UTHealth™
The University of Texas
Health Science Center at Houston
Medical School

Medical Neuroscience

Information Guide
Spring 2013

V. 13.1.0

Offered and Coordinated by the Department of Neurobiology and Anatomy
The University of Texas Health Science Center at Houston

To access Adobe Acrobat PDF versions of the course syllabus as well as other course information, visit the official course website at:

http://nba.uth.tmc.edu/courses/neuroscience/

Table of Contents

Neuroscience Course Faculty and Staff

Faculty	Office	Telephone	Email
Department of Neurobiology and Anatomy (UTHealth)			
John Byrne, PhD (Department Chairman)	MSB 7.046	713-500-5601	john.h.byrne@uth.tmc.edu
Nachum Dafny, PhD (Course Director)	MSB 7.208B	713-500-5616	nachum.dafny@uth.tmc.edu
Co-Directors of Clinical Correlation			
Pedro Mancias, MD	MSB 3.153	713-500-7165	pedro.mancias@uth.tmc.edu
Erin Furr-Stimming, MD	MSB 7.112	713-500-7033	erin.e.furr@uth.tmc.edu
Faculty	**Office**	**Telephone**	**Email**
Michael Beierlein, PhD (Laboratory Coordinator)	MSE R.442	713-500-5619	michael.beierlein@uth.tmc.edu
Andrew Bean, PhD	MSB 7.208	713-500-5614	a.bean@uth.tmc.edu
Michael S. Beauchamp, PhD	MSB G.500E	713-500-5978	michael.s.beauchamp@uth.tmc.edu
Terry Crow, PhD	MSB 7.208A	713-500-5613	terry.crow@uth.tmc.edu
Pramod Dash, PhD	MSB 7.160	713-500-5625	p.dash@uth.tmc.edu
Valentin Dragoi, PhD	MSB 7.166	713-500-5710	v.dragoi@uth.tmc.edu
Neal Waxham, PhD	MSB 7.254	713-500-5621	m.n.waxham@uth.tmc.edu
Jack Waymire, PhD	MSB 7.252	713-500-5620	jack.c.waymire@uth.tmc.edu
Anthony Wright, PhD	MSB 7.174	713-500-5627	anthony.a.wright@uth.tmc.edu
Department of Neurology (UTHealth)			
Andrew Barreto, MD	MSB 7.210	713-500-7002	andrew.d.barreto@uth.tmc.edu
Jeremy Slater, MD	MSB 7.100	713-500-7117	jeremy.d.slater@uth.tmc.edu
Raymond Martin, M.D.	UPB 1014	832-325-7079	raymond.a.martin@uth.tmc.edu
Department of Neurosurgery (UTHealth)			
Arthur Day, MD	MHMP 2800	713-704-7377	arthur.l.day@uth.tmc.edu
Mark Dannenbaum, M.D.	HPB 2800	713-704-7378	Mark.Dannenbaum@uth.tmc.edu
Department of Neurosurgery (The Methodist Hospital)			
David S. Baskin, MD	6560 Fannin, Ste. 944	713-441-3800	dbaskin@tmhs.org
Department of Anesthesiology (UTHealth)			
Katherine Normand, MD	MSB 5.020	713-500-6222	katherine.c.normand@uth.tmc.edu

~Continued~

Faculty	Office	Telephone	Email
Department of Symptom Research in the Division of Anesthesiology and Critical Care (MD Anderson)			
Patrick Dougherty, PhD	P 11.3032	713-745-0438	pdougherty@mdanderson.org
Department of Otorhinolaryngology, Head & Neck Surgery (UTHealth)			
Ron J. Karni, MD	MSB 5.036	713-500-5410	ron.j.karni@uth.tmc.edu
Soham Roy, MD	MSB 5.036	713-500-5410	soham.roy@uth.tmc.edu
Department of Internal Medicine, Geriatrics (UTHealth)			
Carmel Dyer, MD	MSB 4.200	713-566-4646	carmel.b.dyer@uth.tmc.edu
Department of Ophthalmology (UTHealth)			
Judianne Kellaway, MD	MSB 7.240	713-704-1777	judianne.kellaway@uth.tmc.edu
Department of Ophthalmology (Methodist)			
Andrew G. Lee, M.D.	Methodist	713-441-8823	aglee@tmhs.org
Private Practice			
Ron Moses, MD (ENT)	Center for ENT	713-795-5343	rmoses@centerforent.com
Tracy Jakob, MD (ENT)	Houston ENT	281-578-1910	tjakob@houstonent.com
Becky McGraw-Wall, M.D.	Houston ENT	713-796-1300	bmcgraw@houstonent.com
Etai Funk, MD (ENT)	MHHS Memorial City	713-636-2757	drfunk@funkfacialplastics.com

Staff	Office	Telephone	Email
Marijane DeTranaltes, Coordinator	MSB 7.248	713-500-5931	marijane.detranaltes@uth.tmc.edu

General Information

The Medical Neuroscience course at The University of Texas Medical School at Houston is a team-taught course that provides an interdisciplinary approach to the understanding of the nervous system. The course consists of 52 hours of lecture, 33 hours of laboratory sessions, including 11 clinical post-laboratory reviews using clinical cases, 21 hours of clinical correlation sessions including small groups, 4 midterm examinations, and one comprehensive final exam.

The ultimate objectives and goals of the Medical Neuroscience course are to provide an understanding of the structure, function and dysfunction of the nervous system and the organs it regulates. The Medical Neuroscience course presents material in cell biology, molecular biology, neurophysiology, neurochemistry, neuroanatomy, sensory and motor systems, neuroendocrinology, neuroimmunology, homeostasis and higher functions, such as temperature and feeding control, emotion, learning and memory, sleep and arousal, brain metabolism, traumatic brain injury, and aging. Also taught is higher cortical function such as language, cognition and executive processing, and behavior. This broad course is fundamental to aspects of neurology, neurosurgery, ophthalmology, otolaryngology, psychiatry and behavioral sciences, anesthesiology, pediatrics, internal medicine, family practice, surgery, and neuroradiology. The course prepares students to understand the bases of the neurological examination and conduct a neurological examination, establishes a foundation for the further clinical evaluation of normal and pathological peripheral and central functioning of the nervous and other organ systems, and provides the knowledge required to convey to patients and other professionals the information concerning medical conditions. The course occupies a unique position in the medical curriculum because it not only examines the function of the nervous system, but also addresses more fundamental questions such as the physiological basis of mind, our emotions, our relationships to others and our perceptions of the physical world in which we live. Neuroscience is perhaps one of the last frontiers in the biological sciences. Progress in this field is rapid and a solid foundation in the cellular and molecular functioning of the nervous system is necessary to help interpret new developments.

Traditionally, the material in neuroscience has been covered in separate courses comprising the basic science curriculum of medical schools. For example, neuroanatomy was often presented as separate courses. Neurophysiology was taught in general physiology courses and neurochemistry was taught in biochemistry and pharmacology courses. There has been a trend in medical school curricula to integrate these various disciplines into a single multidisciplinary Medical Neuroscience course. There are a number of reasons for doing so. To begin with, there has been a tremendous increase in the understanding of the cell and molecular biology of the nervous system. This understanding has made it possible to begin to relate problems in neurology and psychiatry to their underlying neuroanatomical structure, circuitry, neurophysiological, and molecular mechanisms. Furthermore, it has become clear that from both a pedagogic and scientific point of view, the best way to present neuroanatomical structures is in the context of the functions that they are known to subserve. The concept of an integrated approach to the teaching of the nervous system has thus evolved. Presenting cell biology, molecular biology, neurophysiology, neurochemistry, neuroanatomy, neuroendocrinology and neuroimmunology, as well as aspects of neurology, neurosurgery, neuropathology, ophthalmology, otolaryngology, psychiatry, anesthesiology, emergency medicine, physical

rehabilitation and neuroradiology in an integrated course permits each discipline to reinforce the other.

This course consists of four blocks. The first begins with an introduction to basic neurobiology with emphasis on the cellular and molecular basis of nervous system development and function. The second block of the course builds upon the student's understanding of the peripheral sensory receptors, and the sensory pathways and functions. This block also includes lectures on the spinal cord, the somatosensory system, and specific sensory systems such as audition, taste, smell, and vision, and includes several clinical cases. The third block includes the anatomy and function of the motor system, with several clinical correlation lectures and several small groups to discuss clinical cases. Finally, the fourth block of the course introduces homeostasis and higher brain functions such as the control of the autonomic nervous system, temperature regulation, feeding and obesity, neuroendocrine function and feedback, learning and memory, cognition and higher function, brain trauma and metabolism, and aging, as well as the interpretation of clinical case studies related to these topics. In conclusion, the Medical Neuroscience Course is comprised of formal lectures, clinical correlation presentations and clinical case sessions in small groups as well as a neuroanatomy laboratory period. At each lab session, there is are clinical post-laboratory reviews designed to integrate and mutually reinforce the material.

In order to perform adequately, the student must master material derived from the following five major sources. The material covered in these sources is considered required material.

Lectures

You are responsible for the material presented by the lecturers. In some cases, a lecturer may present new material not printed in the syllabus. Participation in the Turning Point exercise will be part of your lecture grade.

Neuroscience Syllabus

The lecture outlines, the material covered by the lecturer and the required and recommended reading for each lecture are provided in four volumes and will be available on the WWW throughout the course and at the Bookstore. Supplemental material is provided for cases in which the required texts do not provide an adequate coverage of the lecture topic. **Do not rely on previous years' lecture videos. Faculty members and the material offered sometimes change, and it is not always the same from year to year.**

Clinical Correlations

In coordination with the regularly scheduled lectures and laboratories, a series of special clinical correlation (CC) presentations will be given in the areas of neurology, neuroophthalmology, otolaryngology, neurosurgery, neuroendocrinology, psychiatry, anesthesiology, and neuroimaging. **Questions pertaining to these presentations will be included in the exams. Three small group clinical correlations will be scheduled. The class will be divided into 12 to 24 groups. Attendance will be taken.**

Texts

Required readings from the texts as well as additional references [available in the Learning Resource Center (LRC)] are indicated in each lecture outline included in the syllabus (Volumes I-IV).

Laboratory

The class is divided into four rooms. In each room, seven or eight students are assigned to a row, and each four to five students will be assigned to a group. At the beginning of the first lab, each group will receive a container with a preserved spinal cord, brain stem, one whole brain and one hemisected human brain. **Each group is responsible for maintaining the integrity of the specimens.**

Students should bring to each laboratory:

- laptop computer
- gloves
- dissection tools
- the *Laboratory Guide*
- *The Human Brain* (Nolte) and *Structure of the Human Brain (Atlas)* (DeArmond)
- Container with wet brain specimen

The ***Laboratory Guide*** and its contents are an integral part of the course as well as your laptop and the Neuroanatomy Lab Online program. **You need to bring these items to each laboratory.**

Students are strongly advised to review the Neuroanatomy Lab Online electronic interactive program before each laboratory, and to read each chapter prior to the scheduled laboratory. You can access Neuroanatomy Lab Online at:

https://oac22.hsc.uth.tmc.edu/courses/neuroanatomy/

Laboratories are designed for self-study and are staffed by faculty and selected upper-class medical students and graduate students. The Neuroanatomy Lab Online program exercises will count as 3% of the final laboratory grade.

All laboratories begin at 1:00 PM. Prior to each laboratory session, a brief instruction and review will be given in the lecture hall (MSB 2.006). Eleven laboratory sessions are scheduled. After the brief instruction and review, go to the laboratory and start the learning assignment listed in your laboratory manual. Two assignments you are required to complete 1. The wet material (brain, brain stem or spinal cord) and the plate from the Brain Atlas. 2. The Neuroanatomy Online. You will have 50 minutes to master each one of the above two assignments. You need to finish this exercise by 3:30 PM. At the end of each Neuroanatomy Lab exercise, you will get a grade. The grade from the Neuroanatomy Lab Online exercises will count as 3% of the final laboratory grade. At about 3:30 PM you will have a lab exercise using your laptop which will count as 3% of the final laboratory grade. At about 3:40 PM, in room MSB 2.006, a post lab review using clinical cases will be introduced to the class and followed by discussion. Students must attend all clinical case history sessions. **Questions pertaining to these presentations will be included in the practical portion of the exams.**

Please do not consume food during lectures. Faculty and fellow students are distracted by this activity. Thank you for your cooperation.

Required Textbooks, Study Aids And Reference Material

Required Textbooks And Other Aids

For Lectures and Laboratory

1. Neuroscience Syllabus
2. Laboratory Guide
3. *The Human Brain*, 6th edition, J. Nolte, Mosby.
4. S*tructure of the Human Brain*, 3rd edition, S. DeArmond, Oxford (Brain Atlas)

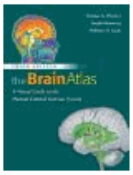
NOTE: *All the above texts are available either in the UT Bookstore or at Quick Copy.*

Computer Programs

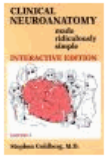
1. "*Brainiac"* - The "Brainiac" interactive program allows students to study and identify structures, follow tracts and pathways through several sections, and rehearse and/or test their knowledge of the names, locations and functions of the different brain structures.
2. "*The Animated Brain"* - The "Animated Brain" is a computerized approach to the study of the brain and behavior, demonstrating neural development, gross brain structures, the sensory and motor systems and higher order cortical functions.
3. "*Fundamentals of Human Neural Structure"* – A new, computerized approach to the study of the brain; a wonderful CD to review the labs.

NOTE: "*Brainiac*" can be accessed on the PCs in the LRC as well as the computers in the Neuroanatomy laboratories. "*The Animated Brain" and* "*Fundamentals of Human Neural Structure"* are available in the LRC. In addition, the Department of Neurobiology and Anatomy produces the *Neuroanatomy Lab interactive program*.

Reference Books Available At LRC (Optional)



The brain atlas : a visual guide to the human central nervous system Details
Call #: WL17W9162008c.1 Woolsey, Thomas A.
Published 2008
Copies in this category: 2 Show More

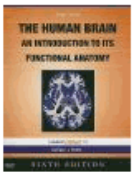


Clinical neuroanatomy, made ridiculously simple Details
Call #: WL101G618C2000c.2 Goldberg, Stephen, M.D.
Published 2000
Copies in this category: 2 Show More

Cranial nerves: anatomy and clinical comments Details
Call #: WL330W752C1988c.1 Wilson-Pauwels, Linda.
Published 1988
Copies in this category: 5 Show More

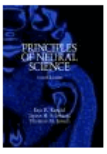
From molecules to networks : an introduction to cellular and molecular neuroscience Details
Call #: WL300B9952004c.1 edited by John H. Byrne, James L. Roberts.
Published 2004
Copies in this category: 2 Show More

Fundamentals of human neural structure Details
Call #: WL17F1232000c.1 S. Mark Williams, 2000.
Published 2000
Copies in this category: 3 Show More



The human brain : an introduction to its functional anatomy Details
Call #: WL300N7982009c.1 Nolte, John.
Published 2009
Copies in this category: 3 Show More

Neuroscience in medicine Details
Call #: WL102N5051995c.1 editor, P. Michael Conn.
Published 1995
Copies in this category: 2 Show More



Principles of neural science Details
Call #: WL102P9571991c.1 edited by Eric R. Kandel, James H. Schwartz, Thomas M. Jessell.
Published 1991
Copies in this category: 2 Show More

Structure of the human brain : a photographic atlas Details
Call #: WL17D2851989c.10 DeArmond, Stephen J.
Published 1989
Copies in this category: 4 Show More

The animated brain A computerized approach to the studey of brain and behavior Details
Call #: WL102A1231998c.1 Theodore J. Voneida, Ph.D., 1998.
Published 1998
Copies in this category: 5 Show More

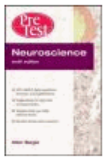
Case files. Neuroscience Details
Call #: WL18C3372009 Eugene C.Toy ... [et al.].
Published 2009
Copies in this category: 1 Show More

Deja review. Neuroscience Details
Call #: WL18T7892006 [edited by] Matthew Tremblay.
Published 2007
Copies in this category: 1 Show More

Neuroanatomy Details
Call #: WL18F5662008c.1 Fix, James D.
Published 2008
Copies in this category: 2 Show More

Neuroanatomy : a review with questions and explanations Details
Call #: WL18S671N1992c.1 Snell, Richard S.
Published 1992
Copies in this category: 2 Show More

Neuroanatomy NMS : The National Medical Series for Independent Study Details
Call #: WL18D389N1988c.1 William DeMyer, 1988.
Published 1988
Copies in this category: 2 Show More



Neuroscience : pretest self-assessment and review Details
Call #: WL18F5662007c.1 Siegel, Allan, 1939-
Published 2007
Copies in this category: 1 Show More

PreTest neuroscience : PreTest self-assessment and review Details
Call #: WL18S5712010 Siegel, Allan, 1939-
Published 2010
Copies in this category: 1 Show More

Neuroscience / : Rapid review Details
Call #: WL18W5742007 Weyhenmeyer, James A.
Published 2007
Copies in this category: 1 Show More

Teaching Slides

Most of the laboratory slides presented in the Neuroanatomy Lab Online program are available to you in unlabeled and labeled form for your review. Go to the course homepage and click on **Labeled** and **Unlabeled** Slides: **https://oac22.hsc.uth.tmc.edu/courses/neuro/neuro2013/**

Examinations And Grading Policy

Examinations

There will be four Block examination sessions and a final examination. Each exam (except the fourth Block) consists of two parts: 1) **written**, based on lectures, participation in Turning Point exercises, syllabus material and assigned readings, and 2) **practical**, based on the assigned laboratory material and post-laboratory reviews. The practical exams have multiple-choice questions relating to structure (identification) as well as function of the gross structures (wet specimens). Additionally, more specific structures, as seen in the Neuroanatomy Lab Online program, DeArmond atlas plates, in kodachrome slides, laboratory manual, MRIs, as well as material presented in the post-laboratory reviews may be included. The Block IV exam will consist of only a written component.

The written part of the final and all Block examinations will include a total of 302 questions and will constitute 52% of the final grade and additional 3% for participation in the Turning Point exercises i.e. the value of the lecture part of the courses is 55%. The practical section will include a total of 231 questions and 100 lab exercise questions and will constitute 45% of the final grade. The practical section is divided into three components: 1) the practical exams worth 39.0%; 2) the Neuroanatomy Lab Online interactive exercises, which are completed during the lab, worth 3%; and the Laboratory Exercises, which are completed at the end of each laboratory, worth 3.0% (i.e. total of 45.0%). Neuroanatomy Lab Online interactive exercise #1 and Laboratory Exercise #1 will be "practice" exercises and will not be included in the grading. (For a detailed summary of each exam, see below and the next page.) Students who miss any of the above exercises will lose the points for those lab exercises. No remediation will be available.

The ***final examination*** will be given at the end of the semester and consists of material given in all sections (i.e., a comprehensive exam). The final examination will consist of a written examination and a laboratory practical. Below is a percentage breakdown of each exam.

Examination I	**Feb 1, covering material up to and including Jan 25**	
	Written 3 questions/hour 2 cc	7.9%
	Practical	8.7%
	Two Neuroanatomy Lab Online exercises	0.6%
	Two Laboratory Exercises	0.6%
		~18%
Examination II	**March 4, covering material up to and including Feb 27**	
	Written	9.8%
	Practical	8.7%
	Three Neuroanatomy Lab Online exercises	0.9%
	Three Laboratory Exercises	0.9%
		~20%
Examination III	**Apr 12, covering material up to and including Apr 5**	
	Written	7.4%
	Practical	8.7%
	Three Neuroanatomy Lab Online exercises	0.9%
	three Laboratory Exercises	0.9%
		~18%
Examination IV	**May 10, covering material up to and including May 3**	
	Written	8.6%
	Two Neuroanatomy Lab Online exercises	0.6%
	Two Laboratory Exercises	0.6%
		~10%
Final Examination	**May 14, comprehensive final examination**	
	Written	18.2%
	Practical	13.2%
	Participation in Turning Point Exercises	03.0%
		~34%

Questions on examinations will be supplied by the faculty of the course. However, the Course Director is ultimately responsible for the examinations. Examination questions will be based on material covered in lectures, handouts, web material, reading assignments, material covered in the laboratories, post-laboratory reviews, and in the required texts. Faculty may choose to lecture on material not included in the reading and this should be viewed as additional required material. **If the lecturer does not cover material included in the required reading, it is nonetheless available for examination.**

Examination Procedures (issued by the Dean's office)

1. Students are to arrive ten minutes before the exam. Anyone entering the examination room more than 15 minutes late will be considered as absent and must contact the Office of Student Affairs. No extra time will be given for late comers.
2. All purses, backpacks or like items must be left at the front or sides of the room.
3. A student may have in his/her possession only ID badge, pencils and erasers.
4. Students may not leave during the examination except to go the restroom. When they leave, their papers must be surrendered to a proctor who will make a written note of the time. All students will be escorted.
5. Absolutely no talking or disturbing behavior will be permitted once the examination has begun.
6. No questions are permitted during the examination, although students are allowed to inquire about obvious errors as misspelled words, numbering or pagination errors.
7. No beverages or food items are permitted in the examination room during the examination.
8. A student found in violation of any of these guidelines will be subject to provisions of the Regent's Rules and Regulations pertaining to student discipline.

Examination Policy

All examinations will be turned in at the end of the examination period along with the answer sheets. Only those answers scored on the scantron will be accepted. It is the responsibility of the student to make sure all answers have been filled in before handing in the exam. All questions not filled in will be counted as incorrect. There will be no exceptions. If you know prior to an examination that you will be unable to sit for that examination, notification must be made to the Office of Student Affairs and the Course Director prior to examination. Failure to do so will jeopardize your eligibility for an excused absence; an unexcused absence will be recorded as a "0".

If you have to miss an examination, you must request an excused absence from the Office of Student Affairs as soon as possible and preferably prior to the day of the exam. The Office of Student Affairs will consider each request and will inform you and the Course Director if your absence is considered to be excused. **The Course Director does not have the authority to excuse an absence**. For an excused absence from an examination, a make-up examination will be given shortly after the initial exam. The makeup exam will be different from the missed exam and the examination time will be determined by the Course Director. For an excused absence from the final exam, a make-up examination will be given in August at the end of the summer vacation.

A copy of each student's written answer sheet (Scantron) can be obtained by request from the teaching coordinator. Keys to the correct answers for both the written and practical portions of the examinations will be posted as soon as possible following each examination, both on the website and outside MSB 7.248.

Grading Scales

Grading Policy for Medical Students:

Honors (H)	91.1% -100%
High Pass (HP)	83.1% -91.0%
Pass (P)	64.1% -83.0%
Marginal Performance (MP)	60.1% -64.0%
Fail (F)	Below 60.0%

There is no class ranking; numerical grades do not leave the Department of Neurobiology and Anatomy. For medical students, the only grade recorded with the Office of the Registrar is **Honors, High Pass, Pass, Marginal Performance or Fail.** For graduate students, the grade recorded with the Office of the Registrar is A, B, C, or F. Medical students who receive a grade of "Marginal Performance" or "Fail" in the course will be referred to the Student Evaluations and Promotions Committee for review. This committee will determine the available options for the student and instruct the Course Director on what to do. Please consult the Office of Student Affairs for additional information.

Students who do not complete all course requirements will receive an "Incomplete" grade for the course. Course deficiencies must be completed by the end of the academic year, or the "Incomplete" will revert to the grade of "Fail". A failure can only be corrected by retaking the entire course at either this institution, or an equivalent course at another institution that has been approved by the Course Director. If an equivalent course is taken at another institution, a "Pass" is the highest grade that will be recorded on the permanent record at this School.

The Dean's office will notify the student(s) and the course director of each student who earns an MP and is eligibility to remediate. The remedial exam is a comprehensive exam, which includes material from all four blocks of the Neuroscience course and the 11 laboratories. The format and examination time and date will be determined by the Course Director. The grade received from the remedial exam (which will be pass/fail) will be the only and the final grade for the Neuroscience course. No challenges to the exam questions will be accepted on any remedial or make-up exam.

Examination Schedule

The division of the class into groups for the written and practical examinations will be announced via E-mail and posted outside of MSB 7.201, MSB 2.105, MSB 2.107 and MSB 2.006 prior to each exam.

	DATE	TIME	TYPE
Block 1 Exam	Friday, February 1, 2013	1:00 – 4:00 PM	Written + Practical
Block 2 Exam	Monday, March 4, 2013	1:00 – 4:00 PM	Written + Practical
Block 3 Exam	Friday, April 12, 2013	1:00 – 4:00 PM	Written + Practical
Block 4 Exam	Friday, May 10, 2013	1:00 – 2:30 PM	Written Only
Final Examination	Tuesday, May 14, 2013	1:00 – 5:00 PM	Written + Practical

Student Evaluation of the Course

The Department of Neurobiology and Anatomy evaluates the course on three levels. First, on an informal level, students are encouraged to contact the Course Director or the faculty at any time during the course regarding problems or issues that need to be addressed. Second, on a formal level, evaluation forms will be distributed to students at the end of each exam section and at the end of the semester. Third, class representatives will meet with the Course Director and Faculty to provide input after each Block exam according to the following schedule:

	DATE	TIME	LOCATION
After Block 1 Exam	February 11, 2013	12:00 Noon	MSB 7.046
After Block 2 Exam	March 18, 2013	12:00 Noon	MSB 7.046
After Block 3 Exam	April 22, 2013	12:00 Noon	MSB 7.046

Lecture Schedules

Block 1

DATE	TIME	TOPIC	INSTRUCTOR
Week 1			
Jan 7, 2013	8:00am	Introduction to Neuroscience	John Byrne
Jan 7, 2013	9:00am	Synaptic Formation/Development and Regeneration	Andrew Bean
Jan 8, 2013	1:00pm	Lab #1 Pre-Lab Instruction + Review	Nachum Dafny, Pramod Dash
Jan 8, 2013	1:30pm	Lab #1 External Anatomy of the Brain & Principles of Neurological Examination	Nachum Dafny, Pramod Dash
Jan 8, 2013	3:30pm	Lab #1 Clinical Post Lab Case	Pedro Mancias
Jan 9, 2013	8:00am	Organization of Cell Types	Jack Waymire
Jan 9, 2013	9:00am	Resting Potentials and Action Potentials	John Byrne
Jan 11, 2013	8:00am	Ionic Mechanisms of Action Potentials	John Byrne
Jan 11, 2013	9:00am	Propagation of Action Potentials	John Byrne
Week 2			
Jan 14, 2013	8:00am	Synaptic Transmission at the Skeletal Neuromuscular Junction	John Byrne
Jan 14, 2013	9:00am	Synaptic Transmission in the Central Nervous System	John Byrne
Jan 15, 2013	1:00pm	Lab #2 Pre-lab Instruction +Review	Nachum Dafny
Jan 15, 2013	1:30pm	Lab #2 Internal Organization of the Brain	Nachum Dafny
Jan 15, 2013	3:30pm	Lab #2 Clinical Post Lab Case	Pedro Mancias
Jan 16, 2013	8:00am	Synaptic Plasticity	John Byrne
Jan 16, 2013	9:00am	Transport and Molecular Mechanisms of Secretion	Jack Waymire
Jan 18, 2013	8:00am	Acetylcholine Neurotransmission	Jack Waymire
Week 3			
Jan 22, 2013	1:00pm	Lab #3 Pre Lab Instruction + Review	Terry Crow
Jan 22, 2013	1:30pm	Lab #3 Ventricles. Blood Vessels and External Surfaces of the Brain Stem	Terry Crow
Jan 22, 2013	3:30pm	Lab #3 Clinical Post Lab Case	Pedro Mancias
Jan 23, 2013	8:00am	Biogenic Amine Neurotransmitters	Jack Waymire
Jan 23, 2013	9:00am	Amino Acid Neurotransmitters	M Waxham
Jan 25, 2013	8:00am	Neuropeptides and Nitric Oxide	M Waxham
Jan 25, 2013	9:00am	Principles of Structural Neuroimaging	Michael Beauchamp
Week 4			
Feb 1, 2013	**1:00pm**	**Exam I**	
Feb 1, 2013	1:30pm	Study Room	Nachum Dafny

Block 2

DATE	TIME	TOPIC	INSTRUCTOR
Week 5			
Feb 4, 2013	10:00am	Somatosensory Systems	Patrick Dougherty
Feb 4, 2013	11:00am	Spinal Cord and ascending and descending pathways	Nachum Dafny
Feb 5, 2013	1:00pm	Lab #4 Pre-Lab Instruction	Nachum Dafny
Feb 5, 2013	1:30pm	Lab #4 Spinal Cord: External and Internal Anatomy and Intro to Somatosensory Pathways	Nachum Dafny
Feb 5, 2013	3:30pm	Lab #4 Clinical Post Lab Case	Pedro Mancias
Feb 6, 2013	8:00am	Pain Principle	Nachum Dafny
Feb 6, 2013	9:00am	Pain Pathways and different types	Nachum Dafny
Feb 8, 2013	8:00am	Pain Modulation	Nachum Dafny
Feb 8, 2013	9:00am	Clinical Correlate: Headaches	Raymond Martin
Week 6			
Feb 11, 2013	8:00am	Somatosensory Pathways	Patrick Dougherty
Feb 11, 2013	9:00am	Somatosensory Processes	Patrick Dougherty
Feb 12, 2013	1:00pm	Lab #5 Pre-Lab Instruction + Review	Patrick Dougherty
Feb 12, 2013	1:30pm	Lab #5 Somatosensory, Viscerosensory and Spinocerebellar Pathways	Patrick Dougherty
Feb 12, 2013	3:30pm	Lab #5 Clinical Post-Lab Cases	Pedro Mancias
Feb 13, 2013	8:00am	Clinical Correlate: Spinal Cord Disorders	Pedro Mancias
Feb 13, 2013	9:00am	Clinical Correlate: Somatosensory Disorders	Pedro Mancias
Feb 15, 2013	8:00am	Vestibular System: Structure and Function	Terry Crow
Feb 15, 2013	9:00am	Vestibular Pathways and Reflexes	Terry Crow
Week 7			
Feb 20, 2013	8:00am	Auditory System: Structure and Function	Terry Crow
Feb 20, 2013	9:00am	Auditory Pathways	Terry Crow
Feb 22, 2013	8:00am	Clinical Correlate: Clinical Neuroimaging	Clark Stilton
Feb 22, 2013	9:00am	Clinical Correlate: Principles of Neuroanesthesia	Katherine Normand
Feb 22, 2013	10:00am	Olfaction & Gustation	Terry Crow
Week 8			
Feb 25, 2013	8:00	Clinical Correlate: Otology Methods	Ron Moses
Feb 25, 2013	9:00	Small Groups: Otology Clinical Cases	Nachum Dafny
Feb 26, 2013	1:00pm	Lab #6 Pre-Laboratory Instruction + Review	Terry Crow
Feb 26, 2013	1:30pm	Lab #6 Auditory, Vestibular, Gustatory & Olfactory Systems	Terry Crow
Feb 26, 2013	3:30pm	Lab #6 Clinical Post Lab Case	Ron Moses
Feb 27, 2013	8:00am	The Eye	Valentin Dragoi
Feb 27, 2013	9:00am	Visual Pathway	Valentin Dragoi
Week 9			
Mar 4, 2013	**1:00pm**	**EXAM II**	
Mar 4, 2013	1:30pm	Study Room	Nachum Dafny
Mar 11-15, 2013		Spring Break – no classes	

Block 3

DATE	TIME	TOPIC	INSTRUCTOR
Week 10			
Mar 18, 2013	8:00am	Visual Motor System	Valentin Dragoi
Mar 18, 2013	9:00am	Ocular Motor Control	Valentin Dragoi
Mar 18, 2013	10:00am	Visual Pathways, Eye Movement and Sensory Motor Integration	Valentin Dragoi
Mar 19, 2013	1:00pm	Lab #7 Pre-Laboratory Introduction + Review	Valentin Dragoi
Mar 19, 2013	1:30pm	Lab #7 Visual System and Control System for Eye Movements	Valentin Dragoi
Mar 19, 2013	3:30pm	Lab #7 Clinical Post Lab Case	Pedro Mancias
Mar 20, 2013	8:00am	Clinical Correlate: Neuroophthalmology Methods	Andrew Lee
Mar 20, 2013	9:00am	Small Groups: Neuroophthalmology Methods	Nachum Dafny
Mar 22, 2013	8:00am	Motor Units and Muscle Receptors	Michael Beauchamp
Mar 22, 2013	9:00am	Spinal Reflexes	Michael Beauchamp
Week 11			
Mar 25, 2013	8:00am	Clinical Correlate: Lower Motor Neuron Disorders	Pedro Mancias
Mar 25, 2013	9:00am	Cerebellum	Michael Beauchamp
Mar 27, 2013	8:00am	Clinical Correlate: Cerebellar Disorders	Pedro Mancias
Mar 27, 2013	9:00am	Basal Ganglia	Michael Beauchamp
Mar 28, 2013	1:00pm	Lab #8 Pre-Lab Instruction + Review	Michael Beauchamp
Mar 28, 2013	1:30pm	Lab #8 Higher Motor Function	Michael Beauchamp
Mar 28, 2013	3:30pm	Lab #8 Clinical Post Lab Case	Pedro Mancias
Mar 29, 2013	8:00am	Clinical Correlate: Extra Pyramidal Disorders	Erin Stimming
Mar 29, 2013	9:00am	Motor Cortex	Michael Beauchamp
Week 12			
Apr 1, 2013	8:00am	Integrated Motor System	Michael Beauchamp
Apr 1, 2013	9:00am	Clinical Correlate: Upper Motor Neuron Disorder	Pedro Mancias
Apr 2, 2013	1:00pm	Lab #9 Pre-Lab Instruction + Review	Michael Beauchamp
Apr 2, 2013	1:30pm	Lab #9 Descending Pathways to the Spinal Cord	Nachum Dafny
Apr 2, 2013	3:30pm	Lab #9 Clinical Post-Lab Case	Pedro Mancias
Apr 3, 2013	8:00am	Clinical Correlate: Principle of Neurosurgical Intervention	David Baskin
Apr 3, 2013	9:00am	Clinical Correlate: Genetic & Neurological Diseases	Andrew Bean
Apr 5, 2013	8:00am	Brain Circulation	Andrew Barreto
Apr 5, 2013	9:00am	Clinical Correlate: Stroke	Andrew Barreto
Week 13			
Apr 12, 2013	**1:00pm**	**EXAM III**	
Apr 12, 2013	1:30pm	Study Room	Nachum Dafny

Block 4

DATE	TIME	TOPIC	INSTRUCTOR
Week 14			
Apr 15, 2013	8:00am	Small Groups: Cranial Nerves Syndrome	Nachum Dafny
Apr 15, 2013	9:00am	Small Groups: Cranial Nerves Syndrome	Nachum Dafny
Apr 16, 2013	8:00am	Clinical Correlate: Brain Stem Syndrome	Mark Dannenbaum
Apr 16, 2013	9:00am	Hypothalamus: Structural Organization	Patrick Dougherty
Apr 16, 2013	10:00am	Hypothalamic Control of Pituitary Hormone	Patrick Dougherty
Apr 16, 2013	1:00pm	Lab #10 Pre-Lab Instruction	Terry Crow
Apr 16, 2013	1:30pm	Lab #10 Cranial Nerve Nuclei and Brain Stem Circulation	Terry Crow
Apr 16, 2013	3:30pm	Lab #10 Clinical Post Lab Case	Pedro Mancias
Apr 19, 2013	8:00am	Central Control of Autonomic Nervous System and Thermoregulation	Patrick Dougherty
Apr 19, 2013	9:00am	Central Control of Feeding Behavior	Patrick Dougherty
Week 15			
Apr 22, 2013	8:00am	Limbic System: Anatomy Pathways & Functions of the Hippocampus	Anthony Wright
Apr 22, 2013	9:00am	Limbic system: Anatomy, Pathways & Function of the Amygdala	Anthony Wright
Apr 23, 2013	8:00am	Clinical Correlate: Hypothalamic Disorders	Arthur Day
Apr 24, 2013	8:00am	Learning & Memory	Terry Crow
Apr 24, 2013	9:00am	Sleep & Arousal	Terry Crow
Apr 26, 2013	8:00am	Clinical Correlate: Sleep Disorders	Jeremy Slater
Apr 26, 2013	9:00am	Clinical Correlate: Seizure Disorder (Epilepsy)	Jeremy Slater
Week 16			
Apr 29, 2013	8:00am	Higher Cortical Function: Language & Cognition	Anthony Wright
Apr 29, 2013	9:00am	Higher Cortical Function: Executive Processing	Anthony Wright
Apr 30, 2013	1:00pm	Lab #11 Pre-Lab Instruction + Review	Terry Crow, Patrick Dougherty
Apr 30, 2013	1:30pm	Lab #11 Limbic System and Hypothalamus	Terry Crow, Patrick Dougherty
Apr 30, 2013	3:30pm	Lab #11 Clinical Post-Lab Review Cases	Pedro Mancias
May 1, 2013	8:00am	CNS Aging and Alzheimer's Disease	Jack Waymire
May 1, 2013	9:00am	Clinical Correlate: Aging, Alzheimer's Disease & Cognitive Disorders	Carmel Dyer
May 3, 2013	8:00am	Blood Brain Barrier and Cerebral Metabolism	Pramod Dash
May 3, 2013	9:00am	Traumatic Brain Injury and Cell Death	Pramod Dash
Week 17			
May 10, 2013	**1:00pm**	**EXAM IV**	
Week 18			
May 14, 2013	**1:00pm**	**FINAL EXAM**	

Research Opportunities

The faculty invites students to visit their individual laboratories for demonstration of experimental techniques related to material being covered in the course, or demonstration of their current research work. Such demonstrations can be arranged on an individual or group basis by contacting individual faculty members or the Course Director. Brief descriptions of the research interests of the faculty are summarized below.

Department of Neurobiology and Anatomy
The University of Texas Medical School at Houston (UTHealth)

John Byrne, PhD, Professor and Chairman

- Cellular basis of learning and memory
- Synaptic transmission
- Excitable membranes
- Neural modeling

Andrew Bean, PhD, Associate Professor

- Molecular mechanisms of endocytosis
- Vesicular trafficking

Michael S. Beauchamp, PhD, Associate Professor

- Functional magnetic resonance imaging (fMRI)
- Brain function in human subjects
- Visual and somatosensory stimulation in normal volunteers
- Visual and somatosensory stimulation in patients with stroke and epilepsy
- Transcranial magnetic stimulation
- Multisensory integration and visual perception

Michael Beierlein, PhD, Assistant Professor

- Short-term synaptic plasticity in local neuronal circuits
- Dendritic integration of synaptic activity
- Retrograde signaling by endocannabinoids

Leonard Cleary, PhD, Professor, Research

- Cellular mechanisms of learning and memory
- Morphological basis of synaptic plasticity
- Neural circuits underlying reflex behaviors

Terry Crow, PhD, Professor

- Learning and memory
- Sensory physiology
- Synaptic and membrane plasticity
- Neuronal modulation
- Proteomics

Nachum Dafny, PhD, Professor

- Mechanisms of pain and pain modulation
- Mechanisms of drug addiction (Morphine, Ecstasy, Cocaine, Amphetamine, alcohol and Ritalin)
- Effects of psychostimulants on circadian activity patterns

Pramod Dash, PhD, Professor, and Scientific Director, Mission Connect

- Molecular mechanisms underlying memory formation and memory dysfunction

Valentin Dragoi, PhD, Professor

- Network mechanisms of visual behavior
- Neural coding
- Visual perception
- Learning and adaptive behavior
- Computational neuroscience

Daniel Felleman, PhD, Associate Professor

- Optical recording of functional architecture in primate extrastriate visual cortex
- Single unit properties associated with extrastriate functional maps
- High density microelectrode array recording of neural properties in extrastriate cortex
- Neuroanatomical pathway tracing between cortical areas and functionally defined modules

Ruth Heidelberger, MD, PhD, Professor

- Mechanisms of neurotransmitter release
- Modulation and plasticity of neuronal signaling
- Retinal ribbon synapses and visual processing

Roger Janz, PhD, Assistant Professor

- Synaptic transmission
- Molecular neurobiology
- Mouse genetics
- Function of synaptic vesicle proteins
- Mouse models for neurological diseases

Yin Liu, PhD Assistant Professor
- Computational biology and bioinformatics
- Protein interaction network
- Signal transduction pathway reconstruction
- Genomic and Proteomic data mining

David Marshak, PhD, Professor
- Neural circuits in the primate retina

Anne Sereno, PhD, Professor
- Neurophysiology of attention and short-term memory in primates
- Attention and eye movements in normal and clinical human populations

Harel Shouval, PhD, Associate Professor
- Theoretical neuroscience
- The cellular basis of learning and memory
- Experience-dependent development of receptive fields
- The neural basis of temporal perception

Neal Waxham, PhD, Professor
- Molecular neurobiology
- Role of second messengers and protein phosphorylation in the regulation of neuronal enzymes, receptors, and channels
- Molecular basis of learning

Jack Waymire, PhD, Professor, and Levit Family Professor of Neuroscience
- Molecular and cellular properties of adrenergic neurons and differentiated stem cells
- Role of cell signaling and second messengers in neural stem cells and neurodegeneration

Anthony Wright, PhD, Professor
- Learning and memory process with pigeons, monkeys, and people
- Processes of concept learning with pigeons and monkeys in same/different and matching to sample tasks
- Visual list memory processing with pigeons, monkeys and people
- Auditory list memory processing with people