

FLORIDA ATLANTIC UNIVERSITY
Department of Electrical Engineering

EEL 1007C - Electronic Design with Operational Amplifiers

Summer 2008

Course Synopsis: Hands-on electronic circuit design using standard electronic components and electronic lab instruments. No prior background in electromagnetism is assumed. The theoretical material and the design methods are covered through interactive PSPICE software simulation sessions and lectures. The course lab experiments culminate in a design project competition of a wireless optical communication system.

Instructors: Dr. Ali Zilouchian SE 468 561/297-3468 zilouchi@fau.edu
Meeting Places: Lab: Science and Engineering Building Room 350
(Near-by phone 561-297-3416)
Computer Lab: Education Building Room 117
Lecture: TBA

Monday, June 9

9:15 - 9:45 Orientation Building 36 Lobby
10:00 -11:00 Lecture Complex numbers; applications to RC circuits driven by a-c signals
11:10 -12:30 Computer Lab DC electrical networks, a-c and pulse signals, capacitors and RC circuits
12:30-1:30 Lunch
1:30-4:30 Lab Organization (teams selection, distribution of parts and tools) and basic instruments familiarization, RC circuits

Wednesday, June 11

9:30 -10:30 Lecture Fourier series; Frequency response; Filters
10:40 -12:30 Computer Lab Op-amps: Inverting and Non-inverting amplifiers, Comparators
12:30-1:30 Lunch
1:30-4:30 Lab Op-amps - Voltage Gain, Comparators

Friday, June 13

9:30 -10:30 Lecture Filters design
10:40 -12:30 Computer Lab Level Shifting, Low Pass, High Pass and Bandpass Filters, Difference Amp
12:30-1:30 Lunch
1:30-4:30 Lab Level Shifting, Bandpass Filter and Difference Amplifiers

Monday, June 16

9:30 -10:30 Lecture **Quiz#1**, The physics of diodes and transistors
10:40-12:30 Computer Lab Diodes, Transistors and applications
12:30-1:30 Lunch
1:30-3:30 Computer Lab Audio Power Amplifiers
3:30-4:30 Lecture Power amplifiers

Wednesday, June 18

9:30 -12:30 Lab Diodes characteristics, Transistor characteristics
12:30-1:30 Lunch
1:30 -2:50 Computer Lab AM Transmitters
3:00 -4:30 Lecture Basics of AM communication

Friday, June 20

9:30 -12:30 Lab **Quiz #2**, LED with Current Amplifier
12:30-1:30 Lunch
1:30-2:30 Lecture AM Receiver
2:40 -4:30 Lab Characterization of a Microphone and Phototransistors

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Monday, June 23

9:30-12:30	Lab	Audio Power Amplifiers
12:30-1:30	Lunch	
1:30 -4:30	Lab	Amplitude Modulated Optical Transmitter

Wednesday, June 25

9:30 -12:30	Lab	Amplitude Modulation Detection and AM Optical Receiver
12:30-1:30	Lunch	
1:30-2:50	Computer Lab	AM Receiver
3:00-4:30	Lecture	<u>Quiz #3</u> , Project discussion

Friday, June 27

9:30 -12:30	Lab	Final Project
12:30-1:30	Lunch	
1:30-4:30	Lab	Project (continued); Project Demonstration - Design Competition
3:30-3:45		Instructors and Course Evaluation
3:45-4:30		Best Project Awards; Course wrap-up

Grading:	Computer Lab Reports	30%
	3 equally weighted Quizzes	15%
	Electronics Lab Reports	35%
	Lab Participation and Work Quality	10%
	Final Project	10%

1) Lab reports, on whatever you accomplished, are due the morning of the next class day. Each team submits one report per experiment in a standard Technical Report format (see attached). You must include the measured data, however answers to questions posed in the lab instructions are optional. Each graded lab report, of the first week's three experiments may be corrected and resubmitted once. There is a make-up lab.

2) Three equally weighted quizzes will be given on the dates shown. Each quiz will be 10 minutes long. It will be based on the lecture as well as understanding of Electronics Lab Material.

3) The computer assignments (some done in class and some done as homework) are also due the morning of the next class. Corrected graded works of each of the first three experiments may be resubmitted once more for a better grade on the morning of the class that follows the first-time return of the work. Each student should submit individual report. Each report should be brief and include only answers to the questions posed, circuit diagrams and the relevant simulation results annotated. **File copying from a friend constitutes cheating, and if detected may result in an automatic F course grade.**

4) Final project grade will be based on demonstrated understanding of circuit operation. Grades are individual.

5) The Lab Participation and Work Quality grade will be based on the Instructors' impression of each team member's contribution to the lab experiments efforts. Students who consistently let their lab partners do most of the work may lose the entire 10% grade in this category. Be an active participant!

6) The numerical overall grade is translated to the alphabetic grade system, using the following key:
A 90-100%, A- 85-89%, B+ 80-84%, B 75-79%, B- 70-74%, C+ 65-69%, C 60-64% etc.

7) **There will be no grade-curving of any sort.** All final grades that will come within 1% of a grade threshold, will be reviewed for possible special consideration, based on the student's demonstrated consistent effort throughout the course.

8) Electronic parts and tools kit and PSPICE 9.2 free demo CD will be distributed on the first day of classes.

9) **Textbook:** J.R. Cogdell, "Foundations of Electronics", Prentice Hall 1999.

10) All notes (computer lab and electronics lab manuals) and class related announcements will be posted on the course's web page (<http://blackboard.fau.edu>).

11) Please print lab manuals ahead of time and bring to class at appropriate dates.