Course Objective: ECE 6445 extends the concepts of analog and power circuits discussed in ECE 4330 and ECE 4430. The presentation reflects the top–down design systems-to-circuits approach that industry adopts when developing power-supply systems. With this framework, the material presents, explains, and shows how to understand, develop, and use semiconductor devices to model, analyze, and design integrated circuits (ICs) that supply and sustain microelectronic loads. Some of the topics covered include power consumption, frequency response, feedback control, and power-supply rejection. The ultimate objective is to cultivate and develop insight and intuition for how circuits draw, condition, and deliver power. In other words, the presentation seeks to provide a physical and intuitive view of devices and circuits that transcends mathematical and algebraic formulations to empower engineers with the tools necessary to design practical and high-performance power-supply ICs.

Course-Grade Composition: Midterm = 30%  
Assignments and Design Projects = 30%  
Final Examination = 35%  
Professionalism: Adherence to syllabus and ECE policies. = 5%  
Possible extra credit for distinguishable and extraordinary effort and professionalism.

Important Dates: First Day of Class August 21 (Monday)  
National Holiday October 1 and 7 (Sunday–Saturday)  
Unusual Class Days September 1 and 22 (Friday)  
Midterm September 20 (Wednesday)  
Last Day to Drop Course October 28 (Saturday)  
Last Day of Class October 30 (Monday) (Last assignment due)  
Final November 3 at 9–11:50 a.m. (Friday)

Important: WHEN IN DOUBT, PLEASE STOP ME DURING LECTURE AND ASK QUESTIONS, but refrain from asking questions about material missed because of class absences.
COURSE EXPECTATIONS AND GUIDELINES

In Class:  No auditors allowed.
- Be seated in class before class begins.
- Cellular phones, laptops, and tablets must be off and out of sight.
- No smoking, eating, or drinking in class.
- All 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.
- Work with the Office of the Dean of Students in case of medical emergencies.
- Pages must be stapled and problems in numerical order (bring a stapler if necessary).
- All answers must be unambiguous and circled and marked clearly.
- Grades become final one week after tests are returned.

HW:  Collaboration between students is allowed and encouraged, unless otherwise stipulated.
- Submitted assignments must be unique – identical assignments split grade.
- Late submissions lose 20% of the grade for each day they are late, including weekends.
- Staple and include a cover sheet with ECE 6445, your name, date, and assignment number.
- Use only text version of SPICE and include netlist and control text used to generate all SPICE results.
- Label all nodes, voltages, currents, and component values in schematics.
- Circle and mark answers clearly and unambiguously, and list problems in numerical order.
- Ensure methods used to obtain solutions are clear.
- Highlight important information and remove unnecessary details from SPICE-generated results.
- Grades become final one week after they are available.

Preparing for Class: Review the sections in the book and references that correspond to the topics outlined in this syllabus and discussed in class. Review lecture slides, examples, and assignments when preparing for exams.

Assistance: The TA (if one is available for the class) and I will provide assistance in direct proportion to the written efforts demonstrated in your own attempts to understand the concepts and solve the problems in question.

Missed Lectures: Contact one of your peers for missed assignments, announcements, and material covered in class.

Academic Integrity: All Georgia Tech students must know and follow Georgia Tech’s Academic Honor Code (described at 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 Student Integrity, who will investigate incidents and mandate appropriate penalties for violations. So out of respect for your peers, professors, Georgia Tech, and alumni, which includes me, please do not engage in dishonest activities in the classroom and at Georgia Tech.

Accommodations for Individuals with Disabilities: If you have learning needs that require special accommodations, please send me a note and schedule an appointment with the Office of Disability Services at disabilityservices.gatech.edu to discuss any special needs.

Student–Faculty Expectations: At Georgia Tech, we strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and students. See www.catalog.gatech.edu/rules/22.php 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.

TENTATIVE COURSE TOPICS

1. Powering Microsystems
2. Analog Electronics
3–4. Switched-Inductor Supplies and Circuits:
   - Operation, Losses, Response, Control, and Circuits
5–6. Linear Power Supplies and Systems:
   - Operation, Stability, PSR, and IC Design