

UNIVERSITY OF FLORIDA
COLLEGE OF MEDICINE SYLLABUS
NEUROSCIENCE
GMS 6705 Functional Human Neuroanatomy Lecture (4 credits)
GMS 7795, Laboratory Section (1 credit)

Semester: Fall 2020

Delivery Format: Online and On-Campus

Mon, Tues, Wed (9:00 am – 10:00 am), Fri (9:00 am – 11:00 am)

Instructor Names: Drs. Streit, Mandel, Heaton and Burke

Room Number: Zoom link:

<https://ufl.zoom.us/j/94953269840?pwd=c0xXTStTRG5nU3ZOc1ZXMTgwbWR4QT09>

Email Addresses: (Streit) pschorr@ufl.edu; (Mandel) rmandel@ufl.edu; (Heaton)

heaton@ufl.edu; (Burke) burkes@ufl.edu

Office Hours: Due to current social distancing requirements, on-campus office will not be scheduled. Dr. Burke will be available by Zoom or Google Hangouts on Tues/Wed from 10am to 11am. Additional online meetings can be scheduled with Dr. Burke or the other course instructors as requested.

Graduate Assistant: NA

Canvas site: <https://ufl.instructure.com/courses/404209>

Preferred Course Communications: Canvas or email

Prerequisites: Must be a graduate student in Neuroscience or related discipline (e.g., Psychology, Clinical Health Psychology, Biomedical Engineering, Pharmacodynamics)

Purpose and Outcome: Neuroanatomy is the science of how the nervous system is built and how it functions. It is the basis for understanding nearly all aspects of modern medicine and should be a cornerstone for all discovery science and clinical research in the neurosciences. The purpose of this course is to provide graduate students with foundational knowledge of the basic anatomy, organization, and cells that make up the central nervous system.

Course Overview: Neuroanatomy is a complex but rewarding field of study. The earliest documented interest in this subject appears in an Egyptian script written in the 17th century BCE that was likely based on observations made a thousand years earlier. During the 3rd century BCE, several Greek scientists, philosophers, and physicians made significant contributions to our understanding of brain structure through dissection, a practice that was outlawed for several hundred years until the Renaissance period. The driving force behind studies of the human brain continues to be our desire to explain changes in human behavior and cognition resulting from injury and disease.

In this course, you will learn the structure and function of all major systems in the central nervous system (brain and spinal cord). Our studies of the anatomy and function of the brain will

be complemented by clinical cases and observations in humans. At the end of this course, you will have both a working knowledge of human neuroanatomy, and you will also be able to use this knowledge to explain how disruption of brain structure leads to changes in human behavior and cognition.

Relation to Program Outcomes:

After successful completion of this course, you will have a knowledge base of brain structure and function that will facilitate your graduate research and overall neuroscience training. It is also a goal that successful completion of this course will position students to serve as teaching assistants and/or instructors for a neuroanatomy course in the future.

Course Objectives and/or Goals:

Specific learning objectives will be provided at the start of each lecture and lab introduction. Broadly, upon successful completion of this course students will be able to:

- 1) Identify and name all structures provided on the anatomy “hit list.”
- 2) Describe the anatomy and function of all primary sensory and motor systems.
- 3) Describe the basic organization of higher-order cortical function.
- 4) Be able to predict precise lesion locations in the nervous when presented with detailed functional deficits (neurological symptoms).
- 5) Understand how disruption of neural systems translates to changes in human behavior and cognition.

Instructional Methods:

Because both the lecture and the laboratory are being provided in an online format, it is important that students understand how to use the various technologies used in this course, the general structure of the course, the course deadlines, and when and how to obtain help. Some lectures will be given in Zoom so that students can ask questions (which is **STRONGLY** encouraged). Others will be given using Voice Thread (available in Canvas) or uploaded to Canvas. For the latter, time will be made available to ask the instructor follow-up questions. We ask that students please view instructors as a resource that want to share their love of neuroanatomy with you and help you be a successful researcher in the neurosciences.

It is the instructors' expectation that students taking this course will work on mastering the material presented throughout each week. It is not possible to do well in this course if the time you spend on the course is limited to a few hours on weekends. All exams in this course will utilize LockDown browser technology so it is important that you become familiar with this technology. You will have a chance to take "practice" quizzes using this technology before taking the first course exams.

Description of Course Content:

Below is a detailed outline of the course content. This course includes a lecture (4 credits) and a laboratory (1 credit) section for 5 hours of instruction each week that run concurrently. The lectures and the lab content are designed to complement each other.

Topical Outline/Course Schedule

Week	Days/Date(s)	Topic(s)	Instructor/Readings
1	MON Aug 31	Course Introduction and Cells of the Nervous System	Streit (lecture), Mandel, Burke and Heaton for Introductions /Ch 1,2,4 in <i>Kandel</i> , <i>Nadeau Ch-3 cycles 1-3</i>
	TUES Sept 1	Basic Development of the CNS	Sarkisian/Ch 52, 53 in <i>Kandel</i>
	WED Sept 2	Blood Brain Barrier, Choroid Plexus and CSF	Streit/ <i>Appendix D in Kandel, Nadeau Ch1 cycle 3, Ch-3 cycle 3-4</i>
	FRI Sept 4 (LAB 1)	Intro to Neuroanatomy: Directional Terms/Basic Terminology and Gross Anatomy, External Features of Brainstem, Forebrain, and Ventricles, (PRACTICE PRACTICAL OPENS ONLINE)	Mandel/ <i>Haines Ch 2, Nadeau Ch 1 cycles 1-2 4-10</i>
	FRI Sept 4 1:00-2:30 pm	OPTIONAL LAB IN CG-67 TO ACCESS BRAIN SAMPLES	Burke and Mandel
2	MON Sept 7	LABOR DAY – NO CLASS	
	TUES Sept 8	Basic Neurophysiology, Membrane Potential and Action Potential	Burke/Ch 6,7 and <i>Appendix A in Kandel, Nadeau Ch 5</i>
	WED Sept 9	Synaptic Transmission	Burke/Ch 8, 9, 10 in <i>Kandel</i>
	FRI Sept 11 (LAB 2)	Meninges, White Matter, Subcortical Gray Matter, Diencephalon	Mandel/ <i>Haines Ch 4, Nadeau Ch 1 cycles 6-9</i>
	FRI Sept 11 1:00-2:30 pm	OPTIONAL LAB IN CG-67 TO ACCESS BRAIN SAMPLES	Burke and Mandel
3	MON Sept 14 (LAB 3)	The Spinal Cord, Spinothalamic Tract, Medial Lemniscus System, and Sectional Neuroanatomy	Mandel/ <i>Haines Ch 5, 6</i>
	TUES Sept 15	The Spinal Cord	Mandel/Ch 16, 35 in <i>Kandel, Nadeau Ch2 cycles 11-12</i>
	WED Sept 16	Overview of Somatosensation	Mandel/Ch 22 in <i>Kandel, Nadeau Ch 7 cycles 2,3,5</i>
	THURS Sept 17 1:00-2:30 pm	OPTIONAL LAB IN CG-67 TO ACCESS BRAIN SAMPLES	Burke and Mandel

	FRI Sept 18	Touch and Proprioception Receptors and Signal Transduction	Streit/Ch 21, 23 in Kandel, Nadeau Ch 7 cycle 1
4	MON Sept 21	Pain	Streit/Ch 24 in Kandel, Nadeau Ch 7 cycles 6-7
	TUES Sept 22 (LAB 4)	Motor Pathways	Mandel/Ch 37 in Kandel, Nadeau Ch 6
	WED Sept 23	Motor Pathways 2 and Functional Correlates of Spinal Cord Lesions	Mandel
	FRI Sept 25 (EXAM)	LECTURE EXAM #1	
5	MON Sept 28 (LAB 5)	Cerebellum and Basal Ganglia	Mandel/Haines pp 241-261
	TUES Sept 29	Basal Ganglia	Mandel/Ch 43 in Kandel
	WED Sept 30	Cerebellum	Mandel/Ch 42 in Kandel, Nadeau Ch 6 cycle 10
	Oct 2	UF HOMECOMING HOLIDAY	
6	MON Oct 5	Cognitive control of movement	Burke/Ch 19, 37, 38 in Kandel
	TUES Oct 6	Functional Correlates of Brain Motor System Lesions	Mandel
	WED Oct 7	Language	Mandel/Ch 60 in Kandel, Nadeau Ch 12 cycle 3
	FRI Oct 9 (EXAM)	LAB PRACTICAL EXAM #1	Streit, Heaton, Mandel and Burke
7	MON Oct 12 (LAB 6)	Cranial Nerves External/Internal Anatomy	Burke/Haines Ch 3, Nadeau Ch 8
	TUES Oct 13	Cranial Nerves I-VI	Burke/Ch 45 in Kandel
	WED Oct 14	Cranial Nerves VII-XII	Burke
	FRI Oct 16	Chemical Senses: Smell and Taste	McIntrye/Ch 32 in Kandel
8	MON Oct 19	Horizontal Eye Movements and Pupillary Reflexes	Mandel/Ch 39 in Kandel, Nadeau Ch 8 cycles 3-4, Ch 9 cycle 5
	TUES Oct 20	Functional Correlates of Cranial Nerve Damage	Mandel/Appendix B in Kandel Burke/Haines pp 154-173, 262-270

	WED Oct 21 (LAB 7)	The Thalamus, Visual Anatomy, Auditory Anatomy	Burke
	FRI Oct 23	The Thalamus	
9	MON Oct 26	The Auditory and Vestibular Systems	Antonelli/ <i>Ch 30, 31, 40 in Kandel, Nadeau Ch 10</i>
	TUES Oct 27	The Visual System #1	Semple-Rowland/ <i>Ch 26, 27, 28 in Kandel</i>
	WED Oct 28	The Visual System #2	Semple-Rowland/ <i>Nadeau Ch 9</i>
	FRI Oct 30	Name the Lesion 1	Mandel (NTL)
10	MON Nov 2 (EXAM)	LECTURE EXAM #2	
	TUES Nov 3 (LAB 8)	Arteries and Veins of the CNS	Mandel/ <i>Nadeau Ch 2</i>
	WED Nov 4	Cerebrovasculature	Mandel/ <i>Appendix C in Kandel</i>
	FRI Nov 6	Stroke	Candelario
11	MON Nov 9	Cortical Organization of Higher-Level Perception	Burke/ <i>Ch 17, 18, 28, 29 in Kandel</i>
	TUES Nov 10	Hypothalamus and the Autonomic Nervous System	Johnson/ <i>CH 47 in Kandel, Nadeau Ch 11</i>
	WED Nov 11	VETERAN'S DAY – NO CLASS	
	FRI Nov 13 (EXAM)	LAB EXAM #2	
12	MON Nov 16 (LAB 9)	Anatomy of the Limbic/Memory System, and Hypothalamus	Burke/ <i>Haines pp 280-293, Nadeau Ch 12 cycle 4</i>
	TUES Nov 17	Learning and Memory	Burke/ <i>Ch 65, 67 in Kandel, Nadeau Ch 12 cycle 5</i>
	WED Nov 18	Reward Systems and the Neurobiology of Addiction	Setlow/ <i>CH 49 in Kandel</i>
	FRI Nov 20	PAPER TOPIC DUE. Neuropathology and Neurodegeneration	Streit/ <i>Ch 44 in Kandel</i>
13	Nov 23-Nov 27	THANKSGIVING WEEK – NO CLASS	
14	MON Nov 30	Name the Lesion 2	Mandel
	TUES Dec 1	Name the Lesion 3	Mandel

	WED Dec 2	Name the Lesion 4 and REVIEW	Mandel (name the lesion), Burke, Heaton, Streit (review)
	FRI Dec 4 (EXAM)	NAME THE LESION EXAM	
15	MON Dec 7	PAPER DUE , Neuroimaging of Cognition	Febo/Ch 20 in Kandel
	TUES Dec 8	Identifying Structures in MRI	Burke/Haines Ch 7
	WED Dec 9	Emotion	Burke/CH 48 in Kandel
	FRI Dec 11 (EXAM)	LECTURE EXAM #3	

Class Guest Lecturers:

<u>Name</u>	<u>Email</u>	<u>Department</u>
Patrick Antonelli	pa@ufl.edu	Otolaryngology
Eduardo Candelario-Jalil	ecandelario@ufl.edu	Neuroscience
Marcelo Febo	febo@ufl.edu	Psychiatry
Rick Johnson	rdjohnso@ufl.edu	Veterinary Medicine
Jeremy McIntyre	jmcin@ufl.edu	Neuroscience
Sue Semple-Rowland	rowland@ufl.edu	Neuroscience
Barry Setlow	setlow@ufl.edu	Psychiatry
Matt Sarkisian	msarkisian@ufl.edu	Neuroscience

Course Materials and Technology:

LECTURE (required): Hudspeth, A. J., Jessell, T. M., Kandel, E. R., Schwartz, J. H., & Siegelbaum, S. A. (Eds.). (2013). *Principles of Neural Science*. McGraw-Hill, Health Professions Division.
(Available on Kindle)

LABORATORY (required): Haines, D. E. 10th Edition (9th is also acceptable) (2019). *Neuroanatomy: an Atlas of Structures, Sections, and Systems* (Vol. 153, No. 2004). Lippincott Williams & Wilkins.

SUPPLEMENTAL READING (made available through dropbox):

Sylvius 4 Online: *An Interactive Atlas and Visual Glossary of Human Neuroanatomy*. Authors: S. Mark Williams and Leonard E. White. Sinauer Associates, Inc. ISBN 978-0-87893-969-5
<https://global.oup.com/academic/product/sylvius-4-online-9780878939695?cc=us&lang=en&>
This Atlas is currently free to students through this site:
<https://www.learnmedicalneuroscience.nl/covid-19-free-access-to-sylvius/>

We will also be providing you with *Medical Neuroscience* as a downloadable PDF through the CANVAS site. Authors: Stephen E. Nadeau, Tanya S. Ferguson, Edward Valentstein, Charles J. Vierk, Jeffrey C. Petruska, Wolfgang J. Streit and Louis A. Ritz, Saunders 2004, ISBN 0-7216-0249-5 (out of print).

Atlas of the Human Brain in Section. By Melville Roberts and Joseph Hanaway, Virginia. Will be made available as a pdf through the Canvas site.

Neuroanatomy Through Clinical Cases, 2nd Edition. Author: Hal Blumenfeld. Sinauer Associates, Inc. 2010. ISBN 978-0-87893-058-6 We recommend you buy the hardcopy from a friend or a vendor like Amazon because we do not like the eBook interface. However, if you are interested in the eBook the link is: <https://redshelf.com/book/673333/neuroanatomy-through-clinical-cases-673333-9781605353975-hal-blumenfeld>

TECHNOLOGY:

CANVAS Site: <https://ufl.instructure.com/courses/379354>

Laptop or desktop computer equipped with microphone and video camera. A microphone and video camera will be used for video conferencing with instructors.

- There is a Canvas app that can be used to access the course using your portable devices. The app is not as good as laptop or desktop computers.
- There are VoiceThread apps that are available for iOS and Android devices that can be used to view and post comments on VTs. While these portable devices are excellent for watching lectures and asking questions, we strongly recommend that you use laptop or desktop computers when working on this course.
- **Installation of LockDown Browser** – Installation instructions will be made available prior to practice practical exams.
- A high-speed internet connection such as DSL or cable. **When using LockDown Browser your computer should be directly connected to the internet rather than accessing using WiFi.** A broadband internet connection is strongly recommended. Slower connections should still be able to access e-Learning, but will take longer to load and will be unreliable when taking tests.
- It is highly recommended that you work with Canvas and VT using either the **Firefox or Chrome Browsers.**
- For specific questions about browser compatibilities and general questions about e-learning at UF please go to <https://wiki.helpdesk.ufl.edu/FAQs/E-Learning>.

- **All VoiceThread lectures are accessed directly through the Canvas course website. VoiceThread is an asynchronous interaction platform that allows you to post questions about the material directly within the lectures using the text, audio, or video + audio commenting feature of VoiceThread.**

For technical support for this class, please contact the UF Help Desk at:

- Learning-support@ufl.edu
- (352) 392-HELP - select option 2
- [UF eLearning](#)

Academic Requirements and Grading:

Assignments:

For the lecture, there will be 3 exams based on the lecture content, and 1 name the lesion exam. For the laboratory section there will be 2 exams that involve identifying structures in gross anatomy or sections. We also require a paper written in the format of a *Journal of Neuroscience* Journal Club paper: <https://www.jneurosci.org/content/jneurosci-journal-club>. The paper grade can be used to replace your lowest exam grade in either the lecture or lab section of the course.

Student Paper: Each student will write one “Journal Club” on a paper of their choice that related to the course content. This will follow the *Journal of Neuroscience* format for Journal Club Papers (<https://www.jneurosci.org/content/jneurosci-journal-club>) and should have three components: a short overview of the background of the reviewed paper, a critical data-based review of the key findings, and a brief summary of the significance of the paper. The Journal Club should focus on the most important results (it is not necessary to discuss each figure), and a successful paper will offer a critical evaluation the results in the context of other work. *Please get approval of our paper topic from an instructor by Nov 20, 2020. This is required in order to get credit for the paper.* The length should be between 1200 and 1500 words. Papers should be submitted through the Canvas site by **5:00 pm on Dec 7, 2020.**

Grading:

LECTURE

Requirement	Due date	Points or % of final grade (% must sum to 100%)
Lecture Exam 1	9/25	25%
Lecture Exam 2	11/2	25%
Name the Lesion Exam	12/4	25%

Paper	12/7	Grade will be used to replace the lowest exam in the lecture or laboratory section
Lecture Exam 3	12/11	25%

LABORATORY

Requirement	Due date	Points or % of final grade (% must sum to 100%)
Practical Exam 1	10/9	50%
Practical Exam 2	11/13	50%

Grades:

Percentage Earned	Letter Grade
93-100	A
90-92	A-
87-89	B+
83-86	B
80-82	B-
77-79	C+
73-76	C
70-72	C-
67-69	D+
63-66	D
60-62	D-
Below 60	E

Please be aware that a C- is not an acceptable grade for graduate students. The GPA for graduate students must be 3.0 based on 5000 level courses and above to graduate. A grade of C counts toward a graduate degree only if based on credits in courses numbered 5000 or higher that have been earned with a B+ or higher.

More information on UF grading policy may be found at:

<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades>

Exam Policy:

Exams will be administered online at the date and time specified on the syllabus. Exam grades will be adjusted by setting the highest score to 100%. Questions that all students get incorrect will be dropped.

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 discuss this with the course directors to identify an alternative exam date.

Policy Related to Make-up Exams or Other Work

Please note: Any requests for make-ups due to technical issues MUST be accompanied by the UF Computing help desk (<http://helpdesk.ufl.edu/>) correspondence. You MUST e-mail the instructors within 24 hours of the technical difficulty if you wish to request a make-up.

Policy Related to Required Class Attendance:

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Excused absences must be consistent with university policies in the Graduate Catalog (<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance>). Additional information can be found here:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Student Expectations, Roles, and Opportunities for Input:

Expectations Regarding Course Behavior:

We expect all students to be in attendance for every lecture and lab, as well as to participate in class discussions.

Communication Guidelines:

Please see the NETIQUETTE GUIDE FOR ONLINE COURSES: <http://teach.ufl.edu/wp-content/uploads/2012/08/NetiquetteGuideforOnlineCourses.pdf>

Academic Integrity:

Students are expected to act in accordance with the University of Florida policy on academic integrity. As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge:

“We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.”

You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit 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.”

It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For additional information regarding Academic Integrity, please see Student Conduct and Honor Code or the Graduate Student Website for additional details:

<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>

<http://gradschool.ufl.edu/students/introduction.html>

Please remember cheating, lying, misrepresentation, or plagiarism in any form is unacceptable and inexcusable behavior.

Online Faculty Course Evaluation Process:

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

Support Services:

Accommodations for Students with Disabilities:

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester. The College is committed to providing reasonable accommodations to assist students in their coursework.

Counseling and Student Health:

Students sometimes experience stress from academic expectations and/or personal and interpersonal issues that may interfere with their academic performance. If you find yourself facing issues that have the potential to or are already negatively affecting your coursework, you are encouraged to talk with an instructor and/or seek help through University resources available to you.

- The Counseling and Wellness Center 352-392-1575 offers a variety of support services such as psychological assessment and intervention and assistance for math and test anxiety. Visit their web site for more information: <http://www.counseling.ufl.edu>. On line and in person assistance is available.
- You Matter We Care website: <http://www.umatter.ufl.edu/>. If you are feeling overwhelmed or stressed, you can reach out for help through the You Matter We Care website, which is staffed by Dean of Students and Counseling Center personnel.
- The Student Health Care Center at UF Health is a satellite clinic of the main Student Health Care Center located on Fletcher Drive on campus. Student Health at UF Health offers a variety of clinical services. The clinic is located on the second floor of the Dental Tower in the Health Science Center. For more information, contact the clinic at 392-0627 or check out the web site at: <https://shcc.ufl.edu/>
- UF Health Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32698, ufhealth.org/emergency-room-trauma-center.
- University Police Department: Visit police.ufl.edu/ or call 352-392-1111 (or 9-1-1 for emergencies).
- Crisis intervention is always available 24/7 from:

Alachua County Crisis Center:

(352) 264-6789

<http://www.alachuacounty.us/DEPTS/CSS/CRISISCENTER/Pages/CrisisCenter.aspx>

Do not wait until you reach a crisis to come in and talk with us. We have helped many students through stressful situations impacting their academic performance. You are not alone so do not be afraid to ask for assistance.

Academic Resources

E-learning technical support: Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at helpdesk@ufl.edu.

Career Connections Center: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services career.ufl.edu/.

Library Support: cms.uflib.ufl.edu/ ask various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center: Broward Hall 352-392-2010 or to make an appointment 352 392-6420. General study skills and tutoring. teachingcenter.ufl.edu/

Writing Studio: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers. writing.ufl.edu/writing-studio/

Student Complaints On-Campus: sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/

On-Line Students Complaints: distance.ufl.edu/student-complaint-process