Discipline:ELECTRICAL ENGINEERING	Semester :3rd	Name of the Teaching Faculty: BISWANATH PRATAP SINGH
Subject: **INTRODUCTION TO ELECTRIC GENERATION SYSTEMS**	No. of days/per week class allotted:**03**	Semester From date : **14.07.2025** To:- **15.11.2025** No. of weeks:18
Week	**Class Day**	**Theory Topics**
1ST	1ST	Layout and working of a typical thermal power plant with steam turbines and electric generators
	2ND	Layout and working of a typical thermal power plant with steam turbines and electric generators
	3RD	Layout and working of a typical thermal power plant with steam turbines and electric generators
2ND	1ST	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	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	Safe Practices and working of various thermal power plants: coalbased, gas- based, diesel-based, and nuclear-based
3RD	1ST	Safe Practices and working of various thermal power plants: coalbased, gas- based, diesel-based, and nuclear-based
	2ND	Functions of the following types of thermal power plants and their major auxiliaries
	3RD	Functions of the following types of thermal power plants and their major auxiliaries
4TH	1ST	Coal fired boilers: fire tube and water tube
	2ND	Gas/diesel based combustion engines
	3RD	Gas/diesel based combustion engines
5TH	1ST	Types of nuclear reactors :Disposal of nuclear waste and nuclear
	2ND	Types of nuclear reactors :Disposal of nuclear waste and nuclear s
	3RD	Gas/diesel based combustion engines
6TH	1ST	Coal fired boilers: fire tube and water tube
	2ND	**Large Hydropower Plants**
	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	High head-Pelton turbine
8TH	1ST	Medium head-Francis turbine

	2ND	Low head-Kaplan turbine
	3RD	Safe Practices for hydro power plants
9TH	1ST	Locations of these different types of large hydro power plants in India
	2ND	Locations of these different types of large hydro power plants in India
	3RD	**Micro-Hydropower Plants**
10TH	1ST	Lay out of micro hydro power plants
	2ND	Lay out of micro hydro power plants
	3RD	3.2 Different types of micro-hydro turbines for different heads: 3.2.1 Pelton turbines 3.2.2 Francis turbines 3.2.3 Kaplan turbines
11TH	1ST	Pelton turbines
	2ND	Francis turbines
	3RD	Kaplan turbines
12TH	1ST	Locations of these different types of micro-hydro power plants in India
	2ND	Locations of these different types of micro-hydro power plants in India
	3RD	**Economics of Power Generation and Interconnected Power System**
13TH	1ST	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	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	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	Cost of generation: Average demand, maximum demand, demand factor, plant capacity factor, plant use factor, diversity factor, load factor and plant load factor
	2ND	Choice of size and number of generator units
	3RD	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	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	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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Discipline: **ELECTRICAL ENGINEERING**	Semester :**3rd**	Name of the Teaching Faculty: PRATIK DAS
Subject: ELECTRICAL CIRCUIT	No. of days/per week class allotted:**03**	Semester From date : **09.09.2025** To:- **15.11.2025**
Week	**Class Day**	**Theory Topics**
1ST	1st	Generation of alternating voltage, Phasor representation of sinusoidal quantities
	2nd	R, L, C circuit elements its voltage and current response
	3rd	Impedance, reactance, impedance triangle of R-L, R-C, R-L-C combination of A.C series circuit
2ND	1st	Power factor, active power, reactive power, apparent power of R-L, R-C, R-L-C combination of A.C series circuit
	2nd	Power triangle ,vector diagram of R-L, R-C, R-L-C combination of A.C series circuit
	3rd	Resonance of R-L, R-C, R-L-C combination of A.C series circuit
3RD	1st	Bandwidth, Quality factor and voltage magnification in series R-L, R-C, R-L-C circuit
	2nd	Impedance, reactance, Phasor diagram, impedance triangle of R-L, R-C and R-L-C parallel combination of A.C. circuits
	3rd	Power factor, active power, apparent power, reactive power, power triangle of R-L, R-C and R-L-C parallel combination of A.C. circuits
4TH	1st	Resonance in parallel R-L, R-C, R-L-C circuit
	2nd	Bandwidth, Quality factor and voltage magnification in parallel R-L, R-C, R-L-C circuit
	3rd	Phasor and complex representation of three phase supply, Phase sequence and polarity
5TH	1st	Types of three-phase connections
	2nd	Phase and line quantities in three phase star and delta system
	3rd	Balanced and unbalanced load
6TH	1st	Neutral shift in unbalanced load
	2nd	Three phase power, active, reactive and apparent power in star and delta system
	3rd	Source transformation
7TH	1st	Star/delta and delta/star transformation
	2nd	Mesh Analysis
	3rd	Node Analysis
8TH	1st	Superposition theorem
	2nd	Thevenin's theorem
	3rd	Norton's theorem
9TH	1st	Maximum power transfer theorem
	2nd	Reciprocity Theorem
	3rd	Open Circuit Impedance Parameters
10TH	1st	Short Circuit Admittance Parameters, Transmission Parameters, Hybrid Parameters
	2nd	Interrelationship of Two Port Network
	3rd	Inter Connection of Two Port Network

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Discipline:ELECTRICAL ENGINEERING	Semester :3rd	Name of the Teaching Faculty: BISWANATH PRATAP SINGH
Subject: **ELECTRICAL& ELECTRONICS MEASURENT**	No. of days/per week class allotted:03	Semester From date : **14.07.2025** To:- **15.11.2025** No. of weeks:18
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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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 : 14.07.2025 To:- 15.11.2025 No. of weeks:18
Week	**Class Day**	**Theory Topics**
1ST	1ST	**1.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	**2.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	**3. 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	**4.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	**5. 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 AND PRABHAT RASHMI MALLIK
Subject: **RENEWABLE ENERGY POWER PLANTS**	No. of days/per week class allotted:03	Semester From date : **14.07.2025** To:- **15.11.2025** No of Weeks-18
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
18TH	1ST	DOUBT CLEARING CLASSES
	2ND	DOUBT CLEARING CLASSES
	3RD	DOUBT CLEARING CLASSES

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