

EET 219

Electronic Networks

COURSE DESCRIPTION

Studies include analysis and design considerations for electronic amplifiers and power supplies using semiconductor devices. Class A amplifiers using bipolar transistors will be analyzed with emphasis on frequency response, power dissipation and efficiency. PSPICE will be used for circuit simulation and to verify all design projects.

Text(s): **Electronic Principles** by Malvino, 6th Edition, Glencoe Publishing

Prerequisites: **EET139**

Co-requisites:

Credits: **4**

Lecture Hours: **3**

Studio/Lab Hours: **3**

Coordinator: **Dominick T. DeFino**

Latest Review: Fall 2009

Instructor:	Prof. DeFino	Office Hours	M 3 to 5:30, T/W 10:30 to 12
Office No.	ET 130	Tel. 609-570- 3456	Email: defino@mccc.edu

Attendance Policy:

Mercer County Community College does not have a “cut system.” Students are expected to attend all classes of every course on their schedules. Only illness or serious personal matters may be considered adequate reasons for absence.

It is the prerogative of the instructor to excuse absences for valid reasons, provided the student will be able to fulfill all course requirements.

Student performance in classes is formally verified at the middle of each full semester. If a student’s attendance has been infrequent or performance unsatisfactory, he or she may receive notification in the mail. At any time, the instructor may withdraw the student from class for insufficient attendance.

Academic Integrity:

Students are required to perform all the work specified by the faculty and are responsible for the content and integrity of all academic work submitted, such as papers, reports, and examinations.

A student will be guilty of violating the Rule of Academic Integrity if he or she:

- Knowingly represents the work of others as his or her own;
- Uses or obtains unauthorized assistance in any academic work;
- Gives fraudulent assistance to another student.

- Intentionally damages any contents of the lab or classroom
- Is found to have stolen anything from the lab or classroom

Penalty:

First violation for stealing or damaging is F in the course.

Other Violations:

First violation will result in an F for the test or project involved.

Second violation will be an F in the course.

Temporary Grade Policy:

If you do not complete the course requirements by the end of the semester, and you have a prior agreement with the instructor, you may be given an INC (incomplete). INC indicates that the instructor is affording extra time to earn a grade in the course. The amount of extra time is determined by the instructor, up to a maximum of 16 calendar weeks after grades are submitted. A INC grade which has not been resolved within 16 calendar weeks is changed to an F or NC (no credit) grade, as appropriate to the course.

Letter Grades:

Letter grades have the following quality point values:

A = 93 - 100	4.0
A ⁻ = 90 - 92	3.7
B ⁺ = 87 - 89	3.4
B = 83 - 86	3.0
B ⁻ = 80 - 82	2.7
C ⁺ = 77 - 79	2.4
C = 70 - 76	2.0
D = 60 - 69	1.0
F = 0 - 59	0.0

Audit:

If you audit the course, you will receive an “AU” grade—this cannot be changed to a letter grade.

Withdrawal Course Requirements: Check College Calendar

To receive a W grade for any course, a student must consult with the course instructor or an appropriate division representative and then withdraw officially before two-thirds of the course has been completed by submitting a withdrawal form to the Office of Student Records. Withdrawal after this point results in a grade other than W (usually F). At any time before two-thirds of the course has been completed, the instructor may also withdraw with a W grade any student who has been absent excessively. A student thus withdrawn will not be entitled to any refund of tuition or fees. The student may appeal this action.

GENERAL OBJECTIVES

Student will gain:

1. An understanding of Low Frequency Amplifiers & Linear Regulated Power Supplies.
2. An understanding of the analysis of Amplifiers & Power Supplies.
3. An understanding of Class A Amplifiers, efficiency & power dissipation.
4. An understanding of thermal resistance and h parameter models.
5. An understanding of PSPICE circuit simulation.
6. An understanding of Class A amplifier design.

COURSE OBJECTIVES

Unit 1

Students will be able to:

- 1/ Name the most commonly used semiconductor
- 2/ List the two types of carriers
- 3/ Distinguish between P type, N type and intrinsic semiconductors and the type of impurity which produces them.
- 4/ Identify forward and reverse bias PN junctions
- 5/ Calculate barrier potential for Si at a given temperature.
- 6/ Distinguish between minority and majority carriers.
- 7/ Draw the diode symbol and label the terminals
- 8/ Describe the ideal diode, as well as the 2nd and 3rd approximations
- 9/ Describe how to test a diode using an ohmmeter.
- 10/ Draw load line given sufficient information.
- 11/ Distinguish between half wave and full wave rectification.
- 12/ Draw diagram of a bridge rectifier.
- 13/ Draw a diagram for either a negative or positive power supply using a CT transformer or full wave bridge.
- 14/ Calculate filter capacitance required given sufficient information.
- 15/ Draw the zener diode symbol.
- 16/ Analyze a zener regulated supply given sufficient information.
- 17/ List at least 4 opto electronic devices and their basic usage.
- 18/ Distinguish between a photo diode, photo voltaic cell and LED

Unit 2

Students will be able to:

- 1/ State and use the relationship between base, collector and emitter currents.
- 2/ Draw a diagram for the two types of BJTs
- 3/ Identify the 3 regions of operation for a BJT.
- 4/ State and use the relationship between beta, collector current and base current.
- 5/ Draw the 2 different diagrams for a BJT.
- 6/ Calculate the max power for a transistor amplifier.
- 7/ Calculate beta from a data sheet curves
- 8/ Draw load line given circuit information
- 9/ Identify cutoff, saturation and Q point
- 10/ Calculate the Q point using base or emitter bias.
- 11/ Draw diagram of a VDB (constant base voltage bias) circuit
- 12/ State the advantage of VDB
- 13/ Calculate the currents and voltages in a VDB NPN or PNP circuit.
- 14/ Draw the load line and show the Q point for #3

Unit 3

Students will be able to:

- 1/ Analyze CE amplifier.
- 2/ Draw the AC and DC equivalent circuit for a CE amplifier.
- 3/ Calculate the coupling capacitor and bypass capacitor values needed given sufficient information.
- 4/ Calculate the impedance at the base of a CE amplifier.
- 5/ Calculate voltage gain of a CE amplifier.
- 6/ Draw the AC equivalent circuit using the “Pi” or “T” model.
- 7/ Calculate the input impedance to CE amplifier stage.
- 8/ Show DC and AC load lines for a CE and CC amplifier.
- 9/ Calculate MPP for a CE amplifier
- 10/ Identify a class B/AB push-pull amplifier.
- 11/ Determine the power gain and efficiency for a power amplifier
- 12/ Determine if a heat sink is needed in a given circuit.
- 13/ Identify a CC and CB amplifier and calculate the voltage gain of each.
- 14/ Identify a Darlington connection and determine beta.
- 15/ Determine the output voltage for a transistor voltage regulator

Unit 4

Students will be able to:

- 1/ Identify the JFET symbol for N channel and P channel devices.
- 2/ Name the terminals on the #1 devices.
- 3/ Identify the drain curves
- 4/ Identify I_{DSS} and V_p
- 5/ Calculate R_{DS}
- 6/ Distinguish between depletion mode and enhancement mode from the symbol as well as the characteristic curves.
- 7/ Distinguish between P channel, N channel MOSFETs from the symbol as well as the characteristic curves.

GRADING

The final grade will be based on three test grades and the lab report. There will be three scheduled tests which will be averaged with the lab report grade.

Since all tests will be cumulative and may also include problems related to the labs, there will not be a final exam.

To earn an	A	your average must be	93 - 100
	A⁻		90 - 92
	B⁺		87 - 89
	B		83 - 86
	B⁻		80 - 82
	C⁺		77 - 79
	C		70 - 76
	D		60 - 69

Special Needs

Any student in this class who has special needs because of a disability is entitled to receive accommodations. Eligible students at Mercer County Community College are assured services under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973. If you believe you are eligible for services, please contact Arlene Stinson, the Director of Academic Support Services. She can be reached at (609) 570-3525.

Unit Assignments

UNIT 1

Chapter 2

HW: Pg 53 Questions 2,3, 5, 6, 8-12, 15-17, 19-36, 38, 40, 41, 43, 45-47, 53,54
Pg 56 Prob. 1 to 9

Chapter3

HW: Pg 83 Questions 1-10, 16-20
Pg 84 Prob. 1 to 18

Chapter 4 (pages 89 to 113)

HW: Pg 133 Questions 1-20
Pg. 134 Prob. 3 to 6, 8, 9, 14, 17, 21, 23

Chapter 5 (pages 143-175)

HW: Pg 182 Questions 1-13, 16, 17, 20, 21, 22, 29
Pg. 184, Prob 1,3,7,9,13

UNIT 2

Chapter 6 (pages 189 – 211)

HW: Pg 217 Questions 1-7, 12, 16-18, 21, 24, 25, 28-30
Pg. 219 Prob 4,7,9,11,14,16

Chapter 7 (pages 223-238)

HW: Pg 252 Questions 1-6, 9-27
Pg. 254 Prob. 3,7,8,13,15,21,25

Chapter 8 (pages 261-278)

HW: Pg 280 Questions 1-5, 7, 9-14
Page 282 prob 9,11, 23, 29-33

UNIT 3

Chapter 9 (pages 287-307)

HW: Pg 313 Questions 1-17

Page 314 prob. 3,4,7,8,9,11,13,15-18

Chapter 10 (pages 319-333)

HW: Pg 340 Questions 3, 4, 5, 7, 10, 11, 14, 15, 17, 18, 20-22

Page 341 prob. 1,6,9,12

Chapter 11 (pages 345-363)

HW: Pg 369 Questions 1, 7-20, 26

Page 370 prob. 1,2,3, 9, 15, 17, 19

.

Chapter 12 (pages 377-397)

HW: Pg 418 Questions 6-10, 16-22, 26-29

Page 418 prob. 1,3,7,11,13,15,21

UNIT 4

Chapter 13 (pages 425- 433)

HW: Pg 470 questions 1-10

Page 471 prob. 3, 5, 6, 8

Chapter 14 (pages 479-495)

HW: Pg. 512 Questions 1-9