

**COURSE SYLLABUS
MEDICAL NEUROSCIENCE 2012
060/132: 234**

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060:234; 132:234

Course Director: Dr. Martin Cassell

I. The Course: Medical Neuroscience is a course for medical students, physical therapy students, and graduate students in the basic medical and related sciences, which emphasizes the multidisciplinary study of the human central nervous system. The course consists of lectures and laboratories, and group discussion sessions on patient cases dealing with nervous system disorders. The course material is interrelated throughout these forums, giving students multiple approaches for learning the material and giving faculty multiple approaches for teaching. All lectures, labs, and group discussion cases emphasize integration of basic science concepts with clinical significance and applications. Basic and clinical correlations are further reinforced by a series of lectures highlighting contemporary research and clinical issues in neuroscience, such as developmental and emotional disorders, fetal alcohol syndrome, dementias, and gender-related differences in brain structure and function. The course faculty are drawn from basic and clinical departments in the College of Medicine, including Anatomy and Cell Biology, Physical Therapy and Rehabilitation, Neurology, Psychiatry, Pediatrics, and Neurosurgery.

II. The Objectives: The course objectives described in this section and the lecture, lab, and group discussions meet the following Carver College of Medicine learning objectives: MK01, MK02, MK03, MK04, MK05, MK06, MK07, MK08. (These codes are defined at the end of the syllabus.)

The objectives of the course are: (1) to introduce basic concepts about the organization, structure, and function of the human central nervous system; (2) to enable students to apply these fundamental principles toward understanding nervous system function and dysfunction and toward clinical problem-solving in relation to disorders that affect the nervous system, with emphasis on the central nervous system; (3) to provide the necessary foundation in neuroscience upon which students can build for the rest of their medical training and professional careers. Upon completion of the course, students' will have a working knowledge of the structure and function of the human nervous system necessary for their clinical clerkships, for advanced study of the nervous system, and for monitoring new developments in the basic and clinical neurosciences.

More specifically, students will be able to:

1. Describe and identify the major gross anatomical components of the central and peripheral nervous systems. Students will be able to identify major anatomical structures in brain and spinal cord whole specimens, slices, and dissections; and in media images such as X-rays, CTs, and MRIs.
2. Relate the embryological development of the CNS to the adult brain and spinal cord.

3. Describe and identify the structural components and functional significance of the meninges, CSF, venous sinuses, blood supply, and blood-brain, blood-CSF barriers of the CNS.
4. Describe the general structural and functional organization of different hierarchical levels of the CNS: spinal cord and brainstem segments (spinal and cranial nerves, reflexes, neuromuscular junction); relay and processing sites on the route of ascending and descending pathways.
5. Describe and identify the components and specific functions of the spinal and cranial nerves, and the major sensory and motor pathways.
6. Describe and identify the structures and pathways for the special senses: vision, taste, smell, hearing and balance.
7. Describe and identify the major nuclei of the thalamus and their roles in sensory, motor and cognitive functions.
8. Describe the anatomy and functions of the major components of the basal ganglia.
9. Describe the general structural organization of the hypothalamus and functions associated with major nuclei.
10. Describe and identify the major components of the limbic system, the basal forebrain, and a general overview of their roles and relationships with other parts of the CNS.
11. Describe the structures and mechanisms involved in arousal and sleep, memory, language.
12. Describe localization of cortical functions related to motor and sensory functions, to the special senses, and to higher cognitive functions and behaviors.
13. Analyze the effects of an injury to a specific region of the nervous system.
14. Analyze the clinical manifestations of the various diseases that act upon specific structural and functional systems of the human nervous system.
15. Begin to analyze approaches to diagnosis, treatment, and prognosis in patients with nervous system disorders and diseases.

Note: The structural, physiological, and pharmacological aspects of the neuron and neurotransmission at the cell and molecular level are covered by multiple lectures in other courses, including Medical Cell Biology, Human Organ Systems, and Pharmacology. Therefore, we have not included these as part of our course objectives.

III. The Course Faculty:

Lecturers:

Dr. Harold Adams	Neurology
Dr. Steven Anderson	Neurology
Dr. Dan Bonthius	Pediatrics
Dr. Martin Cassell	Anatomy and Cell Biology
Dr. Robert Cornell	Anatomy and Cell Biology
Dr. Patricia Davis	Neurology
Dr. Natalie Denburg	Neurology
Dr. Eric Dyken	Neurology
Dr. Mark Granner	Neurology
Dr. Gloria Lee	Internal Medicine
Dr. Robert Rodnitzky	Neurology

Dr. Justin Sipla	Anatomy and Cell Biology
Dr. Kathleen Sluka	Physical Therapy and Rehabilitation
Dr. William Talman	Neurology
Dr. Michael Wall	Neurology/Ophthalmology
Dr. John Wemmie	Psychiatry

Laboratory Teaching Staff:

Dr. Martin Cassell	Anatomy and Cell Biology
Dr. Robert Cornell	Anatomy and Cell Biology
Dr. Andy Frank	Anatomy and Cell Biology
Dr. Justin Sipla	Anatomy and Cell Biology

Neuroscience Program Graduate Student Teaching Assistants:

Arliss Dudley-Cash
 Kameko Halfman
 Jake Kurzcek
 Cory Massey
 Jeff Plume
 Rebecca Taugher

Clinical Case Discussion Faculty :

Dr. Harold Adams	Neurology
Dr. Daniel Bonthius	Pediatrics
Dr. Eric Dyken	Neurology
Dr. William Talman	Neurology

IV. Schedule: The Medical Neuroscience course runs from January 10, 2012 through May 8, 2012. Please note that course content is intensive in the early weeks of the course. Moreover, topics that are presented later in the course build on information presented in previous lectures and labs. It is important for you to keep up and not fall behind because the information is cumulative: your performance will depend on a thorough understanding of facts and concepts you have learned from the beginning. It is not unusual for students to feel that examinations get more difficult as the course progresses because of this.

Therefore, please plan your study time accordingly. Regular attendance at scheduled lectures and labs makes it easier to keep up with the material and have access to instructors for questions and assistance.

- A. Lectures** are presented in 1110A MERF, generally on Tuesdays, Thursdays, and Fridays at 9:30 a.m. – 10:20 a.m.

Note that there are a number of exceptions to the general lecture day and time. Please refer to the schedule below.

- B. Laboratories:** Eight laboratory sessions are scheduled and will be held on Tuesdays and Thursday in the Gross Anatomy Lab (1-230 BSB). Students are assigned to attend laboratory sessions in one of the following groups:

Tuesday A from 10:30 a.m. - 11:30 a.m.

Tuesday B from 11:30 a.m. - 12:30 p.m.

Thursday A from 10:30 a.m. - 11:30 a.m.

Thursday B from 11:30 a.m. - 12:30 p.m.

Physical Therapy students attend the Tuesday laboratory.

Graduate students attend the Thursday laboratory.

Pre-Lab presentations have been video-recorded and will be posted on the ICON course site prior to each scheduled lab session. In order to make efficient and effective use of the hour allocated for each lab period, students are expected to view the pre-lab presentation prior to coming to class.

Table assignments for each student will be posted prior to the first laboratory session (Tuesday, Jan. 17 for Medical students and Physical Therapy students) (Thursday, Jan. 19 for Medical students and Graduate students).

For health reasons, food and drink are not permitted in the laboratory. For many of the laboratory sessions, wet CNS specimens will be examined and rubber gloves must be worn. Students at each table may wish to arrange to share the cost of a box of disposable gloves and have them available.

The laboratory practical examinations will be held on Fridays between 12:30 – 5:00 p.m. in 1-230 BSB. Specific times for different groups of students will be announced prior to the examination since facilities do not allow the entire class to be tested at the same time.

- C. Important !! Policies regarding recording and distribution of lectures and other presentations by course faculty:**

The following statement comes from OSAC:

“Dear M1 and M2 Students,

Recently there have been discussions and questions about how Noteservice obtains and distributes lecture materials. To clarify the issues and expand on the policy that must be adhered to:

1. *Noteservice is a not-for-profit organization that serves students and is self-directed. We applaud Noteservice leadership for their advocacy efforts and the professional manner in which they have approached this issue with faculty, administration and their peers.*
2. *Individual faculty must be contacted before lectures are taped. They have a right to refuse all or partial taping of lectures as they effectively own the copyright to their lectures.*
3. *When a student takes notes while listening to a lecture, the notes are considered the student's interpretation of what they have heard and the notes are not considered an infringement of the professor's copyright ownership of the lecture and can be posted to a website. However, the analysis is different if a student transcribes an audio lecture word-for-word. In that instance, the professor is the owner of the copyright and must give permission prior to posting the notes on a website. Similarly, permission must be sought from a professor if an audio recording of a lecture is posted directly on a website.*
4. *The majority of faculty members have consented to full or partial taping of lectures and posting of lecture material.*
5. *If a student has been granted reasonable accommodations that include the audio taping of lectures after a review or pertinent documentation by the Disability Accommodations Committee, then the faculty and the CCOM is responsible for providing this resource in compliance with the Americans with Disability Act.*

We are supportive of a learning environment that allows students access to lecture material in the most effective way possible and anticipate that the majority of faculty will continue to permit taping of their lectures. However, the law is clear that individual faculty members must be contacted and give consent before lectures are taped.”

Policy for this course:

All faculty in this course have given permission regarding their lectures as follows:

- (1) Notes for each lecture will be posted electronically on ICON approximately one week before the date of the lecture.
- (2) PowerPoint slides used by each lecturer will be posted electronically on ICON in pdf format the day before the lecture (if possible).

(3) A videocast of slides and audio from each lecture will be recorded and made available as a stream on the course's ICON site to all students who are registered in the course. Lecturers have requested that students not download the videocasts of their lectures to be copied or saved to personal computers. Please respect this request.

D. Clinical Case Discussions: These discussion groups will be held in 1110 MERF and meet during regularly scheduled lab times during weeks when a laboratory is not scheduled. Each discussion session will last approximately 2 hours, so both groups of Tuesday students will begin at 10:30; and both groups of Thursday students will begin at 10:30, on the occasions when Discussion Groups are scheduled.

Two cases of patients who present with complaints/problems/symptoms related to nervous system disorders will be discussed during each of these meetings. Students will receive only the case history, and will be responsible for discussing pertinent structures, systems, pathways, mechanisms, etc. in explaining the patient's signs and symptoms, arriving at a differential diagnosis, treatment, and prognosis. Students are also encouraged to seek applicable examples of evidence-based medicine as appropriate.

Help to make these discussions meaningful by coming prepared, and don't be shy about asking questions and volunteering your opinions.

Questions for the comprehensive section of the Final Examination will come from material covered in the Clinical Case Discussions.

E. Exams:

Lecture Exam 1	Feb. 17	8:00 – 10:00 AM	1110A, 1117, 2189 MERF
Lab Exam 1	March 2	12:30 – 5:00 PM	1-230 BSB
Lecture Exam 2	March 30	8:00 – 10:00 AM	1110A, 1117, 2189 MERF
Lab Exam 2	April 20	12:30 – 5:00 PM	1-230 BSB
Final Exam	May 8	9:30 AM–12:30 PM	Beisner & Watzke Auds

It is the responsibility of all students, including those with accommodations, to be ready to take the exams at the assigned times. Students, including those with accommodations, will not be allowed to sit the lecture examinations if they arrive in the examination room more than 15 minutes after the exam has commenced. Students who are late for laboratory exams will not be allowed to take the exam once it has started.

- V. Attendance and Student Responsibilities:** Students are held responsible for all material presented in lectures, laboratories, and discussion group sessions. Students are also responsible for all announcements or schedule changes that are made in class, whether or not they are in attendance.

Course policy is that attendance is required for all components of the course – lectures, labs, and discussion groups. Attendance is not recorded, but is considered as an aspect of professional responsibility expected from students.

Attendance at examinations is mandatory, except for serious illness, which must be documented by a written statement from the treating physician. All other requests for excused absences must be submitted in advance and permission obtained from the Dean of the Office of Student Affairs and Curriculum, the Director of the DPT Program, or the Dean of the Graduate Program. The Course Director retains the discretion for decisions about making-up missed exams.

Note: Students should organize a Neuroscience Liaison Committee consisting of five or six medical students, one or two PT students, and one graduate student to meet regularly once each month, and on additional occasions as needed, with the course director. The student chairperson is responsible for contacting other members of the Liaison Committee and the Course Director to coordinate meeting dates, times, and locations.

Consultation: Many concepts and terms in the neurosciences may seem difficult or confusing at first exposure. Usually, a session of a few minutes with the instructor will clear up these difficulties. Therefore, when material presented in class or lab is not understood, students are urged to consult with the appropriate lecturer or lab instructor as soon as possible. Don't leave this to the last minute before exams.

Students whose score on an exam is less than the passing grade should make an appointment with the Course Director to seek assistance if needed. Due to the large size of the class, the Course Director cannot follow up failing students and they are expected to call/email for an appointment as soon as possible after the exam. Early remediation can make a major difference to a student's successful completion of the Course.

Students who fail to pass the course or receive a C or lower letter grade may be offered the opportunity to remediate their grade after the course has finished. The decision to allow a student to remediate will be made by the Course Director in consultation with course faculty and the representatives of a particular student's program. Under no circumstances will a decision be made on remediation prior to the final exam and students will not be able to solicit the Course Director for remediation prior to receiving their final grade. The Course Director reserves the right to decide on the form of remediation and the time course in which remedial material needs to be completed.

VI. Background Knowledge:

Medical Neuroscience is a stand-alone course but it is expected that students have a basic understanding of human anatomy and physiology and the basic vocabulary of the anatomical sciences. Of particular importance is an understanding of the basic functions of the twelve cranial nerves. Much of the lecture and laboratory material, as well as clinical cases, pertaining to the brainstem involve various aspects of cranial nerve function, much of which is not formally covered in the course. Two cranial nerve review sessions will be held in the MERF auditorium during the second week of the course.

VII. Required Course Material:

1. Medical Neuroscience 2012 Syllabus (this includes the first weeks lecture notes)
2. Medical Neuroscience 2012 Laboratory Manual

Recommended Textbooks and Laboratory Manuals:

1. Highly Recommended:
Afifi and Bergman, Functional Neuroanatomy, Text and Atlas, McGraw-Hill, 2nd Edition, 2005. This text is an excellent source for additional information or clarification of topics covered in the course, and is the cited reference for some assigned readings. Students will find that the Clinical Chapters and the Key Concepts (marked by icons) are especially helpful.
***** Students at the University of Iowa have free access to the electronic copy of this text via the Hardin Library link.**
2. Highly Recommended:
Haines, Neuroanatomy: An Atlas of Structures, Sections and Systems, 7th ed. Ed. Lippincott William and Wilkins, 2007. Note that the Laboratory Manual is keyed to illustrations and images in this atlas.
3. Waxman, Clinical Neuroanatomy (Paperback), McGraw-Hill Medical; 26th edition (2009)
***** Students at the University of Iowa have free access to the electronic copy of this text via the Hardin Library link.**
4. Blumenfeld, Neuroanatomy Through Clinical Cases (Paperback), Sinauer Associates; 2nd edition (2010)
5. Nolte, The Human Brain: An Introduction to its Functional Anatomy, 6th Edition, (2009)
6. Goldberg, Clinical Neuroanatomy Made Ridiculously Simple, 4th Edition 2010

VIII. eNeuroscience: Most selected material for the Laboratory section will be available on the eNeuroscience Website. This material will include: (i) brain and spinal cord microscopic sections for the labs on spinal cord, brainstem, and thalamus; (ii) radiographic and relevant pathological material and gross specimens for all Labs; and (iii) two practice practical examinations (available one week before Lab exams). The eNeuroscience Website can be accessed at www.anatomy.uiowa.edu→eNeuroscience.

Pre-lab videos will be made available to students prior to each lab. These videos are intended to facilitate your sessions in the lab to learn neuroanatomy – NOT SUBSTITUTE OR REPLACE them. For many students, the practical labs present the only opportunity you will have to study and handle actual brain specimens, both normal and with unique pathologies. Please do not deprive yourselves of this valuable learning experience.

IX. Examinations and Grading: There will be 2 midterm lecture exams, 2 midterm laboratory practical exams, and a final examination. The points allocated to each will be as follows:

Exam I (Lecture)	40 points
Exam I (Lab practical)	50 points
Exam II (Lecture)	40 points
Exam II (Lab practical)	50 points
Final Exam	<u>120 points</u>
Total possible points	300 points

Students will be required to earn a total of 210 out of 300 points in order to pass the course.

Generally, the minimum points needed for a particular Grade are as follows:

Medical students:	Honors	270 points
	Near honors	267points
	Pass	210 points
	Fail	Below 210 points

Graduate and Physical Therapy students will receive letter grades usually based on a scale of A ≥ 265 points; B ≥ 235 points; C ≥ 205 points; F < 205 points.

These grade policies are intended to cover the students from different programs in the course, but the Course Director reserves the right to make minor adjustments in the cut-offs for all or any grades.

The final examination will cover lectures after Lecture Exam II and a comprehensive component consisting of basic science and clinical material from or relating to Clinical Discussion cases. For the comprehensive component, major concepts and problem-solving skills will be stressed.

An Exam Comment book is available in MERF for all course participants to comment on exam questions shortly after the exam. These comments will be viewed by the Course Director and in most cases the student's query will be answered by email. Responses to recurring themes will be posted on ICON. The Course Director wishes it made clear that while individual student comments about exam questions are very welcome, the comments are primarily used to re-word questions in future exams. Only when there is an absolutely clear error in one or more of the question foils which results in obvious ambiguity as indicated by a preponderance of students answering a question incorrectly will the question be scratched. Individual student *interpretations* of questions or foils will not be considered grounds for double-keying or eliminating a question.

- X. Students with Disabilities:** Any student with the need for a disability accommodation should contact Christine Cork in OSAC and the Course Director, Dr. Martin Cassell, at the beginning of the Course.

CCOM Learning Objectives Codes

Medical Knowledge MK01

Demonstrate and integrate knowledge of the structure and function of the healthy human body from conception to death, including the molecular, cellular, biophysical, genetic, organ system, biostatistical, behavioral and psychological bases for these processes.

Medical Knowledge MK02

Demonstrate knowledge of the causes, epidemiology, risk factors, mechanisms, morphology, pathophysiology, major clinical features, and natural history of various diseases and conditions of the body and its major organ systems, and demonstrate the ability to correlate this knowledge with clinical, laboratory, radiologic, and epidemiologic data in a patient case scenario.

Medical Knowledge MK03

Demonstrate knowledge of the mechanism of action, kinetics, side effects, toxicity, interactions, clinical and non-clinical uses of medications.

Medical Knowledge MK04

Demonstrate knowledge of complementary and alternative medicine.

Medical Knowledge MK05

Demonstrate knowledge of the diagnosis, treatment and prognosis of the diseases and conditions most likely to be encountered in both outpatient and inpatient settings.

Medical Knowledge MK06

Expand understanding of therapeutic modalities, including medications, radiation and alternative therapies.

Medical Knowledge MK07

Demonstrate the skill of critical appraisal of the literature and use of biostatistical concepts, and applications of these to evolving medical understanding.

Medical Knowledge MK08

Demonstrate knowledge of the diagnosis, treatment, and prognosis of the most common diseases and conditions encountered in specialized areas of medicine.

Medical Neuroscience 2012
Lecture, Lab, Small Group, and Exam Schedule

<u>DATE</u>	<u>DAY</u>	<u>TIME</u>	<u>MODULE</u>	<u>LECTURE #</u>	<u>TOPIC</u>	<u>LECTURE R</u>	<u>LAB/DISC GROUP</u>
10-Jan	T	1:30 - 2:20 pm	CNS Overview	1	Introduction to the Brain	Cassell	
10-Jan	T	2:30 - 3:20 pm		2	Nervous System Organization and Terminology	Cassell	
12-Jan	Th	9:30 - 10:20 am		3	Neuroembryology and CNS Topography	Cornell	
17-Jan	T	9:30 - 10:20 am		4	Metabolism, Cerebral Blood Flow, CSF	Cornell	Lab 1 Brain, meninges, ventricles
17-Jan	T	3:30 - 4:20 pm			<i>Optional Cranial Nerves Review</i>	Sipla	
19-Jan	Th	3:30 - 4:20 pm			<i>Optional Cranial Nerves Review</i>	Sipla	Lab 1
20-Jan	F	9:30 - 10:20 am		5	Blood Supply	Sipla	
24-Jan	T	9:30 - 10:20 am		6	Stroke	Davis	Lab 2 Blood supply & stroke
26-Jan	Th	9:30 - 10:20 am	Spinal Cord	7	Spinal Cord I: Segmental Organization	Sipla	Lab 2
31-Jan	T	9:30 - 10:20 am		8	Viscerosomatic Sensation I	Sluka	Lab 3 Spinal cord
2-Feb	Th	9:30 - 10:20 am		9	Viscerosomatic Sensation II	Sluka	Lab 3
3-Feb	F	9:30 - 10:20 am		10	Spinal Cord II: Pathways	Sipla	
7-Feb	T	9:30 - 10:20 am		11	Spinal Cord III: Review of Syndromes	Sipla	Case 1 Discussion 1030-1230 1110A Talman
9-Feb	Th	9:30 - 10:20 am	Brain Stem	12	Brainstem Overview	Cassell	Case 1 Discussion 1030-1230 1110A Talman
10-Feb	F	9:30 - 10:20 am		13	Medulla	Cassell	
14-Feb	T	9:30 - 10:20 am		14	Control of Cardiovascular Function	Talman	Lab 4 Brainstem
14-Feb	T	2:30 - 4:20 pm			Optional Review	Cassell	
16-Feb	Th	9:30 - 10:20 am		15	Pons	Cassell	Lab 4
17-Feb	F	8:00 - 10:00 am			Lecture Exam I		
21-Feb	T	9:30 - 10:20 am		16	Midbrain	Cassell	Case 2 Discussion 1030-1230 1110A Bonthius
23-Feb	Th	9:30 - 10:20 am		17	Auditory-Vestibular	Sipla	Case 2 Discussion 1030-1230 1110A Bonthius
28-Feb	T	9:30 - 10:20 am	Movement	18	Motor System Overview	Cornell	Lab Review

1-Mar	Th	9:30 - 10:20 am		19	Cerebellum	Cornell	Lab Review
2-Mar	F	12:30 - 5:00 pm			Lab Exam I		
6-Mar	T	9:30 - 10:20 am		20	Basal Ganglia 1	Cassell	Lab 5 Diencephalon, basal ganglia, int. capsule
8-Mar	Th	8:30 - 9:20 am		21	Basal Ganglia 2	Cassell	Lab 5
8-Mar	Th	9:30 - 10:20 am		22	Movement Disorders	Rodnitzky	
March 12 -16 SPRING BREAK							
20-Mar	T	9:30 - 10:20 am		23	Hypothalamus I	Cassell	Lab 6 Cerebral cortex
22-Mar	Th	10:30 - 11:20 and 11:30 - 12:20 am					Lab 6
23-Mar	F	9:30 - 10:20 am	Autonomic and Limbic	24	Hypothalamus II	Cassell	
23-Mar	F	10:30 - 11:20 am		25	Limbic System	Cassell	
27-Mar	T	9:30 - 10:20 am		26	Basal Forebrain	Cassell	Case 3 Discussion 1030-1230 1110A Dyken
27-Mar	T	1:30 - 2:20 pm		27	Behavior and Pharmacology of Monoaminergic Systems	Wemmie	
27-Mar	T	2:30 - 3:20 pm			Optional Review	Cassell	
29-Mar	Th	9:30 - 10:20 am	Cerebral Cortex	28	Thalamus	Cornell	Case 3 Discussion 1030-1230 1110A Dyken
30-Mar	F	8:00 - 10:00			Lecture Exam II		
3-Apr	T	9:30 - 10:20 am		29	Cortex	Cornell	Lab 7 Assoc. path, limbic, lat. ventricle
5-Apr	Th	9:30 - 10:20 am		30	Sleep and Wakefulness	Dyken	Lab 7
6-Apr	F	9:30 - 10:20 am		31	Cortical Localization of Function	Tranel	
10-Apr	T	9:30 - 10:20 am		32	Frontal Lobe Syndromes	Tranel	Lab 8 Brain sections, MRIs
10-Apr	T	1:30 - 2:20 pm		33	Memory	Anderson	
12-Apr	Th	9:30 - 10:20 am		34	Language	Anderson	Lab 8
17-Apr	T	9:30 - 10:20 am		35	Epilepsy	Granner	Lab Review
19-Apr	Th	9:30 - 10:20 am		36	Ocular Movements	Thurtell	Lab Review
20-Apr	F	9:30 - 10:20 am		37	Dementia	Denburg	
20-Apr	F	12:30 - 5:00 pm			Lab Exam II		
24-Apr	T	9:30 - 10:20 am		38	Visual Pathways	Wall	Case 4 Discussion Adams

26-Apr	Th	9:30 - 10:20 am	Trauma and Disease	39	Neurodegenerative Disorders	Lee	Case 4 Discussion Adams
27-Apr	F	10:30 - 11:20 am		40	Vascular Syndromes	Adams	

1-May	T	1:30 - 3:20 pm			<i>Optional Review</i>	<i>Course Faculty</i>	
1-May	T	9:30 - 10:20 am		41	Sensory and Motor Syndromes	Adams	
1-May	T	10:30 - 11:20 am		42	Disorders of Development	Bonthius	
8-May	T	9:30 am - 12:30 pm			Final Exam		