

# ECE 461

# FUNDAMENTALS OF SOLAR ENERGY

**Time/Day:** TBA

**Room:** TBA

**Instructor:** Rajendra Singh

**Office:** 206 Riggs

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**Office Hours:** To be announced T, Th or by Appointment

**Prerequisites:** ECE320 or consent of instructor

**Goals:** To provide fundamental knowledge of solar energy conversion systems for generating electricity by solid state devices. Additionally, thermal energy and hybrid energy (electricity and heat) systems will also be covered.

**Text Book:** None, Teacher's Class Notes

## Topics Covered

<i>Topic</i>	<i>Hours</i>
Course Overview	1
Solar Energy: Introduction	2
Importance of Solar Energy as Clean & Sustainable Energy	3
Fundamentals & Technology of Solar Thermal Systems	3
Fundamentals & Technology of concentration solar power	3
Operating principles and design of photovoltaic (PV) cell	6
Processing and manufacturing of photovoltaic Modules	6
Design, sizing and sub-systems of PV system	4
Operating principles design of hybrid photovoltaic/thermal systems	3
Manufacturing of Hybrid photovoltaic /thermal systems	1
Batteries and capacitor based electrical energy storage systems	2
Smart grid and PV systems	2
Urban and rural applications of solar energy	2
Topics of Instructors Choice	4
Tests	2
<b>Total</b>	<b>44</b>

**Grading Policy:** Final grade for this course will be determined by following procedure:

Tests (2)	40%
Home work, & short quizzes	20%
Term Paper (individual research)	15%
Final Exam	25 %

A=90-100, B=80-89, C=70-79, D=60-69 and F= 0-59

**Make Up Tests:** All make up tests (for valid excuses) will be *cumulative* and given at the time of final exam unless previous arrangements can be made.

**Attendance Policy:** Attendance is mandatory. Student is responsible for all the material covered in class. If the instructor does not arrive within 15 minutes of the scheduled start of class, students may leave after checking instructor's office.

**Academic Integrity:** "As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a 'high seminary of learning.' Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form."

"When, in the opinion of a faculty member, there is evidence that a student has committed an act of academic dishonesty, the faculty member shall make a formal written charge of academic dishonesty, including a description of the misconduct, to the Associate Dean for Curriculum in the Office of Undergraduate Studies. At the same time, the faculty member may, but is not required to, inform each involved student privately of the nature of the alleged charge."

**Students with Disabilities:** In accordance with University policy, on a flexible and individualized basis, reasonable accommodations will be provided to students who have disabilities. Students are encouraged to contact Student Disability Services to discuss their individual needs for accommodation.

**Legal Disclaimer:** Any portion of this syllabus may be changed during the semester. Adequate notice will be given in class when necessary.