required Course Materials**

- Advokat, Comaty and Julien, R.M. (2019). *Julien's Primer of Drug Action (14th Ed.)*. Worth Publishing ISBN-13: 978-1319015855
- Additional reading materials may be sent to you during the semester.

##### **Optional Readings and Links:**

National Institute on Drug Abuse – <http://www.drugabuse.gov>

National Advisory and Drug Abuse (NCADA) - <https://www.drugabuse.gov/about-nida/advisory-boards-groups/national-advisory-council-drug-abuse-nacda>

National Clearinghouse for Alcohol and Drug Information – <https://clearinghouse.fmcsa.dot.gov/>

National Institute on Alcohol Abuse and Alcoholism – <https://niaaa.nih.gov/>

Multidisciplinary Association for Psychedelic Studies (MAPS) - <https://maps.org/>

[Erowid.org](http://Erowid.org)

## **Class Overview and Delivery**

This course is designed to provide an overview of information related to various psychoactive drugs. This course is not designed to discuss psychotropic medications that are often prescribed to individuals with a variety of psychological disorders. The class that discusses these topics is Psychology 490/590 (Psychopharmacology). The primary focus of this course is on the biological aspects of illicit drugs and how they work. The course will also discuss aspects of the addiction process and how drugs alter brain functioning that ultimately results in behavioral changes.

### **Here are some specifics about the class.**

First, if you are using “Chrome” for this class, you must do one of two things: Clear your cache or use EDGE (Best Option). If you use Chrome often, you will not see the most recent information in BBL. Relatedly, if you are using Safari, you will have issues submitting some documents. Finally, DO NOT use the Google word processing program. Often after uploading, the instructional staff cannot open the document. So, use EDGE or Firefox.

Once on the website, do the following:

1. Click on the Schedule button. Within this section, you will find a list of topics so that we will be examining.
2. Click on Lesson 1. Here you will find some general information about the topic we will discuss, the reading assignments, PowerPoint Slides, and MP-4 videos. You can listen to PP presentations using Real Player (older technology) or MP-4 video presentations.
3. You will need to complete the lessons in order. The materials are located in the Schedule section. Know when assignments, exams and EC are due. Generally, work 10 hours per week or more on the class. Consider it lecture and some study time but at your convenience.

All ISI courses are delivered through Canvas, an online management system that hosts the course lessons and assignments, and other items that are essential to the course. Upon registration, the student will receive a *Registration Confirmation Email* with information on how to access ISI courses online.

## **Exams**

There will be three exams to examine and develop your knowledge of the material. All exams are 75 minutes and multiple-choice. Total: 300 points (100 points per exam). Each exam will cover only the material for that section. The final will not be comprehensive. You will not be able to drop any questions. Finally, all exams are randomly generated. Thus, the exam you receive will not be the same as other students. All exams will be posted in Blackboard Learn.

**So you can determine how I test, I am allowing you to take Exam 1 (only) twice. For the other exams, you will only receive one opportunity.**

Exams are open book and note. That is, you can use any information you wish to help you. However, pharmacology exams are challenging. Many of the questions are integrative and will not be found directly from the text or the notes. So, make sure you are studying for them as you would study for any hard, in-class, non-open-book test. Do not expect to have time to look up things while taking the exam, or you will get a low score. Essentially, open-book exams allow you to do some minor checking, not trying to read and understand a concept. Generally, it would be best if you were studying at least one to two hours per night for this class. Further, there is a lot of information to learn, so you will need to work very hard.

So, use an outline, take notes while reading the text, etc. ESSENTIALLY, KNOW THE MATERIAL BEFORE YOU TAKE THE EXAM.

The Psyc 472 exams utilize BbLearn's adaptive release feature, where each exam is released depending on the Grade Center item you have submitted for grading. Therefore, you may have additional chapters to study after the link to launch an exam appears. Make sure you have reviewed all the material that is covered on an exam before taking the exam.

- A link to launch Exam 1 will appear under the Exams content area, once you have submitted assignment one for grading.
- Exam 2 will appear once you have submitted assignment two.
- Exam 3 will appear once you have submitted assignment five.

## **Written Assignments**

You will be required to complete brief (1-2 pages) papers on various discussion topics. All materials will be submitted through BBL and will be plagiarism checked. Topics and directions will be provided for each topic to be submitted. **Do not copy and paste materials from the web. If you use other people's work, reference them appropriately in APA style.**

### **Study Hints:**

- Keep a copy of every assignment submitted.
- Complete all reading assignments.
- Set a schedule allowing for course completion one month before your personal deadline.
- Web pages and URL links in the World Wide Web are continuously changing. Contact your instructor if you find a broken Web page or URL.
- Refer to the **Course Rules** in Canvas for further details on assignment requirements and submission.

## **Blackboard Learn**

All exams, papers, and extra credit will be through Blackboard Learn. Your name should already be posted on Blackboard. If you do not see your name, contact ISI to make sure you are in the class. If you cannot access Blackboard Learn at all, contact the Help Desk at 885-4357.

If you have any questions, please feel free to contact me. WORK HARD AND STUDY HARD. THIS IS A TOUGH CLASS.

## **Grading**

At a minimum, all grades will be based on the following scale:

>90%=A

>80%=B

>70%=C

>60%=D

<60%=F

The total points are 415. Also, there are 32 points of extra credit possible.

<u>Assignment</u>	<u>Points</u>	<u>Exam</u>	<u>Points</u>
Assignment 1	20	Exam 1	100
Assignment 2	20	Exam 2	100
Assignment 3	25	Exam 3	100
Assignment 4	25	<b>Total of</b>	<b>300</b>
Assignment 5	25		
<b>Total of</b>	<b>115</b>		

## **Optional Extra Credit – Paper Assignments**

*(In Addition to and Separate from the Discussion Topic Assignments)*

**Optional Extra Credit Option-A Term Paper:** Minimum length = 5 pages, Maximum length = 7 pages. (This does not include the cover sheet, abstract page, or references). 32 points.

**Optional Extra Credit Option-B:** There are four Extra Credit (EC) assignments. If you complete all four extra credit assignments, the maximum number of points you can earn is 32 points.

Option-B EC-1 = 8 points possible

Option-B EC-2 = 8 points possible

Option-B EC-3 = 8 points possible

Option-B EC-4 = 8oints possible

**Total of 32 Points Possible**

**EC Total for Option A or Option B = 32 Points. (You can do all of the extra credit assignments, but even if you do, you can only receive a maximum of 32 points.)**

The final course grade is issued after all assignments and exams have been graded.

**Cheating and Plagiarism:** If you cheat or plagiarize someone else's material and I catch you, you will receive an "F" grade for the class and be referred to the Dean of Student's Office. Note: Copying and pasting material from the web and not citing that information is considered plagiarism. BBL also has plagiarism checking capabilities. Do not even consider cheating in this class.

## **About the Course Developer**

Dr. Meier became a faculty member in 1987. With a specialization in Applied Behavior Analysis, physiology, and addictive behavior, he was instrumental in developing the Psychology Department Addiction's program, later to become the U of I Psychology Addiction's Minor. He further was actively involved in developing the Idaho Student of Addictions Studies curriculum with other Idaho Universities. Simultaneously, he was actively engaged in creating interventions in high-risk populations with the Idaho Department of Health to address the HIV/AIDS epidemic in its early years.

With Sallie Gordon and Richard Reardon (Department Chairs), Dr. Meier helped expand the department's presence and Psychology major in Coeur d' Alene. Further, after receiving a grant from the State Board of Education and in collaboration with Richard Reardon, developed one of the first online distance learning majors at the University of Idaho that continues today. He then created a 2+2 program to create a seamless transfer program for Psychology majors attending community colleges across Idaho. Over his career, Dr. Meier received over three million dollars in grants and contracts. His mentees include eight practicing

physicians, nine Ph.D. Clinical/Counseling Psychologists, and three Physical Therapists. He also received seven awards as a mentor for the U of I Alumni Award for Excellence winners. Finally, he is a veteran, 25-year scout leader, 26-year ski patroller, and currently at the national level with the Benevolent and Protective Order of Elks.

Dr. Meier continues to consult with physicians and attorneys in the area of substance abuse and high-risk behavior. His current interests focus on addressing issues associated with vaping.

### **Contacting Your Instructor**

---

Instructor contact information is posted on your Canvas site under *Course Rules*.



## Lesson 1

### An Overview of Pharmacokinetics, Pharmacodynamics, and Neurobiology

#### **Lesson Outcomes and Objectives**

---

**Outcomes: After completing this lesson, you should understand/be able to:**

- Understand and describe how drugs enter and move through the body.
- Understand and describe structures in a nerve cell (neuron) and their function.
- Understand and describe how neurotransmitters impact the neuron.
- Understand concepts related to basic pharmacology.
- Understand basic concepts related to how drugs impact nerve systems.

**Knowledge, Skills, and Abilities (KSAs):**

- Recognize the potential for substance use disorders to mimic a variety of medical and psychological disorders and the potential for medical and psychological disorders to co-exist with addiction and substance abuse.

**Objectives:**

- Increase knowledge related to pharmacokinetics and Pharmacodynamics.
- Increase understanding of basic neurophysiology.
- Increase understanding of how drugs impact the nerve cell.
- Increase understanding about basic pharmacology

#### **Reading Assignment**

---

- Julien 1-3 and Appendix B

#### **Important Terms**

---

Pharmacokinetics and Pharmacodynamics

Neurophysiology

Affinity

Up and down-regulation

Catecholamines

Receptors

#### **Overview**

---

To understand how drugs work, students must have a basic understanding of how the body and brain work. This includes some basic brain chemistry. In addition, students must understand how drugs move through the body (pharmacokinetics) and their basic mechanisms of action on receptor systems (Pharmacodynamics). In general, if a person can understand these basic processes, the understanding of each individual crowd or compound becomes simpler.

#### **Lecture Topics: See Videos and Slides in Canvas**

---

- Pharmacokinetics
- Pharmacodynamics
- Pharmacodynamics and Neurons
- Receptors

- Neurotransmitters
- G-Proteins
- The Circulatory System

## **Study/Thinking Questions**

---

1. Define and understand what is pharmacokinetics and pharmacodynamics?
2. How do drugs enter the system and are distributed to various receptor sites.
3. What can be used to enter drugs into the body?
4. Be able to describe all of the neuron structures and how they work.
5. What is up and down regulation? Why are these concepts important?
6. Describe drugs that are agonists, antagonists and partial antagonists? How do these drugs work? Be able to provide examples.
7. How do drugs impact various receptor sites?
8. Make sure you understand basic pharmacologic principles such as affinity, effective and lethal doses, therapeutic index, etc.

## **Resources**

---

### **Books**

- Carlson, Physiology of Behavior. Any edition Allyn and Bacon. Good overview book.
- Kandel, Schwartz and Jessell. Principles of Neural Science. Fifth ed. McGraw Hill. This book is considered "The Bible" of Neuroscience

### **Web sites**

There are numerous websites, and one can examine to get more information about these topics. Type any key term into the BING search engine to find more information.

## **Written Assignment**

---

- Before beginning the first written assignment, refer to the *Course Rules* in Canvas for your instructor's assignment requirements.
- Write a 1-2 page, single-spaced with one-inch margins, reaction paper on what you discovered on the topic listed below.
- All materials will be submitted through BBL and will be plagiarism checked.
- Do not copy and paste materials from the web. If you use other people's work, reference them appropriately in APA style.

Complete Assignment 1. The assignment can also be found in the Lesson Assignments and EC section on Canvas.

First, describe three ways how drugs can enter the body. Then describe which route is the fastest to get a drug into the brain and why it is faster.

Next, describe how Vaping impacts the lungs and other body parts.

Finally, describe why injecting a drug (e.g., heroin) might be a preferable route over taking the drug orally. (25 points possible)