

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Physics - NOC:Physics of Renewable Energy Systems

Subject Co-ordinator - Prof. Amreesh Chandra

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and relevance of the course  
Lecture 2 - Energy sources  
Lecture 3 - Solar Radiation  
Lecture 4 - Solar Photovoltaic Systems  
Lecture 5 - Origin of Band Structure and Energy Band Gap  
Lecture 6 - Basics of Semiconductors  
Lecture 7 - Construction of Solar Cells  
Lecture 8 - Characterization of Solar Cells and Future Direction  
Lecture 9 - Solar Heaters  
Lecture 10 - Introduction to Wind Energy  
Lecture 11 - Continuity Equation and its applications  
Lecture 12 - Betz Criteria for extracting wind power  
Lecture 13 - Wind turbines and their operation  
Lecture 14 - Materials Aspects and future direction  
Lecture 15 - Introduction to Hydroelectric Power  
Lecture 16 - Hydroelectric Power Station and Turbines  
Lecture 17 - Wave power and converters  
Lecture 18 - Introduction to Tidal Power  
Lecture 19 - Tidal Power and Geothermal Energy  
Lecture 20 - Introduction to Energy Storage Systems  
Lecture 21 - Thermal Energy Storage  
Lecture 22 - Basics of Mechanical Energy Storage  
Lecture 23 - Pumped Hydroelectric to Flywheels (Mechanical Energy Storage Systems)  
Lecture 24 - Introduction to Li-ion battery  
Lecture 25 - Characteristics and Parameters of Li-ion batteries  
Lecture 26 - Cathode Materials for Li-ion batteries  
Lecture 27 - Anode Materials for Li-ion batteries  
Lecture 28 - Electrolytes and Separators for Li-batteries  
Lecture 29 - From battery to supercapacitors

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- Lecture 30 - Construction, development and classification of Supercapacitors
- Lecture 31 - Electric double layer capacitors (EDLCs)
- Lecture 32 - Pseudocapacitors
- Lecture 33 - Electrochemical Techniques for Supercapacitors and Batteries
- Lecture 34 - From material to a supercapacitor device
- Lecture 35 - Effect of temperature on supercapacitor performance
- Lecture 36 - Effect of external magnetic field and frequency on supercapacitors
- Lecture 37 - Introduction to Fuel Cells
- Lecture 38 - Explanation of Fuel cell systems
- Lecture 39 - Microbial Fuel Cells
- Lecture 40 - Nanotechnology and Nanomaterials for Energy Applications
- Lecture 41 - Synthesis of nanomaterials
- Lecture 42 - Carbon- and metal-oxide based nanomaterials
- Lecture 43 - Nanocatalysts
- Lecture 44 - Characterization techniques for solid materials
- Lecture 45 - X-ray diffraction method
- Lecture 46 - UV-Visible Spectroscopy
- Lecture 47 - Fourier Transform Infrared Spectroscopy
- Lecture 48 - SEM, TEM and XPS
- Lecture 49 - Particle size and zeta potential analysis
- Lecture 50 - BET analysis
- Lecture 51 - Electrochemical Impedance Spectroscopy