Biology 109 - Human Neuroanatomy and Physiology (4 Units – Spring 2005)  full version 1/12/05

General: Biology 109 lecture meets in DH 351 on TTH 1200-1315. Labs meet in DH 443.

Instructor: Dr. Robert Hyde. Office hours: DH 340 on TTh 1000-1150; by Appt.  
Phone: (408) 924-4882.  E-mail: <rhyde@email.sjsu.edu>

Description: Biol. 109 is an introduction to the basic principles of structure and function of the nervous system, from cellular mechanisms to control of behavior. This course includes clinical applications. Prerequisites are a course (or courses) in Human Anatomy and Physiology.

Lab: The human brain specimens are delicate and deserve utmost professional respect. Please point carefully to any specimens with the pointers provided. Safety rules are given during the first lab. NO FOOD, drink, or visitors in lab. NO materials may be removed from lab. For extra review or having missed an early lab, attend other labs if space is available. See <Google.com> → “hyde neuroanatomy” → Hyde → Lab Guide Images.

Objectives: The learner in Biology 109 should be able to
• Explain concepts orally and in writing with organization and clarity;
• Explain the significance of neuroglia, neurons, and neuronal plasticity;
• Compare similarities and differences between resting, action, and synaptic potentials;
• Relate primary afferent fibers to the major sensory pathways;
• Explain how stretch and inverse stretch reflexes operate and interact;
• Explain how gamma motoneurons control muscle contraction;
• Diagnose neurologic deficits when spinal cord injury severs sensorimotor tracts;
• Explain how motor cortex/premotor cortex, basal ganglia, and cerebellum interact;
• Relate pharmacology of neurotransmitters to function of the autonomic nervous system;
• Explain how limbic system structures affect the ANS, moods, hormones, and learning;
• Diagnose cognitive/sensorimotor deficits from various cortical injuries;
• Identify structures/functions for all major neural components.

Requirements:

Exams: Two midterms, a lecture final, 5 “take-home reviews” and 6 lab quizzes are entered for credit.  
Midterm questions are short answer/explanation and multiple choice, from study questions, class activities, and worksheets. Take-home reviews are study quizzes with class time devoted to discussion. Lab quizzes are short answer for structure and function, from lab specimens and activities.

Missed Exams: Immediately alert the instructor. An acceptable, documented excuse may allow taking a missed midterm before the next class meeting. If not, the percentage score on the Final, minus 20%, is entered. The lowest-scoring lab quiz (or one missed quiz) is dropped.

Texts:  
Hyde (2003) Course Reader for Human Neuroanatomy. (pay PreDental Club)  

Dishonesty: Copying other’s exams and other forms of cheating can result in expulsion from the University. See Schedule and Directory for details.

Late Add/Withdrawal: Students must add by the deadline. The university will not accept late Adds after the deadline. University and Departmental guidelines require serious and compelling reasons to drop a course. The University requires documentation (doctor’s letter, etc.) for withdrawing from a course after the official drop date.

Incomplete: May be earned if one is otherwise passing the course and missing no more than one midterm and the final or three lab quizzes. This may require attending part of the course in a later semester.
Course Grade: The percent out of 800 points determines the semester grade.

A+ = 100%; A = 92-99; A- = 90-91; B+ = 88-89; B = 81-88; B- = 80-81;
C+ = 78-79; C = 71-78; C- = 70-71; D+ = 68-69; D = 61-67; D- = 60

Lab Quizzes 200 pts (40 pts x 5 Quizzes out of 6, lowest is dropped)
Take-home reviews 100 pts (20 pts x 5 Reviews)
Midterm 1 150 pts
Midterm 2 150 pts
Final 200 pts
Total possible 800 pts

Take-home reviews

Take-home reviews, worth 20 points each, are lecture quizzes done on one’s own, without notes, outside of class. They are not graded for accuracy of answers. Their purpose is to reveal the extent to which we are succeeding in learning basic concepts and principles that will appear on the midterms. By answering quiz questions in a home environment, we should be able to minimize performance anxiety and maximize what we are able to learn about the effectiveness of our study habits and the extent to which we understand basic concepts.

Part A: Ten of the 20 points available are earned for answering each take-home quiz question and writing out a reason for each answer. Part A must be handed in on the day due. Completed quizzes are discussed in lecture when due. We should gain more from the discussion if we treat the quizzes like actual exams.
Part B: Students discuss in class the study habits, subject knowledge, and thought processes they brought to the quiz. Writing down this analysis on each take-home quiz earns the remaining 10/20 points.

Note: Points are all or nothing; to earn full credit, each part must be thorough. Turning in or E-mailing Part A by the due date but missing the in-class discussion earns no more than half of the points (10/20).

How do I take the quiz (Part A)?
Study as though preparing for an actual quiz. Then take the quiz as during a closed-book exam. On a blank sheet of paper, write or type answers for each question and the reason(s) for your answer. Leave about one inch of space between each answer/ reason. This space will be needed for the discussion.

What reasons do I give for my quiz answers?
Whether you knew the answer or just guessed, what concepts, facts, steps in a process, etc. led you to your answer? Why do you think your answer is correct (or wrong)?

What do I bring to lecture on the due date?
Bring your answer sheet with reasons. Remember to leave space between responses. Bring the actual quiz as a separate item to refer to during the discussion.

What happens in the discussion (Part B)?
We discuss each question in groups of 3-4 and summarize the questions below on our Part A answer sheets.

What questions do I answer during group discussion?
1. What concepts, if any, do I need to work on for answering this question? (What concepts did my discussion partners apply successfully to this question that I left out?)
2. Was my knowledge of concepts accurate and complete? If yes and I answered wrong, what happened?
3. What misconceptions or missing steps in a process can account for my wrong answer?
4. If I misunderstood a question, was it Dr. Hyde’s wording or misconceptions?
5. What helped me succeed in learning concepts accurately and completely?
6. What can I do to increase my success in learning concepts accurately and completely?
<table>
<thead>
<tr>
<th>Lecture</th>
<th>Laboratory</th>
</tr>
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<tbody>
<tr>
<td>Jan. 27 Neuron</td>
<td>Jan. 31 Brain gross anatomy</td>
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<tr>
<td>Feb. 01 Neuroglia</td>
<td>Feb. 07 Spinal Cord, CSF, Dura</td>
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<tr>
<td>03 Membrane Potentials</td>
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<tr>
<td>08 Membrane Potentials (Review 1)</td>
<td>14 **Q1; Arteries, Spinal Cord</td>
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<td>10 Synaptic Potentials</td>
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<td>15 Synaptic Potentials</td>
<td>14 **Q1; Arteries, Spinal Cord</td>
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<td>17 Primary Afferent Fibers</td>
<td>21 Medulla</td>
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<td>22 Spinal Cord</td>
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<td>24 <strong>Midterm 1</strong> (Course Reader - Unit 1)</td>
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<tr>
<td>Mar. 01 Spinal Cord Reflexes</td>
<td>28 Reflexes</td>
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<td>03 Spinal Cord Reflexes</td>
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<tr>
<td>08 Somatosensory System (Review 2)</td>
<td>07 Q2; Sensory Tracts</td>
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<td>10 Somatosensory System</td>
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<td>15 Somatosensory Lesions/ Motor</td>
<td>14 Pons</td>
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<td>17 Motor Systems</td>
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<td>22 Cerebellum (Review 3)</td>
<td>21 Q3; Midbrain, Cerebellum</td>
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<td>24 Cerebellum</td>
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<td>***************************************** SPRING BREAK ***************</td>
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<tr>
<td>Apr. 05 Basal Ganglia</td>
<td>Apr. 04 Basal Ganglia</td>
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<td>07 Review</td>
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<td>12 <strong>Midterm 2</strong> (Course Reader - Unit 2)</td>
<td>11 Q4; Diencephalon, Pain</td>
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<td>14 Neuropharmacology</td>
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<tr>
<td>19 Autonomic Nervous System</td>
<td>18 Limbic System</td>
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<tr>
<td>21 ANS/ Hypothalamus</td>
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<tr>
<td>26 Hypothalamus (Review 4)</td>
<td>25 Review limbic</td>
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<tr>
<td>28 Limbic System</td>
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<td>May 03 Limbic System/ Focusing attention</td>
<td>May 02 Q5; Cortex</td>
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<td>05 Cortex</td>
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<td>10 Cortex/ Associative Learning</td>
<td>09 Auditory &amp; Visual</td>
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<tr>
<td>12 Chemical Circuits (Review 5)</td>
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<tr>
<td>17 Chemical Circuits</td>
<td>16 Q6</td>
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<td>24 <strong>FINAL Exam</strong> (Course Reader - Unit 3)</td>
<td>0945 – 1200 (Tuesday)</td>
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<td>[Final includes some questions on earlier material.]</td>
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**See Quiz Index at the beginning of the Lab Guide for details for each Lab Quiz.**
See <Google.com> → “hyde neuroanatomy” for color photos from Lab Guide.
Readings: LL = Lundy-Ekman (2002); CR = Course Reader

Unit 1

Neuron
LL: 26-32, 43, 50, 70-72, 291
CR: 1-2

Neuroglia
LL: 22-26, 436, 445
CR: 3

Membrane Potentials
LL: 33-36, 38-41
CR: 4-10

Synaptic Potentials
CR: 11-16

Primary Afferent Fibers
LL: 36-37, 44, 74, 100-103, 106-107, 109, 112-113, 117, 133, 138-139
CR: 17-22

Unit 2

Spinal Cord
CR: 23-24

Spinal Cord Reflexes
LL: 102-106, 180-185, 274-276
CR: 25-31

Somatosensory System
LL: 108-121, 132, 135, 273, 279-282, 290, 384, 390-393
CR: 32-39

Motor Systems
LL: 188-200, 206, 243-244, 273, 354-355, 358
CR: 40-43

Cerebellum
LL: 231-240, 245, 372, 412
CR: 44-49

Basal Ganglia
LL: 220-231, 388, 410
CR: 50-53

Unit 3

Neuropharmacology
LL: 157-158, 161
CR: 16, 54-57

Autonomic N. S.
LL: 154-166, 276-277, 288
CR: 58-63

Hypothalamus
LL: 154, 385, 399
CR: 64-67

Limbic System
LL: 136, 331-332, 395-399, 400-403, 405, 413-415
CR: 68-75

Focusing attention
LL: 334
CR: 76

Cerebral Cortex
LL: 403-405, 411-412, 415-418
CR: 77-81

Learning
CR: 82-83

Chemical Circuits
LL: 56, 136-138, 331-333, 405-406, 423
CR: 84-90