
**TEXT BOOKS/ REFERENCES:**


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**18PR622 SUSTAINABLE AND RENEWABLE ENERGY TECHNOLOGY**


TEXT BOOKS/ REFERENCES:


18PR625 POWER QUALITY AND FACTS 3-0-1-4

TEXT BOOKS/ REFERENCES:


18PR602 COMPUTATIONAL INTELLIGENCE FOR POWER APPLICATIONS

2-0-1-3

TEXT BOOKS/REFERENCES:


18PR623 APPLIED DIGITAL SIGNAL PROCESSING 2-0-2-4


TEXT BOOKS/REFERENCES:

3. PICmicro™ PIC16F87XA Data Sheet 28/40/44-Pin Enhanced Flash Microcontrollers, 2003 Microchip Technology Inc., DS39582B.

18PR624 RESTRUCTURED POWER SYSTEM OPTIMISATION 3-0-1-4

Review of power system operation in restructured scenario, marginal cost of generation, least-cost operation, and incremental cost of generation. Introduction to Power System Optimization: classical and evolutionary approaches of optimization, Formulation of optimal

TEXT BOOKS / REFERENCES:


18PR601 POWER ELECTRONICS FOR RENEWABLE ENERGY TECHNOLOGIES


TEXT BOOKS/ REFERENCES:

SMART GRID


TEXT BOOKS / REFERENCES:

The student in consultation with the faculty advisor has to select a topic related to Power and Energy area, write a paper and present it. Lab training sessions in commonly used ICs and kits (Microcontrollers, FPGA kits etc) to prepare students for project phase.

Unit I:

Unit II:
Problem Formulation, Understanding Modeling & Simulation, Conducting Literature Review, Referencing, Information Sources, Information Retrieval, Role of libraries in Information Retrieval, Tools for identifying literatures, Indexing and abstracting services, Citation indexes

Unit III:
Experimental Research: Cause effect relationship, Development of Hypothesis, Measurement Systems Analysis, Error Propagation, Validity of experiments, Statistical Design of Experiments, Field Experiments, Data/Variable Types & Classification, Data collection, Numerical and Graphical Data Analysis: Sampling, Observation, Surveys, Inferential Statistics, and Interpretation of Results

Unit IV:
Preparation of Dissertation and Research Papers, Tables and illustrations, Guidelines for writing the abstract, introduction, methodology, results and discussion, conclusion sections of a manuscript. References, Citation and listing system of documents

Unit V:

TEXT BOOKS/ REFERENCES:
18PR701  POWER PLANT INSTRUMENTATION  2-0-1-3


TEXT BOOKS/ REFERENCES:
5. Nuclear power plant instrumentation and control, A guidebook, International atomic energy agency Vienna, 1984(online resource).

18PR702  MATHEMATICAL MODELLING OF ENERGY SYSTEMS  2-0-1-3

Energy system modelling: background, motivations, modelling physical systems, time scales of power system dynamics, energy system architecture, energy system scripting, python language. Analysis of energy systems: power flow analysis, modelling and solution by Newton Raphson method, continuation power flow analysis, modelling and solution by homotopy methods, optimal power flow analysis, modelling and solution by gradient method. Modelling of Renewable Energy: operation of PV & Wind energy systems, frequency impact & voltage analysis, modelling of solid oxide fuel cell and battery energy storage. Modelling of HVDC transmission system and voltage source converter, modelling of STATCOM and
analysis. Dealing with uncertainty and probabilistic techniques: uncertainty power flow analysis and probabilistic optimal power flow analysis. Case studies of various analyses on standard IEEE test system.

TEXT BOOKS/ REFERENCES:

18PR703 ENERGY CONSERVATION AND MANAGEMENT 2-0-1-3


TEXT BOOKS/ REFERENCES:

**TEXT BOOKS/REFERENCES:**


TEXT BOOKS/ REFERENCES:

18PR706 LOGIC AND DISTRIBUTED CONTROL SYSTEMS 2-0-1-3


TEXT BOOKS/ REFERENCES:

18PR707 CONTROL SYSTEM DESIGN 2-0-1-3
Control system design by root locus method: lag, lead, lag-lead compensators, control system design by frequency response: lag, lead, lag-lead compensators. PID controller design: Tuning algorithms for PID controllers, optimal PID tuning, anti-reset wind up, derivative kick, modifications to conventional PID controller. Design of control system in state space: Pole placement controller, selection of pole locations for good design, control law design for full state feedback, design of servo systems. Observer design: Reduced order observer, design of regulator systems with observers. Computer aided designs. Simulations and case studies of classical controller design.

TEXT BOOKS/ REFERENCES:


18PR708 MACHINE LEARNING AND MULTIAGENT SYSTEM FOR POWER ENGINEERING  2-0-1-3


TEXT BOOKS/ REFERENCES:


TEXT BOOKS / REFERENCES:


Review of solar energy systems. Solar photovoltaic applications: types of systems, system design, balance of solar PV systems, Solar PV inverter & converter design, controllers, energy storage options for solar PV systems, battery & fuel cell, site selection for SPV

TEXT BOOKS/REFERENCES:


18PR711 WIND ENERGY CONVERSION SYSTEMS 2-0-1-3


TEXT BOOKS/REFERENCES:


TEXT BOOKS/REFERENCES:


18PR713 ADVANCED DIGITAL SIGNAL PROCESSORS AND APPLICATIONS

Installing Linux OS, Installing and using OpenCV image processing library and basic python using Raspberry PI.

TEXT BOOKS/ REFERENCES:


18PR714 ELECTRIC VEHICLE TECHNOLOGY 2-0-1-3


TEXT BOOKS/ REFERENCES:


18PR715 CYBER PHYSICAL SYSTEMS 2-0-1-3

Cyber-Physical Systems (CPS) in the real world, Basic principles of design and validation of CPS, CPS HW platforms: Processors, Sensors, Actuators, CPS Network, CPS SW stack RTOS, Scheduling Real Time control tasks. Principles of Automated Control Design:

TEXT BOOKS/ REFERENCES:


18PR716 ICT ENABLED POWER SYSTEM PROTECTION 2-0-1-3


TEXT BOOKS/ REFERENCES:

5. IEEE standards, Transaction papers on power system protection.