



## **I. COURSE DESCRIPTION**

This course introduces the student to electronic devices and circuit applications. Diodes, transistors and their applications will be studied in detail. Hands on skills will be developed in the practical component of this course, which includes device testing, circuit assembly, analysis and troubleshooting.

## **II. LEARNING OUTCOMES AND ELEMENTS OF PERFORMANCE:**

**Upon successful completion of this course, the student will demonstrate the ability to:**

### **1. Understand atomic theory and the formation of a pn junction.**

**Potential elements of the performance:**

- Describe the makeup of the atom.
- State the relationship between the number of valence electrons and the elements conductivity.
- Contrast between trivalent and pentavalent elements
- List the similarities and differences between n-type and p-type semiconductors.
- Explain how a pn junction is formed.
- Define bias and describe the different methods of forward and reverse biasing a pn junction.

### **2. Understand diode principles.**

**Potential elements of the performance:**

- Describe the construction of a diode.
- Compare Silicon and Germanium diodes
- Identify the terminals of a diode and be able to draw and analyze the schematic diagram of a simple diode circuit.
- Describe how to test a diode in and out of circuit with an analog or digital meter.
- Using a specification sheet, list the parameters and operating characteristics of different diodes.
- Discuss the basic operating principles of rectifier diodes, zener diodes and light- emitting diodes.(LEDs).

- Calculate Diode Voltage and Current in electric circuits implementing Silicon or Germanium diodes, Zener Diodes and Light-Emitting Diodes.

### **3. Understand common diode applications.**

#### **Potential elements of the performance:**

- Draw the block diagram of a Linear DC power supply and describe the function of each circuit it contains.
- Describe the operation of the half-wave, full-wave and bridge rectifiers.
- Calculate Load Voltage and Load Current of the three types of rectifiers.
- Explain the effects that filtering has on the output of a rectifier.
- Identify and describe various types of power supply filters.
- Calculate Load Voltage and Load Current of Filtered rectifiers.
- Describe different voltage and current regulators including Zener Regulators and Integrated Circuit Regulators.
- Perform calculations to justify proper operation of the power supply.
- Assemble and test power supplies using proper test equipment.
- Troubleshoot various linear power supplies in a safe and proper manner.

### **4. Fabricate and Test a Complete Linear DC Power Supply.**

#### **Potential elements of the performance:**

- Prototype a complete Linear DC Power Supply (Construct and Test)
- Perform all required Calculations and Measurement prior to final assembly.
- Properly solder all required components.
- Correctly assemble all components implementing common shop practices and assembly techniques.
- Accurately produce a Technical Report as per criteria provided by instructor.

### **III. TOPICS TO BE COVERED:**

1. Atomic theory and the pn junction
2. Diodes and their applications
3. Linear DC Power Supplies

**IV. REQUIRED RESOURCES/TEXTS/MATERIALS:**

- Text - Introductory Electronic Devices and Circuits – 6<sup>th</sup> or 7<sup>th</sup> Edition Author - Robert T. Paynter
- 1st Year Electronic Parts Package
- Digital Multimeter

**V. EVALUATION PROCESS/GRADING SYSTEM:**

The final grade will be derived as follows:

- Theory - Tests ( 3 or 4 ) and Quizzes = 50%
- Lab - Practical tests and reports = 40%
- Attendance and work ethics = 10%
- TOTAL = 100%
- **See Special Notes Section VI for further details affecting final grade.**

The following semester grades will be assigned to students in postsecondary courses:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
<b>Grade</b>	<b>Definition</b>	<b>Grade Point Equivalent</b>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	49% and below	
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations	

	with extenuating circumstances giving a student additional time to complete the requirements for a course.
NR	Grade not reported to Registrar's office.
W	Student has withdrawn from the course without academic penalty.

## VI. SPECIAL NOTES:

### Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your instructor and/or the Special Needs office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

### Retention of course outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

### Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. Students who engage in “academic dishonesty” will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course outline amendments:

The Professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

**Additional Criteria:**

- Attendance to lab activities is compulsory, unless discussed with the instructor in advance of the absence and the absence is for a medical or family emergency. A **deduction of 2% per missed Lab** will be imposed on the final lab mark.
- Your attendance to all classes, and your final grade are directly related. A **deduction of 1% per missed theory hour** will be imposed on the final theory mark.
- Any student that is absent for any test will be required to provide a doctors' note immediately upon returning. Failing to do so will result in a grade of 0% being assigned to the missed test. It is the students' responsibility to contact the college and/or instructor.
- Tests, quizzes and other activities, will not be scheduled on an individual basis, unless it is for a medical or family emergency.
- Disruptions to theory classes, such as lateness, are not acceptable and will be dealt with on an individual basis. Students exhibiting chronic lateness, disruptiveness or absenteeism will be required to meet with the Dean, and will be placed on academic probation.
- The use of Electronic Recording Devices is prohibited unless individual permission is obtained from the instructor. The use of Cell Phones during scheduled classes is prohibited. Turn off all Cell Phones prior to attending class.

**Laboratory Reports** shall be subject to the handout and or criteria given at the start of the semester by the instructor.

All Lab Reports are due **before** the start of the following weeks Lab Class unless otherwise stipulated by the instructor. A **penalty of 10% per day** will be assessed for late submissions ( Weekends included).

**All Lab Reports must be submitted in a Duo-Tang cover unless otherwise noted. No loose papers will be accepted and as such will be graded 0%.**

All other required submissions will be assessed a late penalty of **5% per day** ( Weekends included).

Any submissions that are incomplete will be returned to the student and will not be graded until such a time as they are completed. The maximum mark that can be obtained for incomplete labs re-submitted will be 50%. Incomplete reports handed in after the last scheduled class, will be graded 0%.

#### **VII. PRIOR LEARNING ASSESSMENT:**

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

#### **VIII. DIRECT CREDIT TRANSFERS:**

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.