ECEN 3250 Microelectronics

Fleming 156
Mon/Wed/Fri 11:00 – 11:50 am

Spring 2017

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Department of Electrical, Computer and Energy Engineering
Outline

• Syllabus
  – Text
  – Grading policy
  – Office hours
  – Policies

• Overview of course
  – Goals

Develop a basic understanding of active semiconductor devices. Focus on building an understanding of BJT and CMOS devices in both digital and analog applications.
Syllabus

• Texts
  – Microelectronics, 7th edition, Oxford Univ Press, Sedra and Smith
  – Required text is on hold at Engineering Library

• Grading policy
  
  Show your work!!

  – Homework 10%
  – Quizzes 20%
  – Midterm II (in class) 20%
  – Midterm III (in class) 20%
  – Final 30%

• Grader: Shiril Tichkule Shiril.Tichkule@Colorado.EDU

• Prereqs
  – ECEN 2260, Circuits as Systems

• Office hours:
  – TBD, based on in-class survey

• Policies
  – Collaboration is encouraged, but you must turn in your own homework. Identical homework will be considered cheating. Plagiarism is also considered an honor code violation.
Syllabus

• Attendance is required at all lectures

• Quizzes
  – In class and closed book
  – Will provide necessary equations

• Exams
  – Closed book
  – Allowed one 8.5 x 11 note sheet, handwritten

• Homework
  – Due at beginning of class on Friday

• Calculators
  – Allowed for homework, quizzes, and exams
  – No smart phones allowed as calculators
Syllabus

• Disability/Illness:
  – Contact disability services as soon as possible

• Religious Observance:
  – Let me know of any conflicts

• Decorum/Discrimination:
  – Professional courtesy and sensitivity to race, religion, sexual orientation, gender identity, nationalities, etc.
  – Let me know your preferred name and/or gender pronoun.
Syllabus

• Website
  – http://ece.ecee.colorado.edu/~ecn3250/
  – Lectures, hw & solutions will be posted online for your reference

• Important dates
  – Midterm I: Wednesday March 1, in class
  – Midterm II: Friday April 7, in class
  – Final: Sunday May 7, 7:30-10:00 pm, Fleming 156

• Week 1
  – Circuits I and II Review, Homework 0
    Homework 0 is due 1/27
    Review: Thevenin equivalent circuits, op-amps, laplace transforms, transfer functions and Bode plots
    – Ideal diode, terminal characteristics
      Assigned Friday 1/27; due 2/3
    – Quiz 0 is Wednesday 2/1
Course overview

- Diode circuits (Chapter 4)
- Basics of semiconductor physics and pn junction (Chapter 3)
- MOS transistor operation and circuits (Chapters 5 & 7)
- BJT operation and circuits (Chapter 6 & 7)
- CMOS logic gates (Chapter 14)
- Differential Pair (Chapter 9)
- Frequency Response (Chapter 10)
Looking beyond 3250

Devices:
- **ECEN3320** (Semiconductor devices)
- **ECEN4375** (Microstructures Lab),
- **ECEN4555/5555** (Principles of Energy Systems & Devices)
- **ECEN5355** (Principles of Electronic Devices 1)

More circuits:
- **ECEN4827/5827** (Analog IC design)
- **ECEN5835** (Mixed-signal IC design)
- **ECEN4109** (VLSI System Design)

Energy:
- **ECEN3170** (Energy Conversion 1)
- **ECEN4555/5555** (Principles of Energy Systems & Devices)
- **ECEN4797/5797** (Intro to Power Electronics)
- **ECEN4517/5517** (Renewable Energy and Power Electronics Lab)
Microelectronic Circuits
Electronic Circuits, Discrete
Electronic Circuits, Boards
Electronic Circuits, Integrated
Electronic Circuits, Integrated

Note: When two wires appear they are connected if a dark circle is shown at the intersection. Otherwise, they are not connected.
Electronic Circuits, Nano-scale
Fabrication