New York University Tandon School of Engineering
Department of Electrical & Computer Engineering

ECE-UY 2004 Fundamentals of Electric Circuits

Fall 2020

Instructor: Prof. Michael Knox, mikeknox@nyu.edu
Instructor Office Hours (Zoom): TBD

Teaching Assistants:

In-person Labs	TBD	@nyu.edu
Remote Labs	TBD	@nyu.edu
Self-Study Labs	TBD	@nyu.edu
Graders for Lecture Assignments	TBD	@nyu.edu

Meeting Times:

Lecture	Tuesday	8:00am-9:50am	Room 202 (370 Jay Str.)	& Live Zoom
Lecture	Thursday	8:00am-8:55am	Room 202 (370 Jay Str.)	& Live Zoom
Recitation	Thursday	9:00am-9:50am	Room 202 (370 Jay Str.)	& Live Zoom
Lab Schedule	See Posted Schedule	See Posted Schedule	LC009 and LC019 (Dibner basement)	& Live Zoom

ABET competencies: 1, 2, 6, 7

Course Description

This course covers passive DC and AC circuit elements, Ohm's and Kirchoff's laws, electric power calculations, analysis of DC circuits, Nodal and Loop analysis, voltage and current division, superposition, Thevenin's and Norton's techniques, and source-free and forced responses of RL, RC and RLC circuits. Phasor concepts, impedance and admittance. Three-phase circuits.

A minimum of C- is required to take other ECE courses. Speak to advisor Richard Toth with any questions.

Course Structure

- Lectures (two/week, 3 hours total). In-person lectures are delivered in the classroom and simultaneously streamed over Zoom. Recordings of these lectures will be posted to NYU-Classes.
- Recitations (one/week, 1 hour). In-person recitations are delivered in the classroom and simultaneously streamed over Zoom. Recordings of the recitations will be posted to NYU-Classes. The recitation time will be used for homework review, exam review, quiz taking.
- Laboratory Lectures are pre-recorded and must be viewed before your scheduled lab exercise
- Laboratory Experiments: There are two types of lab experiments – In-person and Self-study.
  - **In-Person Experiments:** One experiment every four weeks, check posted lab schedule for your date/time.
    a) Students attending in-person labs will be assigned a lab bench for the duration of the semester. These students will perform the experiment, collect date and submit a report. Lab reports are due two weeks after the lab experiment.
    b) Remote students will view, over webcam, the in-person experiment being performed by a Teaching Assistant. Data collected during remote viewing will be forwarded to

these students for integration into their lab reports. Lab reports are due two weeks after the in-person lab experiment in complete.

- **Self-Study Experiments:** One experiment every four weeks. All students (in-person and remote) will perform these self-guided experiments, collect data and submit a lab report. Self-study lab reports are all due at the end of each month. Each student will receive a lab kit containing test equipment and components. In-person students will pick up the lab kit in early September. Remote students have the option to pick up the lab kit or have the kit shipped to them.

Textbook: Hayt, Kemmerly and Durbin, *Engineering Circuit Analysis,* McGraw Hill, 8th or later edition

Computer Circuit Simulator: CircuitLab, free account using nyu.edu email. www.circuitlab.com

Grading Policy:

Option 1: Final Exam Carries More Weight	**Option 2:** Equal Exam Weighting
• Quizzes (4-5 held during recitation time): 15% weight with lowest grade dropped • Midterm Exams: (two exams held during lecture time): 35% weight (17.5% each) • Final Exam: 30% (not cumulative) • Laboratory Exercises (6 labs): 20% • Homework Assignments: +/- Points (could move grade up, such as B+ to A-)	• Quizzes (4-5 held during recitation time): 15% weight with lowest grade dropped • Midterm Exams: (two exams held during lecture time): 21.67% weight each • Final Exam: 21.67% (not cumulative) • Laboratory Exercises (6 labs): 20% • Homework Assignments: +/- Points (could move grade up, such as B+ to A-)

Course Grading (preliminary)

A	90-100
A-	86-89
B+	82-85
B	78-81
B-	74-77
C+	70-73
C	66-69
C-	62-65
D+	58-61
D	54-57
F	Below 54

Submissions:

- Homework assignments will be provided as part of the lectures. Assignments are typically due in one week after they are posted and are to be submitted electronically on NYU Classes.

- All lab reports are individual. In-Person experiments require a lab report submission two weeks after the experiment is completed. Self-Study experiments require a lab report submission at the end of the month (actual date will be determined). See Lab Guidelines on the report requirements. Lab reports are submitted electronically on NYU Classes.

Topics Covered: (chapter listings are taken from the 8th edition of the textbook)

Week 1: Electrical Work, Charge and Energy; Current, Voltage, Power Defined: **Chapter 1 and 2**
Week 2: Typical Circuit Elements; Ohm's Law; Kirchoff's Laws: **Chapter 2 and 3**
Week 3: Equivalent Resistance, Voltage and Current Divider rules: **Chapter 3,** Nodal Analysis **Chapter 4.1, 4.2**
Week 4: Mesh Analysis. **Chapter 4.3 – 4.5,** Superposition with and without dependent sources: **Chapter 5.1,** Source Transformations: **Chapter 5.2**
Week 5: Thevenin/Norton Equivalence: **Chapter 5.3**; Maximum Power Transfer: **Chapter 5.4**; Capacitors: **Chapter 7.1**
Week 6: Midterm Exam #1, Inductors: **Chapter 7.2**; Combinations of Capacitors and Inductors: **Chapter 7.3**
Week 7: RC/RL First order circuit analysis: **Chapter 8.1-8.8**
Week 8: RLC circuit analysis; Over-damped, Critical, Under-damped responses: **Chapter 9.1-9.6**
Week 9: Sinusoidal response of RLC circuits: **Chapter 10.1-10.3**
Week 10: Midterm Exam #2, Phasor concept: **Chapter 10.4**
Week 11: Phasor Relationships for R, L, and C: **Chapter 10.4**; Impedance and Admittance: **Chapter 10.5**; Nodal and Mesh in AC circuits: **Chapter 10.6**
Week 12: Thevenin's and Norton's Techniques, Superposiiton and Source Transformation in AC circuits: **Chapter 10.7;** Phasor Diagram: **Chapter 10.8**
Week 13: Instantaneous, average and reactive Power; RMS; Power Factor: **Chapter 11**
Week 14: Three-phase circuits: **Chapter 12**
Week 15: Final Exam

APPENDIX A: NYU School of Engineering Policies and Procedures on Academic Misconduct

Introduction: The School of Engineering encourages academic excellence in an environment that promotes honesty, integrity, and fairness, and students at the School of Engineering are expected to exhibit those qualities in their academic work. It is through the process of submitting their own work and receiving honest feedback on that work that students may progress academically. Any act of academic dishonesty is seen as an attack upon the School and will not be tolerated. Furthermore, those who breach the School's rules on academic integrity will be sanctioned under this Policy. Students are responsible for familiarizing themselves with the School's Policy on Academic Misconduct.

Definition: Academic dishonesty may include misrepresentation, deception, dishonesty, or any act of falsification committed by a student to influence a grade or other academic evaluation. Academic dishonesty also includes intentionally damaging the academic work of others or assisting other students in acts of dishonesty. Common examples of academically dishonest behavior include, but are not limited to, the following:

1. Cheating: intentionally using or attempting to use unauthorized notes, books, electronic media, or electronic communications in an exam; talking with fellow students or looking at another person's work during an exam; submitting work prepared in advance for an in-class examination; having

someone take an exam for you or taking an exam for someone else; violating other rules governing the administration of examinations.

2. Fabrication: including but not limited to, falsifying experimental data and/or citations.
3. Plagiarism: intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise; failure to attribute direct quotations, paraphrases, or borrowed facts or information.
4. Unauthorized collaboration: working together on work that was meant to be done individually.
5. Duplicating work: presenting for grading the same work for more than one project or in more than one class, unless express and prior permission has been received from the course instructor(s) or research adviser involved.
6. Forgery: altering any academic document, including, but not limited to, academic records, admissions materials, or medical excuses.

APPENDIX B: Moses Center Statement of Disability

If you are student with a disability who is requesting accommodations, please contact New York University's Moses Center for Students with Disabilities (CSD) at 212-998-4980 or mosescsd@nyu.edu. You must be registered with CSD to receive accommodations. Information about the Moses Center can be found at www.nyu.edu/csd. The Moses Center is located at 726 Broadway on the 2nd floor.