

# PRINCIPLES OF NEUROSCIENCE III

## 'MOLECULAR NEUROPHARMACOLOGY & ITS CLINICAL APPLICATION'

GMS6023 -- SPRING/2015  
2 CREDITS

**CLASS LOCATION:** MBI BUILDING, L1-101

**MEETING TIME:** MONDAY, WEDNESDAY, FRIDAY (10 AM-12 NOON)

**COURSE DIRECTORS:** *Habibeh Khoshbouei, Pharm.D., Ph.D.*  
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### COURSE DESCRIPTION AND OBJECTIVES:

*This course surveys the basic principles of neuropharmacology with an emphasis on the molecular pharmacology of drugs used to treat CNS disorders. The specific focus of this course will be to provide a description of the cellular and molecular actions of drugs on synaptic transmission with in-depth discussion of drug-induced changes in functioning of the nervous system. We will examine how the neurotransmitter systems influence nervous system as well as therapeutic targets affecting these transmitter systems. Issues surrounding drug entry into the central nervous system will be addressed. Clinical applications of neuropharmacology, the link between neuropharmacology and behavior, and current research investigating the development of drugs for neuronal targets will be addressed. This course is designed to provide a foundation for advanced knowledge in behavioral neuroscience and neuro-psychopharmacology, and to provide an introduction to the pharmacological treatment of CNS pathologies. The ultimate goal is to understand how molecular neuroscience can guide the direction of basic medical science and therapeutic approaches.*

### COURSE TEXTBOOK:

*One of the following Textbooks is recommended for this course:*

- Molecular Neuropharmacology: A Foundation for Clinical Neuroscience  
Eric Nestler, Steven Hyman, Robert Malenka -- 2nd ed. New York, NY: McGraw-Hill
- The Biochemical Basis of Neuropharmacology. Cooper  
R. Jack, Floyd E. Bloom, Robert H. Roth -- 8th ed. Oxford, USA: Oxford University Press, 2002. ISBN: 9780195140088

*Reference books available at the library (on hold)*

- Cell Surface Receptors: A Short Course on Theory and Methods  
Lee E. Limbird, 3rd ed. Springer; 3rd edition. 2004. ISBN-13: 978-038723069
- Psychopharmacology: Drugs, the Brain and Behavior  
Meyer, Jerrold S., and Linda F. Quenzer. 1st ed. Sunderland, MA: Sinauer Associates, 2004. ISBN: 9780878935345.

- The Pharmacological Basis of Therapeutics. Laurence Brunton. Goodman & Gilman's 12th ed. McGraw-Hill Professional; 10 edition 2011 . ISBN: 978-0071354691

### PREREQUISITE KNOWLEDGE AND SKILLS:

*You are expected to be familiar with basic Neuroscience concepts before starting this course series. If you are uncertain about the sufficiency of your background, you are encouraged to read through chapters one through ten in Neuroscience Online – an electronic textbook (Open Access)*

<http://neuroscience.uth.tmc.edu/s1/index.htm>

### COURSE SCHEDULE:

Day	Date	Topic	Lecturer
1	Feb 9	Introduction to Neuropharmacology. History of Drug Discovery Past to Present	Dr. Habibeh Khoshbouei
		Pharmacogenomics	Dr. Eduardo Candelario-Jalil
2	Feb 11	Principles of Nervous System Physiology & Pharmacology Site of Action of Drugs & Signal Transduction Mechanisms	Dr. Eduardo Candelario-Jalil
3	Feb 13	Theoretical and practical analysis of Receptor Occupancy and Cellular Response Theoretical and practical analysis of Receptor Occupancy and Cellular Response	Dr. Joanna Peris
4	Feb 16	Glutamatergic Neurotransmission Pathophysiology & Pharmacology of Glutamatergic Neurotransmission	Dr. Eduardo Candelario-Jalil
5	Feb 18	GABA & Glycine Neurotransmission Pathophysiology & Pharmacology of GABAergic & glycinergic Neurotransmission	Dr. Eduardo Candelario-Jalil
6	Feb 20	Neuropharmacology of Acetylcholine – General Aspects Drugs Acting on Muscarinic Receptors	Dr. Eduardo Candelario-Jalil
7	Feb 23	Neurophysiology of Nicotinic Acetylcholine Receptor System Nicotinic Acetylcholine Receptor System (Neuropharmacology)	Dr. Eduardo Candelario-Jalil
8	Feb 25	Neurophysiology of the Dopaminergic System & Its Pathology Dopaminergic Receptor System. Therapeutic Approaches (Neuropharmacology)	Dr. Habibeh Khoshbouei
9	Feb 27	<b>MIDTERM EXAM</b> Material thru Feb 25th	
10	Mar 2	SPRING BREAK	
11	Mar 4	SPRING BREAK	

12	Mar 6	SPRING BREAK	
13	Mar 9	Neurophysiology & Pathology of the Adrenergic System Adrenergic System Neuropharmacology	Dr. Joanna Peris
14	Mar 11	Dopaminergic Receptor System. Therapeutic Approaches (Neuropharmacology) Dopaminergic receptor system. Therapeutic approaches (neuropharmacology)	Dr. Habibeh Khoshbouei
15	Mar 13	Serotonergic Receptor System. Therapeutic Approaches (Neuropharmacology) Serotonergic Receptor System. Therapeutic Approaches (neuropharmacology)	Dr. Habibeh Khoshbouei
16	Mar 16	Alcohol Dependence Introduction to Neuropeptides Cannabinoids	Dr. Habibeh Khoshbouei
17	Mar 18	Neurophysiology of Anesthesia Anesthetics - Neuropharmacology	Dr. Anatoly Martynyuk
18	Mar 20	<b>FINAL COMPREHENSIVE EXAM</b> Material from February 9- March 18	

Disclaimer: This syllabus represents our current plans and objectives. As we go through the semester, those plans may need to change to enhance the class learning opportunity. Such changes, communicated clearly, are not unusual and should be expected.

## GRADING POLICIES:

*The grade will be assigned based on numerical performance on two examinations, one mid-term, and a non-comprehensive exam at the end of the course. Students will be expected to answer all of the questions on each exam.*

*Student Projects: 20%*

*Midterm Exam: 40%*

*Final Exam: 40%*

**INSTRUCTIONAL METHODS:** *Course materials will be delivered using traditional lectures. Student group learning projects will provide opportunities to review course material and explore topics of interest in more depth. These projects will be created and delivered using VoiceThread, an asynchronous communication learning platform.*

## COURSE POLICIES:

**ATTENDANCE POLICY:** *Attendance of lectures is mandatory*

**QUIZ/EXAM POLICY:** *There are two exams in this course, a mid-term and a final. They are in-class exams comprised primarily of multiple choice and short answer questions.*

**MAKE-UP POLICY:** *You are expected to notify the course directors of any anticipated absences. You should make every effort to take the exams on the days they are scheduled. If extenuating circumstances prevent you from taking a scheduled exam, you will need to schedule an appointment to meet with the course directors to identify an alternative exam date.*

**ASSIGNMENT POLICY:** *Group or individual projects must be completed and posted or turned in by the due date/time to obtain credit for the work.*

**COURSE TECHNOLOGY:** *We will use VoiceThread, an asynchronous online learning system, as the media for constructing and posting your student projects. While not required, a microphone/video camera is useful when creating VoiceThreads. Most laptops are equipped with these devices. We will enroll you in the VoiceThread course which will allow you to access the VoiceThread system using your Gatorlink name and password. This technology will be introduced during the first class period.*

## UF POLICIES:

**UNIVERSITY POLICY ON ACCOMMODATING STUDENTS WITH DISABILITIES:** Students requesting accommodation for disabilities must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drc/>). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

**UNIVERSITY POLICY ON ACADEMIC MISCONDUCT:** Academic honesty and integrity are fundamental values of the University community. Students should be sure that they understand the UF Student Honor Code at <http://www.dso.ufl.edu/students.php>

**NETIQUETTE: COMMUNICATION COURTESY:** All members of the class are expected to follow rules of common courtesy when creating VoiceThreads. The course directors reserve the right to remove materials deemed inappropriate.

## ABOUT THE LECTURERS

**Habibeh Khoshbouei, Pharm.D., Ph.D.** is Associate Professor in the Department of Neuroscience and is a Co-director of the course  
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**Joanna Peris, Ph.D.** is Associate Professor in the Department of Pharmacodynamics  
Molecular Genetics & Microbiology  
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