



Excitable Cell Engineering

BIOMEDE 5580

Credit Hours:

3.00 - 3.00

Course Levels:

Undergraduate (1000-5000 level)

Graduate (5000-8000 level)

Course Components:

Lecture

Course Description:

Quantitative approaches to understanding excitable cell function. Advanced engineering methods applied to study these specialized cells will be addressed.

Prerequisites and Co-requisites:

Prereq: Math 415 or equiv, and EEOB 3510 (415) or equiv; or Grad standing in BiomedE; or permission of instructor.

Course Goals / Objectives:

- Derive and solve differential equations describing electrical activity of cells
 - Calculate electric field from bioelectric sources
 - Critically discuss current topics in literature
 - Apply engineering concepts to draft specific aims for research grants
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Course Topics:

- Biology of excitable cells
 - Ion channels; Critical Review
 - Action potentials
 - Bioelectric sources
 - Electrical stimulation; Advanced Therapies
 - Calcium signaling; Parameter estimation
 - Cell mechanics
 - Numerical simulation
 - Grant writing; Engineering methods
 - Presentations; Grant review
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Designation:

Elective