ACADEMIC LESSON PLAN OF SUMMER 2024

Discipline **Electrical Engg.**	Semester: - **6th**	**Name of the Teaching Faculty: -PRADOSH MOHAPATRA**
Subject: **TH-1** **(ELECTRICAL INSTALLATION AND ESTIMATING)**	No. of days/per week class allotted : 4p/week Tutorial:1p/week	Semester From: 16th January2024 to 26th April 2024 No. of weeks:15 weeks
Week	Class Day	Theory Topics
1st		**1. INDIAN ELECTRICITY RULES** 1.1 Definitions, Ampere, Apparatus, Accessible, Bare, cablew, circuit, circuit breaker,conductor voltage (low, medium, high, EH), live, dead, cut-out, conduit, system,danger, Installation, earthing system, span, volt, switch gear, etc.
		1.2 General safety precautions, rule 29, 30, 31, 32, 33, 34, 35, 36, 40, 41, 43, 44, 45, 46.
		1.3 General conditions relating to supply and use of energy : rule 47, 48, 49, 50, 51, 54, 55,56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 70. .(cont..)
		1.3 General conditions relating to supply and use of energy : rule 47, 48, 49, 50, 51, 54, 55,56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 70
		Tutorial
2nd		1.4 OH lines : Rule 74, 75, 76, 77, 78, 79, 80, 86, 87, 88, 89, 90, 91.(cont..)
		1.4 OH lines : Rule 74, 75, 76, 77, 78, 79, 80, 86, 87, 88, 89, 90, 91
		2. ELECTRICAL INSTALLATIONS 2.1 Electrical installations, domestics, industrial, Wiring System, Internal distribution of Electrical Energy. Methods of wiring, systems of wiring, wire and cable, conductor materials used in cables, insulating materials mechanical protection. Types of cables used in internal wiring, multi-stranded cables, voltage grinding of cables, general specifications of cables. .(cont..)
		2. 1 Electrical installations, domestics, industrial, Wiring System, Internal distribution of Electrical Energy. Methods of wiring, systems of wiring, wire and cable, conductor materials used in cables, insulating materials mechanical protection. Types of cables used in internal wiring, multi-stranded cables, voltage grinding of cables, general specifications of cables. .(cont..)
		Tutorial

3rd		2. 1 Electrical installations, domestics, industrial, Wiring System, Internal distribution of Electrical Energy. Methods of wiring, systems of wiring, wire and cable, conductor materials used in cables, insulating materials mechanical protection. Types of cables used in internal wiring, multi-stranded cables, voltage grinding of cables, general specifications of cables. .(cont..)
		2. 1 Electrical installations, domestics, industrial, Wiring System, Internal distribution of Electrical Energy. Methods of wiring, systems of wiring, wire and cable, conductor materials used in cables, insulating materials mechanical protection. Types of cables used in internal wiring, multi-stranded cables, voltage grinding of cables, general specifications of cables.
		2. 2 ACCESSORIES: Main switch and distribution boards, conduits, conduit accessories and fittings, lighting accessories and fittings, fuses, important definitions, determination of size of fuse – wire, fuse units. Earthing conductor, earthing, IS specifications regarding earthing of electrical installations, points to be earthed. Determination of size of earth wire and earth plate for domestic and industrial installations. Material required for GI pipe earthing(cont..)
		2. 2 ACCESSORIES: Main switch and distribution boards, conduits, conduit accessories and fittings, lighting accessories and fittings, fuses, important definitions, determination of size of fuse – wire, fuse units. Earthing conductor, earthing, IS specifications regarding earthing of electrical installations, points to be earthed. Determination of size of earth wire and earth plate for domestic and industrial installations. Material required for GI pipe earthing(cont..)
		Tutorial
4th		2. 2 ACCESSORIES: Main switch and distribution boards, conduits, conduit accessories and fittings, lighting accessories and fittings, fuses, important definitions, determination of size of fuse – wire, fuse units. Earthing conductor, earthing, IS specifications regarding earthing of electrical installations, points to be earthed. Determination of size of earth wire and earth plate for domestic and industrial installations. Material required for GI pipe earthing(cont..)
		2. 2 ACCESSORIES: Main switch and distribution boards, conduits, conduit accessories and fittings, lighting accessories and fittings, fuses, important definitions, determination of size of fuse – wire, fuse units. Earthing conductor, earthing, IS specifications regarding earthing of electrical installations, points to be earthed. Determination of size of earth wire and earth plate for domestic and industrial installations. Material required for GI pipe earthing.

		2. 3 LIGHTING SCHEME: Aspects of good lighting services. Types of lighting schemes, design of lighting schemes, factory lighting, public lighting installations, street lighting, general rules for wiring, determination of number of points (light, fan, socket, outlets), determination of total load, determination of Number of sub-circuits. (cont..)
		2. 3 LIGHTING SCHEME: Aspects of good lighting services. Types of lighting schemes, design of lighting schemes, factory lighting, public lighting installations, street lighting, general rules for wiring, determination of number of points (light, fan, socket, outlets), determination of total load, determination of Number of sub-circuits. (cont..)
		Tutorial
5th		2. 3 LIGHTING SCHEME: Aspects of good lighting services. Types of lighting schemes, design of lighting schemes, factory lighting, public lighting installations, street lighting, general rules for wiring, determination of number of points (light, fan, socket, outlets), determination of total load, determination of Number of sub-circuits. (cont..)
		2. 3 LIGHTING SCHEME: Aspects of good lighting services. Types of lighting schemes, design of lighting schemes, factory lighting, public lighting installations, street lighting, general rules for wiring, determination of number of points (light, fan, socket, outlets), determination of total load, determination of Number of sub-circuits.
		3. INTERNAL WIRING 3 . 1 Type of internal wiring, cleat wiring, CTS wiring, wooden casing capping, metal sheathed wiring, conduit wiring, their advantage and disadvantages comparison and applications.(cont..)
		3 . 1 Type of internal wiring, cleat wiring, CTS wiring, wooden casing capping, metal sheathed wiring, conduit wiring, their advantage and disadvantages comparison and applications.(cont..)
		Tutorial
6th		3 . 1 Type of internal wiring, cleat wiring, CTS wiring, wooden casing capping, metal sheathed wiring, conduit wiring, their advantage and disadvantages comparison and applications.
		3 . 2 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.(cont..).
		3 . 2 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.(cont..).
		3 . 2 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.
		Tutorial
7th		3 . 3 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.(cont..)
		3 . 3 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.
		3 . 4 Prepare one estimate of materials required for concealed wiring for domestic installation of two rooms and one latrine, bath, kitchen & verandah within 80m2 with given light, fan & plug points. .(cont..)
		3 . 4 Prepare one estimate of materials required for concealed wiring for domestic installation of two rooms and one latrine, bath, kitchen & verandah within 80m2 with given light, fan & plug points.
		Tutorial
8th		3 . 5 Prepare one estimate of materials required for erection of conduct wiring to a small workshop installation about 30m2 and load within 10 KW. .(cont..)
		3 . 5 Prepare one estimate of materials required for erection of conduct wiring to a small workshop installation about 30m2 and load within 10 KW.
		4. OVER HEAD INSTALLATION 4.1 Main components of overhead lines, line supports, factors Governing Height of pole, conductor materials, determination of size of conductor for overhead transmission line, cross arms, pole brackets and clamps, guys and stays, conductors configurations, spacing and clearances, span lengths, overhead line insulators, types of insulators, lighting arresters, danger plates, anti-climbing devices, bird guards, beads of jumpers, jumpers, tee-offs, guarding of overhead lines.(cont..)
9th		4.1 Main components of overhead lines, line supports, factors Governing Height of pole, conductor materials, determination of size of conductor for overhead transmission line, cross arms, pole brackets and clamps, guys and stays, conductors configurations, spacing and clearances, span lengths, overhead line insulators, types of insulators, lighting arresters, danger plates, anti-climbing devices, bird guards, beads of jumpers, jumpers, tee-offs, guarding of overhead lines.(cont..)
		Tutorial
		4.1 Main components of overhead lines, line supports, factors

		Governing Height of pole, conductor materials, determination of size of conductor for overhead transmission line, cross arms, pole brackets and clamps, guys and stays, conductors configurations, spacing and clearances, span lengths, overhead line insulators, types of insulators, lighting arresters, danger plates, anti-climbing devices, bird guards, beads of jumpers, jumpers, tee-offs, guarding of overhead lines.(cont..)
		4.1 Main components of overhead lines, line supports, factors Governing Height of pole, conductor materials, determination of size of conductor for overhead transmission line, cross arms, pole brackets and clamps, guys and stays, conductors configurations, spacing and clearances, span lengths, overhead line insulators, types of insulators, lighting arresters, danger plates, anti-climbing devices, bird guards, beads of jumpers, jumpers, tee-offs, guarding of overhead lines.
		4.2 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), current carrying capacity and voltage regulation consideration using ACSR. .(cont..)
10^{th}		
		4.2 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), current carrying capacity and voltage regulation consideration using ACSR. .(cont..)
		Tutorial
		4.2. 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), current carrying capacity and voltage regulation consideration using ACSR.
11^{th}		4.3. 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), current carrying capacity and voltage regulation consideration using ACSR.
		4.3. 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), current carrying capacity and voltage regulation consideration using ACSR.

		4.4 Prepare an estimate of materials required for HT distribution line (11 KV)within 2 km and load of 2000 KVA maximum and standard spans involvingcalculation of the size of conductor (from conductor chart), current carryingcapacity and voltage regulation of the size of conductor (from conductor chart),current carrying capacity and voltage regulation consideration using ACSR. .(cont..)
		Tutorial
		4.4 Prepare an estimate of materials required for HT distribution line (11 KV)within 2 km and load of 2000 KVA maximum and standard spans involvingcalculation of the size of conductor (from conductor chart), current carryingcapacity and voltage regulation of the size of conductor (from conductor chart),current carrying capacity and voltage regulation consideration using ACSR. .(cont..)
12th		
		4.4 Prepare an estimate of materials required for HT distribution line (11 KV)within 2 km and load of 2000 KVA maximum and standard spans involvingcalculation of the size of conductor (from conductor chart), current carryingcapacity and voltage regulation of the size of conductor (from conductor chart),current carrying capacity and voltage regulation consideration using ACSR.
		5. OVER HEAD SERVICE LINES 5.1 Components of service lines, service line (cables and conductors), bearer wire,lacing rod. Ariel fuse, service support.(cont..)
		5.1 Components of service lines, service line (cables and conductors), bearer wire,lacing rod. Ariel fuse, service support.(cont..)
13th		Tutorial
		5.1 Components of service lines, service line (cables and conductors), bearer wire,lacing rod. Ariel fuse, service support.
		5.2 Prepare and estimate for providing single phase supply of load of 5 KW (light,fan, socket) to a single stored residential building.(cont..)
		5.2 Prepare and estimate for providing single phase supply of load of 5 KW (light,fan, socket) to a single stored residential building.(cont..)
		5.2 Prepare and estimate for providing single phase supply of load of 5 KW (light,fan, socket) to a single stored residential building.
14th	Extra Class	Tutorial

	Extra Class	5.3 Prepare and estimate for providing single phase supply load of 3KW to eachfloor of a double stored building having separate energy meter.(cont..)
	Extra Class	5.3 Prepare and estimate for providing single phase supply load of 3KW to eachfloor of a double stored building having separate energy meter
	Extra Class	5.4 Prepare one estimate of materials required for service connection to a factorybuilding with load within 15 KW using insulated wire.(cont..)
	Extra Class	5.4 Prepare one estimate of materials required for service connection to a factorybuilding with load within 15 KW using insulated wire
15th	Extra Class	Tutorial
	Extra Class	5.5 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.(cont..)
	Extra Class	5.5 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
	Extra Class	**6. ESTIMATING FOR DISTRIBUTION SUBSTATIONS** 6.1 Prepare one materials estimate for following types of transformer substations.(cont..)
	Extra Class	6.1 Prepare one materials estimate for following types of transformer substations
16th	Extra Class	Tutorial
	Extra Class	6.1.1 Pole mounted substation.(cont..)
	Extra Class	6.1.1 Pole mounted substation
	Extra Class	6.1.2 Plinth Mounted substation.(cont..)
	Extra Class	6.1.2 Plinth Mounted substation
17th	Extra Class	Tutorial

pradosh mohapatra

Signature of Teaching Faculty

ACADEMIC LESSON PLAN OF SUMMER 2024

Discipline: **Electrical Engineering**	Semester: 6th **(SEC-A)**	Name of the Teaching Faculty: JAYANTA KUMAR PANDA
Subject:**TH-2 (SWITCH GEAR AND PROTECTIVE DEVICE)**	No. of days/per week class allotted:**4p/week Tutorial:1p/week**	Semester From: 16th January2024 to 26th April 2024 No. of weeks:15 weeks
Week	Class Day	Theory Topics
1st	1st	**1. INTRODUCTION TO SWITCHGEAR** 1.1 Essential Features of switchgear. 1.2 Switchgear Equipment.
	2nd	1.3 Bus-Bar Arrangement.
	3rd	1.4 Switchgear Accommodation.
	4th	1.5 Short Circuit.
	5th	Tutorial Period
2nd	1st	1.6 Short circuit
	2nd	1.7 Faults in a power system
	3rd	**2. FAULT CALCULATION** 2.1 Symmetrical faults on 3-phase system.(Contd.)
	4th	2.1 Symmetrical faults on 3-phase system.
	5th	2.2 Limitation of fault current.
3rd	1st	Tutorial Period
	2nd	2.3 Percentage Reactance. 2.4 Percentage Reactance and Base KVA.(Contd.)
	3rd	2.4 Percentage Reactance and Base KVA.
	4th	2.5 Short – circuit KVA
	5th	Tutorial Period
4th	1st	2.6 Reactor control of short circuit currents.
	2nd	2.7 Location of reactors.
	3rd	2.8 Steps for symmetrical Fault calculations. 2.9 Solve numerical problems on symmetrical fault.(Contd.)
	4th	2.9 Solve numerical problems on symmetrical fault.
	5th	Tutorial Period
5th	1st	**3. FUSES** 3.1 Desirable characteristics of fuse element. 3.2 Fuse Element materials.
	2nd	3.3 Types of Fuses and important terms used for fuses.
	3rd	3.4 Low and High voltage fuses.(Contd.)
	4th	3.4 Low and High voltage fuses.
	5th	Tutorial Period
6th	1st	3.5 Current carrying capacity of fuse element.
	2nd	3.6 Difference Between a Fuse and Circuit Breaker.
	3rd	**4. CIRCUIT BREAKERS** 4.1 Definition and principle of Circuit Breaker.

	4th	4.2 Arc phenomenon and principle of Arc Extinction. 4.3 Methods of Arc Extinction. 4.4 Definitions of Arc voltage, Re-striking voltage and Recovery voltage.
	5th	Tutorial Period
7th	1st	4.5 Classification of circuit Breakers. 4.6 Oil circuit Breaker and its classification. 4.7 Plain brake oil circuit breaker.
	2nd	4.8 Arc control oil circuit breaker.
	3rd	4.9 Low oil circuit breaker. 4.10 Maintenance of oil circuit breaker.
	4th	4.11 Air-Blast circuit breaker and its classification.
	5th	Tutorial Period
8th	1st	4.12 Sulphur Hexa-fluoride (SF6) circuit breaker.
	2nd	4.13 Vacuum circuit breakers. 4.14 Switchgear component.
	3rd	4.15 Problems of circuit interruption
	4th	4.16 Resistance switching. 4.17 Circuit Breaker Rating.
	5th	Tutorial Period
9th	1st	**5. PROTECTIVE RELAYS** 5.1 Definition of Protective Relay.
	2nd	5.2 Fundamental requirement of protective relay.
	3rd	5.3 Basic Relay operation
	4th	5.3.1 Electromagnetic Attraction type 5.3.2 Induction type
	5th	Tutorial Period
10th	1st	5.4 Definition of following important terms 5.5 Definition of following important terms
	2nd	5.5.1 Pick-up current.
	3rd	5.5.2 Current setting. 5.5.3 Plug setting Multiplier. 5.5.4 Time setting Multiplier.
	4th	5.6 Classification of functional relays 5.7 Induction type over current relay (Non-directional)
	5th	Tutorial Period
11th	1st	5.8 Induction type directional power relay.
	2nd	5.9 Induction type directional over current relay.
	3rd	5.10 Differential relay 5.10.1 Current differential relay 5.10.2 Voltage balance differential relay
	4th	5.11 Types of protection
	5th	Tutorial Period
12th	1st	**6. PROTECTION OF ELECTRICAL POWER EQUIPMENT AND LINES** 6.1 Protection of alternator. 6.2 Differential protection of alternators.
	2nd	6.3 Balanced earth fault protection.
	3rd	6.4 Protection systems for transformer. 6.5 Buchholz relay.
	4th	6.6 Protection of Bus bar. 6.7 Protection of Transmission line.
	5th	Tutorial Period
	1st	6.8 Different pilot wire protection (Merz-price voltage Balance system)
	2nd	6.9 Explain protection of feeder by over current and earth fault relay.

13th	3rd	**7. PROTECTION AGAINST OVER VOLTAGE AND LIGHTING** 7.1 Voltage surge and causes of over voltage. 7.2 Internal cause of over voltage.
	4th	7.3 External cause of over voltage (lighting)
	5th	Tutorial Period
14th	1st	7.4 Mechanism of lightning discharge.(Contd.)
	2nd	7.5 Types of lightning strokes.
	3rd	7.6 Harmful effect of lightning. 7.7 Lightning arresters and Type of lightning Arresters.
	4th	7.7.1 Rod-gap lightning arrester 7.7.2 Horn-gap arrester
	5th	Tutorial Period
15th (Extra Class)	1st	7.7.3 Valve type arrester.
	2nd	7.8 Surge Absorber
	3rd	**8. STATIC RELAY** 8.1 Advantage of static relay.(Contd.)
	4th	8.1 Advantage of static relay.
	5th	Tutorial Period
16th (Extra Class)	1st	8.2 Instantaneous over current relay.(Contd.)
	2nd	8.2 Instantaneous over current relay.
	3rd	8.3 Principle of IDMT relay.(Contd.)
	4th	8.3 Principle of IDMT relay.
	5th	Tutorial Period

Jayanta kumar panda

Signature of Teaching Faculty

ACADEMIC LESSON PLAN OF SUMMER 2024

Discipline: Electrical Engg.	Semester: 6th	Name of the Teaching Faculty: SANGRAM KESARI NAYAK
Subject:TH-3 (Control System Engineering)	No. of days/per week class allotted:4p/week Tutorial:1p/week	Semester From: 16th January2024 to 26th April 2024 No. of weeks:15 weeks
Week	Class Day	Theory Topics
1st	1st	1. FUNDAMENTAL OF CONTROL SYSTEM 1.1. Classification of Control system 1.2. Open loop system & Closed loop system and its comparison
	2nd	1.3. Effects of Feed back 1.4. Standard test Signals(Step, Ramp, Parabolic, Impulse Functions)
	3rd	1.5. Servomechanism
	4th	2. MATHEMATICAL MODEL OF A SYSTEM 2.1. Transfer Function & Impulse response, 2.2. Properties, Advantages & Disadvantages of Transfer Function
	5th	Tutorial
2nd	1st	2.3. Poles & Zeroes of transfer Function 2.4. Simple problems of transfer function of network.
	2nd	2.5. Mathematical modeling of Electrical Systems(R, L, C, Analogous systems)
	3rd	Tutorial
	4th	3. CONTROL SYSTEM COMPONENTS 3.1. Components of Control System
	5th	3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors.(Contd)
3rd	1st	3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors.(Contd)
	2nd	3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors.
	3rd	Tutorial
	4th	4. BLOCK DIAGRAM ALGEBRA & SIGNAL FLOW GRAPHS 4.1. Definition: Basic Elements of Block Diagram
	5th	4.2. Canonical Form of Closed loop Systems 4.3. Rules for Block diagram reduction(Contd)
4th	1st	4.3. Rules for Block diagram reduction(Contd) 4.4. Procedure for of Reduction of Block Diagram
	2nd	4.5. Simple Problem for equivalent transfer function(Contd.)
	3rd	Tutorial
	4th	4.5. Simple Problem for equivalent transfer function 4.6. Basic Definition in Signal Flow Graph & properties
	5th	4.7. Construction of Signal Flow graph from Block diagram 4.8. Mason‘s Gain formula
	1st	4.9. Simple problems in Signal flow graph for network(Contd.)
	2nd	4.9. Simple problems in Signal flow graph for network.

5th	3rd	Tutorial
	4th	5. TIME RESPONSE ANALYSIS. 5 . 1 Time response of control system. 5 . 2 Standard Test signal. 5.2.1. Step signal, 5.2.2. Ramp Signal 5.2.3. Parabolic Signal 5.2.4. Impulse Signal 5 . 3 Time Response of first order system with: 5.3.1. Unit step response
	5th	5.3.2. Unit impulse response. 5 . 4 Time response of second order system to the unit step input. 5.4.1. Time response specification.(Contd.)
6th	1st	5.4.1. Time response specification. 5.4.2. Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error.(Contd.)
	2nd	5.4.2. Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error.
	3rd	Tutorial
	4th	5.4.3. Steady state error and error constants(cont.)
	5th	5.4.3. Steady state error and error constants
7th	1st	5 .5 Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system]
	2nd	5 .6 Effect of adding poles and zero to transfer function.
	3rd	Tutorial
	4th	5 .7 Response with P, PI, PD and PID controller(Contd.)
	5th	5 .7 Response with P, PI, PD and PID controller
8th	1st	6. ANALYSIS OF STABILITY BY ROOT LOCUS TECHNIQUE. 6.1 Root locus concept.(cont.)
	2nd	6. 1 Root locus concept.
	3rd	Tutorial
	4th	6. 2 Construction of root loci.(cont.)
	5th	6. 2 Construction of root loci.
9th	1st	6. 3 Rules for construction of the root locus. (cont.)
	2nd	6. 3 Rules for construction of the root locus.(cont.)
	3rd	Tutorial
	4th	6. 3 Rules for construction of the root locus.(cont.)
	5th	6. 3 Rules for construction of the root locus.(cont.)
10th	1st	6. 3 Rules for construction of the root locus.
	2nd	6. 4 Effect of adding poles and zeros to G(s) and H(s).
	3rd	Tutorial
	4th	7. FREQUENCY RESPONSE ANALYSIS. 7.1 Correlation between time response and frequency response.
	5th	7. 2 Polar plots.(cont.)
11th	1st	7. 2 Polar plots.(cont.)
	2nd	7. 2 Polar plots.(cont.)
	3rd	Tutorial
	4th	7. 3 Bode plots.(cont.)
	5th	7. 3 Bode plots.(cont.)
12th	1st	7. 3 Bode plots.(cont.)
	2nd	7. 4 All pass and minimum phase system. 7. 5 Computation of Gain margin and phase margin(contd,)
	3rd	7. 4 All pass and minimum phase system. 7. 5 Computation of Gain margin and phase margin

	4th	Tutorial
	5th	7. 6 Log magnitude versus phase plot.
13th	1st	7. 7 Closed loop frequency response.
	2nd	8. NYQUIST PLOT 8.1 Principle of argument
	3rd	8.2 Nyquist stability criterion.(cont.)
	4th	Tutorial
	5th	8.3 Nyquist stability criterion applied to inverse polar plot.(cont.)
14th	1st	8.3 Nyquist stability criterion applied to inverse polar plot.(cont.)
	2nd	8.3 Nyquist stability criterion applied to inverse polar plot.
	3rd	8.4 Effect of addition of poles and zeros to G(S) H(S) on the shape of Nyquist plot.
	4th	Tutorial
	5th	8.5 Assessment of relative stability.
15th	1st	8.6 Constant M and N circle.(cont.)
	2nd	8.6 Constant M and N circle
	3rd	8.7 Nicholas chart.(contd.)
	4th	8.7 Nicholas chart.
	5th	Tutorial

sangram kesari nayak

Signature of Teaching Faculty

ACADEMIC LESSON PLAN OF SUMMER 2024

Discipline: Electrical	Semester: 6th	Name of the Teaching Faculty: RAJESH KUMAR JENA
Subject: Renewable Energy(TH-4)	No. of days/per week class allotted:4p/week Tutorial:1p/week	Semester From: 16th January2024 to 26th April 2024 No. of weeks:15 weeks
Week	Class/week	Theory Topics
1st	1st	1.1. Environmental consequences of fossil fuel use.
	2nd	1.2. Importance of renewable sources of energy.
	3rd	1.3 Sustainable Design and development.
	4th	1.4. Types of RE sources.
	5th	Tutorial
2nd	1st	1.5. Limitations of RE sources
	2nd	1.6. Present Indian and international energy scenario of conventional and RE sources
	3rd	2.1. Solar photovoltaic system-Operating principle.
	4th	2.2. Photovoltaic cell concepts
	5th	Tutorial
3rd	1st	2.2.1. Cell, module, array, Series and parallel connections.
	2nd	2.3. Classification of energy Sources.
	3rd	2.4. Extra-terrestrial and terrestrial Radiation.
	4th	2.5. Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant.
	5th	Tutorial
4th	1st	2.6. Solar collectors, Types, and performance characteristics,
	2nd	2.6. Solar collectors, Types, and performance characteristics,
	3rd	2.7. Applications: Photovoltaic - battery charger, domestic lighting, street lighting.
	4th	2.7. Applications: Photovoltaic - water pumping, solar cooker, Solar Pond.
	5th	Tutorial
5th	1st	3.1. Introduction to Wind energy.
	2nd	3.2. Wind energy conversion.
	3rd	3.3. Types of wind turbines
	4th	3.3. Types of wind turbines
	5th	Tutorial
6th	1st	3.4. Aerodynamics of wind rotors.
	2nd	3.5. Wind turbine control systems; conversion to electrical power:
	3rd	3.6. Induction and synchronous generators.
	4th	3.7. Grid connected and self-excited induction generator operation.
	5th	Tutorial
7th	1st	3.8. Constant voltage and constant frequency generation with power electronic control.
	2nd	3.9. Single and double output systems.
	3rd	3.10. Characteristics of wind power plant.
	4th	4.1. Energy from Biomass.
	5th	Tutorial
8th	1st	4.2. Biomass as Renewable Energy Source
	2nd	4.3. Types of Biomass Fuels - Solid, Liquid and Gas.
	3rd	4.3. Types of Biomass Fuels - Solid, Liquid and Gas.
	4th	4.4. Combustion and fermentation.
	5th	Tutorial
9th	1st	4.5. Anaerobic digestion
	2nd	4.6. Types of biogas digester.
	3rd	4.6. Types of biogas digester.
	4th	4.6. Types of biogas digester.
	5th	Tutorial
10th	1st	4.7. Wood gasifier.

	2nd	4.8. Pyrolysis,.
	3rd	4.9. Applications: Bio gas, Bio diesel
	4th	5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.
	5th	Tutorial
11th	1st	5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.
	2nd	5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.
	3rd	5.2. Ocean Thermal Energy Conversion (OTEC).
	4th	5.2. Ocean Thermal Energy Conversion (OTEC).
	5th	Tutorial
12th	1st	5.3. Geothermal Energy – Classification.
	2nd	5.3. Geothermal Energy – Classification.
	3rd	5.3. Geothermal Energy – Classification.
	4th	5.4. Hybrid Energy Systems.
	5th	Tutorial
13th	1st	5.3. Geothermal Energy – Classification.
	2nd	5.4. Hybrid Energy Systems.
	3rd	5.6. Diesel-PV, Wind-PV, Microhydel-PV.
	4th	5.6. Diesel-PV, Wind-PV, Microhydel-PV.
	5th	Tutorial
14th	1st	5.6. Diesel-PV, Wind-PV, Microhydel-PV.
	2nd	5.7. Electric and hybrid electric vehicles.
	3rd	5.7. Electric and hybrid electric vehicles.
	4th	5.7. Electric and hybrid electric vehicles.
	5th	Tutorial
15th	1st	5.4. Hybrid Energy Systems.
	2nd	5.5. Need for Hybrid Systems.
	3rd	Revision - Biomass Power
	4th	Revision - Biomass Power
	5th	Tutorial

Rajesh kumar jena

Signature of Teaching Faculty

ACADEMIC LESSON PLAN FOR SUMMER 2024

Discipline **Electrical Engg.**	Semester: - **6th**	Name of the Teaching Faculty: - **PRADOSH MOHAPATRA**
Subject: - **ELECTRICAL WORKSHOP PR-01**	No of Days/per Week Class Allotted: - **6p/week**	Semester From: 16th January2024 to 26th April 2024 No. of weeks:15 weeks
Week	**Class Day**	**Theory/ Practical Topics**
1st	1st	1. Identification of single core (SC), twin core (TC), three cores (3c), four cores (4c);copper and aluminium PVC, VIR & Weather proof (WP) wire and prepare Britannia T joint and Married joint.(Theory)
	2nd	1. Identification of single core (SC), twin core (TC), three cores (3c), four cores (4c); copper and aluminium PVC, VIR & Weather proof (WP) wire and prepare Britannia T joint and Married joint.(Practical)
2nd	1st	1. Identification of single core (SC), twin core (TC), three cores (3c), four cores (4c); copper and aluminium PVC, VIR & Weather proof (WP) wire and prepare Britannia T joint and Married joint.(Practical) (contd.)
	2nd	1. Identification of single core (SC), twin core (TC), three cores (3c), four cores (4c); copper and aluminium PVC, VIR & Weather proof (WP) wire and prepare Britannia T joint and Married joint.(Practical) (contd.)
3rd	1st	2. Cutting copper and aluminium cable and crimping lug to them from 4mm^2 to 25mm^{2}cross section. .(Theory)
	2nd	2. Cutting copper and aluminium cable and crimping lug to them from 4mm^2 to 25mm^{2}cross section. (Practical)
4th	1st	3. Connection and testing of fluorescent tube light, high pressure M.V. lamp, sodium vapor lamp, M.H lamp, CFL and latest model lamps – measure inductance, Lux/ lumens (intensity of illumination) in each case prepare lux table.(Theory)
	2nd	3. Connection and testing of fluorescent tube light, high pressure M.V. lamp, sodium vapor lamp, M.H lamp, CFL and latest model lamps – measure inductance, Lux/ lumens (intensity of illumination) in each case prepare lux table(practical) (contd.)
5th	1st	3. Connection and testing of fluorescent tube light, high pressure M.V. lamp, sodium vapor lamp, M.H lamp, CFL and latest model lamps – measure inductance, Lux/ lumens (intensity of illumination) in each case prepare lux table(practical) (contd.)
	2nd	3. Connection and testing of fluorescent tube light, high pressure M.V. lamp, sodium vapor lamp, M.H lamp, CFL and latest model lamps – measure inductance, Lux/ lumens (intensity of illumination) in each case prepare lux table(practical) (contd.)
6th	1st	4. Study battery charger and make charging of lead acid battery (record charging voltage, current and specific gravity). (Theory)
	2nd	4. Study battery charger and make charging of lead acid battery (record charging voltage, current and specific gravity). (Practical)
7th	1st	5. Erection of residential building wiring by CTS and conduit wiring system using main two points and test installation by test lamp method and a meggar. (Theory)
	2nd	5. Erection of residential building wiring by CTS and conduit wiring system using main two points and test installation by test lamp method and a meggar. (Practical)
8th	1st	5. Erection of residential building wiring by CTS and conduit wiring system using main twopoints and test installation by test lamp method and a meggar. (Practical)(Contd.)
	2nd	5. Erection of residential building wiring by CTS and conduit wiring system using main twopoints and test installation by test lamp method and a meggar. (Practical)
9th	1st	5. Erection of residential building wiring by CTS and conduit wiring system using main twopoints and test installation by test lamp method and a meggar. (Practical) (Contd.)
	2nd	6. Fault finding & repairing of Fan – prepare an inventory list of parts. (Theory)
10th	1st	6. Fault finding & repairing of Fan – prepare an inventory list of parts. (practical)
	2nd	6. Fault finding & repairing of Fan – prepare an inventory list of parts. (practical)(contd.)
11th	1st	7. Find out fault of D.C. generator, repair and test it to run. (Theory)

	2nd	7. Find out fault of D.C. generator, repair and test it to run. (practical)
12th	1st	8. Find out fault of D.C. motor starters and A.C motor starter – prepare an inventory list of parts used in different starters. (Theory)
	2nd	8. Find out fault of D.C. motor starters and A.C motor starter – prepare an inventory list of parts used in different starters. (Practical)
13th	1st	9. Dismantle, over haul and assemble a single-phase induction motor. Test and run it. – prepare an inventory list. (Theory)
	2nd	9. Dismantle, over haul and assemble a single-phase induction motor. Test and run it. – prepare an inventory list. (Practical)
14th	1st	10. Dismantle over haul and assemble a three-phase squirrel cage and phase wound motor. Test and run them. (Theory)
	2nd	10. Dismantle over haul and assemble a three-phase squirrel cage and phase wound motor. Test and run them. (Practical)
15th	1st	11. Overhaul a single phase / 3 phase variac. (Theory)
	2nd	11. Overhaul a single phase / 3 phase variac. (Practical)

pradosh mohapatra

Signature of Teaching Faculty

ACADEMIC LESSON PLAN FOR SUMMER 2024

Discipline **Electrical Engg.**	Semester: - **6th**	Name of the Teaching Faculty: - **PRADOSH MOHAPATRA**
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2nd	1st	1. Identification of single core (SC), twin core (TC), three cores (3c), four cores (4c); copper and aluminium PVC, VIR & Weather proof (WP) wire and prepare Britannia T joint and Married joint.(Practical) (contd.)
	2nd	1. Identification of single core (SC), twin core (TC), three cores (3c), four cores (4c); copper and aluminium PVC, VIR & Weather proof (WP) wire and prepare Britannia T joint and Married joint.(Practical) (contd.)
3rd	1st	2. Cutting copper and aluminium cable and crimping lug to them from 4mm^2 to 25mm^{2}cross section. .(Theory)
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5th	1st	3. Connection and testing of fluorescent tube light, high pressure M.V. lamp, sodium vapor lamp, M.H lamp, CFL and latest model lamps – measure inductance, Lux/ lumens (intensity of illumination) in each case prepare lux table(practical) (contd.)
	2nd	3. Connection and testing of fluorescent tube light, high pressure M.V. lamp, sodium vapor lamp, M.H lamp, CFL and latest model lamps – measure inductance, Lux/ lumens (intensity of illumination) in each case prepare lux table(practical) (contd.)
6th	1st	4. Study battery charger and make charging of lead acid battery (record charging voltage, current and specific gravity). (Theory)
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8th	1st	5. Erection of residential building wiring by CTS and conduit wiring system using main twopoints and test installation by test lamp method and a meggar. (Practical)(Contd.)
	2nd	5. Erection of residential building wiring by CTS and conduit wiring system using main twopoints and test installation by test lamp method and a meggar. (Practical)
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	2nd	6. Fault finding & repairing of Fan – prepare an inventory list of parts. (practical)(contd.)
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