

FALL 2016

Applied Math: APM 531

Mathematical Neuroscience

Instructor: S. M. Baer
Time: 12:00-1:15 Tuesday & Thursday
Location: WXLRA 307
Schedule Line #: 75515
Credits: 3

Content: This is an introductory course to equip students with important mathematical tools for studying the neural circuits underlying brain function; to systematically build biophysical concepts for exploring the relation between structure and function in nerve cells and their networks. This is not a seminar course; but rather a self contained course structured with homework assignments. *Topics:* cable theory and neuronal branching; dendritic spine modeling with applications; Hodgkin Huxley and Hodgkin Huxley-like excitable systems such as Morris-Lecar and FitzHugh-Nagumo models; bursting oscillations in nerve, muscle and secretory cells; bifurcation analysis of excitable systems; synaptic modeling and activity-dependent processes; introduction to modeling neural subcircuits in the outer-plexiform layer of the retina.

Prerequisites: Elementary Differential Equations: MAT 274 or 275. A course in partial differential equations is **NOT** required.

This is a self contained course open to graduate students of mathematics, life sciences, physics, psychology, and engineering; junior/senior level undergraduate students and Barrett Honor students. Please call Steven Baer (965-1057) or email (steven.baer@asu.edu) for further information.