Discipline- Electrical Engg.	Semester-6th	Name of the teaching faculty- Swarnaprabha panigrahi
Subject- Control System	No of days/week class allotted-5	No of weeks-15
Week	Class day	Theory topic
1	1st	**FUNDAMENTAL OF CONTROL SYSTEM -** Classification of Control system
	2nd	Open loop system & Closed loop system and its comparison
	3rd	Effects of Feed back
	4th	Standard test Signals(Step, Ramp, Parabolic, Impulse Functions)
	5th	Servomechanism
2	1st	**MATHEMATICAL MODEL OF A SYSTEM -** Transfer Function & Impulse response
	2nd	Properties, Advantages & Disadvantages of Transfer Function
	3rd	Poles & Zeroes of transfer Function
	4th	Simple problems of transfer function of network
	5th	Mathematical modelling of Electrical Systems(R, L, C, Analogous systems)
3	1st	**CONTROL SYSTEM COMPONENTS -** Components of Control System
	2nd	Gyroscope, Synchros, Tachometer
	3rd	DC servomotors, Ac Servomotors
	4th	Doubt Clearing
	5th	Transfer function Solve
4	1st	**BLOCK DIAGRAM ALGEBRA & SIGNAL FLOW GRAPHS -** Definition: Basic Elements of Block Diagram
	2nd	Canonical Form of Closed loop Systems
	3rd	Rules for Block diagram reduction
	4th	Practice block diagram reduction problems
	5th	Procedure for of Reduction of Block Diagram
5	1st	Simple Problem for equivalent transfer function
	2nd	Sensitivity Analysis
	3rd	Basic Definition in Signal Flow Graph & properties
	4th	Construction of Signal Flow graph from Block diagram
	5th	Mason‘s Gain formula
6	1st	Simple problems in Signal flow graph for network

	2nd	Problem practice on mason's gain formula
	3rd	**TIME RESPONSE ANALYSIS** Time response of control system.
	4th	Standard Test signal. Step signal
	5th	Ramp Signal, Parabolic signal
7	1st	Impulse Signal
	2nd	Time Response of first order system
	3rd	Unit step response
	4th	Unit impulse response
	5th	Time response of second order system to the unit step input
8	1st	Time response specification, Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error
	2nd	Steady state error and error constants. Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system]
	3rd	Effect of adding poles and zero to transfer function
	4th	Response with P, PI, PD and PID controller
	5th	Numerical solving
9	1st	**ANALYSIS OF STABILITY BY ROOT LOCUS TECHNIQUE**
	2nd	Relative and absolute stability
	3rd	Root locus concept
	4th	Procedure to draw root locus diagram
	5th	Construction of root loci
10	1st	Breakeven point, centroid and asymtote
	2nd	Effect of adding poles and zeros to G(s) and H(s
	3rd	Stability analysis using root locus diagram
	4th	Angle of arrival and departure calculation
	5th	Gain margin and phase margin calculation using root locus
11	1st	Numerical solving
	2nd	**Doubt clearing**
	3rd	**FREQUENCY RESPONSE ANALYSIS -** Correlation between time response and frequency response
	4th	Polar plots
	5th	Polar plots

12	1st	Bode plots
	2nd	Bode plots
	3rd	Bode plots
	4th	All pass and minimum phase system
	5th	Computation of Gain margin and phase margin
13	1st	Computation of Gain margin and phase margin
	2nd	Computation of Gain margin and phase margin
	3rd	Numerical practice
	4th	Log magnitude versus phase plot
	5th	**NYQUIST PLOT -** Principle of argument
14	1st	Principle of argument
	2nd	Nyquist stability criterion
	3rd	Nyquist stability criterion
	4th	Niquist stability criterion applied to inverse polar plot
	5th	Effect of addition of poles and zeros to G(S) H(S) on the shape of Niquist plot
15	1st	Assessment of relative stability
	2nd	Constant M and N circle
	3rd	Nicholas chart
	4th	Numerical Solving
	5th	Doubt clearing

Discipline- Electrical Engg.	Semester-6th	Name of the teaching faculty- Sidharth Sankar Sahu
Subject- EIE	No of days/week class allotted-5	No of weeks-15
Week	Class day	Theory topic
1	1st	**INDIAN ELECTRICITY RULES -** Definitions, Ampere, Apparatus, Accessible, Bare, cable, circuit, circuit breaker, conductor voltage (low, medium, high, EH)
	2nd	live, dead, cut-out, conduit, system, danger, Installation, earthing system, span, volt, switch gear, etc
	3rd	General safety precautions, rule 29, 30, 31, 32, 33, 34, 35
	4th	General safety precautions 36, 40, 41, 43, 44, 45, 46
	5th	General conditions relating to supply and use of energy : rule 47, 48, 49, 50, 51
2	1st	General conditions relating to supply and use of energy : rule 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 70
	2nd	OH lines : Rule 74, 75, 76, 77, 78, 79, 80, 86, 87, 88, 89, 90, 91
	3rd	**ELECTRICAL INSTALLATIONS -** Electrical installations, domestics, industrial, Wiring System
	4th	Internal distribution of Electrical Energy. Methods of wiring
	5th	systems of wiring, wire and cable, conductor materials used in cables, insulating
3	1st	Materials mechanical protection. Types of cables used in internal wiring
	2nd	multi-stranded cables, voltage grinding of cables, general specifications of cables
	3rd	ACCESSORIES: Main switch and distribution boards, conduits, conduit accessories and fittings
	4th	Lighting accessories and fittings, fuses, important definitions, determination of size of fuse – wire, fuse units.
	5th	Earthing conductor, earthing, IS specifications regarding earthing of electrical installations
4	1st	Points to be earthed. Determination of size of earth wire and earth plate for domestic and industrial installations. Material required for GI pipe earthing.
	2nd	Points to be earthed. Determination of size of earth wire and earth plate for domestic and industrial installations. Material required for GI pipe earthing.
	3rd	LIGHTING SCHEME: Aspects of good lighting services
	4th	Types of lighting schemes, design of lighting schemes, factory lighting
	5th	public lighting installations, street lighting, general rules for wiring

5	1st	Determination of number of points (light, fan, socket, outlets), determination of total load, determination of Number of sub circuits.
	2nd	Determination of number of points (light, fan, socket, outlets), determination of total load, determination of Number of sub circuits
	3rd	**INTERNAL WIRING -** Type of internal wiring, cleat wiring, CTS wiring
	4th	wooden casing capping, metal sheathed wiring, conduit wiring
	5th	Advantage and disadvantages comparison and applications
6	1st	Prepare one estimate of materials required for CTS wiring for small domestic installation of one room and one verandah within 25 m2 with given light, fan & plug points
	2nd	Prepare one estimate of materials required for CTS wiring for small domestic installation of one room and one verandah within 25 m2 with given light, fan & plug points
	3rd	Prepare one estimate of materials required for CTS wiring for small domestic installation of one room and one verandah within 25 m2 with given light, fan & plug points
	4th	Prepare one estimate of materials required for conduit wiring for small domestic installation of one room and one verandha within 25 m2 with given light, fan & plug points
	5th	Prepare one estimate of materials required for conduit wiring for small domestic installation of one room and one verandha within 25 m2 with given light, fan & plug points
7	1st	Prepare one estimate of materials required for conduit wiring for small domestic installation of one room and one verandha within 25 m2 with given light, fan & plug points
	2nd	Prepare one estimate of materials required for concealed wiring for domestic installation of two rooms and one latrine
	3rd	bath, kitchen & verandah within 80m2 with given light, fan & plug points
	4th	Prepare one estimate of materials required for erection of conduct wiring to a small workshop installation about 30m2 and load within 10 KW
	5th	Prepare one estimate of materials required for erection of conduct wiring to a small workshop installation about 30m2 and load within 10 KW
8	1st	Doubt Clearing
	2nd	Class test
	3rd	**OVER HEAD INSTALLATION -** Main components of overhead lines, line supports, factors Governing Height of pole, conductor materials

	4th	determination of size of conductor for overhead transmission line, cross arms
	5th	pole brackets and clamps, guys and stays, conductors configurations, spacing
9	1st	clearances, span lengths, overhead line insulators, types of insulators, lighting arresters
	2nd	danger plates, anti-climbing devices, bird guards, beads of jumpers, jumpers, tee-offs, guarding of overhead lines
	3rd	Prepare an estimate of materials required for LT distribution line within load of 100 KW maximum and standard spans involving calculation of the size of conductor (from conductor chart
	4th	current carrying capacity and voltage regulation Electrical Page 5 of 28 consideration using ACSR
	5th	Prepare an estimate of materials required for LT distribution line within load of 100 KW maximum
10	1st	standard spans involving calculation of the size of conductor (from conductor chart)
	2nd	current carrying capacity and voltage regulation consideration using ACSR
	3rd	4.Prepare an estimate of materials required for HT distribution line (11 KV) within 2 km and load of 2000 KVA maximum and standard spans involving calculation of the size of conductor (from conductor chart)
	4th	4.Prepare an estimate of materials required for HT distribution line (11 KV) within 2 km and load of 2000 KVA maximum and standard spans involving calculation of the size of conductor (from conductor chart)
	5th	current carrying capacity and voltage regulation of the size of conductor (from conductor chart)
11	1st	current carrying capacity and voltage regulation consider action using ACSR
	2nd	**Doubt clearance**
	3rd	**OVER HEAD SERVICE LINES -** Components of service lines, service line (cables and conductors), bearer wire, lacing rod
	4th	Components of service lines, service line (cables and conductors), bearer wire, lacing rod
	5th	Ariel fuse, service support, energy box and meters etc
12	1st	Prepare and estimate for providing single phase supply of load of 5 KW (light, fan, socket) to a single stored residential building
	2nd	Prepare and estimate for providing single phase supply of load of 5 KW (light, fan, socket) to a single stored residential building
	3rd	Prepare and estimate for providing single phase supply of load of 5 KW (light, fan, socket) to a single stored residential building

	4th	Prepare and estimate for providing single phase supply load of 3KW to each floor of a double stored building having separate energy meter
	5th	Prepare and estimate for providing single phase supply load of 3KW to each floor of a double stored building having separate energy meter
13	1st	Prepare and estimate for providing single phase supply load of 3KW to each floor of a double stored building having separate energy meter
	2nd	Prepare one estimate of materials required for service connection to a factory building with load within 15 KW using insulated wire
	3rd	Prepare one estimate of materials required for service connection to a factory building with load within 15 KW using insulated wire
	4th	Prepare one estimate of materials required for service connection to a factory building with load within 15 KW using insulated wire
	5th	Prepare one estimate of materials required for service connection to a factory building with load within 15 KW using bare conductor and insulated wire combined
14	1st	Prepare one estimate of materials required for service connection to a factory building with load within 15 KW using bare conductor and insulated wire combined
	2nd	Prepare one estimate of materials required for service connection to a factory building with load within 15 KW using bare conductor and insulated wire combined
	3rd	**ESTIMATING FOR DISTRIBUTION SUBSTATIONS -** Prepare one materials estimate for following types of transformer substations
	4th	Pole mounted substation
	5th	Pole mounted substation
15	1st	Pole mounted substation
	2nd	Plinth Mounted substation
	3rd	Plinth Mounted substation
	4th	Plinth Mounted substation
	5th	Doubt Clearnce

Discipline- Electrical Engg.	Semester-6th	Name of the teaching faculty- SWARNAPRABHA PANIGRAHI
Subject- RES	No of days/week class allotted-5	No of weeks-15
Week	Class day	Theory topic
1	1st	**Introduction to Renewable energy:** Environmental consequences of fossil fuel use
	2nd	Environmental consequences of fossil fuel use
	3rd	Importance of renewable sources of energy
	4th	Importance of renewable sources of energy
	5th	Sustainable Design and development
2	1st	Sustainable Design and development
	2nd	Types of RE sources
	3rd	Types of RE sources
	4th	Limitations of RE sources
	5th	Limitations of RE sources
3	1st	Present Indian and international energy scenario of conventional and RE sources
	2nd	Present Indian and international energy scenario of conventional and RE sources
	3rd	**Solar Energy -** Solar photovoltaic system-Operating principle
	4th	Solar photovoltaic system-Operating principle
	5th	Photovoltaic cell concepts
4	1st	Photovoltaic cell concepts
	2nd	Cell, module, array, Series and parallel connections. Maximum power point tracking (MPPT)
	3rd	Classification of energy Sources
	4th	Classification of energy Sources
	5th	Extra-terrestrial and terrestrial Radiation
5	1st	Extra-terrestrial and terrestrial Radiation
	2nd	Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant
	3rd	Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant
	4th	Solar collectors, Types and performance characteristics
	5th	Solar collectors, Types and performance characteristics

6	1st	Applications: Photovoltaic - battery charger, domestic lighting, street lighting, water pumping, solar cooker, Solar Pond
	2nd	Applications: Photovoltaic - battery charger, domestic lighting, street lighting, water pumping, solar cooker, Solar Pond
	3rd	**Wind Energy:** Introduction to Wind energy.
	4th	Introduction to Wind energy.
	5th	Introduction to Wind energy.
7	1st	Wind energy conversion
	2nd	Wind energy conversion
	3rd	Types of wind turbines
	4th	Types of wind turbines
	5th	Aerodynamics of wind rotors
8	1st	Aerodynamics of wind rotors
	2nd	Wind turbine control systems; conversion to electrical power
	3rd	Induction and synchronous generators.
	4th	Grid connected and self excited induction generator operation
	5th	Constant voltage and constant frequency generation with power electronic control
9	1st	Single and double output systems
	2nd	Characteristics of wind power plant
	3rd	Characteristics of wind power plant
	4th	**Biomass Power -** Energy from Biomass
	5th	Energy from Biomass
10	1st	Biomass as Renewable Energy Source
	2nd	Biomass as Renewable Energy Source
	3rd	Biomass as Renewable Energy Source
	4th	Types of Biomass Fuels - Solid, Liquid and Gas
	5th	Types of Biomass Fuels - Solid, Liquid and Gas
11	1st	Combustion and fermentation.
	2nd	Combustion and fermentation.
	3rd	Anaerobic digestion.

	4th	Anaerobic digestion.
	5th	Types of biogas digester
12	1st	Doubt clearing
	2nd	Class test
	3rd	**Other Energy Sources**
	4th	Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems
	5th	Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems
13	1st	Ocean Thermal Energy Conversion (OTEC)
	2nd	Ocean Thermal Energy Conversion (OTEC)
	3rd	Ocean Thermal Energy Conversion (OTEC)
	4th	Geothermal Energy – Classification
	5th	Geothermal Energy – Classification
14	1st	Hybrid Energy Systems
	2nd	Hybrid Energy Systems
	3rd	Doubt Clearing
	4th	Class test
	5th	Need for Hybrid Systems
15	1st	Need for Hybrid Systems
	2nd	Diesel-PV, Wind-PV, Micro hydel-PV
	3rd	Electric and hybrid electric vehicles
	4th	Doubt clearing
	5th	

Discipline- Electrical Engg.	Semester-6th	Name of the teaching faculty- Ashirbad Behera
Subject- SGPD	No of days/week class allotted-5	Semester from- 19/04/2021 to date- 13/08/2021 No of weeks-15
Week	Class day	Theory topic
1	1st	**Introduction to switchgear**, Essential feature
	2nd	Switchgear equipment (Air switch, oil switch, isolator, CB)
	3rd	Different types of busbar arrangements (Single busbar, Duplicate busbar)
	4th	Layout diagram and advantages of busbar arrangements
	5th	Switchgear Accommodation (Outdoor type and indoor type)
2	1st	Short circuit (cause and effect of short circuit)
	2nd	Fault on Power system
	3rd	**Symmetrical Fault calculation**
	4th	Symmetrical fault on three phase system and limitations of faults
	5th	Percentage reactance
3	1st	Percentage reactance and Base KVA/MVA
	2nd	Formula and problem solving on %X and base KVA
	3rd	Short Circuit KVA
	4th	Reactor control of short circuit
	5th	Location of reactor (Generator reactor, feeder reactor, busbar reactor)
4	1st	Symmetrical fault calculation procedure, Draw the reactance diagram
	2nd	Solve problem on symmetrical fault calculation
	3rd	**Fuses** Desirable characteristics of fuse elements
	4th	Fuse element materials, Important terms related to fuse (Current rating, fusing current, fusing factor, prospective current, cut off current)
	5th	Types of fuse - low voltage fuse (semi enclosed rewireable, HRC cartridge type, HRC trip type)
5	1st	High voltage fuse (cartridge type and liquid type)
	2nd	Difference between fuse and circuit breaker and solve numerical on fuse
	3rd	**Circuit Breaker**Definition and principal of CB

	4th	Arc phenomenon and Principle of arc extinction (splitting the arc, lengthening the arc)
	5th	The high resistance method and low resistance method
6	1st	Important terms – Arc voltage, restricting voltage, recovery voltage
	2nd	Classification of circuit breaker
	3rd	Air blast circuit breaker (Axial blast type and redial blast type)
	4th	Oil circuit breaker (Bulk oil circuit breaker)
	5th	Minimum oil circuit breaker
7	1st	Maintenance of oil circuit breaker
	2nd	Sulphur Hexafluoride Circuit Breaker
	3rd	Properties of SF6
	4th	Vacuum Circuit breaker
	5th	Vacuum Circuit breaker Continue
8	1st	Switchgear Components – Bushing, Circuit breaker contact (Tulip contact, Wedge contact, Butt contact)
	2nd	Instrument Transformer (CT and PT), Busbar and conductor
	3rd	Problem of circuit interruption (RRRV, Current copping)
	4th	Problem of circuit interruption (capacitive current braking) and Resistance switching
	5th	Circuit Breaker rating and Doubt Clearance
9	1st	**Protective Relays** Definition of Protective relay
	2nd	Fundamental requirements of Protective relay
	3rd	Basic Relay operation - Electromagnetic Attraction type (Armature type, Balanced beam type)
	4th	Induction type relay (Shaded pole, wattmeter type and Induction cup type)
	5th	Important Terms (Pick up current, Current setting, PSM and TSM)
10	1st	Relay Timing (Instantaneous, Inverse time, Definite time relay)
	2nd	Classification of functional relays – Over current relay, reverse power relay
	3rd	Distance relay, Directional relay
	4th	Differential relay – Current differential and voltage differential relay
	5th	Types of Protection
11	1st	Numerical on PSM, TSM
	2nd	**Protection Of electrical power equipment and lines**

	3rd	Protection of alternator –Failure of prime mover, over current, over voltage, Stator winding fault
	4th	Failure of field, overspeed and unbalancing loading
	5th	Differential and modified differential protection of alternator
12	1st	Balanced earth fault protection
	2nd	Protection of transformer against open circuit, overheat, winding short circuit
	3rd	Buchholz relay and earth fault protection of transformer
	4th	Protection of busbar – Differential protection and fault bus protection
	5th	Merz price protection
13	1st	Explain protection of feeder by overcurrent and earth fault relay
	2nd	**Protection against overvoltage –** Voltage surge and cause of overvoltage
	3rd	Internal cause of overvoltage Switching surge, Arcing ground
	4th	Insulation failure and resonance
	5th	External cause of overvoltage – lightning
14	1st	Mechanism of lightning discharge and types of lightning stroke – direct and indirect
	2nd	Harmful effects of lightning and protection against lightning
	3rd	Earthing screen, Overhead ground wire and surge diverter
	4th	Lightning arresters – Rod gap, horn gap and valve type arresters
	5th	Surge absorber
15	1st	Doubt clearance
	2nd	**Static Relay**
	3rd	Advantages of static relay and Instantaneous overcurrent relay
	4th	Principle of IDMT relay
	5th	

Discipline- Electrical Engg.	Semester-4th	Name of the teaching facualty- SwarnaprabhaPanigrahi
Subject- Ec-I	No of days/week class allotted-5	No of weeks-15
Week	Class day	Theory topic
1	1st	**DC GENERATOR - Introduction, operating principle of generator**
	2nd	Constructional features of DC machine- yoke,pole and field winding
	3rd	Construction- armature, commutator, armature winding- back pitch, front pitch , resultant pitch, commutator pitch
	4th	Simple lap winding
	5th	Simple wave winding, dummy coil
2	1st	Different types of DC machine
	2nd	Derivation of EMF equation of DC generator (solve problem)
	3rd	Losses and efficiency of DC generator Condition of maximum efficiency (solve problem)
	4th	Armature reaction in DC machine
	5th	Commutation
3	1st	Methods of improving commutation Role of interpole and compensating winding
	2nd	Characteristics of DC generator
	3rd	Application of different types of DC generator Solve numerical
	4th	Concept of critical resistance and critical speed of DC shunt generator
	5th	Conditions of build up of EMF of DC generator
4	1st	Parallel operation of DC generator
	2nd	Parallel operation of DC generator, uses of DC generator
	3rd	Brief discussion aboutDC generator, solve numerical
	4th	Discussion on previous year questions on DC generator
	5th	Doubt clearance
5	1st	**DC MOTOR -Introduction**
	2nd	Basic working principle of DC motor

	3rd	Back EMF and it's significance
	4th	Types of DC motor and it's voltage equation (solve numerical)
	5th	Condition for maximum power output of a DC motor (solve numerical)
6	1st	Derive torque equation (solve numerical)
	2nd	Characteristics of shunt, series and compound DC motor and their application
	3rd	Starting method of shunt,series and compound motor
	4th	Speed control of DC shunt motor by flux control method (solve numerical)
	5th	Speed control of DC shunt motor by armature voltage control method (solve numerical)
7	1st	Speed control of DC series motor by field flux control method, tapped field method and series parallel method
	2nd	Determination of efficiency of DC machine by brake test method (solve numerical)
	3rd	Determination of efficiency of DC machine by swinburne's test method (solve numerical)
	4th	Brake test and swinburne's test
	5th	Losses, efficiency and power stages of DC motor
86	1st	Solve numerical
	2nd	Uses of DC motor, DC motor and DC generator
	3rd	Doubt clearance
	4th	**SINGLE PHASE TRANSFORMER- Introduction**
	5th	Working principle of transformer
9	1st	Constructional features of transformer Arrangements of core and winding in different types of transformer
	2nd	Brief idea about transformer accessories-Conservator,tank ,breather, explosion vent,etc
	3rd	Types of cooling method
	4th	Procedure for care and maintenance
	5th	EMF equation of transformer
10	1st	Ideal transformer, voltage transformation ratio
	2nd	Operation of transformer at no load with phasor diagram
	3rd	Operation of transformer on load with phasor diagram
	4th	Equivalent resistance, leakage reactance and impedance of transformer
	5th	Phasor diagram of transformer on load with winding resistance,leakage reactance with unity,lagging, leading pf

11	1st	Explain equivalent circuit (solve numericals)
	2nd	Approximate and exact voltage drop calculation of a transformer
	3rd	Regulation of transformer(solve numerical)
	4th	Losses in a transformer(solve numerical)
	5th	Open circuit test and short circuit test (solve numerical)
12	1st	Efficiency, efficiency at different loadc & pf, condition for maximum efficiency
	2nd	All day efficiency (solve numericals)
	3rd	Determination of load corresponding to maximum efficiency
	4th	Parallel operation
	5th	Solve numerical
13	1st	Previous year questions solving
	2nd	Doubt clearance
	3rd	Class test
	4th	**Auto Transformer- Introduction**
	5th	Constructional features of auto-transformer
14	1st	Working pricipel
	2nd	Uses
	3rd	Comparison of auto transformer with two winding transformer
	4th	Saving of copper in auto transformer
	5th	Tap changer with transformer(on load and off load condition)
15	1st	**Instrument Transformers- Introduction**
	2nd	CT & PT
	3rd	Ratio error, phase angle error, burden
	4th	Uses of CT & PT
	5th	Previous year question paper discussion

Discipline- Electrical Engg.	Semester-4th	Name of the teaching faculty- Sidharth Sankar Sahu
Subject- ED	No of days/week class allotted-4	No of weeks-15
Week	Class day(3P/day)	Theory topic
1	1st 2nd	**WIRING DIAGRAM AND CONTROL CIRCUIT -** 3 point D. C. motor starter 4 point D.C. motor starter
2	1st	DOL starter
	2nd	Star delta starter
3	1st	Auto Transformer Starter
	2nd	Rotor resistance starter
4	1st	**DRAW D.C. M/C PARTS (Dimensional Drawing) -** Pole with pole shoes
	2nd	Commutator
5	1st	Armature
	2nd	Simple lap winding
6	1st	Simple lap winding
	2nd	Simple wave winding
7	1st	**DRAW 1-PHASE & 3-PHASE TRANSFORMER (Assembly Drawing) -** Stepped core type
	2nd	Stepped core type
8	1st	Plane shell type
	2nd	Plane shell type
9	1st	**DRAW SKETCHES OF THE FOLLOWING AS PER B.I.S AND REC SPECIFICATIONS -** Earthing installation
	2nd	Earthing installation
10	1st	Earthing installation
	2nd	Double pole structure for LT and HT distribution lines
11	1st	Double pole structure for LT and HT distribution lines
	2nd	Double pole structure for LT and HT distribution lines
12	1st	**DRAW SINGLE LINE DIAGRAM OF SUBSTATION -** Single line diagram of 33/11kV distribution substation
	2nd	Single line diagram of 33/11kV distribution substation
13	1st	Single line diagram of a 11/0.4 kV distribution substation
	2nd	Single line diagram of a 11/0.4 kV distribution substation

14	1st	**COMPUTER AIDED ELECTRICAL DRAWING USING SOFT WARE -** Draw Electrical symbols (take Print out)
	2nd	Draw D.C. m/c parts (take print out)
15	1st	Draw A. C. m/c parts (take print out)
	2nd	Draw electrical layout of diagram of Electrical Installation of a building

Discipline- Electrical Engg.	Semester-4th	Name of the teaching facualty- SwarnaprabhaPanigrahi
Subject- Electrical Machine Lab-I	No of days/week class allotted-6	Semester from- 9/12/2019 to date- 31/03/2020 No of weeks-15
Week	Class day	Practical topic
1	1st	Identification of different terminal of a dc machine by test lamp method and multimeter method and to measure insulation resistance by megger-brief introduction, theory , procedure,
	2nd	Practical observation, conclusion ,record correction
2	1st	Dimensional and material study of various parts of a dc machine-brief introduction, theory, procedure,
	2nd	Practical observation, conclusion, record correction
3	1st	Plot OCC of a dc shunt generator at constant speed and determine critical resistance from the graph.-brief introduction, theory, procedure,
	2nd	Practical observation, conclusion, record correction
4	1st	Plot External characteristics of a dc shunt generator at constant speed,-brief introduction, theory, procedure,
	2nd	Practical observation, conclusion, record correction
5	1st	Study of three point starter. connect and run a dc shunt motor and measure the no load current-brief introduction, theory, procedure,
	2nd	Practical observation ,conclusion, record correction
6	1st	Study of four point starter. Connect and run a dc compound motor and measure no load current.-brief introduction, theory, procedure.
	2nd	Practical observation, conclusion, record correction.
7	1st	Mid-sessional evaluation….Control the speed of a dc shunt motor by field flux control method and armature voltage control method.- brief introduction, theory, procedure,
	2nd	Practical observation conclusion, record correction.
8	1st	Determine the armature current vs. speed characteristic of a dc motor.-brief introduction, theory, procedure.
	2nd	Practical observation, conclusion, record correction.
9	1st	Determine the efficiency of a dc machine by brake test method.-brief introduction, theory, procedure.

	2nd	Practical observation, conclusion, record correction.
10	1st	Identification of terminals determination of voltage transformation rotio of a single phase transformer.-brief introduction, theory procedure.
	2nd	Practical observation, conclusion, record correction.
11	1st	Perform oc test and sc test of a single phase transformer.-brief introduction, theory, procedure.
	2nd	Practical observation, conclusion, record correction.
12	1st	Determine the voltage regulation of a single phase transformer at different loads.- brief introduction, theory ,procedure.
	2nd	Practical observation, conclusion, record correction.
13	1st	Polarity test of single phase transformer and parallel operation of two single phase transformers.-brief introduction, theory, procedure.
	2nd	Practical observation, conclusion,recordcorrection.S
14	1st	
	2nd	
15	1st	
	2nd	End-sessional evaluation

Discipline- Electrical Engg.	Semester-4th	Name of the teaching faculty- Sidharth Sankar Sahu
Subject- GTD	No of days/week class allotted-4	No of weeks-15
Week	Class day	Theory topic
1	1st	Generation Of electricity
	2nd	Elementary idea on generation of electricity from Thermal, Hydro and Nuclear power plant
	3rd	Introduction to solar power plant
	4th	Layout diagram of generating station and solve numerical on Hydro power plant
2	1st	Transmission of electrics power
	2nd	Short transmission line, Medium transmission line and long transmission line
	3rd	Π model and T model
	4th	Layout of transmission and Distribution line
3	1st	Voltage regulation and Efficiency
	2nd	Solve numerical on voltage regulation, efficiency and transmission line models
	3rd	Kelvin's law for economical size of conductor
	4th	Corona and corona loss on transmission line
4	1st	Types of support, size and spacing of conductor (Overhead lines)
	2nd	Types of conductor material (AAC, Aluminium, Stranded conductor, ACSR and Bundle conductor)
	3rd	Types of insulator (Pin insulator, stray insulator), Cross arm
	4th	Concept of Sag, Sag in overhead line at same level and different level
5	1st	Approximate formula effect of wind, ice and temperature on sag (Solve numerical on Sag)
	2nd	Doubt clearing secession
	3rd	Introduction to Extra High Voltage AC transmission.
	4th	Reasons for adoption of EHV AC line
6	1st	Problems involved in Extra high voltage transmission
	2nd	Different types DC lines
	3rd	HVDC transmission
	4th	Advantages and limitations of HVDC transmission system
7	1st	**Distribution System**

	2nd	Distribution system schemes (Radial, Ring Main, inter connection)
	3rd	DC distributions
	4th	Distributor input at one end
8	1st	Distributor input at both ends
	2nd	Ring Distributor
	3rd	AC distribution
	4th	Types of methods to solve AC distribution problems
9	1st	Three phase three wire star connected arrangement
	2nd	Solve numerical on DC distributor fed at one end
	3rd	Cable installation and classification of cable
	4th	Types of LT and HT cables with constructional feature
10	1st	Methods of cable laying(Underground cable, cable ducts, In cable trenches in outdoor switchyard, fixed with clamps, power cables, control and communication cables)
	2nd	Localization of cable faults – Murray loop for short circuit and earth faults
	3rd	Localization of cable faults – Varley loop for short circuit and earth faults
	4th	**Doubt Clearance**
11	1st	Causes of low power factor and methods of improvement of power factor
	2nd	Explain receiving end capacitor bank, and shunt reactor
	3rd	Factors effecting the economics of generation
	4th	Load curves (Base, peak load and energy consumption)
12	1st	Load factor, Diversity factor and plant factor
	2nd	Demand factor, Maximum demand
	3rd	Peak load and Base load power plants
	4th	**Solve numerical on LF, DF, MD, DF**
13	1st	Types of tariff
	2nd	Desirable characteristics of tariff
	3rd	Explain flat rate and block rate tariff
	4th	Two part and maximum demand tariff
14	1st	Solve problems(tariff)
	2nd	Doubt Clearance

	3rd	Power plant, Power grid and Substation
	4th	Interconnection between Power plant, grid and substation
15	1st	Layout of LT and HT substation (explain)
	2nd	Layout EHT Substation(explain)
	3rd	Earthing of substation and transmission line
	4th	Earthing of distribution line

DISCIPLINE	SEMESTER	Name of the teaching faculty- Ashirbad Behera
SUB-EMMI	4th	
	5days/week	No of Weeks-15(including tutorial)
1st	1st	Ch-1 define accuracy, precision errors resolutions sensitivity And tolerance
	2nd	Classification of measuring instrument
	3rd	Deflecting controlling and damping arrangements in indicating type of instrument
	4th	Calibration of instrument
	5th	Ch-2 Construction and principle of operation
2nd	1st	Advantage and disadvantage ,errors of MI type instrument
	2nd	Construction and principle of operation
	3rd	Advantage and disadvantage, errors of PMMC type instrument
	4th	Dynamometer type instrument
	5th	Revision and doubt clearing
3rd	1st	Rectifier type of instrument
	2nd	Induction type instrument
	3rd	Extend the range of instrument by use of shunts and multiplier
	4th	Numerical solving
	5th	Revision and doubt clearing
4th	1st	Ch-3 Wattmeter
	2nd	Describe construction of wattmeter
	3rd	Principle of working of dynamometer type wattmeter
	4th	Different types of wattmeter (LPF and UPF type)
	5th	Revision and doubt clearing
5th	1st	The errors of Dynamometer type wattmeter
	2nd	Methods of correction of wattmeter
	3rd	Induction type Wattmeters
	4th	Ch-4 Energy meter and measurement of energy
	5th	Numerical solving
6th	1st	Introduction, Single phase induction type energy meter
	2nd	Construction of Single phase induction type energy meter
	3rd	Working principle of 1-ph induction type energy meter
	4th	Compensation and adjustment
	5th	Revision

7th	1st	Testing of energy meter
	2nd	Ch-5 Measurement of speed ,Frequency & power Factor
	3rd	Working principle of Tachometer, types
	4th	Working principles of operation and construction of mechanical & electrical resonance type Frequency meter
	5th	Numerical solving
8th	1st	Principle of operation of working of Dynamometer type 1-ph power factor meters
	2nd	Principle of operation of working of Dynamometer type 3-ph power factor meters
	3rd	Ch-6 Measurement of resistance inductance and capacitance
	4th	Classification of resistance
	5th	revision
9th	1st	Measurement of low resistance by Potentiometer method
	2nd	Measurement of Medium resistance by Wheat stone Bridge method
	3rd	Measurement of high resistance by loss of charge method
	4th	Construction ,principle of operation of megger & Earth Tester for insulation resistance and earth resistance respectively
	5th	revision
10th	1st	Construction and principle of multimeter (analog)
	2nd	Construction and principle of multimeter (Digital)
	3rd	Measurement of inductance by Maxwell's bridge method
	4th	Measurement of capacitance by Schering bridge method
	5th	Numerical solving
11th	1st	Ch-7 Sensors And Transducer
	2nd	Transducer, sensing element or detector element and transduction element
	3rd	Classification of transducer(with examples,) various class of transducer
	4th	Resistive Transducer
	5th	Problem practice
12th	1st	Linear and angular motion potentiometer
	2nd	Thermister and resistance thermometers
	3rd	Wire resistance strain gauges
	4th	Inductive transducer, principle of LVDT and uses
	5th	Capacitive transducer, general principle
13th	1st	Variable area capacitive transducer

	2nd	Change in distance between plate capacitive transducer
	3rd	Piezo electric transducer with application
	4th	hall effect transducer with application
	5th	Revision
14th	1st	Ch-8 oscilloscope
	2nd	introduction
	3rd	Principle of operation of cathode ray tube
	4th	Principle of operation of Oscilloscope
	5th	Revision
15th	1st	Measurement of Dc voltage and current
	2nd	Measurement of Ac voltage and current
	3rd	Measurement of phase and frequency
	4th	Overall discussion
	5th	Doubt clearing