ECE-311 Circuit Analysis II: Syllabus

Spring 2012

Course info
ECE-311 Circuit Analysis II, 4 credits
Coreq: Math-266, Prereq: EE-206 with a grade of C or better
Lecture: MWF 8:00-8:50am in ECE 123
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-235
Course website: http://www.dejazzer.com/ece311/index.html

Instructor
Cristinel Ababei, cristinel.ababei(at)ndsu.edu
Ph: 701-231-7617
Office: ECE-101F
Office hours: Monday, Wednesday 9:00-10:00am or by appointment

Lab TA and HW assignments grader
Lab TA: Varun Dabas, varun.dabas@my.ndsu.edu, Off: Thu. 11am-12pm, EE-211; Ph: 612-801-3833
Grader: Sanjay Nariyal, sanjay.nariyal@my.ndsu.edu, Off: Tue. 11am-12pm, EE-211; Ph: 612-801-3833

Bulletin description
Analysis of single-phase and three-phase circuits. Laplace transforms in circuit analysis. Fourier series. Two-port networks.

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 fundamental concepts and methods of single-phase and three-phase circuits. Specific objectives include the following:

1. Analyze ac (alternating current) circuits containing resistors, inductors, capacitors, transformers, and both independent and dependent electrical sources to determine current, voltage, power, and energy values.
2. Utilize Laplace transforms for circuit analysis.
3. Analyze periodic inputs using Fourier transforms.
4. Determine the frequency response of a given circuit.
5. Draw Bode plots and interpret them.
6. Design simple electrical filters that satisfy specific functional requirements.
7. Characterize linear networks with two-port parameters.
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%

-- Make-up exams will only be allowed in special situations. The extraordinary circumstances requiring a make-up 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.
-- Turn in solutions that are written clearly and neatly; disorganized or esthetically-ugly solutions with scratched out text, figures, and formulas, etc. is penalized by deducting grade-points even if the final answer is correct.
-- 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 ECE-311. You can make-up only one lab (missed for any reason) in the final week. More than one lab can be made-up only with the instructor’s permission. Make-up labs will only be allowed in special situations. The extraordinary circumstances requiring a make-up lab must be verifiable.

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
-- 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	Topics
1	W Jan 11		Overview & general course information
	F Jan 13	10	Review of phasor-based analysis
2	M Jan 16		HOLIDAY – Martin Luther King, Jr. Day (no classes)
	W Jan 18	11	Instantaneous and average power
	F Jan 20	11	Apparent power, power factor, complex power
3	M Jan 23	12	Polyphase systems
	W Jan 25	12	Three phase Y-Y, delta connection
	F Jan 27	13	Mutual inductance
4	M Jan 30	13	Ideal transformer
	W Feb 1	14	Complex frequency
	F Feb 3	14	Laplace transform
5	M Feb 6	14	Inverse transform techniques
	W Feb 8	14	Theorems for Laplace transforms
	F Feb 10		Review
6	M Feb 13		**EXAM 1**
	W Feb 15	14	Theorems for Laplace transforms
	F Feb 17	15	Circuit analysis in the s-domain
7	M Feb 20		HOLIDAY – Presidents' day (no classes)
	W Feb 22	15	Circuit analysis in the s-domain
	F Feb 24	15	Circuit analysis in the s-domain
8	M Feb 27	15	Poles, zeros, and transfer functions
	W Feb 29	15	Complex-frequency plane
	F Mar 2	16	Frequency response – parallel resonance
9	M Mar 5	16	High-Q circuits
	W Mar 7	16	Series resonance
	F Mar 9		Review
			SPRING BREAK (no classes)
10	**M Mar 19**		**EXAM 2**
	W Mar 21	16	Other resonant forms

	F Mar 23	16	Bode diagrams
11	M Mar 26 W Mar 28 F Mar 30	16	Bode diagrams Bode diagrams Bode diagrams
12	M Apr 2 W Apr 4 F Apr 6	16 16 16	Filters Active filters HOLIDAY – Spring Recess (no classes)
13	M Apr 9 **W Apr 11** F Apr 13	 17	HOLIDAY – Spring Recess (no classes) **EXAM 3** Two port networks; admittance parameters
14	M Apr 16 W Apr 18 F Apr 20	17 17 17	Impedance parameters Hybrid parameters Transmission parameters
15	M Apr 23 W Apr 25 F Apr 27	18 18 18	Fourier circuit analysis The use of symmetry The use of symmetry
16	M Apr 30 W May 2 F May 4	18 18 18	Complex form of Fourier series Fourier transform Fourier transform
17	**W May 9**		**Final Exam 8:00-10:00am**

Prepared by: Cristinel Ababei
Date: January 1 2012