SAM HOUSTON STATE UNIVERSITY

COLLEGE OF ARTS AND SCIENCES

DEPARTMENT OF TECHNOLOGY

COURSE DESCRIPTION

ELECTRONICS TECHNOLOGY II
IT 232

August, 2007

IT 232
ELECTRONICS TECHNOLOGY I
3 CREDIT HOURS
FALL 2007

LOCATION: ROOMS :209/201 THOMASON BUILDING

MEETING TIME: TUESDAY/THURSDAY 0930 - 1020, ROOM 209
LAB TIME: TUESDAY/THURSDAY12:00 – 2:00, RM. 201

INSTRUCTOR: DR. TOM HIGGINS

OFFICE: ROOM 204, THOMASON BUILDING
P.O. BOX 2266/SHSU
Office phone & voicemail: 936.294.1204
Email: thiggins@shsu.edu

OFFICE HOURS: Tuesday: 0800-0930 -- 1400-1500
Thursday: 0800-0930 & 1400-1530
Friday:

COURSE DESCRIPTION:
Electronics Technology I is designed to provide fundamental understanding of electronics in DC circuits. Emphasis is on knowledge and application of electrical safety, power generation, metering instruments and circuit analysis. Laboratory experiences include "hand-on" circuit construction and basic troubleshooting.

COURSE OBJECTIVES:

This course is designed to provide the student with a knowledge of the theory and practical applications related to fundamental electronic circuits. Upon completion of the course, the student should be able to:

1. Describe the characteristics of a magnetic field as related to induced current, permeability, and hysteresis.
2. Discuss Faraday's law, Lenz's law and the motor action of magnetic fields.
3. Describe the generation of the basic sine wave and calculate the peak, rms, and average values of a given wave form.
4. Distinguish and provide requested values of wave form frequency, angular velocity, period and wavelength.
5. Demonstrate proper use of the oscilloscope to measure wave form voltage, period, and phase displacement.
6. Explain how inductive and capacitive reactances oppose alternating currents. Determine how circuit reactance affects voltage and current phase relationships.
7. Define a long time constant, a short time constant and an RC differentiating circuit.

8. Describe the rise and fall of the universal time constant chart and solve specific circuit time constants.
9. Calculate the value of current, voltage, power and impedance in AC circuits. Explain the use of rectangular and polar coordinates in solving complex circuits.
10. Explain how tuned circuits are used in communication devices to select a specific frequency. Calculate the resonant frequency of an LC combination.
11. Calculate the required component values for basic filters used in industrial applications.
12. Describe the basic theory of operation of vacuum tubes, semiconductors, and integrated circuits.

COURSE FORMAT:

The course will consist primarily of lecture and student laboratory experiences which will include "hands-on" circuit construction, soldering and basic troubleshooting.

COURSE OUTLINE:

Unit I - Magnetism

Text: Chapter 7

1. The magnetic field
2. Flux density
3. Induced current
4. Magnetic characteristics
5. Ampere turns
6. Permeability
7. Hysteresis
8. Magnetic vs. electric fields
9. Current-induced magnetic fields
10. Motor action of magnetic fields
11. Lenz's Law
12. Faraday's Law

Unit II - Alternating Voltage and Current

Text: Chapter 9

1. The generator
2. Sine waves
3. Sine wave characteristics

4. AC resistance
5. Nonsinusoidal wave forms and harmonics
6. Advantages of 120 V, 60 Hz, AC power

Unit III - Inductance

Text: Chapters 11 & 12

1. Induced voltage
2. Voltage and current traits of inductors
3. Mutual inductance
4. Transformers
5. Core characteristics
6. Circuit inductance
7. Inductive reactance
8. Inductive circuits
    a. Inductive reactance and resistance in series
    b. Inductive reactance and resistance in parallel
    c. Merit of a coil
    d. AF and RF chokes
    e. Calculating the RL time constant

Unit IV - Capacitance

Text: Chapters 10, 13, and 14

1. Capacitor characteristics
    a. Charge storage
    b. The Farad
    c. Series and parallel capacitance
    d. Stray and field capacitance
2. Capacitive reactance
    a. Definition
    b. Series and parallel reactance
    c. Applications of capacitive reactance
3. Capacitive circuits
    a. Voltage and current relationships
    b. RC series circuits
    c. RC parallel circuits
    d. AF and RF coupling
    e. Calculating the RC time constant

Unit V - Resistive-capacitive-inductive circuits

Text: Chapter 16

1. Series RCL circuits
    a. Voltage
    b. Impedance
    c. Current
    d. Power
    e. Effect of frequency
2. Parallel RCL circuits
    a. Voltage
    b. Impedance
    c. Current
    d. Effect of frequency
3. Alternating current circuits
    a. Positive and negative numbers
    b. Polar form complex numbers
    c. Complex numbers in series AC circuits
    d. Complex numbers in parallel AC circuits

Unit VI - Resonance and filters

Text: Chapter 15

1. Series resonance
2. Parallel resonance
3. The resonant frequency
4. Analysis of resonant circuits
5. Transformer coupling
6. Capacitive coupling
7. Filter characteristics
    a. Low-pass
    b. High-pass
    c. Resonant

Unit VII - Introduction to solid state devices

Text: Chapter 17

1. Semiconductors
2. Transistors
3. Integrated circuits

COURSE EVALUATION:

Each unit of study consists of review questions, laboratory experiences and exams. Missed work or exams may be submitted or made-up at the discretion of

the instructor; a grade reduction, determined by the instructor, shall be applied to any late work. Grading shall be according to the following:

Laboratory	20 %
Daily assignments/quizzes	10 %
Exams	70 %
Total	100 %

Course letter grades will be assigned according to the following:

A	90 - 100 %
B	80 - 90 %
C	70 - 80 %
D	60 - 70 %
F	0 - 60 %

CLASS ATTENDANCE POLICY
IT 232

The University's attendance policy is stated in the current undergraduate catalog. The following statements describe the attendance policy for this class and are designed to benefit those with exemplary attendance.

Every student is expected to be present and ***on time*** for every class. Punctual students are normally annoyed by the disruption of those who continually walk into class late. You will be furnished a sign-in sheet each day; legibly sign your name. If you come to class after I have retrieved the sign-in sheet you will be counted absent. **DO NOT COME TO CLASS LATE..**

If you are absent, whether excused or unexcused, you are still responsible for the material covered. ***I will feel obligated to disseminate material and instructions one time only***. If you are absent, the responsibility for obtaining handouts and information is incumbent on you. You would be wise to establish relationships with fellow students for assuring that you are allowed to make copies of distributed documents or notes in order to remain well-informed and adequately prepared for exams. Don't contact me about handouts or notes; find friends in class that like you well enough to provide these for you.

Missed tests may be completed with the consent of and at a time designated by the instructor. Any accepted late work or assignments will be penalized 20 points (starting at close of class period) per late day or portion thereof. Daily Assignments (quizzes, homework, exercises) are considered in-class participation activities and, as a rule, will not be accepted after the fact.

You may bring drinks into the classroom (clean your own spills and discard empty containers prior to leaving), but **NO** food or tobacco in any form; **NO** food, drinks, or tobacco products are allowed in the lab. Please **de-activate** cell phones, pagers, and beeping calculators/watches

The purpose of this class is for each of you to learn as much as possible about the subject. Please keep distractions to a minimum and assist your classmates in this learning process.

Instructor:	Dr. Tom Higgins	
Office:	Thomason Bldg.	Rm 204
	Phone:	294-1204
	Office Hours:	T-H 0800 – 0930 & 1400 - 1530

Signature _____ Printed name:_____

Cell Number:_____

BIBLIOGRAPHY:

Angerbauer, George, *Principles of DC and AC Circuits*, Belmont, CA: Breton Publishers, 1985.
Bell, David, *Fundamentals of Electric Circuits*, Reston, VA: Reston Publishing, 1984.
Belove, Charles, *A First Course for Engineering Technology*, New York: Holt, Rinehart and Winston, 1982.
Berlin, Howard M., *The Illustrated Electronics Dictionary*, Columbus, OH: Merrill Publishing, 1986.
Buban, Peter and Marshall Schmitt, *Understanding Electricity and Electronics*, New York:McGraw-Hill, 1982
Buchla, David, *Experiments in Electric Circuits Fundamentals,* 2nd edition, New York, Merrill, 1991,
Ciletti, Michael D., *Introduction to Circuit Analysis and Design*, New York: Holt, Rinehart and Winston, 1988.
Crozier, Patrick, *Introduction to Electronics*, Boston, MA:Breton Publishers, 1983.
Clemons, John. and others. *Introductory Electronic Devices and Circuits*, Englewood Cliffs: Prentice Hall, 1994.
Grob, Bernard, *Basic Electronics*, New York: McGraw-Hill,1984.
Hazen, Mark E. *Experiencing Electricity and Electronics*, Orlando: Saunders, 1993
Kosow, Irving, *Circuit Analysis*, New York:John Wiley, 1988.
Malcolm, Douglas R. Jr., *Fundamentals of Electronics*, North Scituate, MA: Breton Publishers, 1983.
Mottershead, Allen, *Introduction to Electricity and Electronics*, New York:John Wiley, 1986.
Oppenhiemer, Samuel, *Fundamentals of Electric Circuits*, Englewood Cliffs: Prentice-Hall, 1984.
Schuler,Charles, *Electronics Principles and Applications*, New York:McGraw-Hill, 1984.
Suprynowicz, V.A., *Electrical and Electronics Fundamentals*, St. Paul:West Publishing, 1987.
Hill, 1983.

ACADEMIC HONESTY:

The University expects all students to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain complete 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.

If students are found to be cheating or guilty of a first time offense will result in the test or assignment being counted as a zero (this applies to the person who copied and the person who willingly allowed or supplied the data to be copied). If the student repeats the violation, the course grade will be assigned as 'F'.

CLASSROOM RULES AND CONDUCT:

The lab assistant and instructor will enforce laboratory safety rules for any safety violations. Each safety violation will cause the current lab assignment grade to be dropped by one (1) grade letter for each occurrence. Students who are especially disruptive may be reported to the Dean of Students for disciplinary action in accordance with university policy.

The following are the safety rules:

Cellular telephones and pagers must be turned off before class begins.
Eating, drinking and tobacco products are not allowed.
Talking at inappropriate times, sleeping, horseplay, pranks or other acts of mischief are prohibited.
No equipment may be removed from the laboratory.

DISABILTY STATEMENT:

Students with a disability that affects their academic performance are expected to arrange for a conference with the instructor in order that appropriate strategies can be considered to ensure that participation and achievement opportunities are not impaired. The physically impaired may contact the Director of the Counseling Center as chair of the Committee for Continuing Assistance for Disabled Students by telephone (extension 1720).

Student Absences on Religious Holidays:

Section 51.911 of the Texas Education Code requires that an institution of higher education shall allow a student who is absent from class for the observance of a religious holy day to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence. The student, not later than the 15th calendar day after the first day of the semester, or the 7th calendar day of a summer session, must notify the instructor of each scheduled class day that he/she would be absent for a religious holy day. Refer to the Academic Calendar for the deadline date for notification by students to the faculty members of the student's intent to be absent on religious holy days.