

Course Title: Solid State Devices
Course Number: ELCR 1030
Credit Hr / Min: 5 hr / 4500 min
Class Location: RMTC 827, Vidalia
Class Meets: 5:15-7:55 pm / MW
CRN: 20056

Instructor: William Greene
Office Hours: Mon –Thurs 8:00 am – 9:00 am
1:00 pm – 3:00 pm
Office: RMTC Room 822, Vidalia Campus
E-mail: wgreene@southeasterntech.edu
Phone: 912-538-3102 **FAX:** 912-538-3106

REQUIRED TEXTS: *Electronic Devices, Electron Flow Version, 9th ed.*
by Thomas L. Floyd, published by Prentice Hall,
ISBN# 0-13-254985-9



REQUIRED SUPPLIES: Engineering / Scientific Calculator, **TI-83 Plus Graphing Calculator.** **This calculator is required for the mathematics classes associated with the Electronics programs.**

COURSE DESCRIPTION: Introduces the physical characteristics and applications of solid-state devices.

PREREQUISITES: ELCR 1020

MAJOR COURSE COMPETENCIES / COURSE OUTLINE:

1. PN Diodes
2. Power Supplies
3. Voltage Regulation
4. Bipolar Junction Theory and Application
5. Field Effect Transistors
6. Special Applications

GENERAL EDUCATION CORE COMPETENCIES: STC has identified the following general education core competencies that graduates will attain:

1. The ability to utilize standard written English.
2. The ability to solve practical mathematical problems.
3. The ability to read, analyze, and interpret information.

All students pursuing a degree, a diploma, or a Technical Certificate of Credit with a General Education component will be required to pass the General Education Competency Exams prior to graduation.

STUDENT REQUIREMENTS: Students are expected to complete all tests and comprehensive problems by the due dates. A ten point penalty will be assessed for each day a comprehensive problem is late. There are no makeup tests. **Tests are made available for several days; therefore, there are no makeup tests. Students who miss a test will be assigned a grade of zero.** Students are responsible for policies and procedures included in the *STC Catalog*. **All students must** pledge that they have read and understand the *STC Online Orientation* within the first five days of class. **All students are responsible for checking e-mails and ANGEL announcements DAILY.**

STC ATTENDANCE GUIDELINES: Class attendance is a very important aspect of a student's success. Being absent from class prevents students from receiving the full benefit of a course and also interrupts the learning process. Southeastern Technical College considers both tardiness and leaving early as types of absenteeism. Responsibility for class attendance rests with the student. Regular and punctual attendance at all scheduled classes is required for student success. Students will be expected to complete all work required by the instructor as described in the individual course syllabus.

Instructors have the right to give unannounced quizzes/assignments. Students who miss an unannounced quiz or assignment will receive a grade of 0. Students who stop attending class, but do not formally withdraw, may receive a grade of F and face financial aid repercussions in upcoming semesters.

Instructors are responsible for determining whether missed work may be made up and the content and dates for makeup work is at the discretion of the instructor.

Students will not be withdrawn by an instructor for attendance; however, all instructors will keep records of graded assignments and student participation in course activities. The completion dates of these activities will be used to determine a student's last date of attendance in the event a student withdraws, stops attending, or receives an F in a course.

SPECIAL NEEDS: Students with disabilities who believe that they may need accommodations in this class based on the impact of a disability are encouraged to contact Jan Brantley, Room 1208 Swainsboro Campus, 478-289-2274, or Helen Thomas, Room 108 Vidalia Campus, 912-538-3126, to coordinate reasonable accommodations.

SPECIFIC ABSENCES: Provisions for Instructional Time missed because of documented absences due to jury duty, military duty, court duty, or required job training will be made at the discretion of the instructor.

PREGNANCY: Southeastern Technical College does not discriminate on the basis of pregnancy. However, we can offer accommodations to students who are pregnant that need special consideration to successfully complete the course. If you think you will need accommodations due to pregnancy, please advise me and make appropriate arrangements with the Special Needs Office. Swainsboro Campus: Jan Brantley, Room 1208, (478) 289-2274 -- Vidalia Campus: Helen Thomas, Room 108, (912) 538-3126.

WITHDRAWAL PROCEDURE: Students wishing to officially withdraw from a course(s) or all courses after the drop/add period and prior to the 65% portion of the semester (date will be posted on the school calendar) must speak with a Career Counselor in Student Affairs and complete a Student Withdrawal Form. A grade of "W" is assigned when the student completes the withdrawal form from the course.

Students who are dropped from courses due to attendance (see your course syllabus for attendance policy) after drop/add until the 65% point of the semester will receive a "W" for the course. Abandoning a course(s) instead of following official withdrawal procedures may result in a grade of 'F' being assigned.

After the 65% portion of the semester, the student will receive a grade for the course. (Please note: A zero will be given for all missed assignments.)

There is no refund for partial reduction of hours. Withdrawals may affect students' eligibility for financial aid for the current semester and in the future, so a student must also speak with a representative of the Financial Aid Office to determine any financial penalties that may be assessed due to the withdrawal. All grades, including grades of 'W', will count in attempted hour calculations for the purpose of Financial Aid.

Remember - Informing your instructor that you will not return to his/her course does not satisfy the approved withdrawal procedure outlined above.

MAKEUP POLICY: Students are required to take all tests scheduled during the semester. Failure to take Tests/Exam(s) and Lab assignments **will result in a grade of zero. There will be no makeup of Tests**

or Labs. If Internet or browser failure occurs, contact instructor immediately. A decision will be made at that time if the exam will be reset. Instructor reserves the right to deduct points from the exam scores for exceeding the scheduled time limit on the exam and/or requiring student to come to campus to take the final exam. Note: If student notifies instructor about exam problems because of technical issues after the due date or on the last day of the semester, the student will **NOT** be allowed to make-up the exam. **No exceptions! Assignments must be turned in on the assigned date and will not be accepted late, a grade of zero will be given. ALL assignments are due according to the dates listed on the lesson plan.**

ACADEMIC DISHONESTY POLICY: The STC Academic Dishonesty Policy states *All forms of academic dishonesty, including but not limited to cheating on tests, plagiarism, collusion, and falsification of information, will call for discipline.* The entire policy/procedures will be discussed with you by the instructor. The policy can also be found in the *STC Catalog and Student Handbook*.

Procedure for Academic Misconduct

The procedure for dealing with academic misconduct and dishonesty is as follows:

--First Offense--

Student will be assigned a grade of "0" for the test or assignment. Instructor keeps a record in course/program files and notes as first offense. The instructor will notify the student's program advisor, academic dean, and the Registrar at the student's home campus. The Registrar will input the incident into Banner for tracking purposes.

--Second Offense--

Student is given a grade of "WF" for the course in which offense occurs. The instructor will notify the student's program advisor, academic dean, and the Registrar at the student's home campus indicating a "WF" has been issued as a result of second offense. The Registrar will input the incident into Banner for tracking purposes.

--Third Offense--

Student is given a grade of "WF" for the course in which the offense occurs. The instructor will notify the student's program advisor, academic dean, and the Registrar at the student's home campus indicating a "WF" has been issued as a result of second offense. The Vice President for Student Affairs, or designee, will notify the student of suspension from college for a specified period of time. The Registrar will input the incident into Banner for tracking purposes.

STATEMENT OF NON-DISCRIMINATION: Southeastern Technical College does not discriminate on the basis of race, color, creed, national or ethnic origin, gender, religion, disability, age, disabled veteran, veteran of Vietnam Era or citizenship status, (except in those special circumstances permitted or mandated by law). This school is in compliance with Title VI of the Civil Rights Act of 1964, which prohibits discrimination on the basis of race, color, or national origin; with the provisions of Title IX of the Educational Amendments of 1972, which prohibits discrimination on the basis of gender; with the provisions of Section 504 of the Rehabilitation Act of 1973, which prohibits discrimination on the basis of handicap; and with the American with Disabilities Act (ADA).

GRIEVANCE PROCEDURES: Grievance procedures can be found in the Catalog and Handbook located on STC's website.

ACCESS TO TECHNOLOGY: Students can now access Angel, Remote Lab Access, Student Email, Library Databases (Galileo), and BannerWeb via the mySTC portal or by clicking the Current Students link on the STC website at www.southeasterntech.edu.

ELCR 1030 GRADING POLICY

Tests	55%
Labs	25%
Homework	10%
Study Guides	10%
	100%

GRADING SCALE

A	(90-100)
B	(80-89)
C	(70-79)
D	(60-69)
F	(0-59)

ELECTRONICS COMPETENCY EXAMS:

ELCR-1030 grading is based on the individual chapter exams and labs for the course. However, the final exam for ELCR-1060 (Linear Integrated Circuits) is the ESA Level 3 Exam which covers both Solid State Devices (ELCR-1030) and Linear Integrated Circuits (ELCR-1060).

As we complete each chapter (or area) of the solid state devices material, you will see an icon that will tell you specifically which portions of the ESA-3 material you should now be reviewing for your final exam in ELCR-1060.

No minimum grade is required for this exam; however, this exam will carry a 35% grading weight. Poor performance on this exam could result in a final class grade of <70 out of 100 which will require the student to retake ELCR-1060.

TCSG GUARANTEE/WARRANTY STATEMENT:

The Technical College System of Georgia guarantees employers that graduates of State Technical Colleges shall possess skills and knowledge as prescribed by State Curriculum Standards. Should any graduate employed within two years of graduation be deemed lacking in said skills, that student shall be retrained in any State Technical College at no charge for instructional costs to either the student or the employer.

****Disclaimer Statements****

- (1) Instructor reserves the right to change the syllabus and/or lesson plan as necessary.
- (2) The official copy of the syllabus is located inside the student's online course shell or will be given to them during face to face class time the first day of the semester. The syllabus displayed in advance of the semester in a location other than the course you are enrolled in is for planning purposes only.

LESSON PLAN
ELCR 1030 – Solid State Devices
Fall Semester 2015 (201612)

Color Codes: **Black** = Assignments / Information, **Blue** = Graded Assignments

Date	Chapter / Lesson	Content	Assignments & Tests	*Comp. Area
WEEK 1				
Aug 17	1.1 1.2 1.3	Class Introduction – Syllabi, Outline, Work Ethics, Rules, and Regulations Coverage Section 1.1 – Atomic Structure Section 1.2 – Materials Used in Electronics Section 1.3 – Current in Semiconductors	[On ANGEL] Review “Start Here” Information Post on “Acknowledge” Message Boards Read Sections 1.1, 1.2 & 1.3	1, b,c
18	1		Read Sections 1.4 & 1.5	1, b,c
19	1.4 1.5	Section 1.4 – N- & P-Type Semiconductors Section 1.5 – The PN Junction	LabVolt – Intro to Semiconductors	1, b,c
20	1	ANGEL	Complete Chapter 1 Study Guides Complete Chapter 1 Homework Study for Chapter 1 Exam	1, a,b,c
WEEK 2				
Aug 24	1 2.1 2.2 2.3	ANGEL Section 2.1 – Diode Operation Section 2.2 – V-I Characteristics Section 2.3 – Diode Models	Chapter 1 Exam Read Sections 2.1, 2.2 and 2.3	1,2, b,c
25	2		Read Sections 2.4, 2.5 & 2.6	2, b,c
26	2.4 2.5 2.6	Section 2.4 – Half-Wave Rectifiers Section 2.5 – Full-Wave Rectifiers Section 2.6 – PS Filters & Regulators		2, b,c
27	2		Read Sections 2.7, 2.8, 2.9 & 2.10	2, b,c
WEEK 3				
Aug 31	2.7 2.8 2.9 2.10	Section 2.7 – Diode Limiters & Clampers Section 2.8 – Voltage Multipliers Section 2.9 – The Diode Data Sheet Section 2.10 – Troubleshooting		1, b,c
Sept 1	2	ANGEL	Begin Chapter 2 Study Guides Begin Chapter 2 Homework	1,2, a,b,c
2	2	Chapter 2 Review	LabVolt – Diodes & Half-wave Rectification LabVolt – Full-Wave Rectification & Filter	1,2, b,c
3	2	ANGEL	Complete Chapter 2 Study Guides Complete Chapter 2 Homework	1,2, a,b,c

WEEK 4				
Sept 7		HOLIDAY – LABOR DAY	HOLIDAY – LABOR DAY	
8	2		Study for Chapter 2 Exam	1,2, b,c
9	2 3.1 3.2 3.3 3.4	ANGEL Section 3.1 – The Zener Diode Section 3.2 – Zener Diode Applications Section 3.3 – The Varactor Diode Section 3.4 – Optical Diodes	Chapter 2 Exam Read Sections 3.1, 3.2, 3.3 and 3.4	1,2,3, b,c
10	3		Read Sections 3.5 and 3.6 Begin Chapter 3 Study Guides Begin Chapter 3 Homework	1,3,6, a,b,c
14	3.5 3.6	Section 3.5 – Other Types of Diodes Section 3.6 – Troubleshooting Chapter 3 Review	LabVolt – Diode Wave Shaping & Zener Regulation	1,3,6, b,c
WEEK 5				
Sept 15	3	ANGEL	Complete Chapter 3 Study Guides Complete Chapter 3 Homework Study for Chapter 3 Exam	1,3,6, a,b,c
16	3 11.1 11.2 11.3 11.4	ANGEL Section 11.1 – The Four-Layer Diode Section 11.2 – The SCR Section 11.3 – SCR Applications Section 11.4 – The Diac and Triac	Chapter 3 Exam Read Sections 11.1, 11.2, 11.3 and 11.4	1,3,6, b,c
17	11		Read Sections 11.5, 11.6 and 11.7 Begin Chapter 11 Study Guides Begin Chapter 11 Homework	1,3,6, a,b,c
21	11.5 11.6 11.7	Section 11.5 – The SCS Section 11.6 – The UJT Section 11.7 – The PUT	LabVolt – Silicon Controlled Rectifier	1,3,6, b,c
WEEK 6				
Sept 22	11	ANGEL	Complete Chapter 11 Study Guides Complete Chapter 11 Homework	1,3,6, a,b,c
23	11	Chapter 11 Review	LabVolt – UJT Triggered SCR Power Control Study for Chapter 11 Exam	1,3,6, b,c
24	11	ANGEL	Chapter 11 Exam Read Sections 4.1, 4.2 and 4.3	1,3,6, b,c
28	4.1 4.2 4.3	Section 4.1 – BJT Structure Section 4.2 – Basic BJT Operation Section 4.3 – BJT Characteristics & Parameters		4, b,c

WEEK 7				
Sept 29	4		Read Sections 4.4, 4.5 and 4.6	4, b,c
30	4.4 4.5 4.6	Section 4.4 – The BJT as an Amplifier Section 4.5 – The BJT as a Switch Section 4.6 – The Phototransistor		4, b,c
Oct 1	4	ANGEL	Read Sections 4.7 and 4.8 Begin Chapter 4 Study Guides Begin Chapter 4 Homework	4, a,b,c
5	4.7 4.8	Section 4.7 – BJT Categories & Packaging Section 4.8 – Troubleshooting	LabVolt – Transistor Junctions & PNP Bias	4, b,c
WEEK 8				
Oct 6	4		Complete Chapter 4 Study Guides Complete Chapter 4 Homework Study for Chapter 4 Exam	4, a,b,c
7	4	ANGEL	Chapter 4 Exam	4, b,c
8	5		Read Sections 5.1 and 5.2	4, b,c
12	5.1 5.2	Section 5.1 – The DC Operating Point Section 5.2 – Voltage-Divider Bias MID-TERM		4, b,c
WEEK 9				
Oct 13	5		Read Sections 5.3 and 5.4	4, b,c
14	5.3 5.4	Section 5.3 – Other Bias Methods Section 5.4 – Troubleshooting	LabVolt – Introduction to Transistor Amps	4, b,c
15	5	ANGEL	Begin Chapter 5 Study Guides Begin Chapter 5 Homework	4, a,b,c
19	5	Chapter 5 Review	LabVolt – Bias Stabilization	4, b,c
WEEK 10				
Oct 20	5		Complete Chapter 5 Study Guides Complete Chapter 5 Homework Study for Chapter 5 Exam	4, a,b,c
21	5	ANGEL	Chapter 5 Exam	4, b,c
22	6		Read Sections 6.1, 6.2, and 6.3	4, b,c
26	6.1 6.2 6.3	Section 6.1 – Amplifier Operations Section 6.2 – Transistor AC Models Section 6.3 – The Common-Emitter Amp	LabVolt – Common Emitter Circuit	4, b,c

WEEK 11				
Oct 27	6		Read Sections 6.4, 6.5, and 6.6	4, b,c
28	6.4 6.5 6.6	Section 6.4 – The Common-Collector Amp Section 6.5 – The Common-Base Amp Section 6.6 – Multistage Amplifiers	LabVolt – Common Collector Circuit Read Sections 6.7 and 6.8 Begin Chapter 6 Study Guides Begin Chapter 6 Homework	4, a,b,c
29		FALL ACTIVITY DAY	FALL ACTIVITY DAY	
Nov 2	6.7 6.8	Section 6.7 – The Differential Amplifier Section 6.8 – Troubleshooting Chapter 6 Review	Study for Chapter 6 Exam	4,6, b,c
3	6	ANGEL	Complete Chapter 6 Study Guides Complete Chapter 6 Homework	4, a,b,c
WEEK 12				
Nov 4	7.1 7.2	ANGEL Section 7.1 – The Class A Power Amp Section 7.2 – Class B and Class AB Amps	Chapter 6 Exam Read Sections 7.1 and 7.2	4,6, b,c
5	7	ANGEL	Read Sections 7.3 and 7.4 Begin Chapter 7 Study Guides Begin Chapter 7 Homework	4,6, a,b,c
9	7.3 7.4	Section 7.3 – The Class C Amp Section 7.4 – Troubleshooting Chapter 7 Review	Study for Chapter 7 Exam Complete Chapter 7 Study Guides Complete Chapter 7 Homework	4,6, a,b,c
10	8	ANGEL	Chapter 7 Exam Read Sections 8.1, 8.2, 8.3 and 8.4	4,6, b,c
WEEK 13				
Nov 11	8.1 8.2 8.3 8.4	Section 8.1 – The JFET Section 8.2 – JFET Characteristics & Parameters Section 8.3 – JFET Biasing Section 8.4 – The Ohmic Region		5, b,c
12	8	ANGEL	Read Sections 8.5, 8.6 and 8.7 Begin Chapter 8 Study Guides Begin Chapter 8 Homework	5, a,b,c
16	8.5 8.6 8.7	Section 8.5 – The MOSFET Section 8.6 – MOSFET Characteristics & Parameters Section 8.7 – MOSFET Biasing		5, b,c
17	8		Read Sections 8.8 and 8.9	5, a,b,c

WEEK 14				
Nov 18	8.8 8.9	Section 8.8 – The IGBT Section 8.9 – Troubleshooting Chapter 8 Review	LabVolt – Junction FETs Study for Chapter 8 Exam Complete Chapter 8 Study Guides Complete Chapter 8 Homework	5, a,b,c
19	8	ANGEL	Chapter 8 Exam Read Sections 9.1, 9.2, 9.3 and 9.4	5, b,c
23	9.1 9.2 9.3 9.4	Section 9.1 – The Common-Source Amp Section 9.2 – The Common-Drain Amp Section 9.3 – The Common-Gate Amp Section 9.4 – The Class D Amplifier		5,6, b,c
24	9		Read Sections 9.5, 9.6 and 9.7 Begin Chapter 9 Study Guides Begin Chapter 9 Homework	5,6, a,b,c
THANKSGIVING HOLIDAYS				
25		Thanksgiving Holiday – NO CLASSES	Thanksgiving Holiday – NO CLASSES	
26		Thanksgiving Holiday – NO CLASSES	Thanksgiving Holiday – NO CLASSES	
WEEK 15				
Nov 30	9.5 9.6 9.7	Section 9.5 – MOSFET Analog Switching Section 9.6 – MOSFET Digital Switching Section 9.7 – Troubleshooting		5,6, b,c
Dec 1	9	ANGEL	Begin Chapter 9 Study Guides Begin Chapter 9 Homework	5,6, a,b,c
2	9	Chapter 9 Review	LabVolt – JFET Amplifier	5,6, b,c
3	9	Semester Classes End	Study for Chapter 9 Exam Begin Chapter 9 Study Guides Begin Chapter 9 Homework	5,6, b,c
FINALS WEEK				
Dec 8	9	ANGEL	Chapter 9 Exam	5,6, b,c
9	9		Complete by Midnight	5,6, b,c

*** Competency Areas:**

Electronics Technology Competency Areas:

- | | |
|-----------------------|--|
| 1. PN Diodes | 4. Bipolar Junction Theory and Application |
| 2. Power Supplies | 5. Field Effect Transistors |
| 3. Voltage Regulation | 6. Special Applications |

General Core Competency Areas:

- | | |
|---|---|
| a. The ability to utilize standard written English. | mathematical problems. |
| b. The ability to solve practical | c. The ability to read, analyze, and interpret information. |

IMPORTANT REMINDERS CONCERNING ASSIGNMENTS: *(Students are responsible for all information contained in this lesson plan).*

- **Assignments:** This lesson plan is subject to change at instructor's discretion. All assignments must be submitted and completed by the due dates listed above to receive credit.....so manage your time wisely each week. Missing assignments receive a grade of zero.
- **Study Guides:** For each Chapter within this course, there are online Study Guides (i.e. Practice Tests) available from the publisher's Web Site. You may take these Practice Tests as many times as you would like in order to prepare for the test. ***There are three to four Practice Tests for each Chapter: (example) Multiple Choice, True / False, and Fill in the Blanks. You are required to complete all of these for each Chapter.*** You should refer to lesson plan information above for specific weeks when material is covered and when the Practice Tests are due for your grade.
- **Grades:** Can be checked via the ANGEL class.