COURSE DESCRIPTION: ECE 3400 extends the concepts of semiconductor devices, circuits, and applications begun in ECE 2040 and 3040 and provides a continuation of concepts, problem-solving techniques, and tools needed for subsequent courses in electronics. The material presents, explains, and shows how to use electrical components to model, analyze, and design filters, clamps, rectifiers, peak detectors, op-amp circuits, transistor amplifiers, and oscillators. The underlying aim is to cultivate and develop insight and intuition for how electronic devices work individually and collectively in analog circuits. The material presents an engineering perspective on circuits that transcends math and fosters innovation.

PREREQUISITE: ECE 3040 Microelectronic Circuits

EDUCATIONAL OUTCOMES: Upon successful completion of this course, students should be able to:
1. Analyze first-, second-, and bi-quadratic passive/active filters.
2. Analyze clamps, rectifiers, and peak detectors.
3. Analyze negative-feedback circuits.
4. Analyze amplifiers and oscillators with BJTs and MOSFETs.
5. Use SPICE to simulate circuits.

GRADE COMPOSITION:
- Two Midterm Exams = 50%
- Assignments = 20%
- Final Exam = 25%
- Professionalism: Adherence to syllabus & ECE policies. = 5%
Possible extra credit for distinguishable and extraordinary effort & professionalism.

IMPORTANT DATES:
- First Day of Class: January 9 (Monday)
- School Recess: January 16 (Monday)
- First / Second Midterm Exams: February 13 (Monday) / March 15 (Wednesday)
- Last Day to Drop Course: March 15 (Wednesday)
- School Recess: March 20–24 (Monday–Friday)
- Last Day of Class: April 24 (Monday) – Last assignment due April 24
- Final Exam: April 28 (Friday) at 6:00–8:50 p.m.


REFERENCES:
- MOSFETs: www.amazon.com/dp/107788821X.

ADVICE:
Review material presented after each lecture, write notes, and ask questions.
Bring book to class, mark figures/equations presented, and refer to them in your notes.
COURSE EXPECTATIONS AND GUIDELINES

*Format

IN CLASS: No auditors allowed.
   Be seated and ready before class begins (penalty points for being late).
   Cellular phones, laptops, and tablets must be off and out of sight.
   No smoking or eating in class.
   Students are responsible for all material and information announced in class and over e-mail.

EXAMS: No textbooks or notes allowed.
   Calculators cannot be used in the programmable mode.
   No make-up exams (without prior approval two or more weeks in advance).
   In case of medical emergencies, work with the Office of the Dean of Students.
   Grades become final one week after exams are graded and returned.
   *List problems in numerical order, circle and mark answers clearly, and staple pages together.

ASSIGNMENTS:
   No collaboration allowed (unless otherwise stipulated).
   No late submissions without prior approval (request should be received before due date).
   Allowed late submissions lose 20% for each day they are late (including weekends).
   Grades become final one week after they are available.
   *Attach a cover sheet that includes course name and number, your name, date, and assignment number.
   *List problems in numerical order, circle and mark answers clearly, and staple pages together.

PREPARING FOR CLASS: Review previous lecture and read ahead (material that will be covered that day).

PREPARING FOR EXAMS: Review lectured slides and notes and re-do examples and assignments (without the key).

ASSISTANCE: Provided in direct proportion to demonstrated effort in your own attempts to understand and resolve misunderstandings.

ACADEMIC INTEGRITY: All Georgia Tech (GT) students must know and follow GT's Academic Honor Code (www.catalog.gatech.edu/policies/honor-code). In accordance with the Honor Code, I expect your cooperation in reporting suspicious acts relating to academic misconduct. I must and will therefore report all instances of academic dishonesty to the Office of Student Integrity, who will investigate incidents and mandate appropriate penalties for violations. So out of respect for your peers, professors, Georgia Tech, and alumni, please do not engage in dishonest activities in or outside of class.

STUDENT–FACULTY EXPECTATIONS: At Georgia Tech, we strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and students. See catalog.gatech.edu/rules for basic expectations that you can have of me and I of you. Respect for knowledge, hard work, and cordial interactions will help build the environment we seek, so please remain committed to these ideals in and outside of class.

INSTITUTE ABSENCE POLICY: See Georgia Tech's policies on absences at www.catalog.gatech.edu/rules/4.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES: If you have learning needs that require special accommodations, schedule an appointment with the Office of Disability Services at disabilityservices.gatech.edu to discuss your needs and send me a note that explains your situation and their recommendations before the second week of classes begins.

COURSE OUTLINE

1. RCL Filters
2. Diode Circuits
3. Op-Amp Circuits
4. Transistor Primitives
5. Transistor Amplifiers
6. Oscillators