Course Time: Tues + Thurs, 10:30-11:50am  
Course Location: Solomon Psych Lab A30  

Professor: Hilary Gerstein, Ph.D.  
Lecturer & Associate Director of Education  
Department of Psychology, Center for Neuroscience & Society  
Email: Hgerstein@psych.upenn.edu  
Office Location: Goddard Labs 203, Hamilton Walk  
Office Hours: Tues 12:30-2:20pm or by appointment

Course Description
This course focuses on the current state of our knowledge about the neurobiological basis of learning and memory, integrating psychological methods and theory with the methods and concepts of neuroscience. How can changes in the brain underlie personal experiences? Where and how does the brain store the experiences that make us individuals? A combination of lectures and student seminars will explore the molecular, cellular, and systems basis of learning and memory in invertebrates and vertebrates from a behavioral and neural perspective.

Webpage & Email
The course webpage is available on Canvas. You will find this syllabus, lecture slides, all required readings and other course materials, as well as related links. You are expected to check both your college email and the course Canvas page frequently for course announcements and updates on readings and assignments. I will respond to emails when I can (usually within 24h), but do not expect quick responses during weekend and evening hours and plan accordingly.

Course Policies and Requirements

Syllabus + Readings: This syllabus is your primary source of information about the policies and schedule of the course. If it’s in the syllabus, you are responsible for it. This syllabus is provisional and subject to change. You are expected to do the readings as assigned, available on Canvas. Class time will be spent on discussion of the assigned readings, and it will be difficult to fully participate without having prepared.

Lectures: Tuesday class meetings will usually be lecture-style. Lecture slides will be posted on Canvas after lecture, however, to succeed in this course, it is recommended that you attend the lectures. If you miss a lecture, you should attempt to get the notes of a fellow student who did attend, as the slides lack detail for which you will be responsible.

Student-led Seminars: Thursday class meetings will usually be student-led seminars discussing important papers in the field. As a seminar style course, attendance and participation are mandatory. As a courtesy to your fellow students, please make an effort to be on time; your participation grade will suffer if you are habitually late. At minimum, each student is expected to speak and contribute to the discussion ~3 times during each seminar as part of their participation grade (participation in all Tues classroom activities is also expected). Asking questions about something in the papers counts as speaking/participation, chances are other students have similar questions, so speak up! If you miss a seminar class meeting, you may contact me (prior to the absence if possible) to make up your participation.

Note Taking & Technology: Laptops and tablets are welcome in class, but be mindful of their use and please only use them for note taking, paper reading, and for classroom activities as directed. More broadly, be considerate: it is distracting for your fellow students if you are accessing e-mail or online in class; research has found that laptop use impairs academic performance for laptop-users and also those around them.
Cell phones must be on silent and stowed away during class unless permission is given for their use in a specific activity. Always bring a pen and paper with you as I will sometimes ask you to complete written or drawing activities in class.

Accommodations & Academic Integrity: Any students with documented special needs or learning disabilities should discuss them with the instructor during the first week of class. Please note that Penn has strict rules on academic integrity (see www.upenn.edu/academicintegrity). Violations of the rules will be reported to the Office of Student Conduct and will likely result in automatic failure of the course.

Grades
20%  Midterm Exam (Oct 2\(^{nd}\))
30%  Final Exam (Dec 7\(^{th}\))
30%  Seminar Facilitation/Presentation
20%  Overall Participation

Exams: There is a midterm exam and a final exam, both of which will be taken on the dates above during normal class meeting time. Illness, religious holiday, and other valid reasons for taking an exam at a different time should be brought to my attention as early as possible, ideally prior to said exam.

Seminar Facilitation: I will hand out a separate sheet with details on what is expected of you when you lead class discussion on your paper. Sign-ups for facilitation dates will occur the second week of class once the roster is finalized, so please make sure you are aware of major conflicts (trips, exams/projects for other courses, other responsibilities) in your semester and have your calendar with you on Sept 5 and 7\(^{th}\).

COURSE SCHEDULE

<table>
<thead>
<tr>
<th>Week</th>
<th>Tuesday</th>
<th>Thursday</th>
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| 1    | August 29  
**Introduction, Basic Concepts, Historical Background** | August 31  
**Action Potentials, Synaptic Plasticity, LTP** |
| 2    | September 5  
**LTP/LTD, Strengthening Synapses** | September 7  
**Strengthening Synapses, Protein Synthesis** |
| 3    | September 12  
**Calcium, Dendritic Spines, Signaling** | September 14  
**How Can/Do We Study Memory?** |
| 4    | September 19  
**Memory Formation 1** | **Rosh Hashanah Holiday**  
**No Class** |
| 5    | September 26  
**Memory Formation 2** | September 28  
**Seminar: Memory Formation** |
| 6    | October 2  
**Midterm** | **Fall Break**  
**No Class** |
| 7    | October 10  
**Memory Consolidation & Reconsolidation** | October 12  
**Seminar: Consolidation, Drosophila memory** |
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<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>8</td>
<td>October 17</td>
<td>Genetics &amp; memory</td>
<td>October 19</td>
<td>Seminar: Epigenetics, gene expression</td>
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<td>9</td>
<td>October 24</td>
<td>Space, Place, Time</td>
<td>October 26</td>
<td>Seminar: Place cells, Time cells</td>
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<td>10</td>
<td>October 31</td>
<td>Beyond visual memory</td>
<td>November 2</td>
<td>Seminar: Song bird studies, language</td>
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<td>11</td>
<td>November 7</td>
<td>Amygdala and memory</td>
<td>November 9</td>
<td>Seminar: Fear conditioning, Extinction</td>
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<td>12</td>
<td>November 14</td>
<td>Human memory, Prefrontal Cortex, Anatomy</td>
<td>November 16</td>
<td>Seminar: Cogneuro memory methods</td>
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<td>13</td>
<td>November 21</td>
<td>Seminar: Neurogenesis</td>
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<td>Thanksgiving</td>
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<tr>
<td>14</td>
<td>November 28</td>
<td>Seminar: False memories?</td>
<td>November 30</td>
<td>Seminar: Aging and memory</td>
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<td>15</td>
<td>December 5</td>
<td>Seminar: Sleep, stress, etc</td>
<td>December 7</td>
<td>Wrap Up &amp; Exam</td>
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