Syllabus for Neurobiology of Disease  
03-410-A, Fall, 2012, 9 credit hours

Course Description:
This course will explore the biological basis of several neurological and neuropsychiatric diseases, with an emphasis on medical diagnostic tools and techniques. It will include discussions of the anatomical basis of neurological diseases as well as recent research into understanding the mechanisms of disease. This course is intended to broaden students' understanding of how diseases are diagnosed and studied.

Prerequisites: 03-121 (Modern Biology) or 85-219 (BFoB) or another university neurobiology course

Required Tool: Reflex hammer (sold in bookstore)
Required Text: Neuroantomy through Clinical Cases, 2010, 2nd Edition by Blumenfeld
ISBN: 978-0-87893-613-7


Class times: MWF 11:30 AM – 12:20 PM, HH B103

Instructor: Daniel (DJ) Brasier
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412-268-3377
Office: Mellon Institute 629B
Office Hours: Monday & Thursday 3:00 to 4:00 pm, or by appointment (don’t be shy)

TA’s: Tatjana Wiese
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Office: Thackeray 520 (UPitt)

   Caitlin Winkler
caitlinw@andrew.cmu.edu
Office: Mellon Institute 159

Both TA’s are available by appointment (don’t be shy)

Educational Objectives/ Goals:
- Be conversant in functional brain anatomy.
- Understand the biological basis of many common brain disorders.
- Think like a medical doctor
  o Become familiar with clinical evaluations in neurology and psychiatry.
  o Understand the reasons for various clinical assessments and learn how to interpret results.
  o Learn to take a general patient history & place the neurological exam and the psychiatric exam in the larger context of a patient’s entire physical exam and medical evaluation.
  o Become familiar with reading clinical evaluations of patients and diagnosing diseases.
- **Think like a scientist**
  - Become familiar with scientific methodology.
  - Understand and evaluate the evidence behind scientific theories about brain disorders.
  - Know the distinction between data and theories and its importance in scientific and clinical settings.

**Student-driven learning objectives:**
The neurobiology of disease is a deep and rich field. This course is specifically designed to have students give input on the topics and diseases that we focus on. In the first 2-3 weeks of class, all students in the course are **required to make an appointment to meet with the professor** and discuss their reasons for taking the course and their individual learning objectives. Including how this course fits into each student’s larger learning and career goals and any diseases the student finds of particular interest. The topics for the last 2/3 of the course will be determined by student input and will be announced in February.

**Clinical case study foundations:**
There will be a large portion of this course dedicated to evaluating actual clinical cases. Students should be prepared to learn how to evaluate and interpret a written clinical history. In addition, many *in class activities* will focus on performing clinical evaluations on patients and interpreting the results.

**How to succeed in Neurobiology of Disease:**
- **Attend class and be attentive in class.** Attending class is the most important thing that you can do to be successful in this class. Take notes during class. Students who do not have confidence in their note taking skills should consider audio taping the lectures or reviewing their notes with the TA. Classroom activities may be taped or recorded by a student for the personal use of that student or for all students presently enrolled in the class only, but may not be further copied, distributed, published, or otherwise used for any other purpose without the express consent of Dr. Brasier.
- **Ask questions in class.** Whether these are for clarification, repetition, or because you’re interested and want to know more, student questions make for a better learning environment for all.
- **Think about the in class activities.** As you are learning and practicing clinical evaluations, think about the following:
  - What is the proper way to do this test?
  - Why is this test being performed?
  - If I perform this test on a healthy person, what results would I get?
  - What are the other possible results, and how are those interpreted?
  - *Given my knowledge of brain structure and function and neuroanatomy, *why* is it that a particular result on a clinical test is indicative of a particular type of neurological damage or of a particular psychiatric disorder?*
- **Review/think about/talk about what was covered in class.** In addition to simply showing up for class, spend time between lectures looking over your notes and thinking about what was discussed. This daily review of material is an immensely helpful way of preparing for the next lecture, having questions answered in a timely fashion and learning the material. You can do this alone or in groups with other students in the class. **You should expect to spend on average 6 hours/week outside class reviewing material and preparing for upcoming lectures** (9 units means 3 hours in class, 6 hours outside class).
- **Read (about the brain).** Lots of stuff gets written about the brain. You can go to the library, look on-line, read the newspaper/magazines. Talk to me or the TAs to find other stuff that people have written about the brain. All of this will make you a more sophisticated student and will help you to integrate the topics covered in the course.
- **Read the required and supplementary readings.** Many students have found they do much better with the material if they read ahead prior to class. Be aware of your individual learning style.

- **Contact the TA or the instructor.** Send e-mail any time. Call or visit during office hours for help with any aspect of the course.

- **Required office hours.** All students are required to make an appointment and visit the professor in office hours during the first 2-3 weeks of class to discuss your personal goals and interests in the course.

- **Success in this course is about more than your grade.** We want you to learn to think scientifically about your brain. This will serve you well long after you stop caring about your transcript.

**Grading:**

Your grade is divided into 6 components. The lowest of these 6 will be dropped.

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<thead>
<tr>
<th>Component</th>
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<tbody>
<tr>
<td>Exam 1</td>
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<td>Exam 2</td>
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<td>Exam 3</td>
<td>20%</td>
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<tr>
<td>Practical Exam (Time and location TBA)</td>
<td>20%</td>
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<tr>
<td>Classroom participation</td>
<td>20%</td>
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<tr>
<td>Report</td>
<td>20%</td>
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- **Exams.** Each in-class exam will constitute 20% of your grade. If you miss an exam, your grade for it will be a zero. The mid-term exams are not *explicitly* cumulative, but the final is. However, many of the questions on the second and third midterms will assume a basic understanding of the concepts from the earlier units. This is especially true for the foundational neuroanatomy from Unit 1 which is likely to come up again in Units 2 & 3.

- **The practical exam.** The last exam will have a practical component, which makes it very important that everyone attend on time. The practical exam will require mastery of all the material to succeed (i.e. it is cumulative for the entire course).

- **Exam re-grades.** We are committed to grading as fairly as possible. If you think a mistake was made in grading your exam, you can submit your exam and a written explanation of why you think you deserve more points than you were given and your exam will be re-graded. Re-grades must be submitted **no more than one week** after exams have been returned. The instructors reserve the right to re-grade the entire exam in addition to the disputed question, and add or subtract points.

- **Classroom activities.** Students are required to participate in all classroom activities and to engage in classroom discussions. These include participating in discussion during lecture times and doing the clinical evaluation activities.

- **Report.** Students are required to write a report on one disease of the nervous system. The report will be 6-13 pages, plus references, and should reflect careful evaluation of the topic chosen. Topics must be approved by the instructor or one of the TA's **by 2:00 pm on 4/26.** More details will be given out the second week of classes. **The written report is due at 4:00 pm on May 13**


Academic Integrity:
- **Cheating.** Cheating of any sort will not be tolerated. For example, if quiz or exam answers are copied from another student, both students will receive zeros; if graded exams or quizzes are altered and resubmitted for a higher score, the revised score will be zero. In addition, these and other forms of cheating may also be referred to the Academic Review Board for more severe penalties. This warning has two purposes: 1) to dissuade a small number of students from even thinking about cheating; and 2) to persuade the large majority that they will get a fair grade based on their individual performance.

- **Plagiarism.** Cheating also includes plagiarism, the presentation of the work of another person as one’s own. This applies whether the source of the material is a printed book, a web site, or work of another student from this course or any other course. Lifting even a single sentence without appropriate attribution constitutes plagiarism. Read Promoting Academic Integrity (http://www.cmu.edu/policies/documents/Cheating.html) for official university policy on this issue. Any source you reference (aside from the class text book) must be referenced, even if you only used the source for ideas and did not quote a single word. This applies to all work at CMU, but is especially relevant in this class on the report.

**TURN OFF YOUR CELL PHONE before YOU ARRIVE!** If your phone rings during class, turn it off ASAP. Do not answer it. If it happens more than once, you will be asked to leave for the day.

**Preliminary Class Schedule**

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<tr>
<th>Date</th>
<th>Reading</th>
<th>Lecture Topic</th>
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<tbody>
<tr>
<td><strong>Unit 1: Neurological lesions</strong></td>
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<tr>
<td>1/14</td>
<td>Blumenfeld Ch1</td>
<td>Introduction to clinical cases &amp; neurobiology of disease</td>
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<tr>
<td>1/16</td>
<td>Blumenfeld Ch2</td>
<td>Basic neuroanatomy and important terms &amp; concepts</td>
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<td>1/18</td>
<td>Blumenfeld Ch3</td>
<td>Neurological Exam &amp; pupillary control</td>
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<tr>
<td>1/21</td>
<td>Blumenfeld Ch2</td>
<td>Synaptic communication</td>
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<td>1/23</td>
<td>Blumenfeld Ch6</td>
<td>Limb weakness</td>
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<tr>
<td>1/25</td>
<td>Blumenfeld Ch6</td>
<td>ALS</td>
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<tr>
<td>1/28</td>
<td>Blumenfeld Ch7</td>
<td>Numbness</td>
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<tr>
<td>1/30</td>
<td>Blumenfeld Ch7</td>
<td>Pain</td>
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<td>2/1</td>
<td>Blumenfeld Ch8</td>
<td>Spinal cord compression</td>
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<td>2/4</td>
<td>Blumenfeld Ch10</td>
<td>Cerebral cortex &amp; stroke</td>
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<td>2/6</td>
<td>Blumenfeld Ch10&amp;19</td>
<td>Aphasia &amp; language</td>
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<tr>
<td>2/8</td>
<td>Blumenfeld Ch10&amp;19</td>
<td>Hemineglect</td>
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<td>2/11</td>
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<td><strong>Exam I</strong></td>
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<td>3/6</td>
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<td><strong>Exam II</strong></td>
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<td>4/22</td>
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<td><strong>Exam III</strong></td>
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<td><strong>NOTE: Report topic must be approved by 4/26 at 2:00 pm</strong></td>
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<tr>
<td>4/24</td>
<td>Blumenfeld Ch5</td>
<td>Headaches &amp; cerebrospinal fluid</td>
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<td><strong>NOTE: Report topic must be approved by 4/26 at 2:00 pm</strong></td>
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<tr>
<td>4/26 – 5/1</td>
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<td>Review of neurological and psychiatric exam techniques</td>
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<td>with special emphasis on relationship to disorders covered in class</td>
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<tr>
<td>5/3</td>
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<td><strong>Practical Exam</strong></td>
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<td><strong>NOTE: Report topic must be approved by 4/26 at 2:00 pm</strong></td>
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Options for the last 2/3 of the class

_____ Addiction
_____ Alzheimer's & dementia
_____ Amnesia & other memory problems
_____ Anxiety disorders
_____ Ataxia (walking, balance, & coordination defects)
_____ Attentional disorders (e.g. ADHD)
_____ Auditory dysfunction (e.g. sensorineural hearing loss)
_____ Autism
_____ Bipolar disorder
_____ Coma, vegetative states, brain death, etc.
_____ Concussion & traumatic brain injury
_____ Cotard syndrome and other bizarre diseases (Capgras, Fregoli, reduplicative paramnesia, etc.)
_____ Depression
_____ Disorders of awareness (e.g. hemineglect, blindsight, and Anton’s)
_____ Dyslexia and other linguistic or learning disabilities
_____ Epilepsy
_____ Eye movements
_____ Hemianopia and cortical blindness
_____ Infections (encephalitis, meningitis, Creutzfeldt-Jakob disease, etc.)
_____ Insomnia & sleep disorders
_____ Multiple sclerosis
_____ Obsessive-compulsive disorder
_____ Olfactory dysfunction
_____ Parkinson's disease & dystonia
_____ Post-traumatic stress disorder
_____ Prefrontal cortex damage & planning disorders
_____ Prosopagnosia and other agnosias
_____ Psychopathy
_____ Retinal dysfunction (e.g. Macular degeneration)
_____ Schizophrenia
_____ Single-gene disorders (Tay-Sachs disease, Huntington’s disease, Fragile X syndrome, etc.)
_____ Tourette syndrome
_____ Other (list below)