

SOLAR POWER PLANT- COMPONENTS AND DESIGN

Semi-Conductors, P-N junction, Diode and Solar cell I-V equation of P-N junction, junction under illumination, solar cell parameters, design of solar cells, measurements of solar cell parameters; short circuit current, open circuit voltage, fill factor, efficiency; optical losses; electrical losses, I-V curve; solar cells and solar PV modules, issues with solar PV modules, bypass diode and blocking diode,

DC-DC converters - Buck converter, boost converter, buck - boost converter, DC-AC inverters -Single phase VSI, Three phase VSI, Single phase CSI, Three phase CSI, Design aspects

Battery -Storage Cell Technologies-Storage cell fundamentals- Characteristics- Emerging trends in batteries, Types of Batteries , Batteries used in Solar Power Storage, battery sizing, PV panel sizing, Efficiency Calculations, Charge Controllers

PV Systems-Design of PV systems-Standalone system with DC and AC loads with and without battery storage-Grid connected PV systems-Maximum Power Point, maximum power point tracking algorithms ,centralized and decentralized distribution.

Text Books

1. Edward E. Anderson, "Fundamentals for solar energy conversion", Addison WesleyPubl. Co., 1983.
2. Chetan Singh Solanki, "Solar Photovoltaics-Fundamentals, Technologies and applications", PHI 2nd edition, 2011
3. Hand Book of Batteries and Fuel cells, 3rd Edition, Edited by David Linden and Thomas.B. Reddy, McGraw Hill Book Company, N.Y. 2002

References:

1. Syed A Nasar, "Electric energy conversion and transmission", Macmillan Publishingcompany, New York, 1985
2. Pabla, A.S., „Electrical Power Distribution System", 5th edition, Tata McGraw hill, 2004
3. Solar cells: Operating principles, technology and system applications, by Martin A. Green, Prentice-Hall Inc, Englewood.Cliffs, NJ, USA, 1981..
4. Design of Smart Power Grid Renewable Energy Systems, Ali Keyhani, (2011), Wiley-IEEE Press

Mrs. RB/BM
for Seneta approval