SAM HOUSTON STATE UNIVERSITY

COLLEGE OF SCIENCE & ENGINEERING TECHNOLOGY

DEPARTMENT OF ENGINEERING TECHNOLOGY

COURSE SYLLABUS

ETEE 3350 SOLID STATE ELECTRONICS

Fall 2017

Department: Engineering Technology
Course Name/ Title: ETEE 3350 Solid State Electronics - 80594
Semester: Fall 2017
Credit: 3 Hours (2-2 Format)
Location/Time: Pirkle 220 (Lecture) and Pirkle 140 (Lab), Mon/Wed: 8:00am – 9:50am
Instructor: Iftekhar Ibne Basith
Office: Pirkle 420F
Email: iib002@shsu.edu
Phone: 936-294-4139
Office Hours: Mon/Wed 10am – 11am or by appointment

Course Catalog Description: This course is designed to provide in-depth knowledge and experience in the principles and applications of solid-state devices. Specific emphasis is placed on the construction, characteristics and applications of diodes, rectifiers, transistors, thyristors and integrated circuits. Laboratory experience is gained through circuit construction, testing and troubleshooting. Prerequisite: ETEE 2320 or consent of instructor.

Required Textbook: Electronics Fundamentals: Circuits, Devices & Applications, 8th edition. Thomas L. Floyd & David M. Buchla, Pearson Prentice Hall, 2010. ISBN: 978-0-13-507295-0.

Required Laboratory Workbook: Experiments in Electronics Fundamentals and Electric Circuits Fundamentals, 8th edition. David M. Buchla, Pearson Prentice Hall, 2010. ISBN: 978-013-506327-9.

Required Supplies: A notebook and a Texas Instruments scientific/engineering type calculator. Each student will need scientific/engineering pocket calculator. Student should bring calculator to each class and to each lab session.

Course Objectives: Upon completion of the course, the student should be able to learn:
- Diodes and Application
- Transistors and Applications
- The Operational Amplifier
- Basic Op-Amp Circuits
- Special Purpose Op-Amp Circuits
- Measurement, Conversion, and Control

Class Structure and Attendance: This is an important fundamental class and your attendance is highly encouraged. *Lectures*, *in-class problems* and *discussions*, *laboratory experimental projects*, and *homework assignments* will constitute the structure of the course. The make-up labs and exams will be given only in the case of **documented physical illness** (**In this case, students must inform instructor at least 24 hours before the exam**).

Homework Assignments: Homework assignments will be available through SHSU Blackboard. The HW assignments will be automatically graded by blackboard system and be available to students after completion of each HW assignment. The HW assignments will not be available to the students after the due dates. No credit will be given for late/missed homework assignments. The best two HW will be counted **only** on the condition that you submit all the HW on time and within deadline. If you miss any single deadline for HW submission, then the average of the HW will be considered for your grade.

Blackboard Use: Presentations, course syllabus, Lab/HW assignments will be available in blackboard system. All the HW assignments will be completed through Blackboard systems. Please pay attention to the due dates.

Grading Scale: The final grade will be based on the following requirements.

Mid-term Test (Best of Two)	**20%**
Final Exam	**20%**
Laboratory Experiments	**30%**
Homework Assignments (Best Two of Minimum Five)	**10%**
Attendance, Observed performance, Attitude	**10%**
Project Presentation	**10%**
Total	**100%**

Percentage range	Grade
90 – 100	A
80 – 89	B
70 – 79	C
60– 69	D
0-59	F

Classroom Rules of Conduct: Students will avoid doing behavior in the classroom that intentionally or unintentionally disrupts the learning process and, thus, obstructs the mission of the university. Cellular *telephones* and *pagers* must be turned off before class begins. Students are prohibited from *eating in class*, *using tobacco products*, *making offensive remarks*, *reading newspapers*, *sleeping*, *talking at inappropriate times*, or *engaging in any other form of distraction*. Inappropriate behavior in the classroom shall result in a directive to leave class. Students who are especially disruptive also may be reported to the Dean of Students for disciplinary action in accordance with university policy.

Upon Completion: Upon completion of the course the student should understand

- The basic theory and molecular composition of semiconductors
- The structure and characteristics of the p-n junction & The solid state diode
- Diode rectifiers and other selected applications of diodes
- The structure and characteristics of the bipolar junction transistor
- Transistor amplifier circuits and transistor switching circuits
- Amplifier configurations, classes, and types
- The structure and characteristics of the field effect transistor (FET)
- FET amplifier circuits and FET switching circuits
- The structure and characteristics of four-layer devices (thryristors, SCRs, and others)
- Applications of four-layer switching devices"

Course Content and Lab Schedule: The tentative course content schedule will include the following topics. Depending upon extra handouts//homework assignment explanations, ***the tentative course content may be shifted slightly later in the semester***.

Laboratory Instructions

Laboratory Assignments: There are regular labs will be announced by the instructor during the lectures for this course. All laboratory project assignments must be completed for your lab grading. You must obey departmental laboratory safety rules & policies. ***You must attend and successfully complete each lab.*** Before each Lab, please prepare yourself enough by reading the objective, procedure and theory from the required workbook pages. LAB reports due dates are provided in the tentative schedule. Make sure you write clearly and neatly! If you miss any LAB you will lose points (30) for that corresponding LAB (**make up labs are only allowed in case of documented illness**).

ETEE 3350 Solid State Electronics			
Week	**Date**	**Subject**	**Reading References**
1	8/23	Introduction to the Course and Safety	
2	8/28 8/30	Overview of ETEE 1340 Electronics Technology I Overview of ETEE 2320 Electronics Technology II Lab#15 The Oscilloscope **(Due following week)** - ONLINE	 Workbook pp. 129-134
3	9/4 9/6	**LABOR Weekend, NO CLASS** Lab#16 Sine Wave Measurements **(Due following week)** - ONLINE	 Workbook pp. 129-143
4	9/11 9/13	**Ch 16.** Diodes and Applications **HW#1 (Due following week)** – ONLINE Lab #31 (**Due Following Week**) - ONLINE	Textbook pp. 720-779 Workbook pp. 257-268
5	9/18 9/20	**Ch 17.** Transistors and Applications **HW#2** (**Due Following Week**) Lab #32 (**Due Following Week**) - ONLINE	Textbook pp. 780-844 Workbook pp. 257-268
6	9/25 9/27	Lab #33 (**Due Following Week**) - ONLINE **Project Mid-Presentation**	Workbook pp. 275-279
7	10/2 10/4	**Exam # 1 (Chapter 16 and 17)** **Ch 18.** The Operational Amplifier **HW#3** (**Due Following Week**) – ONLINE	Best of Luck Textbook pp. 845-884
8	10/9 10/11	Lab # 35 (**Due Following Week**) – ONLINE **Ch 19.** Basic Op-Amp Circuits **HW#4** (**Due Following Week**) – ONLINE	Workbook pp. 289-293 Textbook pp. 885-932
9	10/16 10/18	Lab #37 (Continue) Lab#37 (**Due Following Week**) - ONLINE	Workbook pp. 307-311
10	10/23 ***10/25***	Lab #38 (**Due Following Week**) – ONLINE Lab #39 (**Due Following Week**) - ONLINE	Workbook pp. 313-317 Workbook pp. 319-323
11	10/30 11/1	**Ch 20.** Special-Purpose Op-Amp Circuits **HW#5** (**Due Following Week**) – ONLINE **Exam # 2 (Chapter 18 and 19)**	Textbook pp. 933-969 Best of Luck
12	11/6 11/8	Lab #40 Continue Lab #40 (**Due Following Week**) – ONLINE	Workbook pp. 329-333
13	11/13 11/15	Lab #43 Continue Lab #43 (**Due Following Week**) – ONLINE	Workbook pp. 351-356
14	11/20 11/22	**Ch 21**. Measurement, Conversion, and Control **HW#6** (**Due Following Week**) - ONLINE Final Project Presentation	Textbook pp. 970-1010
15	11/27 11/29	Lab #45 Continue Lab #45 (**Due Following Week**) – ONLINE	Workbook pp. 371-375
16	***12/4 - 12/7***	**FINALS (Chapters 20 and 21)**	Best of Luck

Note: *It is the student's responsibility to arrange make-up labs with the instructor/TA. Make-up labs may be considered with a report proven medical reason.*

Rules and Recommendations for Effective and Safe Use of the Laboratory and Work Benches in Pirkle 140 (Electronics Lab)

1. ***DO NOT turn on the power before the instructor checks your circuit!***

2. Use the coat racks for neat laboratory appearance as well as safety. Do not place coats or book bags on workbenches.

3. Refrain from drinking beverages in the laboratory. The hall may be used for intervals of relaxation.

4. ***The lab bench must be cleaned and all wires must be returned to the hooks provided in the lab room before leaving the room.***

5. Report all component and equipment failures to your Instruct or lab TA. Neglecting to report faulty equipment causes problems for the next group that uses the bench and may result in injuries.

6. When using the instruments ***DO NOT STACK THEM,*** as the combined heat may cause component failure.

7. Place all of the trainer units, transformers, motors, DMMs, resistors, inductors, capacitors, etc., back to their original places and/or *original rated* boxes after you are done with the laboratory.

8. ***All power switches should be turned off before leaving the lab bench.***

9. Rings and other jewelry, which may cause a potential hazard, must be removed before working in the laboratory.

10. No individual should operate equipment in the laboratory until the appropriate examinations are passed and/or demonstrations by instructor are safely observed.

Lab Submission Procedure

*Take a picture of the workbook pages after the lab is completed, review questions answered and signed by the instructor; convert this to single page pdf; name the file as "**LABNUMBER_LASTNAME_SAMID_ETEE3350_FALL2017**" and upload in the blackboard. **NO email submission** is accepted. Only one **single pdf** file is accepted; **no picture** files, **no multiple** files. You can use the app "**CamScanner**" for this purpose. Download it free from app store and use it.*

General Safety Procedures – Introduced by the instructor	
I. Introduction: How Electricity Works a. Conductors b. Insulators c. Grounding	II. Hazards of Electricity a. Electrical shock b. Electrical burns c. Electrical fires d. Case Studies of Electrical Accidents
III. Types of Electrical Hazards a. Working on energized (hot) circuits b. Loose connections	IV. How to Protect Yourself from Electricity a. General electrical safety rules b. Properly grounded electrical circuits

c. Frayed or missing insulation d. Missing ground prongs on plugs e. Water and electricity don't mix f. Damaged power tools g. Ungrounded equipment h. Improper use of extension cords	c. Ground fault protection near water sources d. Insulated power tools e. Proper housekeeping f. Don't overload circuits
V. Soldering Hazards a. General soldering safety rules b. Proper handling of soldering equipment	

Academic Dishonesty: All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. The University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials.

Student Absences On Religious Holy Days Policy: Section 51.911(b) of the Texas Education Code requires that an institution of higher education excuse a student from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. A student who is excused under this subsection may not be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused within a reasonable time after the absence. University policy 861001 provides the procedures to be followed by the student and instructor. A student desiring to absent himself/herself from a scheduled class in order to observe (a) religious holy day(s) shall present to each instructor involved a written statement concerning the religious holy day(s). This request must be made in the first fifteen days of the semester or the first seven days of a summer session in which the absence(s) will occur. The instructor will complete a form notifying the student of a reasonable timeframe in which the missed assignments and/or examinations are to be completed.

Disabled Student Policy: It is the policy of Sam Houston State University that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the university. Further, they shall not be denied the benefits of these programs nor shall they be subjected to discrimination. Students with disabilities that might affect their academic performance should register with the Office of Services for Students with Disabilities located in the Lee Drain Annex (telephone 936-294-3512, TDD 936-294-3786, and e-mail disability@shsu.edu). They should then make arrangements with their individual instructors so that appropriate strategies can be considered and helpful procedures can be developed to ensure that participation and achievement opportunities are not impaired.

SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If you have a disability that may affect adversely your work in this class, then I encourage you to register with the SHSU Services for Students with Disabilities and to talk with me about how I can best help you. All disclosures of disabilities will be kept strictly confidential. NOTE: No accommodation can be made until you register with the Services for Students with Disabilities. For a complete listing of the university policy, see:

http://www.shsu.edu/dept/academic-affairs/documents/aps/students/811006.pdf

Tobacco Policy: In order to promote a healthy, safe, and aesthetically pleasing work, educational, and living environment, Sam Houston State University (SHSU) will endorse a smoke free and tobacco free environment.

The primary purpose of this policy is to establish guidelines prohibiting smoking and the use of all tobacco products. Tobacco products include cigarettes, cigars, pipes, smokeless tobacco, and all other tobacco products. This policy applies to all faculty, staff, students, employees of contractors, and visitors of Sam Houston State University on the premises of the university.

Visitors in the Classroom: Only registered students may attend class. Exceptions can be made on a case-by-case basis by the professor. In all cases, visitors must not present a disruption to the class by their attendance. Students wishing to audit a class must apply to do so through the Registrar's Office.

"The above schedule, policies, and assignments in this course are subject to change in the event of extenuating circumstances or by mutual agreement between the instructor and the students."

SHSU Blackboard: Please see below. All the course documents are located under "Course Documents" tab.