Syllabus for Neurobiology of Disease
03-260, Spring, 2014, 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. Students will also learn how basic neurological and psychiatric evaluations are conducted and gain proficiency in these evaluation techniques. We will discuss clinical neuroanatomy to serve as a basis for understanding brain structures and functional alterations in a variety of developmental, degenerative, neurological, and psychiatric disorders.

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

Recommended Texts:  
  Sinauer, ISBN: 978-0878936137  

Other Texts:  

Class times: MWF 11:30 AM – 12:20 PM, WEH 7500

Instructor: Daniel (DJ) Brasier  
dbrasier@cmu.edu  
412-268-3377  
Office: Mellon Institute 336  
Office Hours: Friday 10:30 to 11:20 pm in DH 2313, or by appointment (don’t be shy)

TA's:  
- Kamy Wakim  
kwakim@andrew.cmu.edu  
- Amira Millette  
amillett@andrew.cmu.edu  
Office hours: 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**  
  - Become familiar with clinical evaluations in neurology and psychiatry.  
  - Understand the reasons for various clinical assessments and learn how to interpret results.  
  - 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.  
  - 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.
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?
  - 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.

- **Office hours.** All students are encouraged 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 course grade will be calculated two ways. Whichever is higher is the grade you will be given.

<table>
<thead>
<tr>
<th>Score</th>
<th>Percentage</th>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/3</td>
<td>10%</td>
<td>Neuroanatomy Quiz (67 points)</td>
<td>10%</td>
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<tr>
<td>3/5</td>
<td>10%</td>
<td>Practical Exam (66 points)</td>
<td>10%</td>
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<tr>
<td>2/28</td>
<td>15%</td>
<td>Exam 1 (100 points)</td>
<td>15%</td>
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<tr>
<td>4/4</td>
<td>15%</td>
<td>Exam 2 (100 points)</td>
<td>15%</td>
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<td>4/30</td>
<td>15%</td>
<td>Exam 3 (100 points)</td>
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<td>TBA</td>
<td>15%</td>
<td>Final Exam (100 points)</td>
<td>30%</td>
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<td>4/23</td>
<td>10%</td>
<td>Disease report (66 points)</td>
<td>10%</td>
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<tr>
<td>Ongoing</td>
<td>10%</td>
<td>Class participation &amp; activities (66 points)</td>
<td>10%</td>
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(TOTAL = 665 points)

- **Exams.** Each in-class exam will constitute 15% 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 cumulative. However, many of the questions on the second and third midterms will assume a basic understanding of the concepts from the earlier units.

- **The practical exam.** The first exam will have a separate, practical component, which makes it very important that everyone attend on time on 3/5. Details will be announced closer to the date.

- **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 activities.

- **Report.** Students are required to write a report on one disease of the nervous system. The report will be 7-13 pages, plus references, and should reflect careful evaluation of the topic chosen. Topics must be approved by the instructor or TA by 3/19, and an outline is due on 4/9. More details will be given out the second week of classes. *The written report is due at 4:00 pm on April 23rd.*

**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 books) 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 written 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.

Check blackboard prior to each class period for required reading assignments and posted lecture slides.

**Class Schedule**

<table>
<thead>
<tr>
<th>Date</th>
<th>Reading</th>
<th>Lecture Topic</th>
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<tbody>
<tr>
<td><strong>Unit 1: Neurological disorders</strong></td>
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<tr>
<td>1/13</td>
<td>Blumenfeld Ch1</td>
<td>Introduction to clinical cases &amp; neurobiology of disease</td>
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<tr>
<td>1/15</td>
<td>Blumenfeld Ch2</td>
<td>Basic neuroanatomy and important terms &amp; concepts</td>
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<tr>
<td>1/17</td>
<td>Blumenfeld Ch3</td>
<td>* Neurological exam &amp; pupillary control activity</td>
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<td>1/20</td>
<td>Blumenfeld Ch10&amp;19</td>
<td>Aphasia &amp; Frontal cortex</td>
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<tr>
<td>1/22</td>
<td>Blumenfeld Ch10&amp;19</td>
<td>Vision, Identification, &amp; Hemineglect</td>
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<td>1/24</td>
<td>TBA</td>
<td>Visual attention (TW)</td>
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<td>1/27</td>
<td>N/A</td>
<td>* Mental status exam activity</td>
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<td>1/29</td>
<td>TBA</td>
<td>Delusional misidentification &amp; other bizarre disorders (KW)</td>
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<td>1/31</td>
<td>TBA</td>
<td>Zombies &amp; Infections (EBM)</td>
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<td><strong>Quiz Q&amp;A session with TA’s, time &amp; location TBA</strong></td>
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<td>2/1</td>
<td>Quiz Q&amp;A session with TA’s, time &amp; location TBA</td>
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<td>2/3</td>
<td>Neuroanatomy quiz</td>
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<td>2/5</td>
<td>Blumenfeld Ch18</td>
<td>Memory &amp; Amnesia (NU)</td>
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<td>2/7</td>
<td>Toy Case23</td>
<td>Alzheimer’s (NU)</td>
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<td>2/10</td>
<td>Blumenfeld Ch16</td>
<td>Parkinson’s &amp; Huntington’s (AM)</td>
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<td>2/12</td>
<td>Blumenfeld Ch2</td>
<td>Nerve conduction: Multiple Sclerosis &amp; Guillain-Barré</td>
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<td>2/14</td>
<td>Blumenfeld Ch2</td>
<td>Synaptic communication: Lambert-Eaton &amp; Myasthenia gravis</td>
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<tr>
<td>2/17</td>
<td>Blumenfeld Ch6</td>
<td>Limb weakness: Upper &amp; Lower motor neurons</td>
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<td>2/19</td>
<td>N/A</td>
<td>* Motor control activity</td>
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<tr>
<td>2/21</td>
<td>Blumenfeld Ch7</td>
<td>Somatosensation: Periphery, Spinal Cord, &amp; Brain</td>
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<tr>
<td>2/24</td>
<td>N/A</td>
<td>* Sensory &amp; motor exam activity</td>
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<tr>
<td>2/26</td>
<td>Blumenfeld Ch15</td>
<td>Ataxia</td>
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<td><strong>Exam 1 Q&amp;A session with TA’s, time &amp; location TBA</strong></td>
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<tr>
<td>2/28</td>
<td>Exam I</td>
<td>(all of unit 1)</td>
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<tr>
<td>3/3</td>
<td>N/A</td>
<td>Preparation for practical exam and Q&amp;A</td>
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<tr>
<td>3/5</td>
<td>Practical</td>
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*Continued on the next page*
Unit 2: Developmental & degenerative disorders
3/17 N/A Patient perspectives on neurological/vascular diseases
3/19 Blum.Ch5&18 + Toy17 Concussion & Traumatic brain injury

NOTE: Report topic must be approved by 3/19 at 3:00 pm

3/21 Blumenfeld Ch14 Coma & Brain death
3/24 TBA Epilepsy
3/26 Toy Case37 Insomnia & Narcolepsy
3/28 Toy Cases2&26 Schizophrenia introduction & physician experiences (LM)
3/31 Toy Case46 Autism
4/2 N/A * Developmental & degenerative disorders activity

4/2 Exam 2 Q&A session with TA’s, time & location TBA

4/4 Exam II ************

Unit 3: Neuropsychiatric disorders
4/7 Toy Case28 ADHD
4/9 Toy Cases14, 52, & 31 Addiction (see also Toy Cases 9, 16, 55, & 59)

*** Report outline due 4/9 at 4:00 pm ***

4/14 Toy Cases1&18 Depression & Bipolar (see also Toy Case 7)
4/16 Toy Cases8&11 Anxiety (see also Toy Cases 3 & 30)
4/18 Toy Cases13&42 OCD and Tourette’s (see also Toy Case 20)
4/21 TBA Psychiatric disorders recap

******* REPORT DUE 4/23 at 4:00 pm, (preferably by e-mail) *******

4/23 N/A * Psychiatric activity
4/25 N/A Schizophrenia patient experiences (MS)
4/28 Toy Cases2&26 Schizophrenia biology (see also Toy Cases 6, 15, 27, & 54)

4/28 Exam 3 Q&A session with TA’s, 7:00 pm & PH 125C

4/30 Exam III ************

5/2 Toy Case25 Psychopathy & Antisocial Personality Disorder

TBA Final Exam ************

******* Optional report rewrite due 5/12 at 4:00 pm, (preferably by e-mail) *******