

EK307 – Electric Circuits Fall Semester 2025, Section A2

Instructor	Prof. Michelle Sander
Time	M/W 10.10 – 11.55 am
Classroom	PHO 203
Office Hours	M 4-5pm in PHO 536
E-mail	msander@bu.edu

Course Description:

Introduction to electric circuit analysis and design; voltage, current, and power, circuit laws and theorems; element I-V curves, linear and nonlinear circuit concepts; operational amplifier circuits; transient response of capacitor and inductor circuits, sinusoidal-steady-state response, frequency response, transfer functions; includes design-oriented laboratory. 4 cr. Coreq: CAS MA 226.

Course Content:

EK307 includes a coordinated set of lectures, labs, homework, and exams. Lab sessions meet in PHO105 where students will perform circuit experiments using components and a breadboard. Students will have weekly discussion times with TFs to discuss course material and ask questions on the homework.

Textbook: Fundamentals of Electric Circuits, Charles Alexander, Matthew Sadiku, 7th edition, McGraw Hill, 2021
(older versions can be used as well)

Class Website: <https://learn.bu.edu>

Grading:	Labs	20%
	Homework and Participation	10%
	Mid-term Exam I	20%
	Mid-term Exam II	20%
	Final Exam	30%

Lab instructor: Vladimir Klepstyn vklep@bu.edu

Office Hours: Office hours will be held weekly **Mondays 4-5pm in PHO 536**. Additional office hours will be offered by appointment.

Exams: The exams will be closed book, closed notes. There will be two midterm exams and a Final. **The midterm exams will be given during lecture on Monday, October 6, and Monday November 17.** Do not make any plans to be away from BU on these dates!

Missed Exam Policy: Absence from an exam can be excused only for reasons as stipulated by BU's academic policies, such as illness, or family emergency. Permission of the instructor in advance is required. A student who is unable to attend an examination should contact the instructor as early as possible prior to the examination to discuss the possibility of alternate arrangements. A student who is absent from an examination may request a makeup examination only if the examination was missed for a serious reason (such as illness or family emergency). Students with family emergencies or illnesses should contact the Undergraduate Programs office as soon as possible so that instructors can be notified. Please be aware that special or makeup examinations will not be scheduled to accommodate a student's travel plans.

<https://www.bu.edu/academics/eng/policies/undergraduate-policies/examinations/>

Lecture: Attendance at every lecture is expected in person. Students are expected to behave in a professional manner while in class. Lectures may contain material that is not in the textbook. Such material may appear in homework and on exams.

Homework: Problem sets will be distributed approximately weekly, and submitted via scan and uploaded to blackboard. Please see the homework link on Blackboard for details. Late homework will not be accepted. Electric circuits are all about practice! Please take a look at the example and practice problems in the book.

Collaboration on Homework:

Learning takes place in many ways and is different for all students. You are permitted to collaborate on homework assignments, however everyone needs to submit their own original work and write it in their own words/solution steps. You are not allowed to copy someone else's answers. Please make sure to clearly state all your sources (this includes students you worked with). You may not use any web-based help resources outside of class, e.g. Generative AI tools, to solve your homework, unless the homework specifically requests it.

Academic Misconduct:

BU takes academic integrity very seriously. Academic misconduct is conduct by which a student misrepresents his or her academic accomplishments, or impedes other students' opportunities of being judged fairly for their academic work. Knowingly allowing others to represent your work as their own is as serious an offense as submitting another's work as your own. More information on BU's Academic Conduct Code, with examples, may be found at

<http://www.bu.edu/academics/resources/academic-conduct-code/>.

Discussion Sections:

You can attend any session that fits your schedule. TAs will be available for **the first hour of each discussion session** (e.g. anytime until 7.30pm for the evening session) and will stay longer if you arrive within that time or if you notify the TA ahead of time. The discussions sections are problem solving sessions, where you will have the opportunity to work together with the TAs and your peers on homework problems.

Labs:

Lab information will be posted on blackboard as well (learn.bu.edu). Please note that this is a different website than the class website.

As the labs are a vital part for you to apply the learned material, you need to **complete all labs by the assigned deadlines to pass the course**. The lab grade consists of the labs assignments and any worksheets. Further details about lab procedures and lab

grading will be discussed at your first lab session. Labs will start on 9/8 and all labs will take place in PHO 105 (even if there is a different room assignment for your section).

Inclusion: I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

Accommodations for Students with Documented Disabilities: If you are a student with a disability or believe you might have a disability that requires accommodations, requests for accommodations must be made in a timely fashion to Disability & Access Services, 25 Buick St, Suite 300, Boston, MA 02215; 617-353-3658 (Voice/TTY). Students seeking academic accommodations must submit appropriate medical documentation and comply with the established policies and procedures

Lecture Schedule, EK 307, Fall 2025 (tentative)

Date	Topic	Reading
W 9/3	Course Introduction, System of Units Charge, Current and Voltage; Power and Energy Basic Circuit Elements	Chapter 1
M 9/8	Ohm's law; KVL, KCL, Dependent sources	1.6, 2.1-2.4
W 9/10	Resistors in Series and voltage division Resistors in parallel and current division	2.5-2.6, 2.8-2.9
M 9/15	Node-Voltage Method Solving circuits with linear algebra	3.1-3.3, 3.6
W 9/17	Transistor model and dependent sources	3.9-3.10
M 9/22	Linearity, superposition, source transformation Thevenin & Norton circuits, Part I	4.1-4.5
W 9/24	Thevenin & Norton circuits, Part II Maximum Power Transfer	4.6 - 4.8, 4.10, 4.11
M 9/29	Introduction to operational amplifiers Inverting and non-inverting amplifiers,	5.1-5.5
W 10/1	Basic Op-amp analysis techniques, Exam Review	5.6 -5.8
M 10/6	EXAM 1 (up to Chapter 4, HW4)	
W 10/8	Basic op-amp circuits: Voltage follower, Summing Amplifier, Difference Amplifier,	5.6 -5.8
T 10/14 (no class 10/13)	Introduction to binary numbers D/A conversion, Instrumentation amplifier	5.10, 5.11
W 10/15	Introduction to Capacitors, Inductors Op-amp examples	Chapter 6
M 10/20	Intro to first order circuits: source free RL and RC circuits	7.1-7.3
W 10/22	Singularity Functions Step response of RL and RC circuits	7.4-7.6
M 10/27	First order op-amp circuits	7.7, 7.9-7.10
W 10/29	Intro to second order circuits Series/parallel RLC circuits	8.1-8.4
M 11/3	RLC circuits, step response, Initial and Final conditions for RLC circuits	8.5-8.8, 8.11, 8.12
W 11/5	Sinusoidal steady state and phasors, Phasor relations for circuit elements;	9.1 – 9.4
M 11/10	Impedance and admittance	9.5-9.9
W 11/12	Circuit analysis with phasors: KVL, KCL, Thevenin, Norton; Exam Review	10.1-10.2, 10.4 -10.7, 10.9,10.10
M 11/17	EXAM 2 (up to Chapter 8, HW 8)	
W 11/19	AC Power Analysis: instantaneous vs. average, RMS	11.1-11.4
M 11/24	Intro to frequency analysis. Transfer Functions, Decibel and Bode plots	14.1-14.4
M 12/1	Passive filters (high pass, low pass, band pass), Resonance	14.5-14.7
W 12/3	Active Filters: Analysis, Design, Applications;	14.8, 14.12
M 12/8	Active Filters: Analysis, Design, Applications;	14.8, 14.12
W 12/10	Active Filters, Exam Review	
	FINAL EXAM 12/15 – 12/19	