

**Approval: OTA in 4<sup>th</sup> Convocation Meeting**

**Course Name: Photovoltaic Materials and Fabrication**

**Course No. EM 651**

**Credits: 3**

**Course objective:**

The objective of the course is to develop an understanding of the necessary ideas of photovoltaic sciences. The course is broadly divided into three modules, with each separately covering the topics of photovoltaic devices, PV systems and PV technology. On the completion of the course, the students will have a good understanding of the functioning of solar cells, along with requisite knowledge of PV systems and available photovoltaic technologies.

**Course content:**

- **Photovoltaic devices:**  
History of solar cells, Basics of semiconductor physics, Theory of p-n junction, Principle of detailed balance, Physics of solar cells, Design of solar cells [21 lectures]
  
- **PV systems:**  
Solar radiation, Calculation of direct and diffuse radiation, Solar modules and arrays, Reliability of photovoltaic modules, Components of photovoltaic systems [14 lectures]
  
- **PV technology:**  
Silicon solar cell fabrication, III-V technology, Thin film technology, Other emerging technologies [7 lectures]

**Books**

- Jenny Nelson, “Physics of solar cells”, Imperial College Press, 2003
- Roger Messenger, Jerry Ventre, “ Photovoltaic systems engineering”, CRC press