Broward Community College
Course Outline

STATUS: A

COMMON COURSE NUMBER: EET 2142C

COURSE TITLE: Linear Techniques II

CREDIT HOURS: 4

CONTACT HOURS BREAKDOWN:

Lecture/Discussion	48
Lab	32
Other	
Contact Hours/Week	4

CATALOG COURSE DESCRIPTION:

Prerequisite: EET 1141C

Corequisite: None

Power amplifiers, field and effect transistors and amplifiers, thermal effects in semiconductors, thyristors, rectifier power supplies, voltage and current regulation, operational amplifier applications, differential amplifiers and special devices. Extensive laboratory experience. Student fee charged.

General Education Requirements - Associate of Arts Degree, meets Area(s):
General Education Requirements - Associate in Science Degree, meets Area(s):

UNIT TITLES:

1. Thyristors
2. Special Diodes
3. Audio Power Amplifiers
4. Rectifier Power Supplies
5. Operational Amplifiers
6. Filters

I. **Course Overview**:

Upon successful completion of this course, the students should be able to demonstrate an understanding of thyristors, special diodes, audio frequency power amplifiers, JFET and MOSFET amplifiers, rectifier power supplies and filters, voltage regulators, feedback, operational amplifiers, differential amplifiers and applications of op amps. The students should be able to use computer software to solve technical problems and undertake technical projects requiring library resources with oral presentations.

II. **Units**:

Unit 1. Thyristors

General Outcome:

1.0 The students should be able to discuss the characteristics and operation of 4-layer diodes, SCR, Diac, Triac, and UJT.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

1.1 Describe techniques for turning on and turning off thyristors.

1.2 Design and implement an SCR or Triac light control circuit.

1.3 Use plotted Diac characteristics in a trigger or oscillator circuit.

1.4 Analyze a UJT relaxation oscillator.

Unit 2. Special Diodes

General Outcome:

2.0 The students should be able to demonstrate knowledge of the operation of LED, photodiodes, Schottky, laser, step recovery, and backward diodes.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

2.1 Design and implement an LED circuit.

2.2 Design and implement a photo semiconductor switching circuit.

2.3 Describe the characteristics of various special diodes.

Unit 3. Audio Power Amplifiers

General Outcome:

3.0 The students should be able to classify amplifiers by mode of operation and demonstrate knowledge of single-ended and push-pull AF power amplifiers, coupling methods, and thermal parameters.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

3.1 Define class A, AB, and B amplifiers in terms of power, operating conditions, efficiency, and distortion.

3.2 Analyze single-ended and push-pull audio power amplifier circuits.

3.3 Utilize integrated circuit power amplifiers.

3.4 Solve problems in heat sinking and power limitations for AF power amplifiers.

3.5 Analyze class C, D, E and F amplifiers.

3.6 Design and implement a class B push-pull power amplifier, given appropriate specifications.

Unit 4. Rectifier Power Supplies

General Outcome:

4.0 The students should be able to demonstrate knowledge of rectifier circuits, voltage regulators, and filter circuits.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

4.1 Solve problems in elementary rectifier efficiency, and diode specifications.

4.2 Relate ripple factor calculations to actual circuits.

4.3 Solve for DC and ripple voltage levels at the output of various filter circuits.

4.4 Solve problems in shunt regulator circuits.

4.5 Implement the circuit for a voltage regulator on a design and wiring breadboard and make voltage, current, and power measurements.

4.6 Analyze and describe the operation of a switching regulator power supply.

Unit 5. Operational Amplifiers

General Outcome:

5.0 The students should be able to analyze differential amplifiers and design various configurations of operational amplifier circuits.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

5.1 Calculate gain, input impedance, and output impedance for a feedback amplifier.

5.2 Describe the operation of a differential amplifier.

5.3 Define the various parameters of an operational amplifier.

5.4 Convert such quantities as CMRR and voltage gain in dB to voltage ratios.

5.5 Illustrate the application of a lag network to increase the stability of an op-amp.

5.6 Solve problems and implement a variety of operational amplifier circuits, including summing amplifiers, multivibrators, active filters, and comparators.

Unit 6. Filters

General Outcome:

6.0 The students should be able to explain applications of integrators, differentiators, and resonant circuit type filters.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

6.1 Use a dual time-base oscilloscope and pulse source to demonstrate RC differentiation and integration.

6.2 Calculate solutions to problems in pulse-driven RC networks and verify the solutions by measurement.

6.3 Calculate solutions to problems in pulse-driven RL networks and verify the solutions by measurement.

6.4 Analyze series and parallel resonant circuits and verify calculations of Q,bandwidth, and circuit impedance by laboratory experiments.

6.5 Use specifications for corner frequencies, mid-range frequencies, and roll-off to design and implement low-pass, high-pass, and band-pass filters.

6.6 Use passive components to analyze various impedance-matching networks.

6.7 Analyze various techniques for implementing positive and negative feedback in discrete and integrated electronic circuits.

6.8 Describe the use of fourier techniques in waveform analysis and synthesis.