

INTRODUCTION TO INTEGRATED CIRCUITS

Instructor: C. Dwyer

Office: TBA

Office Hours: by appointment

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Text: *Microelectronics: An Integrated Approach*, R. T. Howe & C. G. Sodini

Grading:

- Three exams (each 20%)
- Weekly homework (10%)
- Seven laboratory reports (15%)
- Group project and in-class quizzes (15%)

Course Outline: ***subject to change at any time***

1. Introduction – Chapter 8 + lecture notes (11 lectures + exam)
 - Overview of design concepts for analog and mixed signal circuits
 - Circuit analysis and s-domain review
 - Device models and transistor biasing
 - Mid-band analysis and small-signal models
 - Single BJT and MOSFET amplifiers

EXAM 1 – Material through Chapter 8 + lectures, **Thursday September 29.**

2. Differential amplifier stages – Chapter 11 + lecture notes (5 lectures)
 - Differential amplifier concepts
 - Large signal analysis
 - Small signal analysis
 - Active loads
 - Current sources
3. Bandwidth considerations of linear amplifiers – Chapter 10 (3 lectures)
 - Time constants
 - Example circuit analysis
 - High frequency transistors in integrated circuits

EXAM 2 – Material through Chapter 11 + lectures, **Tuesday November 8.**

4. Multistage amplifiers – Chapter 9 + lecture notes (5 lectures)
 - Analysis techniques
 - Direct and capacitively-coupled amplifiers
 - Operational amplifier specifications and design
 - Technology considerations
5. Logic circuits – Chapter 5 + lecture notes (4 lectures)
 - Logic circuitry overview
 - CMOS and NMOS/PMOS inverters
 - Bipolar inverters in TTL and ECL
 - Memory cells, latches
 - Memory arrays and register files
 - Switching speed

FINAL EXAM – Comprehensive. Check day and time in final exam schedule.

The course policy for making up a graded exercise missed due to a short-term illness will be consistent with the University policy.