GMS 6705 Functional Human Neuroanatomy (5 credits)
Fall, 2019

Course Directors*:

Dr. Jake Streit
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*Appointments available by request

Class Meetings: The class will meet on Mondays, Tuesdays, Wednesdays and Fridays. Lectures will be in L1-101 in the MBI, from 9:00-10:00am, or 9:00-11:00am (9/13, 10/11, 10/29 only). Wet labs (8/23 - 9/6) will be in CG-67, from 9:00-11:00am. Additional labs and "Name the Lesion" sessions will be in L1-101, from 9:00-11:00am. Exams will be from 9:00-11:00am, except for the 10/16 Lab Exam which will be from 8:30-10:45am. Exam rooms are designated on the schedule.

Text Books: *Principles of Neuroscience*, 5th Edition, Kandel, Schwartz, Jessel, Siegelbaum and Hudspeth (Lecture); *Neuroanatomy: An Atlas of Structures, Sections and Systems*, 8th or 9th Ed, Haines (Lab)

Class Lecturers:

Name	Email	Department
Jose Abisambra	j.abisambra@ufl.edu	Neuroscience
Patrick Antonelli	pa@ufl.edu	Otolaryngology
Jennifer Bizon	bizonj@ufl.edu	Neuroscience
Sara Burke	burkes@ufl.edu	Neuroscience
Eduardo Candelario-Jalil	ecandelario@ufl.edu	Neuroscience
Marcelo Febo	febo@ufl.edu	Psychiatry
Abbi Hernandez	abbirosen@ufl.edu	Neuroscience
Caesar Hernandez	caesar.hernandez@ufl.edu	Neuroscience
Benoit Giasson	bgiasson@ufl.edu	Neuroscience
Tirisham Gyang	Tirisham.Gyang@neurology.ufl.edu	Neurology
Rick Johnson	rdjohnso@ufl.edu	Veterinary Medicine
Jada Lewis	jada.lewis@ufl.edu	Neuroscience
Mark Lewis	marklewis@UFL.EDU	Psychiatry
Nikolaus McFarland	nikolaus.mcfarland@neurology.ufl.edu	Neurology
Jeremy McIntyre	jmcin@ufl.edu	Neuroscience
Roger Papke	rlpapke@ufl.edu	Pharmacology/Therapeutics
Stefan Prokop	sprokop@ufl.edu	Pathology
Paul Reier	reier@ufl.edu	Neuroscience
Sue Semple-Rowland	rowland@ufl.edu	Neuroscience
Barry Setlow	setlow@ufll.edu	Psychiatry
Molly Selba	mollyselba@ufl.edu	Anthropology
Matt Sarkisian	msarkisian@ufl.edu	Neuroscience

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Course Description and Objectives:

The overarching objective of this course is to provide students with an appreciation of the fundamental principles that govern how the nervous system is organized to support perception, movement, learning, and remembering. Students will learn about the functional organization of the nervous system through a combination of lectures, laboratories with human brain specimens, and topical presentations on structural and functional neuroimaging approaches. As normal function is often elucidated by observing the consequences of anomalous events, the course integrates classes on nervous system dysfunction and disease, which are designed to introduce students to some of the major research areas in the field of neuroscience. Since this course is intended to provide a rigorous introduction to the functional organization of the central nervous system, prior neuroscience coursework is not required. Nevertheless, basic knowledge of cell biology and biochemical processes is expected.

By the end of each semester, students will be able to:

- Describe the basic electrophysiological and chemical properties of neurons and the guiding principles of central nervous system organization that enable sensory and motor function and higher order cognitive processes
- Identify major cell types of the nervous system and know their function
- Identify the major white and gray matter structures in the human brain, as well as major components of the cerebral vasculature and ventricular systems
- Identify the structures and laterality of somatosensory and motor pathways and describe the behavioral manifestations resulting from discrete damage or insult to these pathways
- Describe the neural circuitry underlying visual, auditory, and chemosensory perception and use this information to predict behavioral manifestations that emerge from lesions or diseases that damage these sensory systems.
- Describe basic principles of neural organization that support learning, memory, and motivation, and apply that knowledge to predict which brain regions and circuits underlie cognitive disorders and psychiatric diseases
- Explain how aging and genetics serve as risk factors for nervous system disease
- Describe the features of commonly used animal models that are used for preclinical study of nervous system disorders and diseases
- Describe the neuroimaging techniques that are used for evaluation of normal and abnormal nervous system function

University of Florida Honor Code:

University of Florida students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code”. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (http://www.dso.ufl.edu/sccr/process/student-conduct-honor- code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the course directors.

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Accommodations:
The University of Florida is committed to providing academic accommodations for students with disabilities. Students requesting accommodations must first register with the Disability Resource Center (DRC) (352-392-856 http://www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students should present their accommodation letter to the College of Medicine's ADA Representative, Mr. Jim Gorske (jgorske@ufl.edu), who will distribute the accommodation letter to appropriate course and/or clerkship directors, as needed, as well as the testing center. The University encourages students to register with the DRC as soon as they begin their studies at UF, or upon the verification of a disability.

Class Attendance. Make-up Exams, Other Work:
Attendance is required for each class meeting and laboratory session. If you have an excusable absence, please email course directors as far ahead of time as possible. In the event of illness or unforeseeable circumstance, email course directors as soon as you know you will be unable to attend. Requirements for class attendance, make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at: https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

University Counseling and Mental Health Services:
Counseling services can be contacted at 392-1575 or: https://counseling.ufl.edu/cwc/Default.aspx

Course Evaluations:
Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

Grading:
This course will have 6 examinations (2 lab exams, 4 lecture exams). Each exam will count equally toward the final grade. Information on current UF grading policies for assigning grade points may be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Average	Grade
93-100	A
90-92	A-
87-89	B+
83-86	B
80-82	B-
77-79	C+

Average	Grade
73-76	C
70-72	C-
67-69	D+
63-66	D
60-62	D-
<60	E

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Tues., Aug. 20 **9:00-10:00am** **L1-101**	Introduction to Course and Study of Neuroscience	Ch 1 "The Brain and Behavior", Ch 2 "Nerve Cells, Neural Circuitry and Behavior", Ch 15 "The Organization of the CNS"	Streit
Wed., Aug. 21 **9:00-10:00am** **L1-101**	Introduction to Neurohistology	Ch 3 "Cells of the Nervous System"	Streit
Fri., Aug. 23 **9:00-11:00am** **CG-67**	LAB #1	Haines Ch 2 “External Morphology of the CNS”	Mandel
Mon., Aug. 26 **9:00-11:00am** **CG-67**	LAB #2		Mandel
Tues. Aug. 27 **9:00-11:00am** **CG-67**	LAB study day Practice Exam		
Wed., Aug. 28 **9:00-11:00am** **CG-67**	LAB study day Practice Exam		
Fri., Aug. 30 **9:00-11:00am** **CG-67**	LAB #3		Mandel
Mon., Sept. 2	**HOLIDAY**		
Tues., Sept. 3 **9:00-11:00am** **CG-67**	LAB study day Practice Exam		
Wed., Sept. 4 **9:00-11:00am** **CG-67**	LAB study day Practice Exam		
Fri., Sept. 6 **9:00-11:00am** **CG-67**	**LAB EXAM #I**		

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Mon., Sept. 9 **9:00-10:00am** **L1-101**	Development of Nervous System	Ch 52 "Patterning of the Nervous system", Ch 54 "Growth and Guidance of Axon"	Sarkisian
Tues., Sept.10 **9:00-10:00am** **L1-101**	Blood Brain Barrier, Choroid Plexus and Cerebral Spinal Fluid	Appendix D "Blood Brain Barrier, Choroid Plexus & Cerebral Spinal Fluid"	Streit
Wed., Sept. 11 **9:00-10:00am** **L1-101**	Ion Channels	Ch 5 "Ion channels"	Papke
Fri. Sept.13 **9:00-11:00am** **L1-101**	Neurophysiology 1 Neurophysiology 2	Ch 7 "Propagating Signaling: The Action Potential", Ch 8 "Synaptic Transmission"	Burke
Mon., Sept. 16 **9:00-10:00am** **L1-101**	CNS Vasculature	Appendix C "Circulation of the Brain"	Mandel
Tues.,Sept. 17 **9:00-10:00am** **L1-101**	Neurotransmitters	Ch13 "Neurotransmitters"	Bizon
Wed., Sept. 18 **9:00-10:45am** **L1-101**	LAB #4 – Cranial Nerves	Haines Ch 3 "Cranial Nerves"	Mandel
Fri., Sept. 20 **9:00-11:00am** **L1-101**	**LECTURE EXAM #1**		
Mon. Sept. 23 **9:00-10:00am** **L1-101**	Cortical Organization #1: Cognitive Control of Motor Movements	Ch 18 "Organization of Cognition", Ch 19 "Cognitive Functions of the Premotor Systems"	Burke

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Tues.,Sept. 24 9:00-11:00am L1-101	LAB #5 – Sensory Tracts	Haines Ch 6 “Internal Morphology of the Spinal Cord and Brain Stem in Stained Sections”	Mandel
Wed., Sept. 25 9:00-10:00am L1-101	Somatosensory Systems #1: Touch & Proprioception	Ch 21 "Sensory Coding", Ch 22 "The Somatosensory System: Receptor and Central Pathways"	Streit
Fri., Sept. 27 9:00-10:00am L1-101	Somatosensory Systems #2: Pain	Ch 23 "Touch;" Ch 24 "Pain"	Streit
Mon., Sept. 30 9:00-10:00am L1-101	Auditory System	Ch 31 "The Auditory Central Nervous System"	Antonelli
Tues., Oct. 1 9:00-10:00am L1-101	Cerebellum	Ch 41 "Posture", Ch 42 "Cerebellum"	Streit
Wed., Oct. 2 9:00-10:00am L1-101	Basal Ganglia	Ch 43 "Basal Ganglia	M. Lewis
Fri., Oct. 4	**HOMECOMING**	**NO CLASS**	
Mon, Oct. 7 9:00-10:00am L1-101	Cranial Nerves	Haines Ch 3 “Cranial Nerves”	A. Hernandez
Tues., Oct. 8 9:00-11:00am L1-101	LAB #6 - Motor Tracts	Haines Ch 8 “Synopsis of Functional Components, Tracts, Pathways and Systems”	Mandel
Wed., Oct. 9 9:00-10:00am L1-101	Demyelinating Disorders		Gyang

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Fri., Oct. 11 **9:00-11:00am** **L1-101**	Visual System #1 and #2	Ch 26-28 "Retina and Visual Processing"	Semple-Rowland
Mon., Oct. 14 **9:00-11:00am** **L1-101**	**LECTURE EXAM #2**		
Tues., Oct. 15 **9:00-10:00am** **L1-101**	Neuroimaging of Movement Disorders		McFarland
10:00-11:00am **L1-101**	Review for Lab Exam		Mandel
Wed., Oct. 16 **8:30-10:45am** **L1-101**	**LAB EXAM #2**		
Fri., Oct. 18	**Society for Neuroscience Meeting**	**Oct. 19 – Oct. 23** **NO CLASSES**	
Fri., Oct. 25 **9:00-10:00am** **L1-101**	Psychiatric Disorders	Ch 48 "Emotions and Feelings"	M. Lewis
Mon., Oct. 28 **9:00-10:00am** **L1-101**	Cortical Organization #2: Perception	Ch16 "Function Organization of Perception & Movement", Ch17 "From Nerve Cells to Cognition"	Burke
Tues., Oct. 29 **9:00-10:00am** **L1-101**	Neuroimaging of Cognition	Ch 20 “Functional Imaging of Cognition”	Febo
10:00-11:00am **L1-101**	Eye Movements		Mandel
Wed. Oct. 30 **9:00-10:00am** **L1-101**	Chemical Senses	Ch 32 “Smell and Taste: The Chemical Senses”	McIntyre

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Fri., Nov. 1 **9:00-11:00am** **L1-101**	**NAME THE LESION #1**		Mandel
Mon., Nov. 4 **9:00-10:00am** **L1-101**	Animal Models of Neurodegenerative Disease		J Lewis
Tues., Nov. 5 **9:00-10:00am** **L1-101**	Genetics as a Risk Factor for Nervous System Dysfunction	Ch. 3 "Genes and Behavior", Ch. 44 "Genetic Mechanisms of Degenerative Diseases"	J. Lewis
Wed., Nov. 6 **9:00-10:00am** **L1-101**	Nerve Injury and Repair	Ch 57 "Repairing the Damaged Brain"	Reier
Fri., Nov. 8 **9:00-11:00am** **L1-101**	**LECTURE EXAM #3**		
Mon., Nov. 11	**HOLIDAY**		
Tues., Nov. 12 **9:00-10:00am** **L1-101**	Neurodegenerative Disorders #1: Alzheimer's, Parkinson's Huntington's, ALS		Abisambra/Giasson
Wed., Nov. 13 **9:00-10:00am** **L1-101**	Neurodegenerative Disorders #2: Alzheimer's, Parkinson's, Huntington's, ALS		Abisambra/Giasson
Fri., Nov. 15 **9:00-11:00am** **L1-101**	**NAME THE LESION #2**		Mandel
Mon., Nov. 18 **9:00-10:00am** **L1-101**	Stroke		Candelario-Jalil

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Tues., Nov. 19 **9:00-10:00am** **L1-101**	Aging as a Risk Factor for Neurological Dysfunction	Ch 59 "The Aging Brain"	C. Hernandez
Wed., Nov. 20 **9:00-10:00am** **L1-101**	Autonomic Nervous System and Hypothalamus	Ch 47 "The Autonomic Motor System and the Hypothalamus"	Johnson
Fri., Nov. 22 **9:00-11:00am** **L1-101**	**NTL TAKE HOME ASSIGNMENT**		
Mon., Nov. 25 **9:00-11:00am** **L1-101**	LAB #7: Comparative Neuroanatomy		Selba/Mandel
Tues., Nov. 26 **9:00-10:00am** **L1-101**	Neurobiology of Addiction		Setlow
Nov. 27-29	**THANKSGIVING HOLIDAYS**		
Mon., Dec., 2 **9:00-10:00am** **L1-101**	Cortical Organization #3: Learning and Memory	Ch 65 "Learning and Memory"	Burke
Tues., Dec. 3 **9:00-11:00am** **TBA**	LAB #8: Neuropathology		Streit/Prokop
Wed., Dec. 4 **9:00-10:00am** **L1-101**	Review		
Mon., Dec. 9 **9:00-11:00am** **L1-101**	**LECTURE EXAM #4**		