

# ETE 2300 - ELECTRONIC FUNDAMENTALS

Dr. Ward Belliston

4 credits

Spring 2009

## Catalog Description

A study and application of DC and AC concepts, semiconductors, digital electronics, and microcomputers. Prerequisite: Math 1050 or equivalent. **NOTE: Student will be dropped if they do not meet the prerequisite.**

## Course Objective

1. To demonstrate an understanding and application of Ohm's Law
2. To build electronic circuits on a proto board
3. To demonstrate an understanding and application of resistance
4. To demonstrate the ability to use a DMM, power supply and frequency generator
5. To demonstrate an understanding and application of Series, parallel and compound circuits
6. To solve problems and show applications of network theorems
7. To understand the principles of capacitance and inductance in modern electronic and electricity circuits
8. To demonstrate the ability to use an oscilloscope to measure voltage and frequency
9. To understand the basics of semiconductors
10. To build a power supply
11. To understand the application and characteristics of digital circuits
12. To solve a problem using modern digital logic gates

## Textbook

Electronics Fundamentals, Thomas Floyd, Prentice Hall, 2007 (Seventh Edition)

## Fees

The laboratory experiments for this course will require electronic supplies. You have three options in purchasing parts:

1. You may purchase all of the parts *on your own*. The list of parts can be obtained from sources such as Radio Shack, Jameco, Digi Key, past students or any other source you might know about.
2. You may purchase the proto board on your own and get the remaining parts from Dr. Belliston. You will need to pay a parts fee of \$22.00 in the registrar's office; deposit into account number MITE (A02363-525500). Bring the receipt to Dr. Belliston, and he will provide you with all the parts *except the proto board*.
3. You may purchase all of the parts, *including proto board*, from Dr. Belliston. Pay a parts fee of \$42.00 in the registrar's office; deposit into account number MITE (A02363-525500). Bring the receipt to Dr. Belliston, and he will provide you with *all* of the parts, including the proto board.

Note: Do not confuse the parts fee with the \$20.00 course fee which is paid with registration. The course fee is used for maintenance and repairs of equipment.

## Instructor

Dr. Ward Belliston

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Phone: 797-1801

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Office hours: M 9:30–10:30a.m. & TR 11:30-12:30pm

Personal appointments may be made.

## Class Time

Lecture TR – 9:00 – 10:15am in Room Engr 103

Laboratory A - Monday 1:30 - 4:20 p.m. in Room IS 119 (Lab Instructor – Dr. Belliston)

Laboratory B - Tuesday 1:30 - 4:20 p.m. in Room IS 119

Laboratory C – Wednesday 8:30 a.m. –11:20 p.m. in Room IS 119 (Lab Instructor – Dr. Belliston)

## Homework

Homework will be assigned to be due at the beginning of the next class period unless otherwise stated. Late homework will not be accepted for credit. Homework is to be submitted on Engineering computation paper. The class number, assignment number, and your name should appear, in that order, across the top of the page. The page number should appear in the upper right-hand corner of EACH page as N/total pages, where N=1 for first page, N=2 for second page, etc. Each answer should be distinctively marked by such things as an arrow, an underline, a circle, a box, etc. Your work should be clearly shown so that others can easily follow your work. Although not required, you may find it helpful to write out the problem stated and then the solution to the problem. Submit homework flat and stapled in the upper left hand corner.

## Grading Policy

Homework	10%
Examinations	30%
Unannounced quizzes	5%
Laboratory (11 labs) and lab quizzes	30%
Final Examinations	25%

1. Homework will be assigned and graded.
2. Tentative dates for the hourly exams are:
  - Exam #1 – Thursday, January 22, 2009
  - Exam #2 – Thursday, February 12, 2009
  - Exam #3 – Thursday, March 5, 2009
  - Exam #4 – Thursday, April 2, 2009
  - Exam #5 – Thursday, April 16, 2009

NOTE: Material found on exam #1 could be on exam #2 and so on...
3. It is mandatory that each student attend each and every lecture and laboratory period.
4. The comprehensive final examination is scheduled for:
  - Date: Tuesday, April 28, 2009
  - Time: 9:30 a.m. - 11:20 a.m.
  - Place: Engr 103
5. Cheating on quizzes or exams will not be tolerated and will result in a grade of “F” for that particular test.

## Accommodations for Persons with Disabilities

If a student has a disability that requires some accommodation by the instructor, the student must contact the instructor and document the disability through the Disability Resource Center during the first week of the course. Any request for special considerations must be discussed with and approved by the instructor.

### **Class Schedule:**

#### DC & AC Electronics

- Ohm's Law
- Resistance
- Series & parallel circuits
- Electromagnetic induction
- Inductance
- Capacitance

#### AC Electricity

- Single phase
- Three phase
- Transformers
- Rectifiers
- Power supplies

#### Semiconductors

- Diodes
- Transistors
- SCR
- TRIAC

#### Digital Electronics

- Number systems
  - Binary
  - Hexidecimal
- Logic gates
  - AND
  - OR
  - NOT
  - NAND
  - NOR
- Combinational logic

#### Microcomputers

- Basic computer architecture
- Computer interfacing

### Labs (Tentative)

1. Ohm's law
2. Series circuits
3. Parallel circuits
4. Inductance
5. Capacitance
6. AC Measurements
7. Power supplies
8. RC & RL circuits
9. Transistors
10. Resonance
11. Logic gates
12. Combinational logic
13. PLD's

# PARTS FOR ETE 2300

## RESISTORS

11- 150 OHM Resistors  
1- 1k OHM Resistor  
1- 1k OHM Potentiometer

## INDUCTOR

1- 10 mh

## CAPACITORS

2- 470 Microfarad 50 V  
1- 0.01 Microfarad  
1- 0.1 Microfarad

## SEMICONDUCTORS

Diodes:

4 - IN4007

Triac:

1 - SC146M

## DIGITAL

1- 7 segment display  
1- BCD 7 segment • 7447  
1- 7490  
1- 7404  
4- red LED's  
1- yellow LED  
1- green LED  
1- dip switch  
1- GAL22V10  
1- 7805  
1-MOC 3010  
1-PROTO BOARD

EACH LAB PARTNERSHIP IS REQUIRED TO HAVE THE FOLLOWING:

1. Needle nose pliers
2. Wire strippers
3. Diagonal cutters

## Tentative Schedule

The schedule shown may be adjusted from time to time as necessary. (Note: It is assumed that each student will study the summary, self-examination, and review questions at the end of each chapter. No late assignments are accepted.)

<u>Date</u>	<u>Days</u>	<u>Section</u>	<u>Topic</u>	<u>Problems</u>
Jan 6	Tues	Class Instruction	Study Chapter 1	Basic Math Quiz
Jan 8	Thursday	Assignment #1 1-1, 1-2, 1-3, 2-2, 2-3, 2-4, 2-5	Quantities and Units	Page 19-20 1, 2, 4, 6, 8, 10, 12, 14, 16, 20, 21, 22, 23, 25, 26
Jan 13	Tues	Assignment #2 2-6, 2-7	Voltage Current and Resistance	Pg 65-68 1, 2, 3, 4, 7, 8, 11, 13, 14, 17, 19, 20, 25, 26, 27, 29, 30, 31
Jan 15	Thurs	Assignment #3 3-1, 3-2, 3-3, 3-4	Ohm's Law & Power	Pg 102-105 1, 2, 4, 6, 8, 10, 12, 14, 17, 18, 22, 23, 24
Jan 20	Tuesday	Assignment #4	Ohm's Law & Power	Pg 105-106 27, 28, 32, 33, 35, 36, 37 39, 40, 41, 43
Jan 22	Thurs	Exam #1		
Jan 27	Tues	Assignment #5 3-8	Ohm's Law & Power	Pg 106-108 44, 46, 49, 50, 51, 52, 54, 56, 57, 60
Jan 29	Thurs	Assignment #6 4-1, 4-2, 4-3, 4-4	Series Circuits	Pg 152 - 154 1-18
Feb 3	Tues	Assignment #7 4-5, 4-6, 4-7, 4-8, 4-9	Series Circuits	Pg 154-158 18, 20, 22, 24, 26, 28, 30 33, 35, 38
Feb 5	Thurs	Assignment #8 5-1, 5-2, 5-3, 5-4	Parallel Circuits	Pg 202-204 1-14
Feb 10	Tues	Assignment #9 5-5, 5-6, 5-7, 5-8 Advanced Problems	Parallel Circuits	Pg 204-207 17, 18, 19, 21, 25, 31, 32, 34
Feb 12	Thur	Exam #2		
Feb 17	Tues	No Class – Attend Monday's Schedule		
Feb 19	Thurs	Assignment #10 7-1, 7-2, 7-3, 7-4 7-5, 7-6	Magnetism and Electromagnetism	Pg 310-312 1, 4, 7, 8, 9, 10, 12, 16, 17, 18, 19
Feb 24	Tues	Assignment #11 11-1, 11-2, 11-3, 11-4	Inductance	Pg 512-514 1, 3, 4, 8, 9., 12, 13, 14, 15

Feb 26	Thurs	Assignment #12 9-1, 9-2, 9-3, 9-4, 9-5	Capacitors	Pg 417-420 1, 2, 4, 13, 14, 16, 17, 20, 22, 23, 26, 28
Mar 3	Tues	Assignment #13 8-1, 8-2, 8-2, 8-4,  8-5, 8-6	Alternative Voltage and Current	Pg 363-366 1, 3, 5, 6, 7, 8, 14, 16, 21, 22, 23, 24, 25, 26
Mar 5	Thurs	Exam #3		
Mar 9-13	Tues/Thur	No Classes – Spring Break		
Mar 17	Tues	Assignment #14 11-6	Inductors and Capacitors in AC Circuits	Pg 514 17, 18, 19, 20, 21 Pg 420 31, 32, 33, 34, 35, 36, 38, 40, 41
Mar 19	Thurs	Assignment #15 14-1 to 14-9	Transformers	pg 645-648 3, 4, 5, 6, 10, 11, 13, 14, 15, 17, 18, 19, 23, 24, 32
Mar 24	Tues	Assignment #16 16-1, 16-2, 16-3, 16-4 16-5	Diodes and Applications Pg 695-725	Pg 746-749 1, 2, 4, 7, 8, 10, 13, 20, 21, 22, 23, 24, 25
Mar 26	Thurs	Assignment #17	Diodes and Applications Thyristors SCR and Triac Applications	Pg 749 29, 30 Handout
Mar 31	Tues	Assignment #18 7-1	Digital Electronics	Handout
Apr 2	Thurs	Exam #4		
Apr 7	Tues	Assignment #19	Digital Electronics	Handout
Apr 9	Thurs	Assignment #20	Digital Electronics	Handout
Apr 14	Tues	Assignment #21	Combinational Logic	Handout
Apr 16	Thurs	Exam #5		
Apr 21	Tuesday	Assignment #22	Microcomputers	Handouts
Apr 23	Thur	Last Day of This Class		
Apr 28	Tues	Comprehensive Final Exam Time: 9:30 – 11:20 am Place: Engr 103		