National Centre for Photovoltaic Research and Education (NCPRE)

Three day CEP course on

Theory and Technology of Silicon Solar Cells

26th – 28th September, 2019

Venue:

VMCC, 2nd Floor, Room No. 21
IIT Bombay

Indian Institute of Technology, Bombay (IITB)

Theory and Technology of Silicon Solar Cells

Day 1

26th September, 2019

Time	No	Title	Speaker
8:30 – 9:00		*Breakfast*	
9:00 - 9:30		*Course Registration and Course Material Distribution*	
9:30 – 10:00		**Course Inauguration**	
9:30 - 9:50		Welcome and brief introduction to NCPRE	Prof. Chetan Singh Solanki, IIT Bombay
9:50 - 10:00		Introduction to the workshop	Prof. B. M. Arora, IIT Bombay
10:00 - 11:30	**1**	Introduction to the physics of semiconductor devices (band diagram, optical absorption, generation - recombination, transport, pn-junction diode characteristics)	Prof. B. M. Arora, IIT Bombay
11:30 – 12:00		*Tea break with informal discussion on previous lectures*	
12:00 - 13:00	**2**	Introduction to the physics of semiconductor devices (continued)	Prof. B. M. Arora, IIT Bombay
13:00 - 14:00		*Lunch*	
14:00 - 15:30	**3**	Silicon solar cells (characteristics of silicon solar cell, design of silicon solar cells - optical design, junctions, passivation, impact of these parameters on solar cell characteristics, IV measurements, quantum efficiency measurements)	Prof. K. L. Narasimhan, IIT Bombay
15:30 - 16:00		*Tea break with informal discussions on previous lectures*	
16:00 - 17:00	**4**	Silicon solar cells (cont.)	Prof. K.L. Narasimhan, IIT Bombay

Day 2

27th September, 2019

Time	No	Title	Speaker
8:30 – 9:00		*Breakfast*	
9:00 – 10:00	**5**	Fabrication of low-cost industrial full area Al-BSF and local area Al BSF (PERC) silicon (both mono and multi) wafer solar cells	Dr. Hemanta Ghosh, IIT Bombay
10:00 – 11:00	**6**	Characterization of thin films, wafers and cells (ECV, sheet resistance, ellipsometry, UV-Vis, 3D microscopy, lifetime, Lighted IV and QE)	Dr. Suchismita Mitra, IIT Bombay
11:00 – 11:30		*Tea break with informal discussions*	
11:30 – 13:00	**7**	Silicon PV module fabrication and characterization	Prof. Narendra Shiradkar, IIT Bombay
13:00 - 14:00		*Lunch*	
14:00 - 15:30	**8**	Simulation of solar cell using PC1D: a practical session	Dr. Suchismita Mitra (lead), Durga Prasad, Sreejith K. P., Tarun Yadav, Jayshree Bhajipale, Rajul Jain, Anil Kumar (IIT Bombay)
15:30 - 16:00		*Tea break with informal discussions*	
16:00 - 17:30	**9**	Loss analysis of Al-BSF solar cells: a practical session	Ms. Astha Tyagi (lead), Tarun Yadav, Sreejith K. P., Jayshree Bhajipale, Rajul Jain, Durga Prasad, Anil Kumar (IIT Bombay)

Day 3

28th September, 2019

Time	No	Title	Speaker
9:00 – 9:30		*Breakfast*	
9:30 - 11:00	**10**	Wafer level characterization (PL, EL, LBIC) for process, device development and diagnostics	Dr. Ashok Sharma, IIT Bombay
11:00 - 11:30		*Tea break with informal discussion on previous lectures*	
11:30 - 13:00	**11**	Advanced silicon solar cells	Prof. Anil Kottantharayil, IIT Bombay
13:00 - 14:00		*Lunch*	
14:00 – 16:00	**12**	Lab visits (divided into groups – visit of silicon solar cell & characterization laboratories, and optionally also module lab if the participants can stay longer)	Dr. Diksha Makwani (coordinator)