

WEST VIRGINIA UNIVERSITY
Lane Department of Computer Science & Electrical Engineering
EE 221 INTRODUCTION TO ELECTRICAL ENGINEERING
 Spring 2020
 3 Lecture Credit Hours

Instructor: Dr. Kevin Bandura
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Office Hours: Scheduled: MWF 11:00-12:00 or by appointment; However, I have an open-door policy: If my office's door is open whenever I am in, I will be more than glad to help you.

Class Time: MWF 12:00 -12:50 Class Location: SAS 1021

Prerequisites: PHYS 111, MATH 156

Required Text: Fundamentals of Electric Circuits, 6th Edition, Charles Alexander, Matthew N. O. Sadiku.

Course website: WVU eCampus. Instructor is not responsible for lack of access to the website. Please DO NOT wait to the last minute to download course materials.

Objective: To acquaint the student with electrical engineering units, circuit elements, circuit laws, measurement principles, mesh and node equations, network theorems, operational amplifier circuits, energy storage elements, sinusoids and phasors, sinusoidal steady state analysis, average and RMS values, complex power.

Expected Learning

Outcomes: Students will acquire fundamentals to **analyze** and solve **basic** electrical circuits in DC and sinusoidal steady-state. Upon the completion of the course, students will be able to apply

1. Ohm's law, Kirchhoff's Laws, voltage and current division, mesh current, node voltage, Thevenin, Norton equivalents, power calculation to basic DC and AC circuits
2. SPICE

Tentative Lecture Schedule:

<u>Lecture no.</u>	<u>Subject</u>	<u>Topic</u>	<u>Chapter</u>
1	Introduction	Class Policy Introductory Discussion	
2	Circuit Variables	Overview, SI Units, Voltage, Current, Power and Energy	1
3	Circuit Elements	Sources, Resistance	2
4		Martin Luther King Jr. Day	2
5	Voltage & Current Laws	Ohm's Law	3
6		Nodes and Branches	3
7		Kirchhoff's Laws	3
8		Single-loop Circuit	3
9		Dependent Sources	3
10		Resistors in Series and Parallel	3
11		Voltage Division	3
12		Current Division	3
13	<u>Exam # 1</u>		
14	Techniques of Circuit	Introduction	4
15	Analysis	Node Voltage Method	4
16		Node Voltage Method	4

17		Mesh-Current Method	4
18		Mesh-Current Method	4
19		Node vs. Mesh Comparison	4
20		Superposition	5
21		Source Transformations	5
22		Thevenin and Norton Equivalents	5
23		Maximum Power Transfer	5
		Delta-to-Wye Equivalent Circuits	5
24	The Operational Amplifier	Characteristics, Inverting, Summing Circuits	6
25		Noninverting, Difference Circuits	6
26	<u>Exam # 2</u>		
27	Inductors & Capacitors	Inductor, Capacitor	7
		Series, Parallel Combinations	7
28		Spring Recess	
29		Spring Recess	
30		Spring Recess	
31	Sinusoidal Steady-State	Sinusoidal Source and Phasor	10
32	Analysis	Passive Circuit Elements in Phasor Domain	10
33		Kirchhoff's Laws in Frequency Domain	10
34		Node-Voltage Mesh-Current Methods	10
35		Superposition, Source Transformations	10
36		Thevenin and Norton Equivalents	10
37	Sinusoidal Steady-State	Instantaneous Power	11
38	Power Calculations	Average and Reactive Power	11
39		Spring Holiday	11
40		Apparent Power & Power Factor	11
41		Effective (rms) Value	
42		Max. Power Transfer	
43		Max. Power Transfer	11
44		Review	
45	<u>Exam # 3</u>		
46		Review	
47		Review	
48		Review	

Regularly scheduled University final exam

Grading Policy:

There will be three exams plus a final exam; 20% for each hourly exam and 30% for the final exam. There may be some unannounced quizzes given during the semester. There will be weekly quizzes given during the semester. Homework will be assigned but not be collected. Average of quizzes will equal 10% of the final grade. The final grade will be computed using these five scores. Course grades will be assigned on a standard scale: 90, 80, 70, 60, etc.

Quizzes will be given at the **beginning** of class. Some homework problems will be assigned from the text. You are encouraged to discuss the homework problems with other students in the class.

No cell phone, smart watches or smart glasses during exam. Baseball caps should be rotated so that panels and bill are pointing back.

Attendance Policy: Attendance will not be taken. However, all students are responsible for all materials covered in class as well as all assignments made, due dates and any announcements. Consistent with WVU guidelines, students absent from regularly scheduled examinations because of authorized University activities will have the opportunity to take them at an alternate time. Make-up exams for absences due to any other reason will be at the discretion of the instructor.

The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Office of Disability Services (293-6700). For more information on West Virginia University's Diversity, Equity, and Inclusion initiatives, please see <http://diversity.wvu.edu>.