

ECE445 Exam 2 Review, Fall 2010

Coverage

- Ch 3: Amplifiers 25%
- Ch 4: Biopotentials 35%
- SPICE 10%
- Ch 6 Biopotential Amplifiers 20%
- Guest Lectures 10%
 - BioMEMS
 - Entrepreneurship
 - Brain Machine Interface
- Homework 4 & 5

Topics

Op Amps

- ideal op-amp
- op-amp basic principles
- basic op-amp configurations
 - voltage follower
 - inverting
 - non-inverting
 - differential
 - comparator
- differential and common mode gain
- single-ended supply concept
- active filters: low pass, high pass, band pass
- non-ideal op-amp characteristics

Biopotentials (taken from "new" lecture notes)

- ENG; EEG; ECG; EMG
- source of cell membrane potentials; membrane ion flow
- action potentials; cell membrane polarization
- volume conductor electric field effect
- nervous system; reflex arc; EEG
- cardiac operation; anatomy/electrophysiology of the heart
- normal and abnormal cardiac rhythms; ECG
- eye; anatomy of vision; ERG
- anatomy of the brain; function of lobes; EEG
- normal and abnormal neural patterns; EEG

SPICE

- netlist description for: resistors, capacitors, voltage sources, subcircuits
- .AC and .DC analysis statements
- writing netlist for standard op-amp circuit (e.g, inverting or non-inverting configuration)

Biopotential Amplifiers

- bio-amp function and requirements; frequency range
- problems with ECG measurements
- differential amplifier: deriving transfer function, characteristics
- basic 3-op-amp instrumentation amplifier: schematic and characteristics