Physiological Psychology (PSYC 221)
Fall 2011

Professor:
John Green
Dewey Hall 358
E-mail: john.green@uvm.edu
Office hours: By appointment

Teaching Assistants:
Kim Rhodes-Lezak
E-mail: kimberly.rhodes@uvm.edu
Office hours: TBA

Olga Lipatova
E-mail: olga.lipatova@uvm.edu
Office hours: TBA

Laboratory Technician:
Jeremy Arenos
E-mail: jeremy.arenos@uvm.edu
Dewey Hall 126

Meeting Time & Location:
Class: Living/Learning Commons 216
Tuesdays and Thursdays, 2:30-3:45 pm

Lab: Dewey 126
Wednesdays, 3:00-6:00 pm (Section A)
or
Thursdays, 9:00-12:00 pm (Section B)

Prerequisites: Psychology Research Methods I (PSYC 109) and Biopsychology (PSYC 121)

Course Description: This course will examine the structure and function of the mammalian nervous system, focusing on the neurobiological bases of sensory experience, perception, and movement. Throughout these discussions, the processes and mechanisms involved in changes in neural function (i.e., neural plasticity) in response to sensory stimulation and the influence of top-down processing (e.g., attention) on sensory and motor processing will be recurring themes. The course will also include weekly individual laboratory experience.

The broad goal of this course is to provide you with an advanced foundation in basic principles of the nervous system, and an understanding of sight, hearing, touch, taste, smell, and movement from the level of individual neurons to cortical systems. This foundation will help to prepare you for courses in neuroscience that emphasize molecular and cellular neuroscience (e.g., BIOL 261, Neurobiology) and for graduate school in biobehavioral psychology or neuroscience, or medical school.

There is some overlap in material between this course and several other neuroscience-related courses (Biopsychology [PSYC 121]; Cognitive Neuroscience [CSD 281]; Exploring Neuroscience [NSCI 110]; Neurobiology [BIOL 261]). This is intentional. Some overlap is in terms of neurophysiology, a general topic that is difficult to fully understand the first (or even second) time you learn about it. I think you’ll find that what I present complements what is presented in Biopsychology or Exploring Neuroscience. Other overlap is in terms of sensory and motor systems, where I emphasize different aspects (e.g., plasticity; cognitive processes; supplementary motor systems) from Neurobiology and de-emphasize some of the things (e.g., second messenger systems) that are covered in Neurobiology. Overlap in coverage of sensory and motor systems is also because many students take either this course or Neurobiology, rather than both.

Learning Goals: The Department of Psychology has identified 4 program-wide learning goals to meet in our upper-level courses. Here is how this course meets those 4 goals:

1. Students should demonstrate knowledge of core concepts, theoretical perspectives, empirical findings, and historical trends in most of the core areas of psychology (social, developmental, clinical, biobehavioral,
learning & memory, and history of psychology) and their interrelationships. The lectures will address this goal for biobehavioral psychology. Exams will be used to assess how well this goal is being met.

2. Students should demonstrate knowledge of the ethical standards and the scientific process in psychology including research methods and applications. The supplemental readings from the primary literature will address this goal. Oral presentations and discussion will be used to assess how well this goal is being met. The laboratory exercises will also address this goal. Lab reports will be used to assess how well this goal is being met.

3. Students should be able to evaluate critically and interpret psychological claims from a scientific perspective. See #2.

4. Students should be able to review and communicate psychological material effectively both orally and in writing. See #2. Short essay questions on exams will also be used to assess how well this goal is being met.

Required Textbook:

Supplemental Readings: (available on the class Blackboard site under the week they are to be presented)

Attendance: Attendance of lectures is highly encouraged, since I will be discussing material not on the Powerpoint slides. Please be on time! A few times throughout the semester, at the beginning of class, I will take attendance. You will receive 5 pts of extra credit for no more than 1 absence during these attendance takings. If you are absent on more than 1 of these occasions, you will receive no extra credit points. Attendance of at least 9 of 10 labs is mandatory (see Laboratory section below).

Religious Holidays: Students have the right to practice the religion of their choice. If your religious observance will affect your attendance, you should submit in writing to me your documented religious holiday schedule for the semester by the end of the second full week of classes. Faculty must permit students who miss work for the purpose of religious observance to make up this work.

Special Needs & Health: For special needs, you can get information at www.uvm.edu/~access. For health-related issues, you can get information at www.uvm.edu/health.

Important Dates: The Add/Drop deadline is Monday, September 12. If you drop the course before this deadline, it
will be removed from your transcript. The Withdrawal deadline is **Monday, October 31**. If you withdraw from the course before this deadline, it will remain on your transcript with a grade of ‘W’.

**Evaluation:**

- Exam 1 – 20%  
  100 points
- Exam 2 – 20%  
  100 points
- Exam 3 (partially cumulative) – 20%  
  100 points
- Lab reports (4) – 28%  
  140 points
- Article presentation & summary – 12%  
  60 points

**500 points**

**NOTE:** To calculate your grade, add all of your points (including any extra credit for attendance) and divide by 500.

**General Grading Rubric:**

- **A** = Outstanding. Excellent grasp of important concepts and methods in addition to clearly demonstrated hard work and effort.
- **B** = Very good. Solid grasp of important concepts and methods in addition to obvious hard work and effort.
- **C** = Average. Grasp of some concepts and methods but also some deficiencies. Work and effort adequate.
- **D** = Below average. Not enough effort or not a well organized effort put in to trying to learn the material and convey that understanding.
- **F** = Poor. Lack of understanding of material. Little evidence of effort and/or any organization to effort.

**Exams:** Exam format generally will be multiple-choice and short essay answer. Exams will cover lectures, assigned textbook readings, and supplemental readings. Make-up exams must be arranged with the instructor **at least 48 hours prior to the exam**. In the event of an illness, make-up exams will be administered **only if a medical excuse is provided by the Dean’s office**. If you have a medical condition that may interfere with taking an exam sometime in the semester, you must contact me in the first week of class to discuss it.

**General structure of the class:** Lectures will cover important topics in the textbook, including concepts and key experiments, and will add supplementary information. **I want to emphasize here that talking out ideas is part of learning so I will be encouraging discussion of topics during lectures throughout the semester.** To facilitate this, we will be doing some THINK-PAIR-SHARE exercises. On some days, students will be leading discussions of the supplementary readings for part of the class. My role will be to guide and shape the discussion, but I expect students to take an active role in posing and (hopefully) answering questions.

**Blackboard information:** I will be using Blackboard to manage the course. Just point your browser to: [bb.uvm.edu](bb.uvm.edu) and log in using your UVM NetID and password. The syllabus and basic information regarding the semester plan will be available online. In addition, the supplemental readings and the lab manual will be available as PDF files.

On the **Friday** before the following week’s classes, a **reduced version of the** PowerPoint overheads that I will use for lecture will be made available as a PDF file. **PLEASE NOTE:** These posted overheads do not contain all of the information on the final overheads that are presented during lecture!!

**Graduate Credit:** Graduate students taking this class for graduate credit will be required to write a 10 page review paper on a topic of their choice. The only restriction on the topic is that it should be related to Physiological Psychology (i.e., there needs to be both a behavioral and a neuroscience component). See me for approval of your topic. At least 15 references are required. The paper should be in APA format, 11 point Arial font, 0.75” margins, and double-spaced. It is due no later than the final class. The paper is worth 100 points, so your grade will be calculated out of 600 points, rather than 500. A **half page description of your paper topic is due by Thursday, October 27.**

**Article presentation & summary:** For about 20 minutes of designated classes, a team of students will “assume the lecturer’s position” and present the supplemental reading for that week and lead a class discussion. These presentations
must be made in Powerpoint format and sent to me 24 hours prior to class. I will post them on the Blackboard site after the presentation.

Your team will consist of you and 2-3 other students. You should all work together on this project, but you should choose 1-2 of your team members to do the oral presentation, since 3-4 presenters is too many. You should work together to divide up the workload. One strategy is to have the non-speakers handle the after-presentation questions and/or the written assignment.

These papers will be challenging for you to read and will likely require more than one read-through. I think you will be amazed at how much you can understand with careful reading and discussion with your classmates. This is excellent practice for those of you interested in graduate school, where most of your reading will be in the form of journal articles.

Your Powerpoint presentation should present the paper in the following order (even though some papers have the Methods section last):

1. **Introduction**
   - (a) Introduce the main concept (for a review paper) or reason for doing the study (for an empirical article), in your own words
   - (b) For an empirical paper, what is the hypothesis (generally stated towards the end of the Introduction)?
   - (c) Why should we care about this particular topic?

2. **Methods**
   - (a) Describe the methods used to address the research question(s)
   - (b) Focus on the purpose of particular methods, rather than every detail

3. **Results**
   - (a) Describe the most important results produced; again, don’t focus on every detail such as F-values of statistical tests
   - (b) Show and explain important figures from the paper – first describe the “take-home” message of the figure and then just enough detail (e.g., what do x- and y-axes represent?) so that audience can see the relevance to main results

4. **Discussion**
   - (a) For an empirical paper, the first paragraph of the Discussion is usually a summary of the results; the rest of the discussion integrates the results with previous findings
   - (b) For an empirical paper, how do the results relate to the main concept or reason for doing the study?
   - (c) How (in terms of concepts and/or methods) is this paper related to our lecture topics?

Summarize! Your Powerpoint presentation should be no more than 10 slides, not including a title slide. Do not copy and paste long passages out the article!

Define! Make sure to define terminology that your audience (or you) might not be familiar with. If you don’t know a term, look it up. Wikipedia provides a good starting point.

Prepare! If you are not presenting, please be prepared to discuss the article. To encourage this, you are required to write down a question you have about the article. I will call on random people to present their questions, and you will turn your questions in at the end of the presentation. These must be typed and handed in in person! If you turn in a question for at least 8 of 9 presentations (you don’t need to turn in a question for your own), you will receive 3 points of extra credit.

Write up! A 2 page (1” margins, 12 pt font, 1.5 spacing) written summary of the article and the class discussion of it will be due by class time one week after your presentation. Every day late will be penalized 5 points. (Please, no excuses!)

Points (out of 60 points total – 12% of your total possible points) will be awarded based on the following criteria:
1. Quality of Powerpoint overheads & presentation – 40 pts (less text, more figures is preferable!)
2. Understanding of the paper – 10 pts (exhibited during presentation)
3. Quality of the written summary – 10 pts (include any questions/comments of audience)

Laboratory: There will be a 3-hour laboratory. You must attend the lab section that you registered for (either Wednesdays, 3:00-6:00 pm, or Thursdays, 9:00-12:00 pm). The laboratories involve hands-on experience with a number
of techniques in physiological psychology. More information will be provided in the first meeting of the laboratory in Week 3. **A complete lab manual is available on the Blackboard course site under Week 1, Lab Materials.**

<table>
<thead>
<tr>
<th>Week</th>
<th>Lab 1: Sheep Brain Dissection and Biopac Tutorial</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td><strong>Lab 2: Electroencephalogram</strong></td>
</tr>
<tr>
<td>5</td>
<td><strong>Lab 3: Galvanic Skin Response and Polygraph</strong></td>
</tr>
<tr>
<td>6</td>
<td><strong>Lab 4: Electronic Instrumentation in the Laboratory</strong></td>
</tr>
<tr>
<td>7</td>
<td>Lab 5: Introduction to Crayfish Motoneuron</td>
</tr>
<tr>
<td>8</td>
<td>Lab 6: Crayfish Motoneuron</td>
</tr>
<tr>
<td>9</td>
<td>Lab 7: Frog Compound Action Potential</td>
</tr>
<tr>
<td>10</td>
<td>Lab 8: Electrooculogram and Cow Eye Dissection</td>
</tr>
<tr>
<td>11</td>
<td>Lab 9: Cockroach Touch Receptor</td>
</tr>
<tr>
<td>14</td>
<td>Lab 10: Sensory Motor Learning</td>
</tr>
</tbody>
</table>

**You must attend these labs. **A LAB REPORT FOR LAB 2 (Electroencephalogram) IS MANDATORY!!!!!!** The reason for this is to get everyone on track right away regarding how to write a proper lab report.

- Lab reports are required for 3 labs chosen from the other 4 labs in bold type. Each of the 4 lab reports you turn in will be worth up to 35 points. You **must** attend the lab that you write a report for.

- Any data needed for writing the lab reports will be posted on the Blackboard site by Friday at 5 pm for that week’s lab. The lab report will be due by the following Friday at 5 pm. Each week day late will be penalized 5 points.
  - **PLEASE NOTE:** You can no longer use the mailboxes in the Dewey mailroom to turn in assignments. Please turn in assignments either in person to the TA of your lab section or put it in the drop box for your lab section outside of Psychology Main Office (Dewey 246). The drop boxes are large gray boxes mounted to the wall to the right of the Main Office door. Make sure you put your report in the correct drop box!!

- Lab attendance is very important! **You are allowed to miss 1 of the 10 labs (except Labs 2 & 4, which you must attend) with no penalty.** Thereafter, you will lose **10 points** for each lab missed.

**Class Schedule:** Every effort will be made to stay on schedule. While there may be minor changes in the syllabus, the examination schedule will almost certainly not be changed. Labs in **bold** have lab reports associated with them.
<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Topic</th>
<th>Textbook</th>
<th>Additional Reading</th>
<th>Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aug. 30</td>
<td>Syllabus &amp; Introduction Some Background</td>
<td>Chapter 1</td>
<td>Get “Lab Materials” from Blackboard site</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Sep. 6</td>
<td>Neurophysiology – Resting Potential</td>
<td>Chapter 2 (pp. 23-34)</td>
<td></td>
<td>Sheep Brain Dissection &amp; Biopac Tutorial</td>
</tr>
<tr>
<td></td>
<td>Sep. 8</td>
<td>Neurophysiology – Resting Potential</td>
<td>Chapter 3 (pp. 57-61)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Sep. 13</td>
<td>Neurophysiology – Action Potential</td>
<td>Chapter 3 (pp. 61-72)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sep. 15</td>
<td>Neurophysiology – Action Potential</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Sep. 20</td>
<td>Neurophysiology - Techniques</td>
<td>Chapter 2 (pp. 50-55)</td>
<td>deCharms (pp. 720-725)</td>
<td>Electro-encephalogram</td>
</tr>
<tr>
<td></td>
<td>Sep. 22</td>
<td>Neurophysiology - Synapses</td>
<td>Chapter 3 (pp. 73-85)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Sep. 27</td>
<td>Neurophysiology - Synapses</td>
<td></td>
<td>Rosenkranz et al.</td>
<td>Galvanic Skin Response &amp; Polygraph</td>
</tr>
<tr>
<td></td>
<td>Sep. 29</td>
<td>EXAM 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Oct. 4</td>
<td>Sensory Processing – Physiology/Psychology</td>
<td>Chapter 8 (pp. 215-228)</td>
<td>Snyder</td>
<td>Electronic Instrumentation</td>
</tr>
<tr>
<td></td>
<td>Oct. 6</td>
<td>Sensory Processing – Anatomy</td>
<td>Chapter 2 (pp. 35-37)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Oct. 11</td>
<td>Touch &amp; Pain</td>
<td>Chapter 8 (pp. 228-245)</td>
<td>Briggs &amp; Usrey</td>
<td>Intoduction to Crayfish Motoneuron</td>
</tr>
<tr>
<td></td>
<td>Oct. 13</td>
<td>Touch &amp; Pain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Oct. 18</td>
<td>Auditory System</td>
<td>Chapter 9 (pp. 247-268)</td>
<td>DeWall et al.</td>
<td>Crayfish Motoneuron</td>
</tr>
<tr>
<td></td>
<td>Oct. 20</td>
<td>Auditory System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Oct. 25</td>
<td>Taste &amp; Smell</td>
<td>Chapter 9 (pp. 268-280)</td>
<td>Roye et al.</td>
<td>Frog Compound Action Potential</td>
</tr>
<tr>
<td></td>
<td>Oct. 27</td>
<td>Taste &amp; Smell</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Nov. 1</td>
<td>EXAM 2</td>
<td>Chapter 10</td>
<td>Electrooculogram &amp; Cow Eye Dissection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nov. 3</td>
<td>Basics of the Visual System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Nov. 8</td>
<td>Higher Functions of the Visual System</td>
<td>Chapter 10</td>
<td>Cockroach Touch Receptor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nov. 10</td>
<td>Higher Functions of the Visual System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Nov. 15</td>
<td>no class – Society for Neuroscience mtg.</td>
<td>Chapter 11</td>
<td>Monosov et al.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nov. 17</td>
<td>Movement – Main Motor System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Nov. 22</td>
<td>no class – Happy Thanksgiving!</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nov. 24</td>
<td>no class – Happy Thanksgiving!</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Nov. 29</td>
<td>Movement – Main Motor System</td>
<td>Chapter 11</td>
<td>Busan et al.</td>
<td>Sensory Motor Learning</td>
</tr>
<tr>
<td></td>
<td>Dec. 1</td>
<td>Movement – Supplemental Motor Systems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Dec. 6</td>
<td>Movement – Supplemental Motor Systems</td>
<td>Chapter 11</td>
<td>Moody et al.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dec. 8</td>
<td>Reading Day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final</td>
<td>Mon., Dec. 12, 1:30-4:15</td>
<td>EXAM 3 (cumulative)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>