

## Course Syllabus and Schedule Spring 2013

# ECE 3042—Microelectronics Laboratory

### Instructors

- Tom Brewer

Lead Instructor

OFFICE: Van Leer E-376

PHONE: 404.894.8206 (office); 404.294.4842 (home—prior to 1:00 am)

E-MAIL: [tom.brewer@ece.gatech.edu](mailto:tom.brewer@ece.gatech.edu)

OFFICE HOURS: M-R afternoons (Schedule posted on office door)

- Christina Bourgeois

Coordinator, Undergraduate Professional Communication Program, ECE

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OFFICE HOURS: TBA

- Allen Robinson

Academic Professional

OFFICE: E-388

PHONE: 404.894.0176

E-MAIL: [robinson@ece.gatech.edu](mailto:robinson@ece.gatech.edu)

OFFICE HOURS: M-F TBA

### Texts

- W. M. Leach, Jr. & T. E. Brewer, *Experiments in Modern Electronics*, 3rd. ed. (ISBN:0-7575-3174-1)  
(Required)

The text may be purchased at either bookstore or directly from the publisher Kendall-Hunt at

<http://www.kendallhunt.com/store-product.aspx?id=19854>

### Attendance Policy

Mandatory for all laboratory sessions and expected for recitation. Any absence from an exam or laboratory session will result in a grade of zero, which may be made-up at the discretion of the instructor. An absence from a pop-quiz will not be made-up and a grade of zero will be assigned.

## Grade Policy

All letter grade assignments are made by the recitation instructor and are based on the ranking in each individual laboratory session. The course grade point average is a random variable for which

$$\text{Probability } [2.9 < GPA < 3.1] = 0.9$$

The formula for determining the ranking is as follows:

$$CA = 0.10(LQ) + 0.15(HW) + 0.15(LR) + 0.10(E1) + 0.10(E2) + 0.20(WA) + 0.20(FE)$$

where

CA=Course Average

LQ=Laboratory Quizzes

HW=Homework

LR=Laboratory Reports

E1=Lecture Exam 1 (one hour closed book and note written exam)

E2=Lecture Exam 2 (one hour closed book and note written exam)

WA=Writing Assignments

FE=Final Exam (one hour closed book and note comprehensive exam).

All assignments are individual assignments; this includes laboratory reports, homework assignments, computer simulations, and exams.

Each pop-quiz will count as one homework assignment.

**All students must participate in all phases of the course. Any student who does not attend the laboratory and perform the experiments or prepare and submit all the writing assignments in a timely manner is unlikely to pass.**

## Policy for Late Assignments

Assignment turned in late but within two days of the due will be penalized 10%. Within a week 20%. No assignments will be accepted after one week of the due date. Exceptions may be made if there is an official excuse from the Dean of Students. Job interviews, vacations, visiting relatives, attending conferences, etc. are not valid excuses for class absences or submitting late assignments.

## Classroom Behavior

Whilst attending a lecture, students are required to pay rapt attention to the lecturer and his/her lecture. This requires that all non-medical devices be turned off such as cell phones, PDAs, cameras, etc. Laptops are permitted only if they are being used to view material directly related to the lecture. Calculators may be used only during quizzes. No inter-student communication is to occur during a lecture; this specifically includes all forms of oral and written communication. Students are, of course, permitted and encouraged to ask pertinent questions to the lecturer. Do not leave the lecture before it concludes or arrive late unless a medical emergency arises. Do not engage in an activity which disrupts the lecture. Students are expected

to take copious notes during all instructors lectures.

Whilst attending a laboratory, students are required to perform the experiment. Do not dine, sleep, or socialize in a laboratory. No food or drink of any kind should ever be brought into a laboratory. Do not leave personal possessions at a laboratory station.

Standards of decorum require that all members of the Georgia Tech community are to be addressed by their proper title, e.g. Mr., Miss, Ms., Dr., Professor, Dean, Provost, President, Chancellor, etc.

## Spring Semester 2013 SCHEDULE

Week of	Recitation Session (F)	Lab Session (T-W-R)
January 7	Orientation & Single Stage Amplifier	None
January 14	Linear Op Amp Circuits I	Exp 1—Single Stage CE BJT Amplifier
January 21	Linear Op Amp Circuits II	Exp 2—Op Amps 1
January 28	Differential & Instrumentation Amplifier	Exp 3—Op Amps 2
February 4	Non Linear Op Amp Circuits	Exp 4—Diff & Instrumentation Amp
February 11	Active Filters	Exp 5—Nonlinear Op Amps
February 18	Exam 1 (February 22)	Exp 6—Active Filters
February 25	Active Device Characteristics	Exp 7—Terminal Characteristics
March 4	Writing Assignment	Writing Assignment
March 11	Exam 2 (March 16)	Exp 8—Digital Electronic Circuits
March 18	Spring Break	Spring Break
March 25	Digital Electronics	Exp 9—AD
April 1	MOSFET Amps	Exp 9—AD
April 8	Review for Final Exam	Exp 16—MOSFET Amp
April 15	Final Exam (April 19)	None
April 22	None	None

## Academic Misconduct

All students taking this course are required to strictly adhere to the Georgia Tech Honor Code, whose complete text may be found at <http://www.deanofstudents.gatech.edu/Honor/>. Any violations of the Code are considered academic misconduct and will be submitted to the Office of the Dean of Students for appropriate action. Several violations of the Code are elaborated upon below.

**Do not engage in unauthorized collaboration.** All of the assignments in this course are to be completed individually; there are no laboratory partners. Each assignment – laboratory reports, homework problems, writing assignments, exams – must reflect only the efforts of the student whose name appears on the assignment. Students may, of course, discuss assignments in general terms with one another, but all work should be generated individually. Likewise, students may receive assistance on assignments from the course instructors, lab instructors, or writing consultants. However, students are expected to write their own reports and do their own work. Copying or allowing peers to copy all or portions of any assignment is

considered plagiarism (see below) and is expressly forbidden; an engineer is a creative thinker and not a scribe.

**Do not plagiarize.** Georgia Tech and the School of ECE define plagiarism as “Submission of material that is wholly or substantially identical to that created or published by another person or persons, without credit notations indicating authorship” (Section XVII. C. Academic Misconduct, General Catalog). Plagiarism constitutes a serious violation of the Honor Code and will be reported immediately to the Dean of Students.

Do not copy or cut-and-paste from any websites, textbooks, lab manuals, etc. simply to create material for your reports. Citing other sources can be a valuable way to bolster your conclusions, and direct quotes may be appropriate at times, but should you find it necessary to consult these types of resources, you **must** cite your source(s). The IEEE style of citation should be used. Instructions for properly citing sources may be found in the following places.

- <http://www.mhhe.com/mayfieldpub/tsw/doc-ie3.htm> [IEEE Citation Guidelines]
- <http://www.mhhe.com/mayfieldpub/tsw/doc-elec.htm> [Citing Electronic Sources]
- [http://upcp.ece.gatech.edu/content/3041/citing\\_sources.pdf](http://upcp.ece.gatech.edu/content/3041/citing_sources.pdf) [Users Guide Example]

**Do not copy—even the smallest portion—of another student’s report.**

**Do not attempt to falsify data and/or experimental results, or to secretly alter a paper after submission.**

**Do not attempt to forge the signature of someone else.**

**Do not engage in disruptive behavior or hooliganism, which includes, but is not limited to, the abuse and/or theft of Institute equipment and/or littering.**

Each student signs a **Pledge of Academic Honesty** when submitting any writing assignment. The Pledge reads as follows.

*On my honor, I pledge that I have neither given anyone else assistance or information on this writing assignment nor have I received assistance or information from anyone other than Drs. Brewer and/or Robinson, Instructor Bourgeois, or the GTA lab assistants or writing consultants. I further pledge that I am in full compliance with every statute and codicil of the Georgia Tech Honor Code and that all of the work that appears in this report is my own, unless it is attributed to another source. I understand and agree that any violations of the Georgia Tech Honor Code will be forwarded to the Dean of Students for adjudication.*

This Pledge is included on the Evaluation Form to be submitted with each writing assignment. All Evaluation Forms are accessible on the UPCP website. **Any student not signing the Pledge will receive a zero for that particular writing assignment.**

## **Policies for Students Repeating the Course**

Students who are repeating the course must perform all of the assignments anew. This includes all laboratory reports, writing assignments, homework problems, etc. Material from a previous semester is unacceptable. Attempts to alter dates or names on assignments will result in a charge of Academic Misconduct.

## **Policies for Homework**

All assignments are individual assignments. Each homework assignment must have a cover sheet with the course number, section number, section day and time, and a bitmap of the student. Each homework problem that involves the use of computer software such as National Instruments SPICE, and/or Mathcad must be digitally signed by pasting a bitmap photo of the student onto the solution. Any unsigned homework will be assigned a grade of zero. All SPICE plots must have the time/date stamp on the printout or it will be assigned a grade of zero. Any attempt to alter a time date stamp will be considered Academic Misconduct.

## **Format for Laboratory Reports and Open Laboratory Policies**

Unless otherwise stated by the lead instructor for the course, all laboratory reports are due one week from the date the experiment began. The first page of each laboratory report is the Verification Sheet. The Verification Sheet contains signatures of the laboratory instructors and the date for each major section of the experiment. An Open Laboratory is provided for the convenience of students who cannot complete the experiment in the allotted three hour laboratory section. Open Laboratory instructors staff this facility. The open lab hours are to be used to complete an experiment, not to begin an experiment. You must complete at least three experimental procedures during your scheduled lab period or spend the entire scheduled lab period making progress on the experiment to be allowed to complete it during the open lab hours. Before you leave your scheduled lab period, you must have your GTA sign your verification sheet to indicate that you met this requirement. Without this signature, you may use the open lab to perform the experiment at a 50% penalty. Any attempt to forge the signature of a laboratory instructor is Academic Misconduct. All printouts of the screen of the oscilloscope for each section of an experiment must have the time/date stamp provided by the oscilloscope or it will not be accepted.

## **Background Requirements**

Prerequisite: ECE 2040, ECE 3041, and ECE 2031

## **Technical Writing**

Writing is integrated into the course to reinforce the skills learned in the laboratory, to reinforce the concepts behind those skills, and to encourage the kind of analysis engineers will need to advance both in the institute and in the workplace. Several resources are available to assist students during all stages of the writing process, including the UPCP website (<http://upcp.ece.gatech.edu>) and GTA writing consultants (office hours and contact info listed on the website).

WA	Genre	Topic	Presentation	Due
1	Laboratory Report	JFET	March8	April 1

Every writing assignment must be submitted with the following two sheets attached to the report cover.

(1) A signed and completed Verification Sheet.

All Verification Sheets may be found at

<http://www.ece.gatech.edu/academic/courses/ece3042/>

(2) A signed and completed Evaluation Form

All Evaluation Forms may be found at

[http://upcp.ece.gatech.edu/3042/eval\\_sheets.html](http://upcp.ece.gatech.edu/3042/eval_sheets.html)

## Special Policies Governing Writing Assignments

### Assignment Submittal

All writing assignments must be submitted **in person** to a UPCP writing consultant or to Christina Bourgeois. No other method of submittal will be accepted. At the time of submittal, you may be asked to show your Buzz Card for ID verification.

The easiest method for submitting your assignments is to be present in your lab when your writing consultant drops by to pick up reports for your section. You will always receive an e-mail from your consultant notifying you of this time. This time will always fall within the three-hour period in which your lab section meets.

If, for some reason, you cannot be present at the time that your writing consultant picks up a particular assignment, and if you do not want to be subject to a late penalty (see below), then you must submit your paper early. But again, submittal must be **in person**. It is your responsibility to find one of the persons specified above when submitting your paper at any time other than the time at which your writing consultant visits your lab. See the list of Writing Resources at the end of this document for availabilities and locations of UPCP staff.

### Late Papers

Any writing assignment submitted after your writing consultant has picked up papers in your lab (even if he/she has just left the lab and is walking down the hall) will be considered late. **Late papers will generally be accepted, but will be penalized 20 points for each day late.** Saturday and Sunday or Institute holidays are not considered late days, as UPCP staff are, in general, not available for paper submittal on the weekends. The number of days late is determined in relation to the precise time at which your paper is due. The following examples demonstrate the policy.

Due Date:	Friday 12:30 pm		
	Date	Days late	Late Penalty
Submittal Date 1	Friday 12:29 pm	0	0 pts
Submittal Date 2	Friday 12:31 pm	1	- 20 pts
Submittal Date 3	Monday 12:29 pm	1	-20 pts
Submittal Date 4	Monday 12:31 pm	2	-40 pts

Extenuating circumstances that prevent a timely submittal of the report may be treated more leniently, but must be discussed **at least 24 hours prior to the due date**. Extenuating circumstances include a death in the family or serious injury or illness. Schedule conflicts (having a test in another course the same day the report is due), technological difficulties (corrupted disks, printer problems, crashing computers), and procrastination (waiting until the night before the report is due to begin writing) will not be treated as extenuating circumstances. Please plan accordingly; **save all files in multiple locations**.

## Electronic Copies of Papers

It is highly recommended that students keep electronic copies of all papers submitted. Alternately, students should keep one hard copy of each paper submitted for their own files. ECE writing and engineering faculty reserve the right to request additional copies of student work at any time after the due date. Failure to produce a copy will throw into question the authenticity of the original copy, and may result in a zero for that assignment and/or disciplinary action.

## Grade Disputes

All students have the right to ask questions about the grades they receive on assignments. However, “haggling” or negotiating over points or grades will not be tolerated. Students who wish to discuss their grade must follow the procedures outlined below:

1. Make an appointment to discuss the grade with the GTA who evaluated the assignment.
2. If you still have questions or concerns about the grade, send an email to Christina Bourgeois, which clearly and concisely explains the problem.
3. Sometimes an email response from Ms. Bourgeois may be enough to solve the problem, but he may request that you make an appointment to discuss the grade, or you may feel it necessary to request an appointment yourself.
4. Understand that your score could go up or down upon review or re-grade.

## Writing Consultations

Writing consultants are available five days a week in the UPCP Professional Communication Studio (Van Leer C-448) to assist you with your ECE writing assignments and with other technical writing tasks. You may also schedule an appointment with Christina Bourgeois, who is here daily. All students are required to attend one, sixty minute group meeting consultation with their GTA writing consultant to discuss WA1. Details about the mandatory group consultation will be explained by Christina Bourgeois. Consultants will be happy to assist you in the following areas.

- Getting started
- Overcoming writer’s block
- Planning papers
- Reorganizing and revising drafts

- Documenting research papers using IEEE format
- Improving basic grammar and punctuation skills

Writing consultants are *NOT* required to assist you with the following tasks.

- Find and fix all grammar and punctuation errors
- Guarantee a particular grade on an assignment
- Separate form and content—we take a holistic approach to reviewing documents
- Write papers for our students

To ensure that you make the most of your consultation session, please come to the Studio prepared with the following:

- A functional draft (hard copy) of the assignment you are working on
- A copy of the assignment sheet or writing guidelines
- A pen or pencil for taking notes
- Specific questions and comments about your draft

Individual writing consultant office hours are posted outside the Lab and on the UPCP website. (See *Writing Resources*.)

## **Use of the Professional Communication Studio Resources**

The Communication Studio (Van Leer C-448) is equipped with several Dell PCs with flat panel displays and one network printer for student use. Each PC is loaded with a wide range of software used by ECE undergraduates, including MS Office, Matlab, Mathcad, and PSpice. Students working on ECE writing assignments have priority on these machines, though when available, they may be used to work on other ECE assignments. Recreational use of these machines is not permitted.

Please clean up after yourself and respect those trying to work around you.

## **Writing Resources**

Christina Bourgeois, Coordinator, Undergraduate Professional Communication Program

`christina.bourgeois@ece.gatech.edu`

Van Leer E-268

Availability: M-F, by appointment only

404.894.9597

ECE Professional Communication Studio – This is where all writing consultants hold their office hours.

Van Leer C-448

Availability: Posted on Entrance Door; Writing Consultant office hours are posted outside the Studio and on the UPCP website.

UPCP Website: <http://upcp.ece.gatech.edu>

Here you will find all of the writing resources for this course, including downloadable templates, tip sheets, examples of properly labeled figures, and much, much more.

## On-Line Resources

- <http://www.ece.gatech.edu/academic/courses/ece3042/> [ECE 3042 Course Website]
- <http://upcp.ece.gatech.edu/> [UPCP Website]

## Materials Required

Lab Manual—one per student

Proto-Board or Breadboard—one per student

ECE 3042 Parts Kit

Calculator

One USB Memory Stick

These materials must be brought to each lab session.