

# Physics 189L – Sustainability Spring 2018

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## DESCRIPTION

This lab course provides hands-on experience in renewable energy sources such as solar and wind power. Since the atmosphere plays a crucial role in renewable energy, the topics involve practical application of concepts covered in Phys 189, Weather and Climate. In addition, there will be an introduction to important techniques common to all observational research -- such as experiment design, data analysis, and error estimation.

We will attempt to complete a range of activities as listed below. There will also be group projects culminating in poster presentations at the 2018 Student Research Symposium in April . The goal is to gain an understanding of the physics of solar energy conversion and storage.

## SCHEDULE

Date	Exercise	Reading			
18-Jan	Begin PV module analysis	Nelson Chap 6			
25-Jan	I-V curves for PV module	Green Chap 1			
1-Feb	No lab meeting. Reading and homework	Green Chap 4, S1-2			
8-Feb	Conclude PV module analysis	Green Chap 4, S7-8			
15-Feb	Introduce projects; matlab assignment	Green, Chap 5			
22-Feb	Begin projects: Models and mock-ups	Zwiebel Chap 11-12			
1-Mar	Proposals for parts, design concepts				
8-Mar	Fabrication/Integration of components				
15-Mar	Spring Break				
22-Mar	Testing and analysis of components				
29-Mar	First Draft of Extended Abstract due				
5-Apr	Poster Practice				
12-Apr	Scaling up: Residential	Selected brochures, residential installers			
19-Apr	Scaling up more: Commerical	Online documents from power suppliers			
26-Apr	Wrap up; dismantling and storage				

## GRADING

In addition to selected reading assignments, there will be quantitative homework problems along with questions from the reading material. For the first few weeks, we will also have some in-class exercises that should be written up and turned in with the homework (if any) assigned in the previous week. In late February, we will begin working on class projects for the SRS and will spend the next 6 weeks on these. **Sixty percent** of your grade will be based on the quality of work on your project, judged primarily from your extended abstract (25%), poster presentation (25%), and work during the lab periods (10%). Graded lab exercises, homework problems, and reading questions will account for the remaining 40%.