EE-206 Circuit Analysis I: Syllabus

Fall 2011

Course info
EE-206 Circuit Analysis I, 4 credits
Coreq: Phys 252, Prereq: Math 129, 166 both with a grade of C or better
Lecture: MWF 9:00-9:50am in E. Morrow Lebedeff Hall 370
Lab/recitation: Th 8:00-9:50am (1), 10:00-11:50am (2), 12:00-1:50pm (3), 2:00-3:50pm (4) in ECE-207
Course website: http://venus.ece.ndsu.nodak.edu/~cris/ee206/index.html

Instructor
Cristinel Ababei, cristinel.ababei(at)ndsu.edu
Ph: 701-231-7617
Office: ECE-101F
Office hours: Tuesday 10:30-11:30am, Thursday 1:00-2:00pm or by appointment

Lab TA and HW assignment grader
Lab TA: Rucha Sule, rucha.sule@my.ndsu.edu, Off: Mon. 9-10am, EE-211; Ph: 612-801-3833
Grader: Claudia Sampaio, claudia.sampaio@ndsu.edu, Off: Tue. 11am-12pm, EE-211; Ph: 612-801-3833

Bulletin description
Linear electric circuits. Component models, circuit laws, transient analysis, design issues, computer tools.

Textbook
Hayt, Kemmerly, and Durbin, *Engineering Circuit Analysis,* seventh edition, 2007.

Course objectives
The overall course objective is to teach electrical and computer engineering students the fundamental concepts and methods of analysis of linear electric circuits. Specific objectives include the following:

1. Analyze ac (alternating current) and dc (direct current) circuits containing resistors, inductors, capacitors, and both independent and dependent electrical sources to determine current, voltage, power, and energy values.
2. Utilize basic analysis laws (Kirchhoff's current law, KCL, Kirchhoff's voltage law, KVL, and Ohm's law) to derive useful relationships for series and parallel combinations of passive and active components.
3. Utilize voltage and current division techniques to simplify circuit analysis.
4. Utilize Thévenin's and Norton's theorems to determine equivalent circuits.
5. Analyze the transient and ac steady state behavior of a circuit.
6. Simplify the analysis of circuits using mathematical transformations.
7. Design simple electrical circuits, with DC sources, that satisfy specific functional requirements.
8. Simulate linear electric circuits and measure their properties.
9. Conduct laboratory experiments to confirm the analysis done in the class.
10. Prepare informative and organized lab reports that describe the methodologies employed, the results obtained, and the conclusions made in a laboratory experiment.

Relationship of course objectives to ABET Criterion 3 student outcomes (see http://www.abet.org/Linked%20Documents-UPDATE/Program%20Docs/abet-eac-criteria-2011-2012.pdf)

	ABET Criterion 3 student outcome	**Course objective(s)**
3A	Apply knowledge of mathematics, science, and engineering	1,2,3,4,5,6,7
3B	Design and conduct experiments, as well as to analyze and interpret data	9
3C	Design a system, component, or process to meet desired needs	7

3D	Function on multidisciplinary teams	
3E	Identify, formulate, and solve engineering problems	1,2,3,4,5,6,7
3F	Understanding of professional and ethical responsibility	
3G	Communicate effectively	10
3H	Broad education necessary to understand the impact of engineering solutions	6
3I	Recognition of the need for, and an ability to engage in life-long learning	
3J	Knowledge of contemporary issues	
3K	Use the techniques, skills, and modern engineering tools	2,4,5,6,7,8
L	Grow in the knowledge of and make professional contributions to at least one specific area of ECE	

Grading

-- Grade breakdown: A = [90-100], B = [80-90), C = [70-80), D = [60-70).

-- Final grade components:

- Exam 1,2,3: 15%,15%,15%
- Final exam (comprehensive): 25%
- Homework (includes labs also): 20%
- Quizzes: 10%

-- Makeup exams will only be allowed in special situations. The extraordinary circumstances requiring a makeup exam must be verifiable.

Homework

-- Homework submissions are due before class starts. No late submissions are accepted.

-- If you are absent from class or you know that you will be absent from class, you should as soon as possible arrange with the instructor for any missed work. It is the student's responsibility to contact the instructor in such a case. Arrangements made in advance of an absence (if approved -- depends on the reason of absence) may allow full credit to be given for late work.

-- Collaboration on homework is ok, copying is not ok; a separate solution is required for each student.

-- Include your name on all homework assignments, reports, exams, etc.

-- You can pick up your graded homework assignments at the ECE front office.

-- To get full credit: (i) draw a schematic diagram of the circuit and related information; (ii) show all your work - answers without supporting work will receive a grade of zero; (iii) give all equations used before substituting numerical values into them and always give the units involved.

-- The grade for each homework assignment is computed based only on the grading of up to three randomly selected problems from among those assigned in the assignment.

10 Minute Quizzes

Unannounced 10 minute quizzes will frequently be given during the class period. The quizzes may cover the day's reading assignment or previous course work. There will be no "make-up" for any 10 minute quiz missed due to an absence.

Labs

All labs must be completed and lab reports turned in or you will fail EE-206.

Special needs

Any students with disabilities or other special needs, who need special accommodations in this course, are invited to share these concerns or requests with the instructor as soon as possible.

Veterans and soldiers

Veterans and student soldiers with special circumstances or who are activated are encouraged to notify the instructor in advance.

Academic honesty
All work in this course must be completed in a manner consistent with NDSU University Senate Policy, Section 335: Code of Academic Responsibility and Conduct. Violation of this policy will result in receipt of a failing grade. Please read: http://www.ndsu.edu/fileadmin/policy/335.pdf

Others
-- All ECE majors are required to have a grade of "C" or better in EE-206 before proceeding to the ECE junior-level courses.
-- While university regulations do not require attendance in class, the student should know that there may be material covered in class which is not discussed in the text or which may be discussed in a different manner than presented in the text. The student is responsible for all the material discussed in class whether or not the student was in class. If the student misses a class period, it is the student's responsibility to obtain the notes from a classmate.
-- If the student has questions about the way a particular homework or exam problem was graded, s/he should discuss this with the instructor during office hours. However, this must be done within one week the exam or homework was returned to the class. This does not apply to the final exam.
-- Questions during class are highly encouraged.
-- Do not pack your stuff and get ready to leave with minutes before the lecture is over - this annoys your colleagues.
-- Usage of cell phones, laptops, newspapers, magazines, etc. is not allowed during lectures.

Course outline and schedule (NOTE: This is subject to change during the term.)

Week	Day and date	Ch	Pages	Topics
1	W Aug 24	1	1-11	Overview & general course information
	F Aug 26	2	11-17	Basic electric units
2	M Aug 29	2	17-22	Circuit elements & their models
	W Aug 31	2	22-28	Ohm's Law
	F Sep 2	3	35-38	Circuit definitions, KCL (Kirchhoff's Current Law)
3	**M Sep 5**			HOLIDAY - Labor Day (no classes)
	W Sep 7	3	38-45	KVL (Kirchhoff's Voltage Law)
	F Sep 9	3	45-51	Two node circuits, source combinations
4	M Sep 12	3	51-57	Resistor combinations
	W Sep 14	3	57-63	Voltage and current division
	F Sep 16	4	79-89	Nodal analysis
5	M Sep 19	4	89-91	Supernodes
	W Sep 21	4	92-101	Mesh analysis
	F Sep 23			Review
6	**M Sep 26**			**EXAM 1**
	W Sep 28	4	101-108	Analysis issues. CAD
	F Sep 30	5	121-128	Linearity and superposition
7	M Oct 3	5	131-138	Source transformations
	W Oct 5	5	139-149	Thévenin and Norton equivalents
	F Oct 7	5	150-152	Maximum Power Transfer
8	M Oct 10	5	152-156	Delta-wye conversion
	W Oct 12		793-799	Trees and general nodal analysis (Appendix 1)
	F Oct 14		799-804	Links and loop analysis (Appendix 1)
9	M Oct 17	6	173-182	Op amp basics
	W Oct 19	7	215-224	Capacitors
	F Oct 21	7	224-243	Inductors
10	M Oct 24	8	255-264	RL circuits
	W Oct 26	8	266-276	RC circuits
	F Oct 28			Review
11	**M Oct 31**			**EXAM 2**
	W Nov 2	8	276-289	Unit-step, pulse functions. Natural and force responce

	F Nov 4	8	289-302	Driven circuits
12	M Nov 7 W Nov 9 **F Nov 11**	9	319-357	RLC circuits HOLIDAY – Veterans day (no classes)
13	M Nov 14 W Nov 16 F Nov 18	10 10 10	369-376 376-383 383-393	Sinusoids Phasors Phasor relationships and impedance
14	M Nov 21 **W Nov 23** **F Nov 25**			Review **EXAM 3** HOLIDAY - Thanksgiving (no classes)
15	M Nov 28 W Nov 30 F Dec 2	10 10 11	393-404 404-407 419-432	ac steady-state analysis Phasor diagrams Average power
16	M Dec 5 W Dec 7 F Dec 9	11 11	423-437 437-446	Effective values Apparent power and power factor, Complex power Review for final exam
17	**W Dec 15**			**Final Exam 10:30am-12:30pm**

Prepared by: Cristinel Ababei
Date: August 19 2011