

From Material to Modules: A Modern Introduction to Solar Cells

Overview

Global warming and the desire to bring electricity to the off-grid, resource-poor parts of the world have renewed interest in solar cells as a clean energy resource. Encouraged by ambitious plans from various governments worldwide, a number of technologies are being developed to seek solutions in the domain ranging from power utility to niche applications. Moreover, the technologies must survive for 30-50 years in a specific geographic location that might be cold/dry or hot/humid. Therefore, solar cells must be developed and understood with an end-to-end, material-to-module perspective. Few textbooks offer such a holistic perspective regarding the development and choice of PV technology. In this course, we will focus on a broad, modern understanding of the PV technology that will allow a student understand the fundamental issues associated with all aspects of solar cells design.

This week long course will consist of lectures and tutorials with assignments involving simulation of devices discussed.

Dates for the Course	13th to 19th March, 2017
Host Institute	IIT Madras
No. of Credits	1
Maximum No. of Participants	30
You Should Attend If...	<ul style="list-style-type: none">▪ You wish to appreciate the PV technology within a broader conceptual framework.▪ Wish to be able to distinguish between technology-specific vs. technology-agnostic fundamental issues related to all aspects of a PV technology.▪ Wish to be prepared for graduate research in PV or related topics.▪ You are interested in designing photovoltaic cells and modules.▪ Need to ask questions while making technology decisions in PV.
Course Registration Fees	<p>The participation fees for taking the course is as follows: Student Participants: Rs.1000 Faculty Participants: Rs.3000 Government Research Organization Participants: Rs.5000 Industry Participants: Rs.10000</p> <p>The above fee is towards participation in the course, the course material and computer use for tutorials and assignments.</p> <p>Mode of payment: Demand draft in favour of "Registrar, IIT Madras" payable at Chennai The demand draft is to be sent to the Course Coordinator at the address given below.</p>
Accommodation	<p>The participants may be provided with hostel accommodation, depending on the availability, on payment basis. Request for hostel accommodation may be submitted through the link: http://hosteldine.iitm.ac.in/iitmhostel</p>

Course Faculty



Professor Muhammad A. Alam teaches Electrical Engineering at Purdue University, where his research focuses on the physics, simulation, characterization and technology of classical and novel semiconductor devices. From 1995 to 2001, he was with Bell Laboratories, Murray Hill, NJ, as a Member of Technical Staff in the Silicon ULSI Research Department. From 2001 to 2003, he was a Distinguished Member of Technical Staff at Agere Systems, Murray Hill, NJ. He joined Purdue University in 2004. Dr. Alam has published over 300 papers in international journals, has presented many invited and contributed talks at international conferences, and more than 100,000 students have learned some aspect of the semiconductor devices from his web-based lectures. He is a fellow of IEEE, APS, and AAAS, and recipient of the 2006 IEEE Kiyo Tomiyasu Award for contributions to device technology for communication systems. His research interests include: (1) Reliability physics of MOSFETs for microelectronic applications, (2) Extremely low power logic and memory based on Landau transistors, (3) performance limits Nano-composite thin-films for macroelectronic applications (flexible, perhaps printable, large-area electronics), (4) functionalized nano-bio sensor arrays for bio-medical and electro-chemical applications, and (5) technology agnostic, end-to-end physics and modeling of solar cells.



Professor **Enakshi Bhattacharya** is with the Department of Electrical Engineering and the Centre for NEMS and Nanophotonics at the Indian Institute of Technology Madras. Her research interests are: MEMS processing and sensors, Biosensors and BioMEMS, Micro/Nano cantilever based sensors, and Silicon nanoporous membranes.



Dr. **Soumya Dutta** is with the Department of Electrical Engineering and the Centre for NEMS and Nanophotonics at the Indian Institute of Technology Madras. His research interests are: Organic Electronic and Optoelectronic Devices and Circuits, 2D material based NEMS, Polymer based SAW devices, Perovskite based Solar Cells and TFTs, and Printed Electronics.

Course Coordinator

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