THE COLLEGE OF NEW JERSEY
DEPARTMENT OF ELECTRICAL& COMPUTER ENGINEERING
CIRCUIT ANALYSIS

ENG 212, MR 12:30PM-1:50PM, AR 137 **SPRING 2008**

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COURSE OUTLINE

Educational Objectives:
(What TCNJ engineers should be able to accomplish during the first few years after graduation) The School of Engineering at The College of New Jersey seeks to prepare its graduates:

- To contribute to the economic development of New Jersey and the nation through the ethical practice of engineering;
- To become successful in their chosen career path, whether it is in the practice of engineering, in advanced studies in engineering or science, or in other complementary disciplines;
- To assume leadership roles in industry or public service through engineering ability, communication skills, teamwork, understanding of contemporary global and socio-economic issues, and use of modern engineering tools;
- To maintain career skills through life-long learning and be on the way towards achieving professional licensure.

Engineering Science graduates will have:

a. **an ability to apply knowledge of mathematics, science and engineering**;
b. an ability to design and conduct experiments, as well as to analyze and interpret data;
c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
d. an ability to function in multidisciplinary teams;
e. an ability to identify, formulate and solve engineering problems;
f. an understanding of professional and ethical responsibility;
g. an ability to communicate effectively;
h. the broad education necessary to understand the impact of engineering solutions in a global and societal context;
i. a recognition of the need for, and an ability to engage in life-long learning;
j. a knowledge of contemporary issues;
k. **an ability to use the techniques, skills and modern engineering tools necessary for engineering practice**;

The bolded educational objectives apply directly to this course, ENG 212 Circuit Analysis.

The educational objective “a” is met as we use our knowledge of math, science and engineering throughout this course. We use the concepts of differential and integral calculus, differential equations and linear algebra, conservation of energy and basic engineering knowledge throughout this course.

The educational objective “c” is met when we discuss how analysis is used in the design of new products and how they must be designed for manufacturability, and if it is a piece of equipment used in the health care industry how it must be designed so that the safety of a patient is not compromised. Since design is at a minimum in this course we still design some basic circuit such as voltage and current dividers and we must always ask the appropriate safety and manufacturability questions.

The educational objective “e” is met as we are identifying, formulating and solving engineering problems throughout this course.

The educational objective “f” is met when we discuss the professional and ethical responsibilities that an engineer must have when they are required to design products for the use in the commercial, military and or consumer markets. We discuss the responsibilities of an engineer when they are required to design products for the foreseeable use and misuse of a product.

The educational objective “k” is met when we use computer programs such as PSpice and or Matlab and Excel to solve and graph the results of circuit problems.

Course Objectives*:

Objective 1: To introduce students to the basic principles of electric circuit components and analysis.

Objective 2: To instill in students the ability to formulate and solve engineering problems in electric circuits involving both steady state and transient conditions.

Texts: **1. Electric Circuits, Nilsson and Riedel, Prentice Hall 2002, Eighth edition**
2. Introduction to MATLAB 7, Etter, Kuncicky, with Hull, Prentice Hall 2001

Software: **1. MATLAB Student Version, Release 13**
2. Orcad Release 9.2 Pspice with Text # 1

OTHER INFORMATION

Course Description:	Electric circuit concepts, Kirchoff's laws, node and mesh analysis, network theorems, natural and forced response, steady state analysis, phasor notation, balanced 3 phase, Fourier series, and frequency selective networks.
Instructor Information:	Office Location: AR 159 Phone: (609) 771-2470 E-Mail: hernande@tcnj.edu Web: http://www.tcnj.edu/~hernande/
Office Hours:	Wednesdays 10:00 AM - 11:20 AM Thursdays 4:00 PM - 5:20 PM By appointment (send me email) And whenever my office door is open
Prerequisite:	General Physics II (PHY 202)
Corequisite:	Advanced Engineering Mathematics (ENG 272) or permission of the instructor
Tips for Success:	Read the book sections prior to their discussion in class. Do as much homework as possible. Attempt to do all the problems, even the ones that have not been assigned. Do not be shy about asking questions, either during class or outside of the class.

TENTATIVE AGENDA

WEEK	TOPIC	SECTIONS	HOMEWORK
1a.	**Circuit Variables**	**1.1-1.6**	**1.1, 3, 7, 9, 11, 12, 15, 19, 21, 26, 29, 30**
1b.	**Circuit Elements**	**2.1-2.5**	**2.1, 2,5, 7, 10, 11, 13, 17, 18*, 21*, 23*, 24*, 28*, 33a, 34**
2a.	**Same as 1b**		
3.	**Simple Resistive Circuits**	**3.1-3.6**	**3.1, 3*, 7*, 9*, 11*, 13*, 15*, 18, 20*, 21, 26*, 28*, 30, 31, 33, 36, 39**
4.	**Techniques of Circuit Analysis**	**4.1-4.13**	**4.2, 4, 6*, 7*, 9*, 11*, 17*, 21*, 27, 28*, 31*, 34, 38*, 40*, 42*, 43*, 56*, 59*, 60*, 63*, 64*, 66*, 67*, 68*, 71*, 72*, 77*, 79*, 81*, 90*, 91, 92, 95*, 98**

WEEK	TOPIC	SECTIONS	HOMEWORK
5.	Same as week 4		
6.	The Operational Amplifier	5.1-5.7	5.1*, 3*, 4*, 7*, 8*, 9, 12*, 15*, 21*, 27*, 34
7.	Inductance & Capacitance	6.1-6.3	6.1*, 2*, 11, 14, 15*, 20, 23, 25, 27, 32
8.	Response of First-Order RL & RC Circuits	7.1-7.4	7.1, 2*, 4, 5, 8*, 10*, 11*, 17, 21, 23*, 25*, 31, 33*, 34*, 36, 48*, 50*, 51*, 53, 55*, 75*
9.	Natural & Step Response of RLC Circuits	8.1-8.4	8.1, 2, 6*, 7*, 10*, 19*, 25*, 28*, 30*, 37, 40*, 41*, 42*, 44*, 50*, 51*
10a.	Same as week 9		
10b.	Sinusoidal Steady State Analysis	9.1-9.9	9.1, 3, 5, 6, 7, 8, 9, 11, 14, 16*, 18, 21, 24, 25*, 28*, 38*, 40, 41, 51, 54, 57, 60, 62*, 63*, 64*, 71
11.	Same as week 10b		
12.	Sinusoidal Steady State Power Calculations	10.1-10.6	10.1, 3, 4*, 7, 9, 11, 13, 16*, 17*, 19, 21, 23, 25,29,41,49
13a	Same as week 12		
13b.	Introduction to Frequency Selective Circuits	14.1-14.5	14.1, 2*, 4, 5, 6*, 8, 10, 11, 12*, 15, 19, 20*, 21*, 22*, 30*, 31, 33*, 34*, 36
14.	Same as week 13b		

THERE WILL BE 3 TESTS (CHAPTERS 1-4, CHAPTERS 5-8, AND CHAPTERS 9-10, AND 13) GIVEN DURING THE SEMESTER.

COURSE GRADING POLICY:

1.	**3 TESTS WORTH 19% EACH**	**57 %**
2.	**HOMEWORK PROBLEMS (STARRED)**	**13 %**
3.	**COMPREHENSIVE FINAL EXAM**	**30 %**
	TOTAL	**100 %**

NOTE: THE STARED PROBLEMS MUST BE DONE WITH THE APPROPRIATE COMPUTER PROGRAM (i. e. PSPICE OR MATLAB) AND BY THE CONVENTIONAL METHOD OF LONG HAND.