

Computational Physiology

COURSE DESCRIPTION:

This course is to explore cellular physiology and systems physiology through mathematical modeling and computer simulations. The topics include: biochemical reactions; membrane biophysics; calcium dynamics; stimulation of fiber and fiber bundles; cardiac electrophysiology.

PREREQUISITES:

Fundamental knowledge on calculus and ordinary differential equations.
Familiarity with a programming language.

TEXT:

- James Keener and James Sneyd, *Mathematical Physiology*, Springer, 1998.

Supplementary reading:

- Readings from original articles.
- Christopher Fall et al., *Computational Cell Biology*, Springer, 2002.
- Plonsey and Barr, *Bioelectricity: A Quantitative Approach*, Kluwer, 2000.

WEBSITE:

A course website will be set up for announcements and supplemental materials.

GRADING:

Participation in class (10%)
Homework and quizzes (60%)
Term project (30%)