Principles of Neuroscience III – Neural Integration and Control – GMS 6023

SPRING 2012

DIRECTORS:

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PREREQUISITES: Participation in either Principles of Neuroscience II (GMS 6022) or Fundamentals of Neuroscience (GMS 6705). Exceptions require instructor approval.

COURSE DESCRIPTION:

This course is a 5-week advanced module and represents the third part of the Principles of Neuroscience sequence. There will be 6 contact hours per week. Principles associated with sensory function, motor control, learning, emotion, higher cortical function, and neuroplasticity will be explored from multidisciplinary neuroscience perspectives. The primary objective of this course is to provide students with an overview of principles underlying how the interactions among many neurons in various brain regions contribute to specific functional modalities (e.g., motor, sensory) and general behaviors (e.g., cognition, emotions). Focus of the course will then turn to how neuropharmacological, developmental, and genetic principles relate to the expression of learning (e.g., autism) and different affective (e.g., schizophrenia) disorders. Emphasis also will be directed to how the brain may compensate via neuroplasticity and related mechanisms.

The primary teaching format will involve lectures. These lectures will be supplemented with discussions of papers and questions submitted by the students. There will be reading assignments from the assigned textbook and selected review articles. Students will be required to submit two questions each week based on the lecture materials and their own interests in Neuroscience. Some of these questions may be selected for use during the weekly discussion groups.

TEXTBOOKS:

Any of the following would be appropriate:
Neuroscience, Purves et al., 4th Ed., 2008
From Neuron to Brain, Nicholls et al., 4th Ed., 2001

GRADING:

Student evaluation will be based upon participation in course discussions, discussion presentations (written format), and the quality of an in-depth final paper that extends a specific area of lecture emphasis. The paper topic must receive approval by April 22nd. Papers should be 10-15 pages in length, double spaced, 12 pt font, and include a reference list (reference list not included in total page length).

CLASS SCHEDULE:

Unless a change is necessary, all class meetings will be in Rm. L1-101 of the McKnight Brain Institute on Monday, Wednesday, and Friday of each week from March 26, 2012 to April 25, 2012. All class sessions will be from 10 am – noon. Friday sessions will consist of lecture and discussion of papers dealing with current research related to the central topic of the week. Students are expected to do outside reading and be fully participatory.