Discipline:**ELECTRICAL ENGINEERING**	Semester :**3rd**	Name of the Teaching Faculty: PRATIK DAS
Subject: **RENEWABLE ENERGY POWER PLANTS**	No. of days/per week class allotted:**03**	Semester From date : **08.07.2026** To:- **05.11.2026** No of Weeks-17
	Course Outcome	1. Explain the construction and working principle of Solar PV and Concentrated Solar Power Plants. 2. Describe the components and working principles of large and small Wind Power Plants 3. Explain the construction and working principle of Micro-hydro Power Plants 4. Discuss the properties of solid, liquid and gaseous fuels for biomass power plants 5. Prepare layout for biomass-based Power Plants
Week	**Class Day**	**Theory Topics**
1ST	1ST	**Solar PV and Concentrated Solar Power Plants** 1.1 Solar Map of India: Global solar power radiation, Solar PV
	2ND	1.1 Solar Map of India: Global solar power radiation, Solar PV
	3RD	1.1 Solar Map of India: Global solar power radiation, Solar PV
2ND	1ST	1.2 Concentrated Solar Power (CSP) plants, construction and working of: Power Tower, Parabolic Trough, Parabolic Dish, Fresnel Reflectors
	2ND	1.2 Concentrated Solar Power (CSP) plants, construction and working of: Power Tower, Parabolic Trough, Parabolic Dish, Fresnel Reflectors
	3RD	1.2 Concentrated Solar Power (CSP) plants, construction and working of: Power Tower, Parabolic Trough, Parabolic Dish, Fresnel Reflectors
3RD	1ST	1.2 Concentrated Solar Power (CSP) plants, construction and working of: Power Tower, Parabolic Trough, Parabolic Dish, Fresnel Reflectors
	2ND	1.2 Concentrated Solar Power (CSP) plants, construction and working of: Power Tower, Parabolic Trough, Parabolic Dish, Fresnel Reflectors
	3RD	1.3 Solar Photovoltaic (PV) power plant: components layout, construction, working. Roof top solar PV power system
4TH	1ST	1.3 Solar Photovoltaic (PV) power plant: components layout, construction, working. Roof top solar PV power system
	2ND	1.3 Solar Photovoltaic (PV) power plant: components layout, construction, working. Roof top solar PV power system
	3RD	1.3 Solar Photovoltaic (PV) power plant: components layout, construction, working. Roof top solar PV power system
5TH	1ST	**Large Wind Power Plants** 2.1 Wind Map of India: Wind power density in watts per square meter Lift and drag principle; long path theory
	2ND	2.1 Wind Map of India: Wind power density in watts per square meter Lift and drag principle; long path theory
	3RD	2.1 Wind Map of India: Wind power density in watts per square meter Lift and drag principle; long path theory

6TH	1ST	2.2 Geared type wind power plants: components, layout and working. Direct drive type wind power plants: components, layout and working
	2ND	2.2 Geared type wind power plants: components, layout and working. Direct drive type wind power plants: components, layout and working
	3RD	2.2 Geared type wind power plants: components, layout and working. Direct drive type wind power plants: components, layout and working
7TH	1ST	2.3 Constant Speed Electric Generators: Squirrel Cage Induction Generators(SCIG)
	2ND	2.3 Constant Speed Electric Generators: Squirrel Cage Induction Generators(SCIG)
	3RD	2.4 Wound Rotor Induction Generator (WRIG); Variable Speed Electric Generators: Doubly-fed induction generator (DFIG), wound rotor synchronous generator (WRSG), permanent magnet synchronous generator (PMSG).
8TH	1ST	2.4 Wound Rotor Induction Generator (WRIG); Variable Speed Electric Generators: Doubly-fed induction generator (DFIG), wound rotor synchronous generator (WRSG), permanent magnet synchronous generator (PMSG).
	2ND	2.4 Wound Rotor Induction Generator (WRIG); Variable Speed Electric Generators: Doubly-fed induction generator (DFIG), wound rotor synchronous generator (WRSG), permanent magnet synchronous generator (PMSG).
	3RD	2.4 Wound Rotor Induction Generator (WRIG); Variable Speed Electric Generators: Doubly-fed induction generator (DFIG), wound rotor synchronous generator (WRSG), permanent magnet synchronous generator (PMSG).
9TH	1ST	**Small Wind Turbines** 3.1 Horizon axis small wind turbine: direct drive type, components and working Horizontal axis small wind turbine: geared type, components and working
	2ND	3.1 Horizon axis small wind turbine: direct drive type, components and working Horizontal axis small wind turbine: geared type, components and working
	3RD	3.1 Horizon axis small wind turbine: direct drive type, components and working Horizontal axis small wind turbine: geared type, components and working
10TH	1ST	3.2 Vertical axis small wind turbine: direct drive and geared, components and Working Types of towers and installation of small wind turbines on rooftops and open fields
	2ND	3.2 Vertical axis small wind turbine: direct drive and geared, components and Working Types of towers and installation of small wind turbines on rooftops and open fields
	3RD	3.2 Vertical axis small wind turbine: direct drive and geared, components and Working Types of towers and installation of small wind turbines on rooftops and open fields
11TH	1ST	3.2 Vertical axis small wind turbine: direct drive and geared, components and Working Types of towers and installation of small wind turbines on rooftops and open fields
	2ND	3.3 Electric generators used in small wind power plants

	3RD	3.3 Electric generators used in small wind power plants
12TH	1ST	**Biomass-based Power Plants** 4.1 Properties of solid fuel for biomass power plants: bagasse, wood chips, rice husk, municipal waste
	2ND	4.1 Properties of solid fuel for biomass power plants: bagasse, wood chips, rice husk, municipal waste
	3RD	4.1 Properties of solid fuel for biomass power plants: bagasse, wood chips, rice husk, municipal waste
13TH	1ST	4.2 Properties of liquid and gaseous fuel for bio mass power plants: Jatropha, biodiesel gobar gas
	2ND	4.2 Properties of liquid and gaseous fuel for bio mass power plants: Jatropha, biodiesel gobar gas
	3RD	4.2 Properties of liquid and gaseous fuel for bio mass power plants: Jatropha, biodiesel gobar gas
14TH	1ST	4.3 Layout of a Bio-chemical based (e.g. biogas) power plant:
	2ND	4.3 Layout of a Bio-chemical based (e.g. biogas) power plant:
	3RD	4.4 Layout of a Thermo-chemical based (e.g. Municipal waste) power plant
15TH	1ST	4.4 Layout of a Thermo-chemical based (e.g. Municipal waste) power plant
	2ND	4.5 Layout of a Agro-chemical based (e.g.bio-diesel) power plant
	3RD	4.5 Layout of a Agro-chemical based (e.g.bio-diesel) power plant
16TH	1ST	EXTRA CLASSES
	2ND	EXTRA CLASSES
	3RD	EXTRA CLASSES
17TH	1ST	EXTRA CLASSES
	2ND	DOUBT CLEARING CLASSES
	3RD	DOUBT CLEARING CLASSES

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Discipline:**ELECTRICAL ENGINEERING**	Semester :**3rd**	Name of the Teaching Faculty: **PRABHAT RASHMI MALLIK**
Subject: **DC MACHINES AND TRANSFORMERS**	No. of days/per week class allotted:**03**	Semester From date : **01.07.2026** To:- **05.11.2026** No. of weeks:18
	Course Outcome	1. Explain the construction and working principle of dc machines. 2. Describe the performance characteristics of dc motor and dc generator. 3. Explain the construction and working principle of transformer. 4. Describe the performance of single phase and three-phase transformer. 5.Discuss about special purpose transformers
Week	**Class Day**	**Theory Topics**
1ST	1ST	**UNIT I.DC GENERATOR** 1.1 D.C. generator: construction, parts, materials and their functions
	2ND	1.1 D.C. generator: construction, parts, materials and their functions
	3RD	1.2 Principle of operation of DC generator
2ND	1ST	1.2.1 Fleming's right hand rule
	2ND	1.2.2 Derive the emf equation of DC Generator
	3RD	1.2.3 Schematic diagrams of different types of DC generator
3RD	1ST	1.2.4 Armature reaction
	2ND	1.2.5 Commutation
	3RD	1.2.6 Applications of D.C. generators
4TH	1ST	**UNIT II.D.C. motor** 2.1 D.C. motor: Types of DC motors
	2ND	2.1.1 Fleming's left hand rule
	3RD	2.1.2 Principle of operation of Back e.m.f. and its significance
5TH	1ST	2.1.3 Voltage equation of DC motor
	2ND	2.1.4 Torque and Speed; Armature torque, Shaft torque, BHP, Brake test, losses,efficiency
	3RD	2.1.4 Torque and Speed; Armature torque, Shaft torque, BHP, Brake test, losses,efficiency
6TH	1ST	2.2 DC motor starters: Necessity, two point and three point starters
	2ND	2.3 Speed control of DC shunt and series motor: Flux and Armature control
	3RD	2.4 Brushless DC Motor: Construction and working
7TH	1ST	**UNIT III. SINGLE PHASE TRANSFORMERS** 3.1 Types of transformers: Shell type and core type
	2ND	3.2 Construction: Parts and functions

	3RD	3.3 Materials used for different parts: CRGO, CRNGO, HRGO, amorphous cores
8TH	1ST	3.4 Transformer: Principle of operation
	2ND	3.5 EMF equation of transformer: Derivation, Voltage transformation ratio
	3RD	3.6 Significance of transformer ratings
9TH	1ST	3.7 Transformer No-load and on-load phasor diagram, Leakage reactance
	2ND	3.8 Equivalent circuit of transformer: Equivalent resistance and reactance
	3RD	3.9 Voltage regulation and Efficiency: Direct loading, OC/SC method, All day efficiency
10TH	1ST	3.9 Voltage regulation and Efficiency: Direct loading, OC/SC method, All day efficiency
	2ND	**UNIT IV.THREE PHASE TRANSFORMERS** 4.1 Bank of three single phase transformers,(Y-Y,Δ-Δ ,Δ-Y, Y- Δ)
	3RD	4.2 Single unit of three phase transformer
11TH	1ST	4.3 Distribution and Power transformers: Construction and cooling
	2ND	4.4 Criteria for selection of distribution transformer, and power transformer.
	3RD	4.5 Need of parallel operation of three phase transformer
12TH	1ST	4.6 Conditions for parallel operation.
	2ND	4.7 Polarity tests on mutually inductive coils and single phase transformers
	3RD	4.8 Polarity test, Phasing out test on Three-phase transformer
13TH	1ST	4.8 Polarity test, Phasing out test on Three-phase transformer
	2ND	**UNIT V.SPECIAL PIRPOSE TRANSFORMERS** 5.1 Single phase and three phase autotransformers: Construction, working and applications.
	3RD	5.1 Single phase and three phase autotransformers: Construction, working and applications.
14TH	1ST	5.1 Single phase and three phase autotransformers: Construction, working and applications.
	2ND	5.1 Single phase and three phase autotransformers: Construction, working and applications.
	3RD	5.2 Isolation transformer: Constructional Features and applications
15TH	1ST	5.2 Isolation transformer: Constructional Features and applications
	2ND	5.2 Isolation transformer: Constructional Features and applications
	3RD	5.2 Isolation transformer: Constructional Features and applications
16TH	1ST	EXTRA CLASSES
	2ND	EXTRA CLASSES
	3RD	EXTRA CLASSES
17TH	1ST	PROBLEM SOLVING CLASSES
	2ND	PROBLEM SOLVING CLASSES
	3RD	PROBLEM SOLVING CLASSES
18TH	1ST	DOUBT CLEARING CLASSES
	2ND	DOUBT CLEARING CLASSES
	3RD	DOUBT CLEARING CLASSES

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Discipline:**ELECTRICAL ENGINEERING**	Semester :**3rd**	Name of the Teaching Faculty: **BISWANATH PRATAP SINGH**
Subject: **ELECTRICAL CIRCUITS**	No. of days/per week class allotted:**03**	Semester From date : **01.07.2026** To:- **05.11.2026** No. of weeks:18
	Course Outcome	1. Explain various characteristics of different single phase AC series, AC parallel circuits and terms related to three phase circuits 2.Solve problems using network reduction & principles of circuit analysis 3. Apply Network theorems in analyzing and solving electrical circuit problems 4. Explain the behavior of circuit in transient condition. 5.Describe two-port networks
Week	**Class Day**	**Theory Topics**
1ST	1ST	**UNIT I Single Phase A.C Series Circuits** 1.1 Generation of alternating voltage
	2ND	1.2 Phasor representation of sinusoidal quantities
	3RD	1.3 R, L, C circuit elements its voltage and current response 1.4 R-L, R-C, R-L-C combination of A.C series circuit
2ND	1ST	1.4.1 Impedance, reactance, impedance triangle 1.4.2 Power factor, active power, reactive power, apparent power
	2ND	1.4.3 Power triangle and vector diagram
	3RD	1.4.4 Resonance, Bandwidth
3RD	1ST	1.4.5 Quality factor and voltage magnification in series R-L, R-C, R-L-C circuit
	2ND	**UNIT II Single Phase A.C Parallel Circuits** 2.1 R-L, R-C and R-L-C parallel combination of A.C. circuits
	3RD	2.1 R-L, R-C and R-L-C parallel combination of A.C. circuits
4TH	1ST	2.1.1 Impedance, reactance, phasor diagram, impedance triangle
	2ND	2.1.2 Power factor, active power, apparent power, reactive power, power triangle
	3RD	2.2 Resonance in parallel R-L, R-C, R-L-C circuit
5TH	1ST	2.2 Resonance in parallel R-L, R-C, R-L-C circuit
	2ND	2.3 Bandwidth, Quality factor and voltage magnification
	3RD	2.3 Bandwidth, Quality factor and voltage magnification
6TH	1ST	**UNIT III Three Phase Circuits** 3.1 Phasor and complex representation of three phase supply

	2ND	3.2 Phase sequence and polarity
	3RD	3.3 Types of three-phase connections
7TH	1ST	3.4 Phase and line quantities in three phase star and delta system
	2ND	3.5 Balanced and unbalanced load
	3RD	3.6 Neutral shift in unbalanced load
8TH	1ST	3.7 Three phase power, active, reactive and apparent power in star and delta system
	2ND	3.7 Three phase power, active, reactive and apparent power in star and delta system
	3RD	**UNIT IV Network Reduction and Principles of Circuit Analysis** 4.1 Source transformation
9TH	1ST	4.2 Star/delta and delta/star transformation
	2ND	4.3 Mesh Analysis
	3RD	4.4 Node Analysis
10TH	1ST	4.4 Node Analysis
	2ND	**UNIT V Network Theorems** 5.1 Superposition theorem
	3RD	5.1 Superposition theorem
11TH	1ST	5.2 Thevenin's theorem
	2ND	5.2 Thevenin's theorem
	3RD	5.3 Norton's theorem
12TH	1ST	5.3 Norton's theorem
	2ND	5.4 Maximum power transfer theorem
	3RD	5.4 Maximum power transfer theorem
13TH	1ST	5.5 Reciprocity Theorem
	2ND	**UNIT VI Two Port Network** 6.1 Open Circuit Impedance Parameters
	3RD	6.2 Short Circuit Admittance Parameters, Transmission Parameters , Hybrid Parameters
14TH	1ST	6.2 Short Circuit Admittance Parameters, Transmission Parameters , Hybrid Parameters
	2ND	6.2 Short Circuit Admittance Parameters, Transmission Parameters , Hybrid Parameters

	3RD	6.3 Interrelationship of Two Port Network
15TH	1ST	6.3 Interrelationship of Two Port Network
	2ND	6.4 Inter Connection of Two Port Network
	3RD	6.4 Inter Connection of Two Port Network
16TH	1ST	EXTRA CLASS
	2ND	EXTRA CLASS
	3RD	EXTRA CLASS
17TH	1ST	DOUBT CLEARING CLASS
	2ND	DOUBT CLEARING CLASS
	3RD	DOUBT CLEARING CLASS
18TH	1ST	PROBLEM SOLVING CLASS
	2ND	PROBLEM SOLVING CLASS
	2ND	DOUBT CLEARING CLASS
	3RD	DOUBT CLEARING CLASS

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Discipline:ELECTRICAL ENGINEERING	Semester :3rd	Name of the Teaching Faculty: **PRABHAT RASHMI MALLIK**
Subject: **INTRODUCTION TO ELECTRIC GENERATION SYSTEMS**	No. of days/per week class allotted:**03**	Semester From date : **01.07.2026** To:- **05.11.2026** No. of weeks:18
	Course Outcome	1. Explain the optimized working of the thermal power plant 2. Describe the efficient operation of large hydropower plants. 3. Describe the efficient operation micro hydropower plants. 4. Select the adequate mix of power generation based on economic operation
Week	**Class Day**	**Theory Topics**
1ST	1ST	**UNIT I Thermal Power Plants: Coal, Gas/Diesel and Nuclear-based** 1.1 Layout and working of a typical thermal power plant with steam turbines and electric generators
	2ND	1.1 Layout and working of a typical thermal power plant with steam turbines and electric generators
	3RD	1.1 Layout and working of a typical thermal power plant with steam turbines and electric generators
2ND	1ST	1.2 Properties of conventional fuels used in the energy conversion equipment used in thermal power plants: Coal, Gas, Diesel, Nuclear fuels-fusion and fission action
	2ND	1.2 Properties of conventional fuels used in the energy conversion equipment used in thermal power plants: Coal, Gas, Diesel, Nuclear fuels-fusion and fission action
	3RD	1.2 Properties of conventional fuels used in the energy conversion equipment used in thermal power plants: Coal, Gas, Diesel, Nuclear fuels-fusion and fission action
3RD	1ST	1.2 Properties of conventional fuels used in the energy conversion equipment used in thermal power plants: Coal, Gas, Diesel, Nuclear fuels-fusion and fission action
	2ND	1.3 Safe Practices and working of various thermal power plants: coal based, gas- based, diesel-based, and nuclear-based
	3RD	1.3 Safe Practices and working of various thermal power plants: coal based, gas- based, diesel-based, and nuclear-based
4TH	1ST	1.3 Safe Practices and working of various thermal power plants: coal based, gas- based, diesel-based, and nuclear-based
	2ND	1.4 Functions of the following types of thermal power plants and their major auxiliaries 1.4.1 Coal fired boilers: fire tube and water tube
	3RD	1.4 Functions of the following types of thermal power plants and their major auxiliaries 1.4.1 Coal fired boilers: fire tube and water tube
5TH	1ST	1.4.2 Gas/diesel based combustion engines
	2ND	1.4.2 Gas/diesel based combustion engines
	3RD	1.4.3 Types of nuclear reactors :Disposal of nuclear waste and nuclear
6TH	1ST	1.4.3 Types of nuclear reactors :Disposal of nuclear waste and nuclear

	2ND	**UNIT II Large Hydropower Plants** 2.1 Energy conversion process of hydro power plant
	3RD	2.1 Energy conversion process of hydro power plant
7TH	1ST	2.2 Classification of hydro power plant: High ,medium and low head
	2ND	2.2 Classification of hydro power plant: High ,medium and low head power plant
	3RD	2.3 Construction and working of hydro turbines used in different types of hydro power plant 2.3.1High head-Pelton turbine
8TH	1ST	2.3.2Medium head-Francis turbine
	2ND	2.3.3Low head-Kaplan turbine
	3RD	2.4 Safe Practices for hydro power plants
9TH	1ST	2.5 Locations of these different types of large hydro power plants in India
	2ND	**UNIT III Micro-Hydropower Plants** 3.1 Lay out of micro hydro power plants
	3RD	3.1 Lay out of micro hydro power plants
10TH	1ST	3.2 Different types of micro-hydro turbines for different heads: 3.2.1 Pelton turbines
	2ND	3.2 Different types of micro-hydro turbines for different heads: 3.2.1 Pelton turbines
	3RD	3.2.2Francis turbines
11TH	1ST	3.2.2Francis turbines
	2ND	3.2.3Kaplan turbines
	3RD	3.3Locations of these different types of micro-hydro power plants in India
12TH	1ST	**UNIT IV Economics of Power Generation and Interconnected Power System** 4.1 Related terms: connected load, firm power, cold reserve, hot reserve, spinning reserve. Base load and peak load plants; Load curve, load duration curve, integrated duration curve
	2ND	4.1 Related terms: connected load, firm power, cold reserve, hot reserve, spinning reserve. Base load and peak load plants; Load curve, load duration curve, integrated duration curve
	3RD	4.1 Related terms: connected load, firm power, cold reserve, hot reserve, spinning reserve. Base load and peak load plants; Load curve, load duration curve, integrated duration curve
13TH	1ST	4.2 Cost of generation: Average demand, maximum demand, demand factor, plant capacity factor, plant use factor, diversity factor, load factor and plant load factor
	2ND	4.2 Cost of generation: Average demand, maximum demand, demand factor, plant capacity factor, plant use factor, diversity factor, load factor and plant load factor
	3RD	4.2 Cost of generation: Average demand, maximum demand, demand factor, plant capacity factor, plant use factor, diversity factor, load factor and plant load factor
14TH	1ST	4.3 Choice of size and number of generator units
	2ND	4.3 Choice of size and number of generator units
	3RD	4.4 Combined operation of power station Causes, Impact and

		reasons of Grid system fault: State grid, national grid, brownout and blackout; sample blackouts at national and international level.
15TH	1ST	4.4 Combined operation of power station Causes, Impact and reasons of Grid system fault: State grid, national grid, brownout and blackout; sample blackouts at national and international level.
	2ND	4.4 Combined operation of power station Causes, Impact and reasons of Grid system fault: State grid, national grid, brownout and blackout; sample blackouts at national and international level
	3RD	4.4 Combined operation of power station Causes, Impact and reasons of Grid system fault: State grid, national grid, brownout and blackout; sample blackouts at national and international level
16TH	1ST	EXTRA CLASS
	2ND	DOUBT CLEARING CLASSES
	3RD	EXTRA CLASS
17TH	1ST	DOUBT CLEARING CLASSES
	2ND	EXTRA CLASS
	3RD	DOUBT CLEARING CLASSES
18TH	1ST	EXTRA CLASS
	2ND	DOUBT CLEARING CLASSES
	3RD	EXTRA CLASS

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Discipline:**ELECTRICAL ENGINEERING**	Semester :**3rd**	Name of the Teaching Faculty: **BISWANATH PRATAP SINGH**
Subject: **ELECTRICAL& ELECTRONICS MEASUREMENT**	No. of days/per week class allotted:**03**	Semester From date : **01.07.2026** To:- **05.11.2026** No. of weeks:18
	Course Outcome	1.Explain the construction and working principle of different types of electrical measuring instruments. 2. Connect different types of electrical measuring instruments to measure various electrical parameters. 3. Select the right instruments for the measurement of voltage, current, power and energy. 4. Apply the appropriate technique to measure resistance, inductance and capacitance
Week	**Class Day**	**Theory Topics**
1ST	1ST	Fundamentals of Measurements
	2ND	Measurement: Significance, units, fundamental quantities and standards
	3RD	Classification of Instrument System
2ND	1ST	Null and deflection type instruments
	2ND	Absolute and secondary instruments
	3RD	Analog and digital instruments
3RD	1ST	Static and dynamic characteristics, types of errors
	2ND	Calibration: need and procedure
	3RD	Classification of measuring instruments: indicating, recording and integrating instruments
4TH	1ST	Essential requirements of an indicating instruments
	2ND	Classification of measuring instruments: indicating, recording and integrating instruments
	3RD	**Measurement of voltage and current**
5TH	1ST	DC Ammeter: Basic, Multi range, Universal shunt
	2ND	DC Voltmeter: Basic, Multi-range, concept of loading effect and sensitivity
	3RD	AC voltmeter: Rectifier type (half wave and full wave)
6TH	1ST	CT and PT: construction, working and applications
	2ND	**Measurement of Electric Power**
	3RD	Analog meters: Permanent magnet moving coil (PMMC) and Permanent magnet moving iron (PMMI) meter, their construction,

		working, salient features, merits and demerits
7TH	1ST	Dynamometer type wattmeter: Construction and working
	2ND	Errors and compensations of PMMI,PMMC and Dynamometer type wattmeter
	3RD	Active and reactive power measurement: One, two and three wattmeter method
8TH	1ST	Effect of Power factor on wattmeter reading in two wattmeter method
	2ND	Maximum Demand indicator(Definition only)
	3RD	Measurement of Electric Energy
9TH	1ST	Single and three phase electronic energy meter: Constructional features and working principle
	2ND	Errors and their compensations
	3RD	Calibration of single-phase electronic energy meter using direct loading
10TH	1ST	Circuit Parameter Measurement, CRO and Other Meters
	2ND	Measurement of resistance
	3RD	Low resistance: Kelvin's double bridge,
11TH	1ST	Medium Resistance: Voltmeter and ammeter method
	2ND	High resistance: Megger and Ohm meter: Series and shunt
	3RD	Measurement of inductance using Anderson bridge (no derivation and phasor diagram)
12TH	1ST	Measurement of capacitance using Schering bridge (no derivation and phasor diagram)
	2ND	Single beam/single trace CRO (Working principle and block diagram only)
	3RD	Digital storage Oscilloscope: Basic block diagram, working, Cathode ray tube, electrostatic deflection, vertical amplifier, time base generator, horizontal amplifier, measurement of voltage/ amplitude/ time period/ frequency/ phase angle delay line, specifications.
13TH	1ST	Other meters: Earth tester, Digital Multimeter; L-C-R meter, Frequency meter (ferromagnetic and Weston type), Phase sequence indicator, power factor meter (single phase and three phase dynamometer type), Synchro scope, Tri-vector meter
	2ND	Signal generator: need, working and basic block diagram.
	3RD	Other meters: Earth tester, Digital Multimeter; L-C-R meter, Frequency meter (ferromagnetic and Weston type), Phase sequence indicator, power factor meter (single phase and three phase dynamometer type), Synchro scope, Tri-vector meter
14TH	1ST	Digital storage Oscilloscope: Basic block diagram, working, Cathode ray tube, electrostatic deflection, vertical amplifier, time base generator, horizontal amplifier, measurement of voltage/ amplitude/ time period/ frequency/ phase angle delay line, specifications
	2ND	Analog meters: Permanent magnet moving coil (PMMC) and Permanent magnet moving iron (PMMI) meter, their construction,

		working, salient features, merits and demerits
	3RD	Classification of measuring instruments: indicating, recording and integrating instruments
15TH	1ST	Effect of Power factor on wattmeter reading in two wattmeter
	2ND	EXTRA CLASS
	3RD	DOUBT CLEARING CLASSES
16TH	1ST	EXTRA CLASS
	2ND	DOUBT CLEARING CLASSES
	3RD	EXTRA CLASS
17TH	1ST	DOUBT CLEARING CLASSES
	2ND	EXTRA CLASS
	3RD	DOUBT CLEARING CLASSES
18TH	1ST	EXTRA CLASS
	2ND	DOUBT CLEARING CLASSES
	3RD	EXTRA CLASS

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