ELE 231 Electrical Engineering Fundamentals (3 credits, Fall 2024)

Welcome to ELE 231! I am thrilled to have you in this course. Together, we will explore the foundational concepts of electrical engineering in a supportive and engaging environment. My goal is to help you succeed, not just by mastering the material, but by growing as a learner and future engineer. Expect a mix of theory, practice, reflection, and collaboration. Mistakes are part of learning, and I am committed to your success. Let's make this a great semester![1]

Instructor: Jean-Daniel Medjo

- Room: 2-183 CST
- Email: jmedjome@syr.edu
- Phone: 315.443.3046
- Class hours: MoWeFr, 10:35 – 11:30 AM, HB CROUSE KITTREDGE[2]
- Help[3] hours: Friday, 01:00 – 03:00 PM (or by appointment), Room: 2-183 CST

Teaching assistants:

Jiajing Chen, jchen152@syr.edu, Office hours: **Tu 3:30-5:30pm** CST 0-121, or 0-123, or 0-124
Jiamin Zhao, jzhao40@syr.edu, Office hours:**Mo 2-3pm, Th 3:30-4:30pm** @3-230 CST
Kevin Buciak, kebuciak@syr.edu, Office hours: **We 12-2pm** @ CST 0-121, or 0-123, or 0-124

Recitations:

- Recitation M009: Mo 3:45 PM – 4:40 PM, Room 3-212 CST, by **Jiamin**
- Recitation M010: Tu 11:00 AM – 11:55 AM, Room 3-212 CST, by **Kevin**
- Recitation M011: Tu 2:00 PM – 2:55 PM, Room 206C Marshall Square Mall, by **Jiajing**
- Recitation M012: We 3:45 PM – 4:40 PM, Room 337 Smith Hall, by **Jiajing**
- Recitation M013: Th 12:30 PM – 1:25 PM, Room 204 (located on quad) HB CROUSE, by **Jiajing**

Required textbooks material

- Charles K. Alexander and Matthew N.O. Sadiku, **Fundamentals of Electric Circuits**, 7th edition, McGraw-Hill Higher Education, 2021, ISBN 978-1-260-22640-9 (available at SU library)

Supplemental materials

- Supplemental and recommended materials will be provided by course instructor and posted on the course Blackboard webpage.

Course description:

[1] This message sets a tone of psychological safety and approachability, encouraging student engagement from Day One.
[2] Moved this info here, to make room for the Welcome message above. Warming up syllabus
[3] Renaming "Office Hours" to **Help Hours** (or "Student Hours") makes the purpose explicit and inviting. Using a warmer term signals that this time is **for them**. This small language shift reduces barriers to help-seeking, increases approachability, and supports psychological safety.

ELE 231 introduces you to the core principles that power modern electrical systems. Together, we will explore how current, voltage, power, and energy behave in real-world circuits and learn practical methods for analyzing and simplifying them. You will develop skills to apply Kirchhoff's laws, network theorems, and circuit reduction techniques, and you will gain confidence in handling both steady-state and transient responses in resistive and reactive circuits. By the end of the course, you will not only understand the "what" and "why" behind circuit behavior but also be able to solve problems systematically and communicate your reasoning clearly; skills that will serve you in advanced courses and your engineering career.[4]

Catalog description: Analysis of electric circuits. Resistive, reactive circuits. Independent, dependent sources. Network theorems, circuit reduction, op amps. Elements of transient and steady state circuit analysis. Power and energy considerations.

Prerequisites: MAT 295, i.e. working knowledge with polynomials, exponential, and logarithmic functions, derivatives and integrals, and series.

Degree requirement: ELE 231 Electrical Engineering Fundamentals is required course for the students in BS in Electrical Engineering and Computer Engineering, as well as in Aerospace and Mechanical Engineering and Bioengineering.

Course Learning Objectives:

By the end of this course, you will be able to[5]:

1. Apply KCL, KVL, and Ohm's Law to analyze DC circuits and compute voltages, currents, and element power.
2. Perform nodal and mesh analyses for linear circuits with independent/dependent sources, documenting assumptions and steps.

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[4] This version:

- **Speaks directly to students** ("you will explore," "you will develop skills").
- **Connects learning to purpose** (real-world circuits, future courses, career).
- **Highlights growth and confidence**, not just content coverage.
- **Keeps technical accuracy** while using approachable language.

[5] These learning objectives were rewritten using the **C.A.L.M.S** principles:

- **Clear**: Each outcome uses precise, student-friendly language so learners know exactly what they will achieve (e.g., "Apply KCL, KVL…" instead of vague terms like "understand the difference…").
- **Attainable**: Objectives are scoped for a 200-level course and achievable within the semester, considering students' math prerequisites and time constraints.
- **Learning-focused**: Outcomes describe what *students will do* (apply, perform, determine, model, formulate, compute, communicate) rather than what the instructor will cover.
- **Measurable**: Each outcome uses action verbs aligned with Bloom's taxonomy, making it possible to assess through exams, practice sets, and readiness quizzes.
- **Specific**: Outcomes target discrete skills (e.g., "formulate first- and second-order differential equations"), avoiding overly broad or combined goals.

This alignment ensures transparency for students, supports backward design, and simplifies assessment mapping to ABET outcomes. Review these objectives annually to confirm they remain relevant and calibrated to student performance data.

3. Determine Thevenin/Norton equivalents for a given network and use them to simplify analysis.
4. Model ideal op-amp circuits and predict behavior under ideal assumptions.
5. Formulate and solve first- and second-order differential equations for RC, RL, and RLC circuits to obtain natural and forced responses.
6. Compute and interpret energy and power in resistive and reactive elements over time, relating results to practical constraints.
7. Communicate circuit analysis and design decisions clearly using standard engineering representations and professionalism.

ABET Student Outcomes

This course contributes to the achievement of the following Student Learning Outcomes:

(1) An ability to use the principles of science and mathematics to identify, formulate, and solve engineering problems. In particular, students should be able to apply this knowledge in a way that demonstrates comprehension of the tradeoffs involved in modeling, design and development of electric systems of various scales and complexity. Program's Performance Indicator (PI) – 1C: Solve.

(7) An ability to acquire and apply new knowledge as needed, using appropriate learning strategies. Program's Performance Indicator (PI) – 7A: Acquire.

Instructional Methods Used to Achieve Objectives (Weekly)[6]

- Mon/Wed: Brief, chunked mini-lectures + active problem solving (think–pair–share; whiteboard jigsaws; muddiest point).
- Fri: Practice studio (guided problems, peer review of solutions).
- Recitation: Short readiness check → targeted practice → debrief; occasional student-generated test questions.
- Weekly: Auto-graded practice set (low stakes) + short reflection ("What clicked? What's still muddy?").

[6] *Increases in-class practice and peer learning, reducing passive coverage. This supports retention and engagement while not increasing prep time; reuse a small set of activity structures (TPS, jigsaw, etc.) with new problems.*

Assessment Plan:[7]

Assessment	Weight	Description
Exam 1	16%	Midterm exam covering foundational analysis methods.
Exam 2	16%	Midterm exam covering foundational analysis methods.
Exam 3	16%	Midterm exam covering advanced topics like transients and op-amps.
Final Exam (optional, grade replacement)	*[16%]*	Cumulative exam that can replace a lower midterm score.
Weekly Practice Sets	16%	Auto-graded and hand-graded problems with feedback.
Recitation Readiness Quizzes	16%	Short weekly quizzes to encourage steady preparation.
Reflection & Engagement Logs	10%	Weekly reflections and minute papers
Concept Checks & Polls	10%	In-class formative assessments using polling tools.

Grading scale

Grade	Points (%)
A	93-100
A^-	90-92.99
B^+	87-89.99
B	83-86.99
B^-	80-82.99
C^+	77-79.99
C	73-76.99
C^-	70-72.99
D	60-69.99
F	Below 60

Grading concerns: I will gladly reconsider any grade problem brought to my attention within a week of its return to you.

[7] This revised plan reduces Exam weight from 96% to 48%, adding low-stakes, formative, and scaffolded assessments. Students have multiple opportunities to earn credit and recover from setbacks. This supports motivation and retention. It also reduces grading stress for the instructor or TAs by using auto-graded tools and structured rubrics.

Email Policy[8]

- **Subject line:** Include **"ELE 231" and your section number** in the subject line (e.g., "ELE 231-Section M001: Question about Homework"). This helps me prioritize and respond quickly.
- **Response window:** I reply to emails on **weekdays between 6:00 AM and 6:00 PM**. Emails sent after 6:00 PM or on weekends will be addressed the next business day.
- **Response time:** I aim to respond within **24 hours** during weekday hours.

Tip: For complex questions, consider bringing them to **Help Hours** for a faster, more detailed response.

Academic Integrity Policy[9]

Syracuse University's Academic Integrity Policy reflects the high value that we, as a university community, place on honesty in academic work. The policy holds students accountable for the integrity of all work they submit and for upholding course-specific, as well as university-wide, academic integrity expectations. The policy governs citation and use of sources, the integrity of work submitted in exams and assignments, and truthfulness in all academic matters, including course attendance and participation. The policy also prohibits students from

- submitting the same work in more than one class without receiving advance written authorization from both instructors and
- using websites that charge fees or require uploading of course materials to obtain exam solutions or assignments completed by others and present the work as their own.

Under the policy, instructors who seek to penalize a student for a suspected violation must first report the violation to the Center for Learning and Student Success (CLASS). Students may not drop or withdraw from courses in which they face a suspected violation. Instructors must wait to assign a final course grade until a suspected violation is reviewed and upheld or overturned. Upholding Academic Integrity includes abiding by instructors' individual course expectations, which may include the protection of their intellectual property. Students should not upload, distribute, or otherwise share instructors' course materials without permission. Students found in violation of the policy are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered, as described in the Violation and Sanction Classification Rubric. Students are required to read an online summary of the University's academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term check-in on MySlice.

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[8] This policy sets **clear expectations** for communication while modeling **healthy boundaries** for instructor wellbeing. Including the course and section in the subject line streamlines inbox management, reducing cognitive load and response delays. The weekday time window and 24-hour goal balance **responsiveness with sustainability**, preventing burnout. Explicitly stating these norms also reduces student anxiety about when to expect a reply, which supports psychological safety and trust. Review mid-semester to ensure the policy meets both student needs and my own work-life balance.

[9] This section and all the following sections (Academic Integrity, Disability Resources, Religious Observances, and Attendance Reporting policies) are retained as per university guidelines. These sections are required and mostly unchanged, but can be framed in student-centered language in the student-facing version.

The policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities.

If you are unsure whether a certain action constitutes cheating, fraud, and/or plagiarism, please assume that it does: you may ask the course instructor for clarification at any time. Detailed information about the Syracuse University academic integrity policy is available at academicintegrity.syr.edu.

Original class materials (handouts, assignments, tests, etc.) and recordings of class sessions are the intellectual property of the course instructor. **You may download** these materials for your use in this class. However, **you may not provide** these materials to other parties (e.g., web sites, social media, other students) without permission. Doing so is a violation of intellectual property law and of the student code of conduct.

The Syracuse University sanctions for violating academic integrity may be found on the web site http://studentconduct.syr.edu/processes--sanctions/sanctions/Sanctioning%20Guidelines.html.

Disability-Related Accommodations

If you believe that you need accommodations for a disability, please contact the Center for Disability Resources (CDR), https://disabilityresources.syr.edu/, located in Suite 303 of 804 University Avenue, or call (315) 443-4498, TDD: (315) 443-1371 for an appointment to discuss your needs and the process for requesting accommodations. CDR is responsible for coordinating disability-related accommodations and will issue students with documented Disabilities Accommodation Authorization Letters, as appropriate. Since accommodations may require early planning and generally are not provided retroactively, please contact CDR as soon as possible to begin this process.

Diversity and Disability

Syracuse University values diversity and inclusion; we are committed to a climate of mutual respect and full participation. My goal is to create learning environments that are useable, equitable, inclusive and welcoming. If there are aspects of the instruction or design of this course that result in barriers to your inclusion or accurate assessment or achievement, I invite any student to meet with me to discuss additional strategies beyond accommodations that may be helpful to your success.

Students who believe they may not be able to adhere to the protocols for disability-related reasons should contact the Center for Disability Resources to request a reasonable accommodation/modification. Email: disabilityresources@syr.edu Phone: 315.443-4498.

Religious Observances Notification and Policy

SU religious observances notification and policy recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. More detailed information could be found at https://policies.syr.edu/policies/university-governance-ethics-integrity-and-legal-compliance/religious-observances-policy/

Under the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance provided they notify their instructors before the end of the second week of classes for regular session classes and by the submission deadline for flexibly formatted classes.
For fall and spring semesters, an online notification process is available for students in **MySlice/Student Services/Enrollment/My Religious Observances/Add a Notification.**
Instructors may access a list of their students who have submitted a notification in MySlice/Faculty Center.

Student Academic Work Policy

SU policy on student academic work may be found at:
http://coursecatalog.syr.edu/content.php?catoid=3&navoid=270#Student_Academic_Work
Student work prepared for University courses in any media may be used for educational purposes. The students grant permission to have their work used in this manner by registering for, and by continuing to be enrolled in this course.

As part of the regular ABET accreditation process for the undergraduate program in engineering and computer science, there will be collecting samples of students' work in each of our undergraduate classes.
As a result, some of your exams may be used to present to the ABET evaluators.

Attendance

Attendance in classes is expected in all courses at Syracuse University. It is a federal requirement that faculty promptly notify the university of students who do not attend or cease to attend any class. Faculty will use Early-Semester Progress Reports and Mid-Semester Progress Reports in Orange SUccess to alert the Registrar and Financial Aid Office on non-attendance. For more information visit: https://registrar.syr.edu/students/non-attendance/
If a student is unable to participate in-person for an extended period of time (48 hours or more), the student may request an absence notification from their home school/college Dean's Office or the Dean of Students Office. Instructors will be notified via the "Absence Notification" flag in Orange Success.
Barnes Center at the Arch (Health, Counseling, etc.) staff will not provide medical excuse notes for students. When Barnes Center staff determine it is medically necessary to remove a student from classes, they will coordinate with the Dean of Students Office case management staff to provide appropriate notification to faculty through Orange Success. For absences lasting less than 48 hours, students are encouraged to discuss academic arrangements directly with their faculty.