**NEUROSCIENCE 1, PSB 6345  
Fall Semester, 2011  
Behavioral Sciences BS 12 Room 303  
Tues & Thurs 9:30-10:50am**

***Instructors:***

Dr. Ken Dawson-Scully (Sanson 214; 7-0337; ken.dawson-scully@fau.edu)

Dr. Robert W. Stackman (Behavioral Sci 522; 7-2270; [rstackma@fau.edu](mailto:rstackma@fau.edu))

***Office Hours:***Stackman: Mondays 2-4:00 PM – *(stop in BS 101 for access to my office)*

Dawson-Scully: Mondays 8:30-9:30 AM  
  
***Overview:*** This course is intended for Graduate Students and is the first of a two-part core sequence (6 credits total) which together provide in-depth coverage of the principles of neuroscience. Neuroscience 1 topics include neural cell and molecular biology, genetics of behavior, fundamentals of electrical and chemical signaling of neurons, post-synaptic mechanisms, neural development and synaptic plasticity. Interested undergraduates should consult with the instructors.  
  
***Course Objectives:*** This is a foundation course that prepares the graduate student for more intensive courses and training in brain science. Neuroscience is a vast discipline; the topics to be covered are extensive, and so we will not be able to cover them all in great depth in class. However, as a graduate student you are expected to complete all of the assigned readings provided as well as research additional material as necessary to achieve a mastery of the subject matter. We recommend reading textbook chapters before class. The course will follow a lecture format with in-class discussion of the topics presented, as well as material from the textbook and other selected readings. Questions and lots of discussion are actively encouraged.

***Required Text:*** D Purves, GJ Augustine et al. (2008) *Neuroscience*, 4th edition, Sinauer Associates, Inc.

*Chapters from other texts and readings for in-class discussion will be found on the Blackboard course site.*

***Optional Texts*** *(these resources may also be helpful):*

ER Kandel, JH Schwartz and TM Jessell (2000) *Principles of neural science*, 4th ed, McGraw-Hill.

D Johnston, & S Wu, (1994) *Foundations of cellular neurophysiology*, MIT Press, Inc.

C Hammond (2008) *Cellular and molecular neurophysiology,* 3rd ed., Academic Press, Inc.

***Readings for In-class Discussions:*** Readings will also be assigned from the primary literature to reinforce topics covered in lecture. Each paper will be discussed during the final 15 minutes of class on the respective date indicated on the schedule. You are expected to read each paper and then be prepared to discuss it in class. There will also be exam questions based on these readings.

***Evaluation Method:*** Course grade will be based on (i) a mid-term (45%); (ii) a final exam (45%); and (iii) participation in in-class discussions of readings (5%). The exams will be comprised of multiple-choice and short essay style questions to test your understanding of the topics covered in this course. **Exam questions will be based on material covered in lecture and in the assigned readings.** No extra credit assignments will be given. As a graduate course, final grades fall on a scale of A – C, with a grade of C representing insufficient mastery of the material. An incomplete grade (I) will not be given in lieu of a grade of C. If there is a justifiable reason for missing an exam (e.g., illness, jury duty, death, etc) then a make-up exam will be given. Unjustifiable reasons for missing an exam will result in zero points for the exam missed. Appropriate documentation must be presented for justifiable absence from an exam.

***Course Schedule / Assigned Readings:***

The following topics will be covered; however, we may spend more time on one than another. Exams will be based on material covered in class and in the assigned chapters and discussion papers.

08-23 (T): Course Overview, Historical perspective - Stackman

08-25 (R): Neural basis of behavior (Purves: 1) - Stackman

08-30 (T): Cellular & molecular basis of the nervous system (KSJ: 4,5) – Stackman

09-01 (R)/06 (T): Genes and behavior (KSJ: 3) – Stackman *9-1-11: Discussion:* Araque et al. (2010) *Philos Trans R Soc Lond B 365: 2375-81.*

09-08 (R): Synthesis of neuronal proteins, ion channels (KSJ: 6, Purves: 4) - Stackman *Discussion:* Robinson et al. (2008) *Science, 322: 896-900.*

09-13 (T)/15 (R): Membrane potential, passive properties (Purves: 2) – Dawson-Scully

09-20 (T)/22 (R): Action potential, signal conduction (Purves: 3) - Dawson-Scully *Discussion:* Tomas et al. (2009) *J. Neurophysiol. 102: 285-293*

**09-27 (T)/29 (R):** ***Review and Mid-Term Exam***

10-04 (T)/06 (R): Overview of synaptic transmission (Purves: 4, 5) - Dawson-Scully

10-11 (T)/13 (R): Neuromuscular and central synapses (Purves: 5) - Dawson-Scully *Discussion:* Atwood and Karunanithi (2002) *Nat Rev Neurosci. 3(7):497-516.*

10-18 (T)/20 (R):Factors controlling transmitter release (Purves: 5) – Dawson-Scully

10-25 (T)/27 (R): Neurotransmitters and neuromodulation (Purves: 6) – Stackman

11-01 (T)/03 (R):Receptors and molecular signaling cascades (Purves: 7) – Stackman

11-08 (T):Synaptic plasticity – short-term forms (Purves, Ch. 8) – Stackman *Discussion paper:* Wegener & Koch (2009) *Pharmacopsychiatry*

**11-10 (R):** ***No class – Veteran’s Day***

**\*11-15 (T)/17 (R) *No class* – *Society for Neuroscience meeting, Nov 12-16, NIH Study Section meeting, Nov 17-18, Washington, DC***

11-22 (T): Synaptic plasticity – long-term forms (Purves, Ch. 8) – Stackman *Discussion paper:* Pastalkova et al. (2006) *Science, 313: 1141-1144.*

***\*11-24 (R):* *No class – Thanksgiving Day***

**11-29 (T)/12-01 (R): *Review and Final Exam***