

BOSTON UNIVERSITY COLLEGE OF ENGINEERING

Syllabus: EK307 – Electric Circuits – Fall 2022

Lecture:

Section	A2
Instructor	Selim Ünlü (selim@bu.edu)
Time	M/W 10:10AM – 11:55AM
Classroom	CAS 211
Office Hours	TBD
Office Location	PHO 826 (Office Hours in-person in PHO826 or on ZOOM @ https://bostonu.zoom.us/my/selimunlu)

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 credits)

Coreq: CAS PY 212

Textbook: (strongly recommended but not required) Alexander and Sadiku, *Fundamentals of Electric Circuits*, 7th Edition, McGraw Hill, ISBN 9781307555080

Alternate textbook reference:

Thomas/Rosa/Toussaint, *The Analysis and Design of Linear Circuits*, 8th edition, 2016, ISBN 978-1-119-23538-5.

Course Methodology:

EK307 involves the use of a coordinated set of lectures, labs, homework, and exams to provide students with an introduction to electric circuit analysis and design. Laboratory sessions will be conducted using the kits that has been sent to students. Labs are coordinated by Kleptsyn, Vladimir vklep@bu.edu. Students are required to register for a laboratory section as well as a discussion section. The course will contain two mid-terms and a final exam.

Course announcement and communications:

Primary method for course announcement and information disseminations will be through blackboard and piazza sites. All lectures will be in person. We will have office hours in person and by zoom.

Homeworks:

HWs are assigned on EdX and due dates will be posted. Link will be provided to sign up.

Class Participation/Quizzes:

On a weekly basis, a quiz with ~3 questions will be assigned. Some questions will be attempted/reviewed during class and quizzes will be submitted online (Gradescope) by the Monday of the following week.

Grading:	Final Exam	30%
	Mid-term 1	15%
	Mid-term 2	20%
	Labs	20%
	Homework	(intended to provide more practice – no credit)
	Quizzes	10%
	Class Participation	5% (office hours, lectures)

Community of Learning: Class and University Policies

1. Missed Exam – Absence from an exam can be excused only for reasons, as stipulated by Boston University academic policies[†], such as illness, death in a family, religious reasons, or unavoidable travel. In each case, permission of the instructor in advance is required, as well as a written authorization by a physician (in the case of illness) or other appropriate authorized signature. The student will be required to take a makeup exam. **FINAL EXAM is scheduled on December ??**
2. HWs are assigned on EdX and due dates will be posted.
3. You are encouraged to attend office hours and study groups. However, you are required to answer the HW questions by yourself. [‡]
There are 69 students registered for section A3. 43 students have expressed preference to attend in-person lectures. The classroom capacity is 19. We will schedule in-person attendance to meet COVID-19 guidelines.
4. Attendance – Attendance (either in-person or online) in lectures is considered essential but not mandatory. Class participation will constitute 5 % of overall grade. We affirm our commitment to [Policy on Religious Observance](#).[§]
5. Late Homework/Quiz – Late homework/quiz will not be accepted since we intend to make the solutions available soon after the deadline.
6. **COVID 19 & BU Community Health Expectations:**
Mask mandates will remain in effect on the BU Shuttle and in healthcare settings until further notice. **At this time there is not a mask mandate in place for other locations on campus, including classrooms, however we strongly encourage the use of high-quality masks (such as N95s, KN95s, KF94s, and FFP2s) to reduce the risk of transmission in crowded settings or for individuals who are at increased risk of severe illness from COVID-19.** For a detailed description of official BU policies regarding COVID, please visit: <http://www.bu.edu/dos/policies/lifebook/covid-19-policies-for-students/>
7. **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.
8. **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 <http://www.bu.edu/disability/accommodations/>
9. Laboratories will be managed Kleptsyn, Vladimir vklep@bu.edu. We will communicate more information on Labs.

[†] <http://www.bu.edu/academics/policies/>

[‡] <https://www.bu.edu/academics/policies/academic-conduct-code/>

[§] <https://www.bu.edu/academics/policies/absence-for-religious-reasons/>

Schedule^{††} of Lectures and Exams:

Alexander and Sadiku

<u>Dates</u>	<u>Topic Description</u>	<u>Text Material</u>
9/7	READING ASSIGNMENT: Introduction, basic concepts and notation. Units, Voltage, Current, Power, Energy. Review Chapter 1	Chapter 1
9/12	Circuit Elements, Ohm's Law. Resistors in parallel and series.	2.1 – 2.2, 2.5 – 2.6
9/14	Kirchhoff's Laws. KVL and KCL. Dependent sources.	2.3-2.4, 1.6
9/19	Methods of Analysis: Node Voltage, Mesh Current, Equivalencies	3.1 – 3.6
9/21	Circuit Theorems: Linearity, superposition, equivalency	4.1 – 4.3
9/26	Source transformations, Thevenin and Norton Equivalents	4.4 – 4.7
9/28	Maximum Power Transfer and Review of Chapter 4	4.8
10/3	Mid-Term Exam I (up to end of Chapter 4)	
10/5	Introduction to Operational Amplifiers	5.1 – 5.5
10/11	Last Day to Drop Standard Courses (without a "W" grade)	
10/11	Op-amp circuits and analysis	5.6 – 5.8
10/12	Capacitors and Inductors	6.1 – 6.5
10/17	First-order Circuits: Source-free RC and RL circuits	7.1 – 7.3
10/19	Step Response of RL and RC circuits	7.4 – 7.6
10/24	First-order Op-amp circuits and Applications	7.7 and 7.9
10/26	Second-order Circuits: Source-free RLC circuits	8.1 – 8.4
10/31	Second-order Circuits: Source-free RLC circuits	8.5 – 8.7
11/2	Review for Mid-Term Exam II	
11/7	Mid-Term Exam II (up to end of Chapter 8)	
11/9	Complex numbers, sinusoids/phasors	9.1 – 9.3
11/14	Last Day to Drop Standard Courses (with a "W" grade) Last Day for Undergraduate Students to designate a course Pass/Fail	
11/14	Phasor relationships for circuit elements, impedance and admittance	9.3 – 9.9
11/16	Phasors and Sinusoidal Steady-State Analysis	9.5 – 10.4
11/21	Thevenin/Norton and Examples of phasor analysis	10.5 – 10.7
11/28	AC Power Analysis: instantaneous vs average power, RMS	11.1 – 11.4
11/30	Frequency Response – passive filters	14.1 – 14.3
12/5	Frequency Response – Bode Plot	14.7
12/7	Frequency Response – filter response	14.4
12/12	REVIEW	
TBD	Final Exam (all the course material during the semester)	

^{††} This schedule is for Section A3. The specifics may be subject to change.