

Georgia Institute of Technology
School of Electrical and Computer Engineering

ECE 4470 Devices for Renewable Energy



Professor: Dr. Alan Doolittle

Office: Pettite 208 (note this is erroneously listed in some ECE websites)

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Email: alan.doolittle@ece.gatech.edu (by far, the best way to communicate with me).

Credits: 3 lecture hours, letter, pass/ fail, audit

Prerequisites: ECE3040 (or equivalent semiconductor physics class)

Text: *Online Text* <http://pvcdrom.pveducation.org/>

This superb online resource was written by Doctors Christiana Honsberg and Stuart Bowden. These two friends have asked that you supply feedback and help find errors and broken links. Please help out.

Web Resources:

Official Class Web site: <http://users.ece.gatech.edu/~alan/index.html>

Office Hours: Officially: Friday 12:00-1:00. Most weeks I hold “open office hours” on Mondays where you can come by for help anytime that is pre-arranged (strongly recommended to insure I am there, preferably by email) or drop by unplanned (no guarantee I will be in my office). All students are strongly encouraged to consult me with any problem, academic, personal or professional!

Grading Schedule:

Grades will be based on a 100 point scale (see note on the final exam below), but bonus points will frequently be awarded. Exams will fall approximately every 5 weeks.

		Approximate Date
Exam 1	20%	~Sept 16 th (Wednesday May be pushed back to Oct5/7th)
Note: the remaining timing cannot be set until after drop day when we know how many students will be presenting.		
Design Project	20%	~Due week before the presentation
Presentation	20%	~TBD. Order selected by random lottery but generally the last 1/3 to 1/4 class meetings.
Homework	2% each	~5 per term but may be substantially fewer.
Final Exam*	30%	Dec 9 th 8:00-10:50
Pop Quizzes	0.5% Bonus	As needed to insure attendance

Each homework is ***ungraded*** and adds a fixed 2 % (or 0%) if ***ALL*** (or some) assignments are **legitimately** attempted. Homework will be representative of test problems. If more than 5 homework assignments are made, all those above 5 will be counted as bonus points (a good way to raise your grade a couple of points). If less than 5 are assigned, bonus points will be awarded to all to raise the homework contribution to 10%.

*Final exams often have many bonus points, thus accounting for as much as 35-40% of your overall grade ***IF*** all bonus points are attempted.

While curving is not expected to be needed in this class, I do not curve in the traditional GT way. Bonus points are added to the final exam to allow you to receive an “earned curve”. If you do not learn the material, you cannot get the benefit of a curve.

What is Expected of Students

All students are required to follow the academic honor codes established by Georgia Tech.

All students are expected to be respectful of other students.

All students are responsible for materials covered in and/or assigned in class REGARDLESS of whether they attended class.

I strongly prefer an interactive class. Let me know if you do or do not understand what is being lectured. Ask questions!

Instructor Commitment to the Student.

While statistics always result in some students who will perform poorly in this class, no student will perform poorly due to lack of access to the instructor. To that end, I will make every reasonable provision possible to insure your success in this class. Students are strongly encouraged to seek help from this instructor with any problem, academic, personal or otherwise.

Students are also strongly encouraged to supply the instructor with constructive criticism regarding all aspects of class activity. Such criticism (even/especially that considered negative) will be greatly appreciated.

Course Goals and Learning Outcomes

[Developing learning objectives is an important first step in course design, and they should be articulated on your syllabus as a bulleted list. Your learning objectives are meant to identify your main course goals for your students, in terms of the skills and knowledge they will develop in your class. They should be student-centered, action-oriented, and measurable, and they should reflect a big-picture view of the purpose of the course. One way to do this is to write them as a bulleted list of completions of this sentence starter: “Upon successful completion of this course, you should be able to...”. Aim for 3-5 learning objectives for a single course.]

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. For information on Georgia Tech's Academic Honor Code, please visit

<http://www.catalog.gatech.edu/policies/honor-code/> or <http://www.catalog.gatech.edu/rules/18/>.

Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

[Students need to know what your policy is on things like late assignments and missed exams. You should be as clear as possible about your rules and the consequences for your students if they do not follow them. You want to help students focus their efforts appropriately and also make it easy for you to be consistent throughout the course. Note also that at Georgia Tech, some exceptions are made for “approved Institute activities” (e.g. field trips and athletic events). See <http://www.catalog.gatech.edu/rules/4/> for more information.]

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404)894-2563 or <http://disabilityservices.gatech.edu/>, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Semester Syllabus

Students are **STRONGLY** encouraged to read the material **Before** the class discussion.

Very Approximate Semester Week	Topic	Reading Material
1	Class introduction and policies Climate Change Solar Device Classes	Handouts PVCDROM Chapter 1
2	Properties of Sunlight	PVCDROM Chapter 2

Very Approximate Semester Week	Topic	Reading Material
3	P-N Junctions	PVCDROM Chapter 3
4	Solar Cell Operation	PVCDROM Chapter 4
5	Design of Silicon Solar Cells	PVCDROM Chapter 5
6	Design of thin film and advanced Solar Cells	Notes
7	Manufacturing of solar cells	PVCDROM Chapter 6 Notes
8	Modules and Arrays	PVCDROM Chapter 7
9	Selected Characterization topics	PVCDROM Chapter 8
10	Storage Technologies	PVCDROM Chapter 9
11	Abbreviated systems and economics overview	Notes
12	Begin Student Presentations	
17	Final Exams	

Presentation Details:

It is my desire to make your presentation topic as interesting and as useful to you as possible. All topics must be unique. No topic can be shared by another student. Papers regarding topics partially covered in class should provide much more detail than what was covered in our text and class discussions. If chosen carefully, the paper can be a benefit to you and fun to put together instead of a time liability.

The topic is accepted by written (paper) on or before the first exam. Fill out and turn in the form at the end of this syllabus (in person). The topics are on a first come first claim basis and all must be unique (no joint presentations). NOTE that this is a renewable energy device technology class and thus, a review of other devices is not an appropriate topic. How a device is made or how a material is fabricated or characterized is also an appropriate topic.

I WANT TO SEE DETAIL!!!! TELL ME WHAT YOU LEARNED! Ideally, I would like you to tell me something I do not already know. In the absence of this, (because I will likely be familiar with most topics) it should answer a “yes” to the question; “If I heard this topic from you for the first time, would I understand the topic well?”

Presentation specifications:

Length dependent on class size: Generally 10-15 minutes with details to come later (depends on the number of students in class at the presentation time).

Given in PowerPoint with both hard and electronic copies supplied to the instructor prior to your scheduled presentation. Presentation topics scheduled by random lottery order near the 2nd exam time. **REGARDLESS OF PRESENTATION TIME, ALL PRESENTATIONS WILL BE DUE SIMULTANEOUSLY AND CANNOT BE CHANGED AFTER SUBMISSION.**

Note: Reference everything, especially figures on the same slide as they appear (footnotes). Also, I may use some slides from exceptional presentations in future lecture slides.

Presentation Topic Selection Form

Name (as appears on class role): _____

I have read this syllabus and specifically have read the grading procedures: _____
(Initials)

Title of Presentation _____

Rough idea of subtopics to be included (so I know you have at least read up on the topic a little before making your selection)
