

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech in POWER PLANT ENGINEERING AND ENERGY MANAGEMENT
Effective from Academic Year 2017 - 18 admitted batch
COURSE STRUCTURE AND SYLLABUS
I Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-1	Thermodynamics and Heat Transfer	25	75	4	0	0	4
PC-2	Energy Management and Energy Audit	25	75	4	0	0	4
PC-3	Thermal & Hydro Power Plants	25	75	4	0	0	4
PE-1	- Wind and Tidal Energy - Power Plant Erection - Material Handling Management	25	75	3	0	0	3
PE-2	- Solar Energy Technologies - Turbo machines and Propulsion Systems - Direct Energy Conversion	25	75	3	0	0	3
OE-1	*Open Elective - I	25	75	3	0	0	3
Laboratory I	Power Plant Engineering Lab	25	75	0	0	3	2
Seminar I	Seminar-I	100	0	0	0	3	2
Total		275	525	21	0	6	25

II Semester

Category	Course Title	Int. marks	Ext. marks	L	T	P	C
PC-4	Power Plant Maintenance	25	75	4	0	0	4
PC-5	Cogeneration and Combined Cycle Power Plants	25	75	4	0	0	4
PC-6	Power Plant Instrumentation	25	75	4	0	0	4
PE-3	- Environment and Safety Engineering - Power Plant Performance monitoring and Testing - Power Plant Protection and Switch Gear	25	75	3	0	0	3
PE4	- Energy Storage Systems - Pollution Control and Environment - Power Distribution Systems	25	75	3	0	0	3
OE-2	*Open Elective - II	25	75	3	0	0	3
Laboratory II	Power plant Simulation Lab	25	75	0	0	3	2
Seminar II	Seminar-II	100	0	0	0	3	2
Total		275	525	21	0	6	25

III Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Technical Paper Writing	100	0	0	3	0	2
Comprehensive Viva-Voce	0	100	0	0	0	4
Project work Review II	100	0	0	0	22	8
Total	200	100	0	3	22	14

IV Semester

Course Title	Int. marks	Ext. marks	L	T	P	C
Project work Review III	100	0	0	0	24	8
Project Evaluation (Viva-Voce)	0	100	0	0	0	16
Total	100	100	0	0	24	24

*Open Elective subjects must be chosen from the list of open electives offered by **OTHER** departments.

For Project review I, please refer 7.10 in R17 Academic Regulations.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I Year – II Sem. (PPE & EM)

POWER PLANT MAINTENANCE (Professional Core - 4)

UNIT- I

Boiler and its accessories, Boiler structure steel work– Importance, Inspection and maintenance aspects, Problems in structure works & hanging arrangements.

Boiler pressure parts

Economizer: Tube size, material, spacing and their alignment; Causes and effects of erosion & corrosion on tubes; Causes for failure of economizer tubes; Inspection for damage of tubes and their repair /replacement methods.

Boiler Drum & Drum internals: Different connections to boiler drum & their Maintenance, Instrumentation tapings, Safety valves and air vents Problems, Causes and Remedies.

UNIT - II

Water Wall Tube Arrangement: Tube materials, spacing and connections, Expansion & Sealing of boiler bottom and prevention of dust accumulation in seal chamber, Effect of water, erosion & corrosion on water wall tubes, Inspections of water valve tubes, Causes of tube failures, Repair/Replacement Procedures of punctured / damaged tubes, Procedure for alkali boil out & acid cleaning, preservation & flushing, Hydraulic statics test.

Super heaters - Causes of tube failures, Pattern of tube punctures and their repair / welding / replacement procedures, Different types of welding utilized. **Re-heaters** -Inspections of tubes for erosion and corrosion & failures.

Boiler draught system

Draught Fans – ID Fan, FD Fan, PA Fan and their ducts, Causes of erosion and corrosion, Remedial action, Vibration analysis, Bearing/ coupling Maintenance and Shaft Alignment.

Air Pre-Heater - Seal arrangement settings & replacement, Cold end corrosion in Air heaters, Causes & remedies, Driving Unit and its maintenance. SCAPH - Inspection of tubes for erosion and corrosion.

UNIT - III

Soot Blower Maintenance, Pulverisers & Raw Coal Feeders:

Pulverisers -Setting of spring assembly, Fitting of bearings and rollers on journals shaft, Mounting worm gear and shaft, Lubrication system of mills, Setting of classifier vanes, Repair of discharge dampers, Major problems encountered in coal mills & their causes and remedies, Constructional details working and maintenance aspect of driving units and PIV gearbox, Maintenance of coal flow indicators & inlet gate of coal, Maintenance of coal carrying system, i.e. drag link chain / conveyers / rotating blades.

Coal handling plant & ash handling plants maintenance - Coal handling machines –their working and maintenance aspects, Bunker & Chutes- Effect of erosion and corrosion due to coal and their rectification, Coal crusher- Maintenance problems and repairs.

UNIT - IV

Turbine Maintenance: Pre-checks & dismantling sequence of Turbine Measurement of clearances, Checking the conditions of babbitt metal for score pitting, chipping of or lack of bondage between the babbitt and the shell, Checking of turbo supervisory instrument for total expansion & differential expansion, Checking of turbine cylinders for cracks/ deformation, Turbine support arrangements, Cleaning inspection and NDT, Centering of shafts, Alignment of rotors of HP, IP & LP rotors w.r.t. generator, Turbine generating system & control valves and governors, Inspection of barring gears, Vibration analysis, Turbine insulation inspection.

Turbine auxiliaries maintenance: Boiler feed pump, C.W. pump, Feed Heaters- LP & HP Heater, Condensers- Inspection cleaning & repair of tubes, Chemical dosing pumps- reciprocating pumps,

Condensate extraction pump, Construction & function of each part and maintenance problems of all equipments, Removal of complete cartridge of boiler feed pump, Inspection of shaft, bearings, seals, glands, balancing arrangements and wear rings, Dismantling & mounting of bearings, Maintenance of Hydraulic coupling, Alignment of pumps, Trouble shooting of pumps.

UNIT - V

Generator Maintenance: Stator & Rotor maintenance, Vibration monitoring, Hydrogen leakage, Rotor earth fault detection, Excitation system maintenance.

Electrical plant & auxiliary equipment maintenance –Switchgears, Isolators, Motors, Transformers, Batteries, Cable & earthing Actuators. Major Maintenance aspects of Hydro-electric/Gas Power Stations.

REFERENCES:

1. Modern Power Station Practice/C.E.G.B./ Vol-III.
2. Operator's hand book/CEGB
3. NPTI Manual on Power Plant Maintenance.
4. BHEL Operation & Maintenance Manual

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I Year – II Sem. (PPE&EM)

COGENERATION AND COMBINED CYCLE POWER PLANTS (Professional Core - 5)

UNIT - I:

Introduction-Principle of Thermodynamics- cycles-topping-bottoming-combined cycle-organic rankine cycles-performance indices of cogeneration systems-waste heat recovery-sources and types-concept of tri generation

UNIT - II:

Configuration and thermodynamic performance-steam turbine cogeneration systems- gas turbine cogeneration systems-advanced cogeneration systems: fuel cell, Stirling engines etc.,

UNIT- III:

Cogeneration plants electrical interconnection issues-utility and cogeneration plant interconnection issues-applications of cogeneration in utility sector-industrial sector-building sector-rural sector-impacts of cogeneration plants-fuel, electricity and environment

UNIT - IV:

Combined cycle power generation: Hybrid cycle – topping cycle – bottoming cycle – thermodynamic analysis- efficiency – waste heat recovery boiler – pinch point temperature importance in HRSG – Combination of steam cycle and gas turbine cycle – Integration of different power cycles – analysis – fuels used for hybrid cycles – supplementary firing of combined cycles.

UNIT - V:

Latest energy conversion techniques: Integrated Gasification combined cycle (IGCC), Advanced energy storage systems, Clean coal technologies, fluidized bed combustion, Coal based combined cycles, Natural gas based combined cycles, Integrated power generation, Fuel cells, hybrid cycles power generation with direct energy conversion principles, conversion of standalone cycle power generation into combined cycle power generation units.

REFERENCES:

1. Cogeneration-Charles H. Butler-McGraw Hill
2. Cogeneration-Heat and Power, Thermodynamics and Economics-Horlock JH-Oxford.
3. Power Plant Engineering, P K Nag, Tata McGraw Hill Pvt. Ltd

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I Year – II Sem. (PPE & EM)

POWER PLANT INSTRUMENTATION (Professional Core - 6)

UNIT - I

Introduction, Fundamentals of generation of Electricity, its transmission and Distribution. Concept of regional and national power grid. Concept of distance protections and Island types of power plant, introduction and comparison of thermal Power plant, Hydro Electric Power Plant, Nuclear Power Plant, Solar Power Plant. Flow sheet of thermal power plant.

UNIT - II

Thermal Power Plant: Unit overview, air and fuel path, boiler instrumentation, Combustion control, air to fuel ratio control, 3-element drum level control, steam temperature and pressure control, oxygen/CO₂ in flue gases, furnace draft, boiler interlocks, Start-up and shut-down procedures Boiler load calculation, boiler efficiency calculation. Boiler safety standard.

UNIT - III

Non-Conventional Energy Sources: Concept of power generation from non-conventional sources of energy like wind power, Solar Power and Tidal waves. Photovoltaic cells, Hydrogen cells. Criterion for selection of Instrumentation system for wind and solar and tidal wave plant.

UNIT - IV

Hydro Power Plant: Overview on units, Types of water turbine. Regulation of speed and voltage. Surge tank level control.

Nuclear Power Plant: Overview on units, Concept of energy generated from atomic fission. Block diagram of an Atomic power station. Types of coolants. Control of chain reaction. Radio activity and safety measures. Layout of control rooms.

Criterion for selection of Instrumentation system / DCS system for nuclear and hydro power plant.

UNIT - V

Turbine Instrumentation and Control: Elements Of Control Systems Introduction, Importance – Classification – Open and closed systems Servomechanisms–Examples with block diagrams– Temperature, speed & position control systems, Hydraulically controlled speed governing and turbine steam inlet control valve actuation system. Condenser vacuum control- gland steam exhaust pressure control speed, vibration, shell temperature monitoring-lubricating oil temperature control hydrogen generator. Start-up and shut-down, thermal stress control, condition monitoring and power distribution instrumentation. Synchronous, Induction generators cooling system.

REFERENCES:

1. Handbook of Instrumentation and Control/H. Kallen/McGraw-Hill Education.
2. Power plant Engineering/F. Morse/Khanna Publishers.
3. Modern Power Plant Engineering/J. Balasubramaniam and R. Jain/Khanna Publishers.
4. O & M manuals of power plant/Bharat Heavy Electricals Ltd.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I Year – II Sem. (PPE&EM)

ENVIRONMENT AND SAFETY ENGINEERING (Professional Elective - 3)

UNIT- I

Pollution: Air Pollution Standards; Effects of Air Pollutants on Materials, Vegetation and Health Origin and Fate of Pollutants (Carbon monoxide, Hazardous Air Pollutants, Lead, Nitrogen Dioxide, Photochemical Oxidants, Sulphur Oxides, Particulates) Acid Rain, Ozone depletion & Greenhouse effect.

Waste Water Treatment: Waste water Microbiology, Characteristics of Waste Water, Municipal and Industrial waste water treatment, Unit operation of Pretreatment, Primary Treatment, Unit processes of Secondary treatment, disinfections, Land treatment, Sludge treatment and disposal.

UNIT- II

Solid Waste Management: Waste characteristics, Disposal by Sanitary landfill, thermal conversion; combustion or incineration system, Pyrolysis, Gasification, Pelletization. Waste to Energy, Resource conservation and recovery, Biological processing of Solid wastes.

Hazardous Wastes Management: Characteristics of Hazardous Waste, Management of Hazardous Waste; Chemical. Oxidation, vitrification, Hazardous wastes landfills, Radioactive waste; Detection and analysis, classification and disposal of Radioactive Wastes, Fly ash characteristics and disposal, Site remediation techniques.

UNIT - III

Effluents from power plants and Impact on environment – pollutants and pollution standards – Methods of Pollution control.

UNIT - IV

Industrial Safety: Accidents (Causes & Factors, Cost of Accidents, Accident Prevention, Investigation of Accidents, Reporting and Recording Systems for Accidents. First Aid (Basics of First Aid, How injuries are caused in lifting, falls etc.)

Fire Fighting: Fundamentals of Fire, Fire Fighting Equipments and Systems, Fire Extinguishing Methods, Demonstration of various Fire

UNIT - V

Industrial Hazards, Protective Clothing and Equipment, Safe Working Practices in Power Plant, Permit to work system, Safety in Movement and storage of Materials, House Keeping, Safety Rules.

REFERENCES:

1. Energy Management/Murphy WR, Mc Kay G/Butterworth Heinamn/2009
2. Environmental Engg: A Design Approach / Sincereo & Arcadio P/ PHI
3. Environmental Engineering: Water Supply, Sanitary Engineering and Pollution/ Kamala A Rao/TMH
4. Environmental Engineering/Dean J, Howard S/McGraw Hill/1985

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I Year – II Sem. (PPE & EM)

POWER PLANT PERFORMANCE MONITORING AND TESTING (Professional Elective - 3)

UNIT- I

Elementary Details In Numerical Techniques: Number system and errors, Representation of integers, Fractions, Floating point Arithmetic, loss of significance and error propagation, condition and instability, computational methods for error estimation, Convergence of Sequences.

Applied Numerical Methods: Solution of a system of simultaneous Linear Algebraic Equations, iterative schemes of Matrix Inversion, Direct Methods for Matrix inversion, Direct Methods for banded matrices.

UNIT – II

Finite Difference Applications in Heat conduction and Convection – Heat conduction, steady heat conduction in a rectangular geometry, transient heat conduction, finite difference application in convective heat transfer, closure.

UNIT – III

Finite Differences, Discretization, Consistency, Stability, and Fundamentals of Fluid Flow Modeling: Introduction, elementary finite difference quotients, implementation aspects of finite-difference equations, consistency, explicit and implicit methods. Introduction to first order wave equation, stability of hyperbolic and elliptic equations, fundamentals of fluid flow modeling, conservative property, the upwind scheme.

UNIT – IV

Review of Equations Governing Fluid Flow and Heat Transfer: Introduction, conservation of mass, Newton's second law of motion, expanded forms of Navier-stokes equations, conservation of energy principle, special forms of the Navier-stokes equations.

Steady flow, dimensionless form of Momentum and Energy equations, Stokes equation, conservative body force fields, stream function - Vorticity formulation.

UNIT –V

Finite Volume Method: Approximation of surface integrals, volume integrals, interpolation and differentiation practices, Upwind interpolation, Linear interpolation and Quadratic interpolation.

REFERENCES:

1. Numerical heat transfer and fluid flow / Suhas V. Patankar/Butter-worth Publishers
2. Computational fluid dynamics: Basics with applications /John. D. Anderson / McGraw Hill.
3. Computational Fluid Flow and Heat Transfer/ Niyogi/Pearson Publications
4. Fundamentals of Computational Fluid Dynamics /Tapan K. Sengupta / Universities Press

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I Year – II Sem. (PPE&EM)
POWER PLANT PROTECTION AND SWITCH GEAR (Professional Elective - 3)

UNIT - I

Protection System: Importance of protective relaying in power systems; Fundamental requirements of a good protection scheme; Zones of protection, Primary and Back-up Relaying.

Protective Relays: Terms used in protective relaying; Classifications of Relays – Constructional, Functional; Electromagnetic Relays – attracted armature, induction disc, induction cup types relays

UNIT - II

Over current and Earth fault relays, Directional, Differential, Distance Relays etc.; Principles & Characteristics of relays; Operation, setting, testing and applications, maintenance requirements of relays; Translay relay; Negative Sequence relays; Universal Relay Torque Equation; Electronic relays; Static relays; Digital relays; Microprocessor and PC based relaying; Current & Future trends.

UNIT - III

Switchgear Circuit Interruption : Fuses - Types of fuses, Terms (Fusing factor, Breaking capacity etc.), Fuse selection, HRC fuses and their applications; Arcing phenomena, Essential properties of arc, Initiation and Maintenance of an arc, Arc voltage, Arc interruption theories, Recovery and Restriking voltages, Rate of Rise of Restriking Voltage (RRRV), Resistance Switching, Inductive current chopping, Capacitive current breaking.

Circuit Breakers : AC and DC circuit breaking, Types of Circuit Breakers - ACB, OCB, ABCB, SF6CB, VCB; Static Circuit Breakers; Comparative merits and demerits of different types of CBs, Rating of Circuit Breakers, Testing and Selection of Circuit Breakers, Auto reclosing.

UNIT - IV**Power Plant Protection:**

Protection Schemes: Schemes for protection of transmission line; Merz-Price circulating current scheme, Percentage differential relay, Restricted earth fault protection, Negative Sequence protection, Translay scheme, Carrier relaying scheme, Pilot relaying scheme, Static and other relays used in transmission line protection.

Generator Protection :Neutral earthing, stator and rotor earth faults, sustained external faults, instability, protective systems.

Transformer Protection :Various transformer protections, protective systems for Generator Transformers (GTs), Unit Auxiliary Transformers (UATs) and Station Transformers (STs).

UNIT - V

Motor Protection: Faults and Protection systems.

Bus bar Protection: Continuity of supply, Discrimination, Circulating current systems, special features relating to different voltage systems.

Feeder Protection: Continuity of supply discrimination, outline of protection systems – Pilot wire, carrier current, distance protection, PLCC – Telemetry Communication.

REFERENCES:

1. The Electricity Council: Power System Protection/ Vol.1, 2 & 3/Peter Peregrinus Ltd./1990.
2. Protective Relays: Their Theory and Practice/ Vol. 1 & 2/ Van, A. R., & Warrington, C / Chapman and Hall, 1969.
3. Transmission Network Protection: Theory and Practice/ Paithankar, Y. G./ Marcel Dekker, Inc./1998.
4. Power System Protection and Switchgear/ B. Ravindranath and M. Chander/Wiley Eastern Ltd.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I Year – II Sem. (PPE&EM)

ENERGY STORAGE SYSTEMS (Professional Elective - 4)

UNIT - I

Mechanical: Compressed air energy storage (CAES), Fire less locomotive, Flywheel energy storage, Gravitational potential Energy (device), hydraulic accumulator, Pumped-storage, hydro electricity (pumped) hydroelectric storage, PHS, or Pumped storage hydropower, PSH.

UNIT - II

Electrical, Electromagnetic: Capacitor, Super Capacitor, Super Conducting magnetic energy storage (SMES), also super conducting storage coil.

UNIT - III

Biological: Glycogen, Starch.

Electrochemical (Battery Energy Storage Systems) : Flow battery Rechargeable battery, Ultra Battery.

UNIT - IV

Thermal: Brick storage heater Cryogenic energy storage, Liquid nitrogen Engine, Eutectic system, Ice storage air conditioning, Molten salt storage phase change Material, Seasonal thermal energy storage, Solar ponds, Steam accumulator, Thermal energy storage (general)

UNIT - V

Chemical: Biofuels, Hydrated salts, Hydrogen storage, Hydrogen peroxide, Power to gas, Vanadium pent oxide.

REFERENCES:

1. Energy storage Systems & Engineering Technologies-Prof. Anjaneyulu Yerramilli-BS Publications

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M. Tech – I Year – II Sem. (PPE & EM)

POLLUTION CONTROL AND ENVIRONMENT (Professional Elective - 4)

UNIT- I

Overview of Environmental Concepts: Global Warming - Ozone Layer & UV Radiations - Deforestation - Energy & Matter Cycles - Case Studies of Significant Environmental Problems and Disasters and the lessons learnt.

UNIT - II

Air Pollution: Natural and anthropogenic sources of pollution - Primary and Secondary pollutants - Transport and diffusion of pollutants - Gas laws governing the behavior of pollutants in the atmosphere - air sampling methods - Methods of monitoring and control of air pollutants SO₂, NO₂, CO, SPM - Effect of pollutants on human beings – Plants – Animals - Materials and on climate - Acid Rain - Ambient Air Quality Standards - Air pollution control methods and equipment.

UNIT - III

Land Pollution: Sources and classification of land pollutants - Industrial waste effluents and heavy metals - Their interactions with soil components - Degradation of different insecticides - fungicides and weedicides in soil - Solid waste management - Process and equipment for energy recovery from municipal solid waste and industrial waste - MSW Act 2000.

UNIT - IV

Water Pollution: Types - Sources and consequences of water pollution – Physical - chemical and Bacteriological sampling and analysis of water quality – Standards - Sewage and waste water treatment and recycling ASP/STP - Water quality standard – Treatment - Utilization and disposal of sludge - Government norms.

UNIT - V

Marine pollution: Sources and nature of pollutants - Oil pollution - Metallic pollutants - Status of coastal and estuarine pollution in India - Chemicals and drugs from oceans - Sea level rise – Cause - effect.

REFERENCES:

1. Environmental Pollution Control Engineering. C. S. Rao, Wiley Eastern Ltd. Delhi 1991.
2. Management of Energy Environment Systems W. K. Foell John Wiley and Sons.
3. Energy Management and Control Systems M. C. Macedo, Jr. John Wiley and Sons.
4. Environmental Impact Analysis Handbook J. G. Rau, D.C. Wood, McGraw Hill.
5. Energy & Environment – J.M. Fowler, McGraw Hill.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech – I Year – II Sem. (PPE&EM)

POWER DISTRIBUTION SYSTEMS (Professional Elective - 4)

UNIT - I

Distribution System Planning:

Load forecasting, Power Quality parameters, Choice of systems for different consumers, Planning Criteria, Standards, System layout.

UNIT - II

Distribution lines / cables:

Towers/Poles, Stay wires; Conductor - Types, Characteristics & selection; Underground Cables - Selection, laying, cable box and jointing; Earth wire; Insulators & hardware fittings; Distributors, Feeders, Services Mains (LV, MV, HV); Clearances; Pole-mounted sub-stations and its location; Earthing HT & LT poles/supports; Selection & fixing of control devices.

UNIT- III

Distribution Sub-Stations:

Types, General Arrangement, Layout, Bus-bar arrangements; Sub-station equipment – Construction details, selection and specification of equipment (distribution transformer, Circuit Breakers, etc.); Auxiliary Systems; Earthing of sub-station equipment; Basic operational aspects of equipments/systems.

UNIT- IV

Distribution Losses and Efficient Energy Management:

Classification, Causes and Calculation of power losses; Methods of reducing power losses and Anti-theft measures; Causes and cures for breakdowns, tripping and fluctuations in distribution system; System voltage drops and improvements; Distribution transformer failures – causes & remedies; Demand Side Management (DSM), HVDS, Energy efficiency monitoring and corrective measures.

UNIT-V

Meters & Metering:

Meters/Indicators – Types & Function; Metering system; Location of meters; Testing & Setting of meters/indicators; Latest development in metering technologies.

Cost Economics / Commercial Aspects:

Cost Engineering, Costing & Control, Estimation, Estimate for providing service (LT/HT) connections; Tariff structure & types, Rational & Competitive tariff, Energy Accounting, Energy Billing and Revenue realization.

REFERENCES:

1. Power Distribution Engineering: Fundamentals and Applications/ Burke James, J./ Marcel Dekker Inc./1996.
2. Power Distribution Planning Reference Book/ H. Lee Willis/ Marcel Dekker, Inc.
3. Electric Power Distribution Engineering/ Turan Gonen/McGraw Hill.
4. Modern Trends and Practices in Power Sub-Transmission and Distribution Systems/Volumes I & II, / N. K. Jangalwa/ Central Board of Irrigation and Power/ 1996.

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M. Tech – I Year – II Sem. (PPE&EM)

POWER PLANT SIMULATION LAB

Simulation of Following Power Plant Equipment / Processes using LAB VIEW / Flownex or any other flow network simulation software

1. Solar Energy Monitoring and Control
2. Wind Turbine condition monitoring
3. Thermal Energy Storage Systems
4. Gas Turbine Power generation process
5. Steam Turbine Power generation process
6. Environmental Pollution
7. Nuclear Power Plant Simulation.
8. Hydro Electric Power generation

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