

Electrophysiology and Bioelectricity



Introduction

Bioengineering 6460 Bioelectricity

Organization

- **Instructors:**
 - Rob MacLeod (macleod@cvrti.utah.edu)
 - John Bridge (bridge@cvrti.utah.edu)
 - Derek Dossdall (derek.dossdall@carma.utah.edu)
 - Alonso Moreno (moreno@cvrti.utah.edu)
 - Frank Sachse (fs@cvrti.utah.edu)
 - Ravi Ranjan (ravi.ranjan@hsc.utah.edu)
 - Mark Warren (warren@cvrti.utah.edu)
- **Web page:** <http://www.cvrti.utah.edu/~macleod/be6460>
- **Grading:**
 - Homework assignments (short essays, problems, and computer simulations)



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Resource Material

- Text: Plonsey and Barr (3rd edition)
- www.cvrtdi.utah.edu/~macleod/be6460
- Notes: will be available on the web site in pdf format.
- Additional references: see web site
- Assigned readings: distributed in class or via web
- Computation: Matlab, see web page for links to tutorials



Class Scheduling

Monday Tuesday Wednesday Thursday Friday

	Monday	Tuesday	Wednesday	Thursday	Friday
10:45-12:05		BIOEN 6440		BIOEN 6440	



Laboratory Scheduling

- **Multielectrode Measurement Lab**
 - Tentative: in situ heart or tissue measurements
 - 2-3 lab groups
 - 2-3 hours lab time
- **Arrhythmia Lab**
- **ECG Lab**
 - Clinical ECG measurement and interpretation
 - MEB 1480?



Goals of the Course

- Develop intermediate level understanding of electrophysiological principles
- Apply principles to cardiac and nervous system cells and organs
- Develop quantitative approaches to bioelectric sources, media, and fields
- Make use of available expertise



Outline of the Course

- Mathematical and biophysical basics
- Review of cellular electrophysiology
- Cell to cell coupling (gap junctions)
- Propagation of activation
- Extracellular fields and volume conductor problems, bioelectric forward and inverse problems

