

# Next Generation Solar Cells in the Realm of Future Energy Challenges: From Materials Design to Device Architecture

## Overview

Increasing world population coupled with demand for improved standards of life have contemplated surge in demand for energy, with more than 80% of which at present is tapped from fast depleting non-renewable resources. To solve the challenge of energy crisis various approaches are being considered at present. One such approach is to harness the solar energy into electricity by means of solar cells. However, a major deterrent in the commercialization of existing solar cell technology is the cost of production and thereby the payback time. In this regard amongst the next generation solar cells, mesoporous Dye Sensitized Solar Cells (DSSCs) offer a new ray of hope, mainly owing to their low cost of production, light weight and flexibility (particularly of solid state DSSCs). To gain insight into the working of a DSSC one needs to understand the underlying physics, chemistry, nano electronics and materials science. This course aims to take participants through the various aspects material design and device architecture of DSSCs. Some of the other aspects related to circuit modeling and EIS etc. will also be touched upon.

This is a single module course having once credit in all. The topics of the module will expose the participants to the entire gamut of DSSC based PV technology like nanoporous oxide layers, functional dye molecules, the electrolyte media and the Platinum based counter electrode.

Course participants will learn these topics through lectures and hands-on experiments. Also case studies and assignments will be shared to stimulate research motivation of participants.

<b>Modules</b>	<b>A: Dye Sensitized Solar Cells : December 11 - December 16 ' 2017</b> <b>Number of participants for the course will be limited to fifty.</b>
<b>You Should Attend If...</b>	<ul style="list-style-type: none"> <li>▪ Undergraduates, M.Tech./M.Sc. and Ph.D. science/engineering stream students. Any student with a basic background in Electronics/Physics/ Chemistry or Materials Science will be able to follow these lectures and gain valuable information.</li> <li>▪ B.Tech./B.Sc. and M.Tech./M.Sc. level teachers who wish to update their knowledge in an important special field of DSSCs.</li> <li>▪ Executives, engineers and researchers from industry, service and government organizations including R&amp;D laboratories who are engaged in in the research and development of next generation solar cells.</li> </ul>
<b>Fees</b>	<p>The participation fees for taking the course is as follows:</p> <p>Students (UG/PG): INR 4000/-</p> <p>Research Scholars: INR 6000/-</p> <p>Faculty Members: INR 10000/-</p> <p>Foreigners: USD 300</p> <p>Industry and Others: INR 15000/-</p> <p>The above fees include all instructional materials, tutorials and assignments, 24 hrs free internet facility.</p>
<b>Accommodation</b>	Paid accommodation will be provided to participants on first-come-first-serve basis.

## The Faculty



**Prof. Shyam Sudhir Pandey** was born in the Kushinagar district of Uttar Pradesh, India on January 1st, 1967. After completing his Ph. D. From, National Physical Laboratory, New Delhi, India in 1997 in the area of organic conducting polymers, he went to Japan as post-doctoral fellow in 1998. He worked as Fukuoka IST sponsored post-doctoral fellow in the Kyushu Institute of Technology from 1998-2001 in the area of photo-functional materials and devices. He was JSPS post-doctoral fellow from 2001-2003 (Soft-actuators & Artificial Muscles) and Knowledge Cluster invited researcher from 2003-2007 (Protein Biochips). He worked in Kyushu Institute of Technology as Assistant Professor from 2009-2012. Currently he is an Associate Professor at the Graduate School of Life Science and Systems Engineering, Kyushu Institute of Technology since 2012. He has received National Technology Award from National Research Development Corporation, Government of India in 2005 for the development of Glucose Biosensors, which is currently being manufactured and marketed also. He has published more than 170 papers in international refereed journals and has over 25 patents in India, Japan, Europe and USA to his credit. His research interests deal with the Dye-Sensitized and Organic Solar Cells, Quantum Chemical Calculations, Organic Electronics & Optoelectronics, Organic Conducting Polymers, Biosensors and Protein Biochips.



**Dr. Vipul Singh** is presently working as an Associate Professor in the Discipline of Electrical Engineering at Indian Institute of Technology Indore. He obtained his Ph.D. degree from Department of Biological Functions and Engineering, Graduate school of LSSE, Kyushu Institute of Technology, Wakamatsu, Fukuoka, Japan. His research interests are in the areas of Silicon nanodevices, Organic electronics, ZnO nanostructures, charge carrier transport in organic materials, Conducting Polymers, Biosensors, Photosensitive transistors, LEDs and Solar cells.

*For any information regarding eligibility fee payment, travel information, accommodation, etc., please contact the course coordinator via e-mail or phone.*

## Course Co-ordinator

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**Link of Registration:**  
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