

# EE 3005 Fundamentals of Electrical Engineering

*Updated: Feb. 7 2013*

*This course outline is to serve as a reference for instructors and students. It gives a general overview of course content and ABET Outcomes. Please consult the semester specific syllabus produced by the course instructor for more detailed information.*

## Course Prerequisites, Basic Content, and Outcomes

### Catalog Description

(4.0 cr; Prereq-Math 2243, Phys 1302; not for EE majors; fall, spring, summer, every year)  
Fundamentals of analog electronics, digital electronics, and power systems. Circuit analysis, electronic devices and applications, digital circuits, microprocessor systems, operational amplifiers, transistor amplifiers, frequency response, magnetically coupled circuits, transformers, steady state power analysis.

### Contact Hours:

4 lecture hours per week.

### Text:

*Electrical Engineering: Principles and Applications* with CD (Fifth Edition), Hambley, Prentice Hall.

### Prerequisites by Topic:

Mathematical thinking at the calculus level (differential equations and prerequisites).  
Understanding of the basic physical concepts of electricity and magnetism (Physics 1302).

### Course Outcomes:

1. Ability to analyze and design resistive circuits.
2. Understanding of transient analysis sufficient to design or analyze simple RC and RL networks.
3. Ability to analyze passive circuits with resistors, capacitors, and inductors with steady state sinusoidal sources.
4. Familiarity with the concepts of frequency response and the ability to analyze passive circuits to find their frequency response.
5. Knowledge of electronic devices including diodes, bipolar junction transistors, and field effect transistors sufficient to use these devices in basic electronic circuits.
6. Ability to analyze or design simple logic gates and simple combinatorial logic circuits.
7. Knowledge of op amp characteristics sufficient to utilize op amps in basic linear op amp circuits.
8. Ability to design and utilize simple transistor amplifiers.
9. Familiarity with some advanced analog circuits including voltage regulators, differential amplifiers, and some basic oscillators.

**Relationship to Student Outcomes:**

In accordance with ABET accreditation criteria, all engineering programs must demonstrate that their students achieve certain outcomes. This list of outcomes may be found on the ABET.org website. Of the outcomes listed in the ABET criteria (enumerated as (a) through (k)), this course teaches skills which help the student achieve the following outcomes:

This course is for non-majors only and does not apply to EE outcomes.

**Course Outline**

<b><u>Week</u></b>	<b><u>Lecture Topics</u></b>
1	Basic concepts; DC circuit analysis.
2	DC circuit analysis (cont.); transient analysis.
3	Transient analysis (cont.); AC steady state analysis.
4	AC steady state analysis (cont.).
5	Power; frequency response.
6	Frequency response (cont.).
7	Basic electronics concepts; diodes and diode circuit applications.
8	Diodes and diode circuit applications (cont.); basic logic concepts and circuits.
9	Transistors as switches.
10	Logic gates.
11	Op amps
12	Op amps (cont.); large signal transistor operation.
13	Large signal transistor operation (cont.); basic transistor amplifiers.
14	Basic transistor amplifiers (cont.); advanced analog electronics.
15	Advanced analog electronics.

## Departmental and University Policies

**Student Academic Integrity and Scholastic Dishonesty:** Academic integrity is essential to a positive teaching and learning environment. All students enrolled in University courses are expected to complete coursework responsibilities with fairness and honesty. Failure to do so by seeking unfair advantage over others or misrepresenting someone else's work as your own, can result in disciplinary action. The University Student Conduct Code defines scholastic dishonesty as follows:

**Scholastic Dishonesty:** Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering forging , or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis.

Within this course, a student responsible for scholastic dishonesty can be assigned a penalty up to and including an "F" or "N" for the course. If you have any questions regarding the expectations for a specific assignment or exam, ask.

**Incompletes:** A grade of I for Incomplete is given at the discretion of the course instructor when, due to extraordinary circumstances, the student who has successfully completed a substantial portion of the course's work with a passing grade was prevented from completing the work of the course on time. Students must fill out an Incomplete Grade Agreement form found in Keller 3-166. The maximum time to remove and replace an incomplete grade is one year.

**Makeup Work for Legitimate Absences:** Consult university policy here:  
<http://policy.umn.edu/Policies/Education/Education/MAKEUPWORK.html>

**Personal Electronic Devices:** Consult university policy here:  
<http://policy.umn.edu/Policies/Education/Education/CLASSROOMPED.html>

**Mental Health:** As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. University of Minnesota services are available to assist you with addressing these and other concerns you may be experiencing. You can learn more about the broad range of confidential mental health services available on campus via the Student Mental Health Website at <http://www.mentalhealth.umn.edu>