

ECE 201 ELECTRICAL NETWORKS I

Instructor: Dr. Keith E. Holbert E-mail: Holbert@asu.edu
Office Hours: MW, 10-11 a.m.; T, 2-3 p.m.; and by appointment in ERC 581; 965-8594
Class Meeting Info: MW, 7:40-8:55 a.m. in ECG 224
Semester Exams: Scheduled for February 20 and March 29
Final Exam: Monday, May 8, 2006 from 10:00-11:50 a.m.

Textbook: J.D. Irwin, R.M. Nelms, Basic Engineering Circuit Analysis, 8th Ed., 2005.

Class Website: <http://www.eas.asu.edu/~holbert/ece201/ece201.html>
<http://ceaspub.eas.asu.edu/ece201lab/>

Course Objective: Students are proficient in basic analysis, design, and measurement of linear analog electrical systems important across engineering disciplines.

Course Description: Fundamental network theorems for dc and ac analysis. Uses SPICE. Design and measurement of linear analog electrical systems. Lecture, lab. Prerequisites: ECE 100/200; MAT 274/275; PHY 131, 132.

Topics: Textbook Chapters: 1-8

1. Basic Concepts: Current, Voltage, Power, Passive Sign Convention
2. Resistive Networks, Ohm's Law, Kirchhoff's Laws
3. Nodal and Loop Analysis, Op-Amp Circuits
4. Operational Amplifiers
5. Superposition, Thévenin's and Norton's Theorems
6. Capacitance and Inductance
7. First and Second Order Transient Circuits
8. AC Steady-State Analysis

Homework

The homework assignments will be posted on the class web page. Homework is expected to be turned in on-time, which is defined as before the start of class on the due day. Presentation and methods for arriving at the answer are just as important as the mathematical answer; solutions should be neat and logical. For complete credit: (1) show all work, and (2) box the answer and include the units. Students may work together on the homework, but copying is unacceptable: the ASU *Academic Integrity Policy* (AIP) is incorporated herein by reference.

Laboratory

Each student must register for the laboratory component of this course as labs are scheduled on set days and times. Laboratory begins on Monday, **January 23?** in GWC 273.

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|----------------|--------------------|-----|--------|-----|
| <u>Grading</u> | Homework (11) | 15% | 90-100 | "A" |
| | Laboratory | 15% | 80-90 | "B" |
| | Pop Quizzes | 5% | 70-80 | "C" |
| | Semester Exams (2) | 40% | 60-70 | "D" |
| | Final Exam | 25% | <60 | "E" |

SEMESTER TEACHING PLAN
(MW Class; Spring 2006)

The textbook sections (given in parenthesis below) should be read **before** the class meeting that day.

| Week | Date | Lecture Topic | Homework |
|-------------|------|--|--------------|
| 1 | 1/16 | ### MLK Holiday ### | |
| | 1/18 | Introduction; Units; Basic Quantities; Circuit Elements (1.1–1.3) | |
| 2 | 1/23 | Ohm's Law (2.1); Kirchoff's Laws (2.2) | Hmwk #1 Due |
| | 1/25 | Single Loop Circuits (2.3); Single-Node-Pair Circuits (2.4) | |
| 3 | 1/30 | Sinusoids (8.1); Phasors (8.3); Complex Numbers (Appendix) | Hmwk #2 Due |
| | 2/ 1 | Phasor Relationships for Circuit Elements (8.4); Impedance and Admittance (8.5) | |
| 4 | 2/ 6 | Series and Parallel Resistor Combinations (2.5, 8.5) | Hmwk #3 Due |
| | 2/ 8 | Circuits with Resistor Combinations (2.6, 8.7) | |
| 5 | 2/13 | $\Delta \leftrightarrow Y$ Transformation (2.7); Circuits with Dependent Sources (2.8) | Hmwk #4 Due |
| | 2/15 | Review for Exam #1 | |
| 6 | 2/20 | *** Exam #1 *** | |
| | 2/22 | Nodal Analysis (3.1) | |
| 7 | 2/27 | Loop (Mesh) Analysis (3.2) | |
| | 3/ 1 | Nodal and Loop Analysis cont'd (8.8) | Hmwk #5 Due |
| 8 | 3/ 6 | Equiv/Linearity (5.1); Superposition (5.2, 8.8) | |
| | 3/ 8 | Thévenin's Theorem (5.3, 8.8) | Hmwk #6 Due |
| 3/13 – 3/17 | | ### SPRING BREAK ### | |
| 9 | 3/20 | Norton's Theorem (5.3, 8.8) | |
| | 3/22 | DC and AC PSpice Analysis (5.5, 8.9) | Hmwk #7 Due |
| 10 | 3/27 | Review for Exam #2 | |
| | 3/29 | *** Exam #2 *** | |
| 11 | 4/ 3 | Operational Amplifiers (4.1–4.3) | |
| | 4/ 5 | Capacitors (6.1); Inductors (6.2); LC Combinations (6.3) | Hmwk #8 Due |
| 12 | 4/10 | RC Op-Amp Circuits (6.4) | |
| | 4/12 | First-Order Circuits (7.1–7.2) | Hmwk #9 Due |
| 13 | 4/17 | First-Order Circuits cont'd | |
| | 4/19 | Second-Order Circuits (7.3) | Hmwk #10 Due |
| 14 | 4/24 | Second-Order Circuits cont'd. | |
| | 4/26 | Transient PSpice Analysis (7.4) | Hmwk #11 Due |
| 15 | 5/ 1 | Review for Final Exam | |
| | 5/ 3 | --- Reading Day --- | |
| | 5/ 8 | *** Final Exam *** | |

Email: Important information may be sent to students via their ASU email account. Be sure to read your ASU email or forward it to an email account that you do regularly read.

Conduct: Thank you in advance for adhering to the ASU *Student Code of Conduct* and preventing *disruptive classroom behavior*, such as cell phone ringing, arriving late to class, irrelevant side conversations, and inappropriate computer usage.