Instructor

Khalid Eid
SCI221
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Class Meetings

Monday, Wednesday 2:15 – 3:05, ONLINE (Lecture)

Saturday 1:00pm – 4:00pm (Lab)

Text

Basic Electronics: An Introduction to Electronics for Science Students by Curtis A. Meyer. Available in the local bookstores, or you may order it online from http://www.lulu.com.

Course Description

The course covers theory and applications of electronic instrumentation for scientists. Discrete components as well as integrated circuits will be covered. Both analog and digital circuit theories will be discussed.

Course Goals

The student will develop an understanding of the basic theory and applications of analog and digital electronic instrumentation. Upon completion of this course the student will be able to read electronic circuit diagrams, analyze and understand the operation of a given circuit, and design electronic circuits for the measurement of physical quantities.

Course Evaluation

Homework problems will be assigned regularly. There will be one midterm exam and a comprehensive final exam .Exams will consist of free-response problems similar to those worked in class and assigned for homework. Make-up exams will be given only for very special circumstances that must be discussed as soon as they arise!

The weighting of the various parts is as follows:

Midterm exam	**20%**
Final exam	**40%**
All homework assignments together	**10%**
Lab reports	30%

Tentative Schedule

The schedule will be adjusted as necessary.

Ch. 1.1–1.3	Intro; Simple Circuits
Ch. 1.4	Circuits and Power
Ch. 1.6	Equivalent Circuits
Ch. 1.5	Voltage Divider
Ch. 2.1-2.3	Alternating Current Circuits
Ch. 2.6-2.8	
Ch. 2.6- 2.8	AC-circuits/ Impedance, ….
Ch. 6.1–6.2	Amplifier and Negative Feedback
Ch. 6.3	Op-Amps
Ch. 6.3	Op-Amp Circuits
Ch. 6.3	Op-Amp Circuits
Handout?	Instrumentation Amplifier
Ch. 6.4	Ideal vs. Real Op-Amp; Limitations
Ch. 6.8	Positive Feedback, Comparators
Ch. 6.8	Schmitt Trigger
Ch. 4.1–4.4	Semiconductor Physics
Ch. 4.5	PN-Junction and Diodes
Exam 1	
Ch. 4.6	Diode Circuits
Ch. 5.1–5.2	Bipolar Junction Transistor
Ch. 5.3	Bipolar Junction Transistor
Ch. 5.4	Transistor Circuits
Ch. 5.4	Transistor Circuits
Ch. 5.5	Field Effect Transistors
Ch. 7.1–7.3	Digital Electronics, Binary Arithmetic
Ch. 7.4–7.5	Digital Logic and Gates
Ch. 7.6	Flip-Flops and Memories
Ch. 7.7	More Flip-Flops
Ch. 7.8	Digital Counters
Ch. 7.9	Shift Registers

Lab Experiments

1- VOLTAGE DIVIDERS AND KIRCHHOFF'S LOOP RULE

2- LabVIEW CONCEPTS

3- LabVIEW PROGRAMMING EXERCISES

4- INVERTING AND NON-INVERTING AMPLIFIERS

5- THERMOCOUPLE AMPLIFIER

6- INTEGRATING MAGNETOMETER

7- PHYSICAL PENDULUM

8- CURRENT-TO-VOLTAGE CONVERTER

9- BIPOLAR JUNCTION TRANSISTOR CHARACTERISTICS

10- INTRODUCTION TO ARDUINO

11- ARDUINO

12- PULSE-WIDTH MODULATION