

# Course Syllabus

*PHC7505: Cellular electrophysiology of CNS neurons*

## **The Biology of Synapses**

### **Optional reference books:**

**Synapses**, M. Cowan, TC Sudhof and CF Stevens, Eds. 2001, The Johns Hopkins Univ Press.

**Ion channels of excitable membranes**, B. Hille. 3<sup>rd</sup> edition, 2001. Sinauer Associates.

Course outline: PHC7505 seeks to address in depth specific areas of cellular electrophysiology as part of the Neuroscience course offerings at WSU. Its focus is on the molecular mechanisms underlying the electrical activity of neurons and is taught through a mixture of lectures and student presentations. During 2009 the focus will be on synapses and more specifically on the molecular basis underlying synaptic function and synaptic plasticity. Each week we will have a one hour lecture dedicated to surveying a broad topic, and a two hour student-led discussion of pivotal papers in that week's area.

### **Grading:**

The grade will be based in equal parts class participation and presentations. This means in effect that you will need to be prepared for each class to discuss the papers being presented, whether you are presenting or not. It also means that you will be expected to actively participate and contribute to the discussion during each class.

### **Schedule:**

*Thursday Sept 3, 2009. Organizational Meeting*

Week of Sept. 7: The idea of Synapse – focus on the neuromuscular junction

Week of Sept. 14: Synaptic transmission at CNS synapses

Week of Sept. 21: Molecular mechanisms underlying neurotransmitter release

Week of Sept. 28: Release probability and short term synaptic plasticity

Week of Oct 5: Modulation of neurotransmitter release

Week of Oct 12: Excitatory synaptic transmission and synaptic spines

Week of Oct 19: Neuroscience Meeting.

Week of Oct 26: Inhibitory synaptic transmission

Week of Nov 2: Synaptic plasticity I. LTP and LTD.

Week of Nov 9: Synaptic plasticity II. Homeostatic synaptic plasticity

Week of Nov 16: Synaptic plasticity III. Synaptic plasticity and the critical period.

Week of Nov 23: Review week

Week of Nov 29: Synaptogenesis and synaptic competition I

Week of Dec 10: Synaptogenesis and synaptic competition II

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