EE-210 CIRCUITS I
WINTER 2023
COURSE SYLLABUS

Meeting Time and Location: TF 3:35 - 5:05pm, Academic Building 2716

Instructor

Name: Anca L. Sala, Ph.D.
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Office Hours

On campus: Tuesday 1:30 - 3:00pm, Wednesday, 2:00 - 3:30pm in room 2703S AB, walk-ins welcome. Virtual office hours through Google Meet meet.google.com/nqr-gyay-qbb, Monday, 7:00-8:00pm, starting Jan. 16.

Textbook and Required Materials

Required: "Basic Engineering Circuit Analysis", J.D. Irwin and R.M. Nelms, 12th ed., 2021, Wiley, ISBN: 9781119501954. Scientific calculator.

Course Description

Fundamental DC and AC circuit analysis techniques are covered in this introductory course. Topics include circuit variables and elements; resistors, inductors, and capacitors; and sinusoidal steady-state analysis with power calculations.

Course Pre-requisites/Co-requisites, Credits and Contact Hours

Pre-requisites: PHY-224, PHYS-225 and (MATH-102 or MATH-102X or MATH-102H)
Co-requisites: EE-211
Credits: 3
Contact Hours: 3

Course Learning Outcomes

Students who receive credit for EE-210 will have demonstrated the ability to do all of the tasks listed below:

1. Describe independent and dependent sources; resistance and conductance; apply Ohm's law and Kirchhoff's laws; and use color code and resistor size to determine resistance values, tolerance, and power rating.
2. Use modern measuring equipment safely, such as the oscilloscope, digital and analog meters, and function generators.
3. Analyze series and parallel resistor networks and use voltage and current division concepts.

4. Apply circuit analysis techniques, including nodal and mesh analysis, source transformations, Thevenin and Norton equivalent circuits, and the principle of superposition, to solve for circuit variables.
5. Determine voltage-current relationships in capacitors and inductors and calculate the energy stored in each.
6. Define and determine sinewave parameters such as peak value, rms value, frequency, period, phase angle (leading and lagging), and dc offset.
7. Analyze impedance and model circuits with resistors, inductors, and capacitors excited by sinewaves using phasors and standard circuit analysis techniques in the frequency domain.
8. Convert frequency domain phasor quantities to appropriate time domain quantities and vice versa.
9. Calculate power factor, real power, and reactive power for circuits driven with sinusoidal sources.

Assessment

Throughout the course, there will be three examinations, ten weekly homework assignments, and graded in-class partner work.

Exams

The two midterm exams are scheduled for weeks 4 and 7. The final exam will occur at the end of the 11th week. Each exam will cover roughly 2-3 chapters of material. Exams will be taken in class or through Blackboard with the aid of a scientific calculator and an equation sheet.

Homework Assignments

Homework assignments will be released on Tuesday of each week and will be due at 11:59 pm the following Tuesday. There will be about 6 problems in each homework but not all of them will get graded. Late assignments will not be accepted, except for documented cases of special circumstances. Homework may be worked on individually or in groups, but each student must submit their own homework. Please write legibly and show all steps in the solution.

In-class partner work

Every two weeks there will be an opportunity to solve a problem in class working with a partner. These will have a time limit of 10 minutes to turn in the solved problem. You must be present to receive credit.

Grading

All grades will be regularly posted in Blackboard. The weights of the assignments are as follows:

Homework (10x)	30%
Midterm Exams (2x)	40%
Final Exam	20%
In-class partner work	10%
	100%

Course Schedule

Week	Date	Topics	Reading	HW Due
Week 1	Jan. 10	01: Systems of units, basic quantities, circuit elements	Irwin&Nelms: 1.1 - 1.3	
	Jan. 13	02: Ohm's law, Kirchhoff's laws, single-loop circuits	Irwin&Nelms: 2.1 - 2.3	
Week 2	Jan. 17	03: Single-node-pair circuits, series and parallel resistor combinations and circuits	Irwin&Nelms: 2.4 - 2.6	HW01
	Jan. 20	04: Wye-delta transformations, circuits with dependent sources, resistor technologies	Irwin&Nelms: 2.7 - 2.9	
Week 3	Jan. 24	05: Application and design examples, nodal analysis	Irwin&Nelms: 2.10, 2.11, 3.1	HW02
	Jan. 27	06: Nodal and loop analyses	Irwin&Nelms: 3.1, 3.2	
Week 4	Jan. 31	07: Application and design examples	Irwin&Nelms: 3.3, 3.4	HW03
	Feb. 3	**Exam 1 - Ch. 1, 2, 3**		
Week 5	Feb. 7	08: Superposition, Thevenin's theorem	Irwin&Nelms: 5.1 - 5.3	HW04
	Feb. 10	09: Norton's theorem, maximum power transfer, application and design examples	Irwin&Nelms: 5.3 - 5.6	
Week 6	Feb. 14	10: Capacitors, inductors, and combinations	Irwin&Nelms: 6.1 - 6.3	HW05
	Feb. 17	11: Application and design examples, sinusoids	Irwin&Nelms: 6.5, 6.6, 8.1	
Week 7	Feb. 21	12: Sinusoidal and complex forcing functions, phasors, phasor relationships for circuit elements	Irwin&Nelms: 8.2 - 8.4	HW06
	Feb. 24	**Exam 2 - Ch. 5, 6**		
Week 8	Feb. 28	13: Impedance and admittance, phasor diagrams, basic analysis using Kirchhoff's laws	Irwin&Nelms: 8.5 - 8.7	HW07
Week 9	Mar. 7	14: Analysis techniques, application and design examples	Irwin&Nelms: 8.8 - 8.11	HW08
	Mar. 10	15: Instantaneous and average power, maximum average power transfer	Irwin&Nelms: 9.1 - 9.3	
Week 10	Mar. 14	16: RMS values, power factor, complex power	Irwin&Nelms: 9.4 - 9.6	HW09
	Mar. 17	17: Power factor correction, single-phase three-wire circuits, application and design examples	Irwin&Nelms: 9.7 - 9.11	
Week 11	Mar. 21	Review		HW10
	Mar. 24	**Final Exam - comprehensive, emphasis on Ch. 8, 9**	(note: tentative date)	

Letter Grade Conversion

Total Points	Letter Grade
1000 - 930	A
929 - 900	A-
899 - 870	B+
869 - 830	B
829 - 800	B-
799 - 770	C+
769 - 730	C
729 - 700	C-
699 - 650	D+
649 - 600	D
599 - 0	F

Student Participation

Active participation during the lecture is strongly encouraged. Follow the lecture and ask clarifying questions, solve in-class problems in a group setting, and be present for all exams.

Best Practices for Success in the Course

- Attend class regularly and inform the instructor in advance if you must miss a lecture. *If you are sick do not come to class, instead join the Collaborate session in Blackboard.*
- Spend a minimum of 2 hours externally per hour of lecture, on course activities outside the classroom: read the textbook, review the lecture notes, complete the homework assignments, view the Problem Solving Videos accompanying the textbook, review the course objectives, seek help with the instructor, etc.
- Begin working on an assignment shortly after it is released, but only after reviewing the related textbook sections and lecture notes. This will enable you to better understand the following lectures and class discussions.
- Ask the instructor if you have questions about anything (lecture material, homework questions, your performance in the course, etc.). Do not hesitate to contact me when you do not yet feel you fully understand a topic and need help. My preferred contact method is email, which I read regularly.
- Monitor your progress in the course through Blackboard.

Additional Policy Information

In addition to the Course Syllabus please review the **University Policy Syllabus** and the **Understanding the Ethics and Academic Integrity Policies at Kettering University**, posted in Blackboard under the left-hand navigation Syllabus item.

Additionally, as future Electrical and Computer Engineers please review the **IEEE Code of Ethics**. You can find this document at https://www.ieee.org/about/corporate/governance/p7-8.html, and it is also posted under the Syllabus & Course Information page in Blackboard.

Academic Assistance

In addition to your professors, academic assistance with class work and writing is available from the Academic Success Center (ASC), https://my.kettering.edu/page/academic-success-center-asc.

The ASC Lab, https://my.kettering.edu/page/academic-success-center-lab is an academic resource for you that offers: Subject Tutoring, Math Help, Study Buddy, Supplemental Instruction, Writing Support, and more.