

Mercer County Community College

Division of Business and Technology

EET 139

Introduction to Electronics II

COURSE DESCRIPTION

This course is a follow up to EET138. It will cover the basics of AC circuits and devices including resistors, capacitors, inductors and semiconductors. EET139 will introduce the student to fundamental waveforms such as sine waves and pulses and their behavior in solid state circuits.

Text (s): Introductory DC/AC Electronics
 Author: Nigel Cook
 Prentice Hall Publisher

Prerequisites: EET138

Credits: 4

Lecture Hours: 3

Studio/Lab Hours: 3

**Food and drink are strictly prohibited in classrooms as per health and safety laws.
Students may not bring in chemicals or cleaning fluids without the appropriate MSD sheets**

Course Coordinator: Dominick DeFino

Latest Review: Spring 2004

I. LABORATORY

The lab, experiences will reinforce and augment the classroom work Students will use analog and digital meters to measure voltage and current as well as ohmmeters to measure resistance.

Some of the lab time will be spent on the computer experiencing programs such as: BASIC, PSPICE, and EXCEL.

The lab grade will be based on a lab worksheet to be handed in when each lab experiment is completed.

II. GRADING

There will be a mid term and final test as well as weekly quizzes combined with a lab grade to determine the course grade.

III. COURSE OBJECTIVE

This will be the second of a two sequence set of courses to prepare students for sophomore level courses in the EET curriculum. The student will be able to read digital and analog meters, wire and make measurements on AC circuits containing resistors, capacitors, inductors, diodes and transistors.

IV. COMPETENCY

A passing grade of "C" or better will indicate that the student has achieved a level sufficient to move onto sophomore level EET courses.

TOPIC OUTLINE

<u>WEEK</u>	<u>CHAPTER and/or TOPIC</u>
1	10.1-10.4
2	13.1-13.2
3	13.3-13.5
4	15.7-15.9
5	15.10-15.11
6	16.1-16.5
7	16.6-16.10
8	<u>TEST 1</u>
9	17.1-17.3
10	20.1-20.4 Power Supplies
11	Zener diode & power supply regulation
12	Bipolar transistor amplifiers
13	AC/DC load line
14	FET transistors
15	<u>TEST 2</u>

TEXTBOOK READING

Chapter 10	<u>HOMEWORK</u>	
Alternating Current (AC)		
10-1 The Difference between DC and AC	Multiple Choice	Practice Problems
10-2 Why Alternating Current?		
10-2-1 Power Transfer	1 - 20	31 - 40
10-2-2 Information Transfer		
10-3 AC Wave Shapes		
10-3-1 The Sine Wave		
10-3-2 The Square Wave		
10-3-3 The Rectangular or Pulse Wave		
10-3-4 The Triangular Wave		
10-3-5 The Sawtooth Wave		
10-3-6 Other Waveforms		
10-4 Electricity and Electronics		
 Chapter 13	 1 - 15	 26 - 40
Capacitive Circuits, Testing, and Applications		
13-1 Capacitive Reactance		
13-2 Series RC Circuit		
13-2-1 Vector Diagram		
13-2-2 Voltage		
13-2-3 Impedance		
13-2-4 Phase Angle or Shift (θ)		
13-2-5 Power		
13-3 Parallel RC Circuit		
13-3-1 Voltage		
13-3-2 Current		
13-3-3 Phase Angle		
13-3-4 Impedance		
13-3-5 Power		
13-4 Testing Capacitors		
13-4-1 The Ohmmeter		
13-4-2 The Capacitance Meter or Analyzer		
13-5 Applications of Capacitors		
13-5-1 Combining AC and DC		
13-5-2 The Capacitive Voltage Divider		
13-5-3 RC Filters		
13-5-4 The RC Integrator		
13-5-5 The RC Differentiator		

Week 11

Chapter 15

Inductance and Inductors

HOMEWORK

Multiple Choice Practice Problems

15-7 Inductive Reactance

15-8 Series RL Circuit

1 - 25

36 - 49

15-8-1 Voltage

15-8-2 Impedance

15-8-3 Phase Shift

15-8-4 Power

15-9 Parallel RL Circuit

15-9-1 Current

15-9-2 Phase Angle

15-9-3 Impedance

15-9-4 Power

15-10 Testing Inductors

15-10-1 Open

15-10-2 Complete or Section Short

15-11 Applications of Inductors

15-11-1 RL Filters

15-11-2 RL Integrator

15-11-3 RL Differentiator

Chapter 16

Transformers

1 - 10

26 - 35

16-1 Mutual Inductance

16-2 Basic Transformer

16-3 Transformer Loading

16-4 Coefficient of Coupling (k)

16-5 Transformer Ratios and Applications

16-5-1 Turns Ratio

16-5-2 Voltage Ratio

16-5-3 Power and Current Ratio

16-5-4 Impedance Ratio

16-6 Windings and Phase

16-7 Transformer Types

16-7-1 Fixed Turns Ratio Transformers

16-7-2 Variable Turns Ratio Transformers

16-8 Transformer Ratings

16-9 Testing Transformers

16-9-1 Open Primary or Secondary Winding

16-9-2 Complete Short or Section Short in Primary or Secondary Winding

16-10 Transformer Losses

16-10-1 Copper Losses

16-10-2 Core Losses

16-10-3 Magnetic Leakage

Chapter 17
Resistive, Inductive, and Capacitive (RLC) Circuits

HOMEWORK

- 17-1 Series RLC Circuit
 - 17-1-1 Impedance
 - 17-1-2 Current
 - 17-1-3 Voltage
 - 17-1-4 Phase Angle
 - 17-1-5 Power
- 17-2 Parallel RLC Circuit
 - 17-2-1 Voltage
 - 17-2-2 Current
 - 17-2-3 Phase Angle
 - 17-2-4 Impedance
 - 17-2-5 Power
- 17-3 Resonance
 - 17-3-1 Series Resonance
 - 17-3-2 Parallel Resonance

Multiple Choice	Practice Problems
1 - 15	31 - 50

Chapter 20
Diode Power Supply Circuits

1 - 6	23, 26, 27, and 29
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- 20-1 Block Diagram of a DC Power Supply
- 20-2 Transformers
- 20-3 Rectifiers
 - 20-3-1 Half-Wave Rectifiers
 - 20-3-2 Full-Wave Rectifiers
- 20-4 Filters
 - 20-4-1 The Capacitive Filter
 - 20-4-2 Percent of Ripple

Week 13
Diodes and Transistors

HOMEWORK

Week 14
Bipolar Transistor Biasing and DC Amplifier

Instructor Hand Out Sheets

Week 15
Transistor as a power switch