DEE-601-Energy Conservation & Management

Unit-I

General Energy Problem: Energy use patterns and scope for conservation, energy audit, energy monitoring, energy accounting analysis, and targeting, energy management, types of energy audit, qualities and function of energy managers, language of an energy manager, check list for top management, loss of energy in material flow, energy performance, maximizing system efficiency, input energy requirements, energy auditing instruments, material load energy balance diagram.

Unit- II

Thermodynamics of Energy Conservation: Basic principle, irreversibility, second law, efficiency analysis of systems, primary energy sources, optimum use of prime-movers, energy recovery in thermal systems, waste heat recovery techniques, thermal insulation, thermal energy audit in heating, ventilation and air conditioning, friction, lubrication, predictive and preventive maintenance.

Unit-III

Load curve analysis: Load curve analysis & load management, DSM, energy storage for power systems (mechanical, thermal, electrical & magnetic), restructuring of electric tariff from energy conservation consideration, economic analysis depreciation method, time value of money, evaluation method of projects, replacement analysis, pay back period, energy economics, cost benefit risk analysis,

Unit-IV

Energy Efficient System: Energy efficient electric drives, energy efficient house keeping, energy efficient motors, energy flow networks, simulation & modeling, matrix chart.

Unit-V

Energy conservation: Energy conservation policy, energy conservation task before industry, energy conservation equipment's , co-generation, energy conservation process, energy conservation in transportation system in electric vehicle industry, sugar, textiles, cement industries, electrical energy conservation in building, heating, lighting & domestic gadgets .

References:

1. Energy Management – W.R. Murphy & G. Mckey Butler worths.
2. Energy Management Head Book- W.C. Turner, John Wiley.
3. Energy Management Principles- Craig B. Smith, Pergamon Press.
4. Energy Conservation- Paul O Callagan- Pergamon Press.
5. Design & Management of energy conservation. Callaghan.
6. Elect, Energy Utilization & Conservation. Dr. Tripathi S.C.

DEE-602-Installation, Maintenance and Testing

Unit-I

Installation -Types of heavy electrical equipment, installation of small and large machines for static and rotating type. installation of pole mounted transformer, earthing, earth resistance measurement, improvement of earth resistance, rules for earthing.

Unit-II

Insulation Measurement- Instruments used for measuring insulation resistance, reasons for deterioration of insulation resistance, improving insulation resistance, drying of insulation, Measurement of internal temperature of winding, vacuum impregnation, filtering of insulating oil, testing of insulating oil.

Unit-III

Testing And Maintenance Of Relays And Circuit Breakers - Testing of Relays Factory test, commissioning test and preventive periodic maintenance test. Testing of circuit breakers, voltage test, type test, preventive maintenance of circuit breaker, Hot Line maintenance, special types of non-conducting materials used for tools for hot line maintenance.

Unit-IV

Commissioning - Tests required before commissioning procedure to be adopted for commissioning the electrical equipment in respect of - (a) Mechanical fixture and alignment. (b) Electrical tests. (c) Initial precautions for starting.

Unit-V

Preventive Maintenance – Basic concepts, advantages, preventive maintenance schedule for transformer, induction motor, transmission line, circuit breaker and underground cable. Preventive measures to control environmental pollution results due to production of smokes gases flow of waste material and automatic reactions 8in research stations, plants, electrical and electronic equipments and accessories

List of experiments:

1. Maintenance of distribution transformer in distribution system.
2. Maintenance of Overhead Lines.
3. Maintenance of switchgear OCB
4. Preventive maintenance of induction motor in textile mills / industrial establishments.
5. Insulation oil testing
6. Earth resistance testing

7. hot line maintenance.
8. Test report of electrical installation and Accident report writing.
9. Fire extinguisher process.
10. Shut down and energizing procedure.
11. Report on Maintenance schedule .

References:

1. Electrical Maintenance & Repairs by P.P.Gupta., Dhanpat Rai & Sons Pub.
2. Electrical Installations work by T.G. Ffancist. E.L.B.S (Vth metric edition)
3. Electrical Installations Maintenance & fault location work book by T.T.T.I.(W.R.) Bhopal
4. Preventive maintenance Electrical equipment by Charies J Hurburt.
5. Electrical Maintenance & Repairs by P.P.Gupta., Dhanpat Rai & Sons Pub.
6. Fundamentals of maintenance of Electrical Equipment by Bhatia Khanna Pub.
7. Estimating Commissioning and maintenance of Electrical equipment by S. Rao, Khanna Pub.

DEE-603 Electric Traction

Unit-I

Track Electrification-Electric Traction, Description of various systems - D.C. system, single Phase low frequency A.C., single Phase high frequency, 3-Phase A.C. and Composite system, 25 K.V. A.C., 50 Hz System-Advantages and disadvantages, Problems associated with A.C traction system, current and voltage unbalance, production of harmonics and induction effects, comparison between A.C. and D.C. system

Unit-II

Power Supply And Equipment's- High voltage supply, constituents of supply system substation, feeding post, feeding and sectioning arrangements, sectioning post, elementary section, equipment at control posts and switching station, equipment at substation, transformer, circuit breaker, interrupters, protection system for A.C. Traction.

Unit-III

Traction Mechanics-Types of services, speed time curve, average speed and schedule speed, tractive effort, power of traction motor, specific energy consumption, factors affecting specific energy consumption, mechanics of train movement, coefficient of adhesion.

Unit-IV

A.C. Electric Locomotive-Block diagram of A.C. electric locomotive, Overhead equipment (O.H.E.), Pentagonal O.H.E.- catanery construction. OHE Supporting structure, Current collection system, current collection gear for OHE, pole collection bow collection, pantograph collector, Air blast C.B, Traction motor connection, Smoothening reactor, Traction motors-suitability of motors for traction, D.C. Series motors, A.C. Series single phase, repulsion motor, 3-phase I.M. linear I.M., Control of D.C. traction motor, series parallel control, energy saving with series parallel starting, metadyne control, multiple unit control, breaking systems, types of electric breaking, regenerative breaking.

Unit-V

Signaling: Requirements , different signaling used, track circuits, train signaling, special requirements of train lighting, methods of obtaining unidirectional polarity and constant output, battery system, failure of under frame generating equipment.

List of Experiments:

1. Draw speed current characteristic of d.c. Series motor.
2. Draw speed tooque characteristic of d.c. Series motor.
3. Study of various methods for speed control of d.c.
4. Study of pentagraph current collector.
5. Study of metadyne control system.

References:

1. Electric Traction System Equipment D.W. Hingle Pergamo Press
2. Electric Traction A.T. Dover Pitmin & Sons
3. Electric Traction Hand Book. R. Books Pitman & Sons.
4. Modern Electric Traction. H. Pratap Pritam Burai & Bros.

DEE-604- Power System Analysis and Control

UNIT I

Introduction to power system stability problem: Rotor angle stability, voltage stability and voltage collapse, mid term and long-term stability, classification of stability, , system security, system dynamic problems, problems associated with modern interconnected power systems, deregulation, power systems restructuring, distributed generation, congestion, pricing.

Unit-II

Power System Stability - Steady state, dynamic and transients stability, swing equation , equal area criterion, solution of swing equation using step by step method modified Eulers method and Rnge-Kutta method, methods of improving transient stability.

Unit-III

Power Flow Studies - Formulation of static power flow equations and solutions using Gauss-Seidel, Newton Raphson and FDLF methods, comparison of these methods, Economic operation of power system - Economic dispatch, Emission dispatch, line loss, ITL, economic dispatch using lagrangian multiplier method.

Unit-IV

Frequency Control- Coherency, control area, modeling of speed control mechanism, load damping, block diagram of single and two area interconnected system, static and dynamic response.

Unit-V

MVAR Voltage Control - Difference in control strategy over MW – f control, characteristics of an excitation system, DC AC and static excitation system, General block diagram representation of voltage regulators.

References:

1. K.R. Padiyar, Power system dynamics, stability and control, BS Pub. Hydbid
2. P Kunder, Power system stability and control, TMH.
3. P. W. Sauer & M A Pai: Power system dynamics and stability: Pearson.

DEE-605 Major Project

The aim of the final year project is to develop student's knowledge for solving technical problems through structure project research study in order to produce competent and sound engineers. It provides the students with the opportunity to design undertake or conduct an independent research or study related to their degree course.

Following are the compulsory objectives to be needed :

1. It should be from the approved area of the subject.
2. Students must submit a written report of the same.
3. Students must submit outline and action plan for the project execution
4. Each student is required to prepare a project report and present the same at the final examination with a ppt. demonstration.
5. The project should be authentic and must not be copied from anywhere and it should be working.