Class Hours: 3.0 Credit Hours: 4.0
Laboratory Hours: 3.0 Revised: Spring 2011

Catalog Course Description:

An introductory course in solid-state devices and the basic circuits in which they are used. Topics include semiconductor physics, diode circuits, bipolar transistor circuit analysis, FET circuit analysis and Op-Amp basics and uses.

Entry Level Standards:

The student must have knowledge of basic DC circuits to include series and parallel circuits and network theorems such as Thevenin's and Norton's theorems. A complete understanding of Kirchhoff's Laws and power is also required.

Prerequisites:

EET 1012

Textbook(s) and Other Course Materials:

Parts Kit: Approximate Cost $25.00.

I. Week/Unit/Topic Basis:

The following is intended as a guide to the instructor. The material covered in the course may be changed by the instructor depending upon the progress, etc., of the class.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to Diodes &amp; Diode Circuits - Lab 2</td>
</tr>
<tr>
<td>2</td>
<td>Power Supplies - Lab 18</td>
</tr>
<tr>
<td>3</td>
<td>Special Diodes - Lab 3 &amp; Test 1</td>
</tr>
<tr>
<td>4</td>
<td>Bipolar Transistor - Lab 4</td>
</tr>
<tr>
<td>5</td>
<td>Transistor Circuits - Lab 5.1</td>
</tr>
<tr>
<td>6</td>
<td>Transistor Circuits – Lab 5.2</td>
</tr>
<tr>
<td>7</td>
<td>Other Transistor Circuits - Lab 6.1 &amp; Test 2</td>
</tr>
<tr>
<td>8</td>
<td>Field-effect transistor amplifiers and MOSFETS - Lab 7.1</td>
</tr>
</tbody>
</table>
II. Course Goals*:

A. The course will guide students toward understanding the operation and applications of the PN junction diode. I, II

B. Understand the operation of and how to properly bias/connect transistors and operational amplifiers. I, II

C. Calculate the DC and AC voltages present in transistor circuits and op amp circuits. I, II

D. Perform mid-band analysis of single and multistage small-signal bipolar and field effect transistor amplifiers and op amp circuits. I, II

E. Connect any of the circuits studied and make basic AC and DC measurements to verify circuit performance and reinforce the theory. I, II, III

F. Understand and perform frequency response of amplifiers. I, II

G. Understand the operation of thyristors and other special devices studied in the course. I, II, III

H. Demonstrate, as an individual and as a team member, library/information skills, time management skills, problem-solving skills, material management skills, and communication skills. I, II, III, IV, V

*Roman numerals after course goals reference goals of the Engineering Technology program (Career Program Goals and General Education Goals are listed http://www.pstcc.edu/departments/curriculum_and_instruction/syllabi/)

III. Expected Student Learning Outcomes*:

The student will be able to:

1. Identify the anode and cathode of a diode. A

2. Obtain the diode characteristics from a curve tracer. A, E

3. Determine the forward and reverse breakdown voltage for any diode. A, E


5. Identify a voltage multiplier. A
6. Identify clamper circuit. A
7. Construct a zener regulator circuit. A, E
8. Explain the characteristics of a LED. G
9. Explain the operation of a photo diode. G
10. Explain the operation of an opto coupler. G
11. Properly take measurements using the Oscilloscope. E
12. Obtain transistor characteristics from a curve tracer. B, E
13. Explain the operation of the transistor as a switch. B
14. Connect circuits which will properly bias the transistor. B, E
15. Calculate and measure the DC and AC voltages present in bipolar and field-effect transistor circuits. B, C, E, H
16. Perform midband analysis of single and multistage bipolar and field-effect transistor small-signal amplifiers. D, H
18. Explain Miller’s Theorem and the use of decibels. F
19. Calculate the low-frequency response of an amplifier. F, H
20. Calculate the high-frequency response of an amplifier. F, H
21. Combine calculated low-, mid-band, and high-frequency responses to produce a complete frequency response of an amplifier. D, F, H
22. Perform frequency response measurement techniques in the laboratory on amplifiers. E, F
23. Acquire technical information from various media in the Educational Resource Center or elsewhere. H
24. Function as an effective team member in the lab or in classroom team assignments. H
25. Prepare a technical report. H

* Capital letters after Expected Student Learning Outcomes reference the course goals listed above.

**IV. Evaluation:**

A. Testing Procedures: 80% of grade

The evaluation in the classroom grade will be determined by a combination of tests, homework, and a final exam. Pop quizzes may also be used at the discretion of the instructor. The percentage that each of these factors count and the frequency of quizzes,
tests and homework is left to the discretion of the instructor, but the following is offered as a guide:

<table>
<thead>
<tr>
<th>Test type</th>
<th>Frequency</th>
<th>Weightage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tests</td>
<td>At least 4 tests</td>
<td>40%</td>
</tr>
<tr>
<td>Homework</td>
<td>Approximately once per week</td>
<td>20%</td>
</tr>
<tr>
<td>Lab Reports</td>
<td></td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td></td>
<td>20%</td>
</tr>
</tbody>
</table>

B. Laboratory Expectations: 20% of grade

The laboratory grade will be determined by a combination of performance (including teamwork) within the lab and the degree of comprehension demonstrated in the lab report. There will be at least twelve labs during the semester to go along with the classroom material. The following is offered as a guide for the instructor:

<table>
<thead>
<tr>
<th>Lab Report component</th>
<th>Weightage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab Reports (neatness and content)</td>
<td>80%</td>
</tr>
<tr>
<td>Laboratory Test</td>
<td>20%</td>
</tr>
</tbody>
</table>

C. Field Work:

N/A

D. Other Evaluation Methods:

N/A

E. Grading Scale:

- 93 - 100   A
- 88 - 92   B+
- 83 - 87   B
- 78 - 82   C+
- 70 - 77   C
- 60 - 69   D
- Below 60   F

V. Policies:

A. Attendance Policy:

Pellissippi State expects students to attend all scheduled instructional activities. As a minimum, students in all courses (excluding distance learning courses) must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. Individual departments/programs/disciplines, with the approval of the vice president of the Learning Division, may have requirements that are more stringent. In very specific circumstances, an appeal of the policy may be addressed to the head of the department in which the course was taken. If further action is warranted, the appeal may be addressed to the vice president of the Learning Division.

B. Academic and Classroom Misconduct:

Academic misconduct committed either directly or indirectly by an individual or group is subject to disciplinary action. Prohibited activities include but are not limited to the following practices:
• Cheating, including but not limited to unauthorized assistance from material, people, or devices when taking a test, quiz, or examination; writing papers or reports; solving problems; or completing academic assignments.
• Plagiarism, including but not limited to paraphrasing, summarizing, or directly quoting published or unpublished work of another person, including online or computerized services, without proper documentation of the original source.
• Purchasing or otherwise obtaining prewritten essays, research papers, or materials prepared by another person or agency that sells term papers or other academic materials to be presented as one’s own work.
• Taking an exam for another student.
• Providing others with information and/or answers regarding exams, quizzes, homework or other classroom assignments unless explicitly authorized by the instructor.
• Any of the above occurring within the Web or distance learning environment.

C. Accommodations for disabilities:

Students who need accommodations because of a disability, have emergency medical information to share, or need special arrangements in case the building must be evacuated should inform the instructor immediately, privately after class or in her or his office. Students must present a current accommodation plan from a staff member in Services for Students with Disabilities (SSWD) in order to receive accommodations in this course. Services for Students with Disabilities may be contacted by going to Goins 127, 132, 134, 135, 131 or by phone: 539-7153 or TTY 694-6429. More information is available at www.pstcc.edu/departments/swd/.