C A M O S U N C O L L E G E

ELECTRONICS & COMPUTER ENGINEERING DEPARTMENT

COURSE OUTLINE

CALENDAR DESCRIPTION

ELEN 144 SEMICONDUCTOR DEVICES (I)

This course introduces students to the fascinating world of active devices. It covers essential topics from basic semiconductor theory through transistors and Op-Amps to L.C.D.s. The emphasis of this course is in the application of these devices and their troubleshooting, providing the student with a thorough foundation upon which to develop skills in electronics.

OFFERED:	2nd Quarter
CREDIT:	4
IN-CLASS WORKLOAD:	4 Lecture, 2 Lab
OUT-OF-CLASS WORKLOAD:	8
PREREQUISITES:	
PRE OR COREQUESITES:	

OBJECTIVES:

Upon completion of this course the student will have an understanding of commonly used analog electronic components and circuits.

OUTLINE:

1. Diodes

- 1.1 The conductor and insulator
- 1.2 Doping
- 1.3 N and P type materials
- 1.4 Biasing the PN Junction
- 1.5 Diode characteristics
- 1.6 Zener Diode characteristics
- 1.7 Light-emitting diodes
- 1.8 Photo diodes and laser diodes
- 1.9 Schottky diodes
- 1.10 Varactor diode
- 1.11 Varistor
- 1.12 Half and full wave rectifier circuits
- 1.13 Diode Applications

2. Introduction to Bipolar Transistors

- 2.1 BJT construction
- 2.2 Biasing BJT's
- 2.3 BJT characteristics
- 2.4 Temperature effects on biasing voltages
- 2.5 Troubleshooting transistor bias circuits

3. Transistor AC Amplifiers

3.1 Common emitter amplifier
3.2 Common collector amplifier
3.3 Common base amplifier
3.4 Class A amplifiers
3.5 Class B and class C amplifiers
3.6 Types of distortion
3.7 RC phase shift oscillator
3.8 Colpitts oscillator
3.9 Harley and other oscillators
3.10 Crystal controlled oscillators

4. Field Effect Transistors

4.1 JFET characteristics
4.2 JFET biasing
4.3 JFET amplifiers
4.4 D type mosfets
4.5 E Type mosfets
4.6 FET amplifiers

5. Amplifier Frequency Response

5.1 Low Frequency Amplifier Response
5.2 High Frequency Amplifier Response
5.3 Total Amplifier Frequency Response
5.4 Frequency Response of Multistage Amplifiers
5.5 Switching characteristics

6. Operational Amplifiers

6.1 Differential amplifier
6.2 OP AMP characteristics
6.3 Various OP amp circuits

7. OP-Amp Circuits

7.1 Passive filters
7.2 Low pass filters
7.3 High pass filters
7.4 Band pass/stop filters
7.5 Wien bridge oscillator
7.6 Relaxation oscillator

8. OP-Amp Related Devices

8.1 Transimpedance amplifier
8.2 Voltage comparators
8.3 Electronic timers
8.4 555/ XR 2240
8.5 Monostable/Astable Operation

9. Unregulated and Regulated Power Supplies

- 9.1 Zener regulator
- 9.2 Emitter follower regulator
- 9.3 Variable feedback regulator
- 9.4 Linear and Switching regulator
- 9.5 Other IC regulators
- 9.6 Basic power supply design
- 9.6 Determining power supply component values

10. Thyristors and Unijunction Devices

- 10.1 Shockley diodes and basic thyristors
- 10.2 SCR characteristics
- 10.3 Diac's characteristics
- 10.4 Triac's characteristics
- 10.5 UJT characteristics

11. Miscellaneous Devices

- 11.1 Solar cells, LCD's, Speakers, Motors, Batteries, and Fiber optics

EVALUATION:

Assignments/Quizzes	15%
Term tests	30%
Final exam	45%
Laboratory	10%
TOTAL:	**100%**

TEXTS AND REFERENCES (Including optional references for Q2, 2004):

Electronic Devices 6th Edition (or 5th Edition)
Floyd Thomas L. ISBN 0-13-028484-X
Foundations of Electronics, Circuits and Devices 4th Edition (or 3rd Edition)
Russell L. Meade ISBN 0-7668-0427-5
Laboratory Exercises, Handouts and Course Outline
Available at Camosun College Bookstore

GRADING (in accordance with College policy):

A+	95 – 100%	**B-**	70 - 74%
A	90 – 94%	**C+**	65 - 69%
A-	85 – 89%	**C**	60 - 64%
B+	80 – 84%	**D**	50 - 59%
B	75 – 79%	**F**	< 50%