**Molecular signaling pathways in synaptic plasticity**

Course Information and Syllabus

Spring 2016

Course Dr. Oliver Schlüter

Organizer: A210 Langley Hall

412-624-1876

Email: [schluter@pitt.edu](mailto:schluter@pitt.edu)

(e-mail works best)

Class Schedule: Fridays

**Course Objective**: This class focuses on signaling mechanisms, which underlie long-term synaptic plasticity. It will address the molecular pathways, which regulate thresholds for synaptic plasticity, the synaptic machinery for induction and expression of long-term synaptic plasticity and how it is converted to structural changes of the neural network, which might underlie the consolidation of memory. The presentations will be guided by experimental approaches, which have influenced the conceptual framework.

Students completing this course should:

* understand the basic principles of signaling pathways in the synapse and neuron
* understand how these signaling pathways are linked to long-term synaptic plasticity and memory
* start to identify experimental questions addressing aspects of synaptic plasticity and formulate experimental approaches to test them

Course Website Information and documents pertinent to the course can be found at <http://courseweb.pitt.edu>.

**Organization of Course Content**

Class will be organized by topics.

Tentative topics are: Introduction/Repetitorium of long-term synaptic plasticity

Synaptic tagging and memory correlates

Gating of long-term synaptic plasticity and the coincidence of three signals

The postsynaptic density as a hot spot for synaptic signaling

Signaling from the synapse to the nucleus

Local protein translation in dendrites

The CaMKII protein family and calcium signaling

G-protein coupled signaling

Metabotropic glutamate receptor signaling and GABA-B receptor function

Adenylyl Cyclase signaling

Growth hormone receptors

Receptor protein tyrosine kinases

Wnt signaling

MAPK signaling pathway

Protein phosphatases in synaptic plasticity

Signalosomes and signaling specificity

**Course Requirements**

Weekly reading assignments:

posted on webcourse, 0-3 hrs/week time commitment outside of class

Lecture prerequisites:

Intro to Neuroscience

Synaptic Transmission

(Synaptic Plasticity, recommended)

**Exams**

Written exam at middle and end of course, based on course content

Example quizzes will be provided for each lecture, which will be discussed at the beginning of the next class.

**Grading Policy**

Attendance and class discussion, including quizzes contribution 20% and exam 80%

**Policy on late work and make-ups**

Late work and make-ups are only available for special requests.