OFFICIAL COURSE OUTLINE INFORMATION

Students are advised to keep course outlines in personal files for future use.

Shaded headings are subject to change at the discretion of the department and the material will vary - see course syllabus available from instructor

FACULTY/DEPARTMENT: PHYSICS 332 NATURAL SCIENCES

COURSE NAME/NUMBER FORMER COURSE NUMBER UCFV CREDITS
ELECTRONICS

COURSE DESCRIPTIVE TITLE

CALENDAR DESCRIPTION:

Physics 332 is an introductory electronic principles and circuit analysis course. This course will cover the following topics: analysis of DC and AC circuits, diodes, bipolar transistors, field effect transistors, transistor amplifiers, operational amplifiers, power supplies, and digital logic. Students enrolling in this course must also take in the same semester, Physics 342, the accompanying lab course. A major emphasis will be placed on using the provided computers to model the circuits and the circuit devices studied in this course. Access to a home, IBM compatible computer, will assist the student in doing many of the problems and experiments.

PREREQUISITES: 
Physics 222

COREQUISITES: 
Physics 342

SYNONYMOUS COURSE(S) 
(a) Replaces:
(b) Cannot take:

SERVICE COURSE TO:

TOTAL HOURS PER TERM: 60 TRAINING DAY-BASED INSTRUCTION

STRUCTURE OF HOURS:
Lectures: 60 Hrs
Seminar: Hrs
Laboratory: Hrs
Field Experience: Hrs
Student Directed Learning: Hrs
Other (Specify): Hrs

HOURS PER DAY:

MAXIMUM ENROLLMENT:

EXPECTED FREQUENCY OF COURSE OFFERINGS:

WILL TRANSFER CREDIT BE REQUESTED? (lower-level courses only) ☑ Yes ☐ No

WILL TRANSFER CREDIT BE REQUESTED? (upper-level requested by department) ☐ Yes ☐ No

TRANSFER CREDIT EXISTS IN BCCAT TRANSFER GUIDE:

AUTHORIZATION SIGNATURES:

Course Designer(s): George McGuire
Chairperson: (Curriculum Committee)

Department Head: Henry Speer
Dean: J.D. Tunstall, Ph.D.
PAC Approval in Principle Date: PAC Final Approval Date: November 24, 1993
LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:

This course is designed to provide students with:
1. The theory needed to understand and predict how electronic devices will function when placed in circuits;
2. The theory to design and analyze the electronic circuits;
3. The ability to design, run, and test circuits on computer simulators;
4. An appreciation of the importance electronics plays in the lives of Canadians.

METHODS:

This course will be presented using lectures, demonstrations, and computer simulations. The use of the computer simulators will permit the students to design and check how their circuits should function when constructed in the lab. The computer simulations will help the students understand and master the electronic principles and circuit theory, as well as provide an appreciation of how important a computer can be to a physicist. Students after successfully completing this course will have a good understanding of basic electronic devices, how computers may be used to model and test electronic circuits (active and passive devices), and the ability to design, construct, and to test circuits.

PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

Credit can be awarded for this course through PLAR (Please check:) □ Yes □ No

METHODS OF OBTAINING PLAR:

TEXTBOOKS, REFERENCES, MATERIALS:

[Textbook selection varies by instructor. An example of texts for this course might be:]


REFERENCES:


SUPPLIES / MATERIALS:

STUDENT EVALUATION:

[An example of student evaluation for this course might be:]

Assignments 20%
Mid-term 20%
Computer Simulations 20%
Final 40%

COURSE CONTENT:

[Course content varies by instructor. An example of course content might be:]

Week 1: Semiconductors
- Conductors and semiconductors
- Doping a semiconductor
- Diode curve: forward and reverse bias
- Diode approximations
- Diode circuits

Week 2: Bipolar Transistors
- Unbiased and biased transistor (PNP NPN)
- Collector curves
- Transistor approximations
Week 3: Transistor Fundamentals
   - load line, operating point, saturation points
   - transistor switch
   - LED drivers
   - Transistor Biasing

Week 4: AC Models
   - coupling and bypass capacitors
   - small signal operation
   - AC resistance of the emitter diode
   - CE amplifier

Week 5: Voltage Amplifiers
   - CE amplifier
   - voltage gain
   - analysis of voltage amplifiers
   - power amplifiers (AC load line, Class A operation)

Week 6: Emitter follower
   - CC amplifier
   - voltage gain
   - Class B operation

Week 7: Field Effect Transistors
   - JFET
   - drain curves
   - JFET approximations
   - MOSFET

Week 8: Op. Amps
   - integrated circuits
   - differential amplifier

Week 9: Op. Amps
   - Op-amp characteristics
   - small and large frequency operation
   - negative feedback and inverting voltage feedback
   - linear and non-linear op amp circuits

Week 10: Op Amps
   - oscillators
   - Schmitt triggers
   - phase locked loops
   - relaxation oscillations

Week 11: Op Amps
   - voltage regulators

Week 12: Digital Logic
   - the logic gates
   - flip-flops

Week 13: Digital Logic
   - registers and counters
   - buffers

Week 14: Digital Logic
   - digital to analog conversion/circuits
   - analog to digital converter circuits