

Smart Solar Energy and E-Mobility

Syllabus

1. Solar Energy:

Solar Photovoltaics: Introduction, Solar Radiation & its relation with Photovoltaic Effect. Solar cell material: Silicon mono & Poly crystalline, raw material other than silicon. Different types of solar cell construction and design, flat plate arrays:- optimal system sizing & protection. Photovoltaic concentration, Photovoltaic system standalone, PV- hybrid , Grid interactive. Stationary and tracking panels, maximum power point tracking, energy storage, converter & inverter systems & their control. Application water pumping & power plants, cost & economics, recent developments.

2. Solar Thermal:

Thermal characteristics of solar radiation, Solar collectors:- materials, types, focussing. Solar thermal power plant- layout and arrangement, solar cooling, recent developments.

3. Arduino:

Basics of Arduino, Architecture, Pin diagram, pin description, specifications, programming software, Arduino programming, Datatypes, variables, Arrays, control structure, some important keys, Types of Arduino, Advantages, Limitations, Applications of Arduino Technology in Robotics, Electrical Appliances, Home automation.

4. Neural Networks-1(Introduction & Architecture):

Neuron, Nerve structure and synapse, Artificial Neuron and its model, activation functions, Neural network architecture: single layer and multilayer feed forward networks, recurrent networks. Various learning techniques; perception and convergence rule, Auto-associative and hetro-associative memory.

5. E-mobility

Economics and Ecosystem in eMobility, Vehicle Dynamics and Control, Powertrain and Fuels, Power Electronics and Motors, Battery Technology, Grid to Vehicle and Vehicle to Grid Technology and the smart charging station infrastructure.

References

1. Siman Haykin, "Neural Netowrks" Prentice Hall of India
2. E-Mobility: A New Era in Automotive Technology, **M. Kathiresh (Editor), G. R. Kanagachidambaresan, 2022**
3. G.D. Rai, Khanna Publication, Non- conventional energy resources.
4. S. Rajasekaran, G.A.Vijayalaskmi pai, Neural Network, Fuzzy Logic, Genetic Algorithms Synthesis and Applications.