ST course Proposal on

Distribution System, Pumped Hydro & Solar PV system Technology

For WBSEDCL Engineers

Topics and Content of Modules with Duration	
Distribution System: Components, Analysis and Operation **Module : I**	Duration/ Faculty
Topics: A. Components I(a) ➢ Line parameter (resistance, inductance and capacitance) calculation ➢ Overhead line insulators - types, string efficiency, tests ➢ Underground cables - construction, properties, types, dielectric loss, dielectric stress and grading, ➢ Gas Insulated Lines B. Analysis & Operation I(b) ➢ Load characteristics ➢ Distribution system load flow ➢ Loading limit, loss in distribution system ➢ Voltage regulation: tap changers, boosters, capacitors	**Module : I(a)- 3 hrs** **Module : I(b)-3 Hrs** **6 hrs** **DC**
Pumped Hydro Power Plants **Module : II**	Duration/ Faculty
Topics: ➢ Pumped Hydro Power Plants system ▪ Hydro Pumps and Turbines II(a) ▪ Hydro Generators II(b)	**Module : II(a)-2hrs-VRD** **Module : II(b)-2Hrs-DC**
Transformer **Module : III**	Duration/ Faculty
Topics: ➢ Testing of Transformer (Power Transformer up to 33 kV and Distribution Transformer)	**Module : III-2Hrs-SP**
Switchgears **Module : IV**	Duration/ Faculty
Topics: ➢ Fundamentals of Current Interruption ➢ The arc extinction mechanism and characteristics of quenching medium ➢ Circuit Breaker theory, types and testing ➢ Low, Medium and High voltage switchgears ➢ Brief discussion on BIS & IEC on switchgear specification. ➢ Environmental issues	**Module : IV(a)-2hrs** **Module : IV(b)-2Hrs** **4hrs** **SP**
Insulation Coordination and High Voltage Lab. **Module : V**	Duration/ Faculty
Topics: ➢ Insulation Coordination (V(a)) ➢ *High Voltage Laboratory (V(b))*	**Module : V(a)-2hrs** **Module : V(b)-1Hr** **3 hrs** **NKK**

Distribution System Protection and Lab **Module : VI**	Duration/ Faculty
Topics: ➢ Protection Overview – philosophy ➢ Numerical protection and comparative assessment ➢ Different Protection Schemes – a) Feeder Protection, Rural feeder protection i.e. protection of radial feeder with spur lines b) Transformer Protection c) Bus Protection d) Protection of Capacitor bank ➢ *Power System Protection lab* (VI (C))	**Module : VI(a)-2hrs** **Module : VI(b)-2Hrs** **Module : VI(c)- 1Hr** **5 hrs** **AKP**
Power Quality issues and Lab **Module : VII**	Duration/ Faculty
Topics: ➢ Grid interactive microgrid Lab and demonstration	**Module : VII(a)-2Hrs** **2 hrs** **SC**
Recent Advances **Module : VIII**	Duration/ Faculty
Topics: ➢ Indian Power System: Advances ➢ Short Term Power Market In India ➢ Power Trading ➢ Indian Electricity Markets: PXs ➢ Availability based tariff (ABT) Mechanism ➢ Deviation settlement Mechanism (DSM)	**Module : VIII(a)-2hrs** **Module : VIII(b)-2Hrs** **4 hrs** **PB**
Solar Photovoltaic Technologies **Module : IX**	Duration/ Faculty
Topics: ➢ Greening the Indian Power grid ➢ Renewable energy sources ➢ Integration issues ➢ Solar PV technology generations I, II, III ➢ Design and Management of Solar PV based system	**Module : IX (a)- 2 hrs** **PB** **Module : IX (b)-2 hrs** **JNR**
Renewable Systems Labs **Module : X**	Duration/ Faculty
➢ Hybrid Microgrid system Labs ➢ Solar simulator Lab	**2 Hr** **PB**
Total Lecture hours-30 Total Lab hours -6 Total Teaching hours- 36	

Faculty—

PB- Dr. Prabodh Bajpai, Electrical Engg. Dept. (Course Co-ordinator)

NKK- Prof. N.K. Kishore, Electrical Engg. Dept.

AKP- Prof. A.K. Pradhan, Electrical Engg. Dept.

DC-Prof. Dheeman Chatterjee, Electrical Engg. Dept

SC- Prof. Souvik Chattopadhyay, Electrical Engg. Dept

SP- Dr. Saurav Pramanik, Electrical Engg. Dept.

VRD- Prof. V.R. Desai, Civil Engg. Dept.

JNR- Visiting Professor, School of Energy Science & Engineering