THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Bioelectromagnetics

ECE 6011

Credit Hours:
3.00

Course Levels:
Graduate (5000-8000 level)

Course Components:
Lecture

Course Description:
This course provides an introduction to the interdisciplinary field of bioelectromagnetics for graduate students. Lectures cover the interaction of electromagnetic fields with biological tissues across the frequency spectrum; bioelectromagnetic dosimetry; and various applications of bioelectromagnetics (medical, consumer, and more).

Prerequisites and Co-requisites:
Prereq: Grad standing in Engineering, Biological Sciences, Mathematical and Physical Sciences; or permission of instructor.

Course Goals / Objectives:
- Become familiar with electromagnetic field interactions with the human body.
- Become familiar with bioelectromagnetic dosimetry.
- Be exposed to medical and other applications of bioelectromagnetics.
- Be competent in identifying and critically reading the state-of-the-art literature.

Course Topics:

- Basic Concepts: history, electromagnetic fields, properties of biological tissues, examples, definitions
- Bioelectromagnetics at DC and extremely low frequencies
- Bioelectromagnetics at Radio-Frequencies
- Bioelectromagnetics at THz and beyond
- Bioelectromagnetic dosimetry
- Applications: communications, sensing, stimulation, powering, hyperthermia, imaging, wearables, implants
- In-class discussions on homework assignments
- Final project presentations

Designation:

Elective