

ACADEMIC LESSON PLAN OF SUMMER 2023

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/w eek	Semester From: 14 th Feb 2023 to 23 rd May2023 No. of weeks:15 weeks
Week	Class Day	Theory Topics
1 st		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
2 nd		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

3 rd		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
4 th		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
5 th		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
6 th		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
7 th		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
8 th		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..)
9 th		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 involving calculation of the size of conductor (from conductor chart), current carrying capacity 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 involving calculation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation consideration using ACSR. .(cont..)
12 th		
		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 involving calculation of the size of conductor (from conductor chart), current carrying capacity 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..)
13 th		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.
14 th	Extra Class	Tutorial

	Extra Class	5.3 Prepare and estimate for providing single phase supply load of 3KW to each floor 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 each floor of a double stored building having separate energy meter
	Extra Class	5.4 Prepare one estimate of materials required for service connection to a factory building with load within 15 KW using insulated wire.(cont..)
	Extra Class	5.4 Prepare one estimate of materials required for service connection to a factory building with load within 15 KW using insulated wire
15 th	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
16 th	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
17 th	Extra Class	Tutorial

pradosh mohapatra

Signature of Teaching Faculty

ACADEMIC LESSON PLAN OF SUMMER 2023

Discipline: Electrical Engineering	Semester: 6 th	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: 14 th Feb 2023 to 23 rd May 2023 No. of weeks: 15 weeks
Week	Class Day	Theory Topics
1 st	1 st	1. INTRODUCTION TO SWITCHGEAR 1.1 Essential Features of switchgear. 1.2 Switchgear Equipment.
	2 nd	1.3 Bus-Bar Arrangement.
	3 rd	1.4 Switchgear Accommodation.
	4 th	1.5 Short Circuit.
	5 th	Tutorial Period
2 nd	1 st	1.6 Short circuit
	2 nd	1.7 Faults in a power system
	3 rd	2. FAULT CALCULATION 2.1 Symmetrical faults on 3-phase system.(Contd.)
	4 th	2.1 Symmetrical faults on 3-phase system.
	5 th	2.2 Limitation of fault current.
3 rd	1 st	Tutorial Period
	2 nd	2.3 Percentage Reactance. 2.4 Percentage Reactance and Base KVA.(Contd.)
	3 rd	2.4 Percentage Reactance and Base KVA.
	4 th	2.5 Short – circuit KVA
	5 th	Tutorial Period
4 th	1 st	2.6 Reactor control of short circuit currents.
	2 nd	2.7 Location of reactors.
	3 rd	2.8 Steps for symmetrical Fault calculations. 2.9 Solve numerical problems on symmetrical fault.(Contd.)
	4 th	2.9 Solve numerical problems on symmetrical fault.
	5 th	Tutorial Period
5 th	1 st	3. FUSES 3.1 Desirable characteristics of fuse element. 3.2 Fuse Element materials.
	2 nd	3.3 Types of Fuses and important terms used for fuses.
	3 rd	3.4 Low and High voltage fuses.(Contd.)
	4 th	3.4 Low and High voltage fuses.
	5 th	Tutorial Period
6 th	1 st	3.5 Current carrying capacity of fuse element.
	2 nd	3.6 Difference Between a Fuse and Circuit Breaker.
	3 rd	4. CIRCUIT BREAKERS 4.1 Definition and principle of Circuit Breaker.
	4 th	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.

	5 th	Tutorial Period
7 th	1 st	4.5 Classification of circuit Breakers. 4.6 Oil circuit Breaker and its classification. 4.7 Plain brake oil circuit breaker.
	2 nd	4.8 Arc control oil circuit breaker.
	3 rd	4.9 Low oil circuit breaker. 4.10 Maintenance of oil circuit breaker.
	4 th	4.11 Air-Blast circuit breaker and its classification.
	5 th	Tutorial Period
8 th	1 st	4.12 Sulphur Hexa-fluoride (SF6) circuit breaker.
	2 nd	4.13 Vacuum circuit breakers. 4.14 Switchgear component.
	3 rd	4.15 Problems of circuit interruption
	4 th	4.16 Resistance switching. 4.17 Circuit Breaker Rating.
	5 th	Tutorial Period
9 th	1 st	5. PROTECTIVE RELAYS 5.1 Definition of Protective Relay.
	2 nd	5.2 Fundamental requirement of protective relay.
	3 rd	5.3 Basic Relay operation
	4 th	5.3.1 Electromagnetic Attraction type 5.3.2 Induction type
	5 th	Tutorial Period
10 th	1 st	5.4 Definition of following important terms 5.5 Definition of following important terms
	2 nd	5.5.1 Pick-up current.
	3 rd	5.5.2 Current setting. 5.5.3 Plug setting Multiplier. 5.5.4 Time setting Multiplier.
	4 th	5.6 Classification of functional relays 5.7 Induction type over current relay (Non-directional)
	5 th	Tutorial Period
11 th	1 st	5.8 Induction type directional power relay.
	2 nd	5.9 Induction type directional over current relay.
	3 rd	5.10 Differential relay 5.10.1 Current differential relay 5.10.2 Voltage balance differential relay
	4 th	5.11 Types of protection
	5 th	Tutorial Period
12 th	1 st	6. PROTECTION OF ELECTRICAL POWER EQUIPMENT AND LINES 6.1 Protection of alternator. 6.2 Differential protection of alternators.
	2 nd	6.3 Balanced earth fault protection.
	3 rd	6.4 Protection systems for transformer. 6.5 Buchholz relay.
	4 th	6.6 Protection of Bus bar. 6.7 Protection of Transmission line.
	5 th	Tutorial Period
13 th	1 st	6.8 Different pilot wire protection (Merz-price voltage Balance system)
	2 nd	6.9 Explain protection of feeder by over current and earth fault relay.
	3 rd	7. PROTECTION AGAINST OVER VOLTAGE AND LIGHTING 7.1 Voltage surge and causes of over voltage. 7.2 Internal cause of over voltage.
	4 th	7.3 External cause of over voltage (lighting)
	5 th	Tutorial Period
14 th	1 st	7.4 Mechanism of lightning discharge.(Contd.)
	2 nd	7.5 Types of lightning strokes.

	3 rd	7.6 Harmful effect of lightning. 7.7 Lightning arresters and Type of lightning Arresters.
	4 th	7.7.1 Rod-gap lightning arrester 7.7.2 Horn-gap arrester
	5 th	Tutorial Period
15 th (Extra Class)	1 st	7.7.3 Valve type arrester.
	2 nd	7.8 Surge Absorber
	3 rd	8. STATIC RELAY 8.1 Advantage of static relay.(Contd.)
	4 th	8.1 Advantage of static relay.
	5 th	Tutorial Period
16 th (Extra Class)	1 st	8.2 Instantaneous over current relay.(Contd.)
	2 nd	8.2 Instantaneous over current relay.
	3 rd	8.3 Principle of IDMT relay.(Contd.)
	4 th	8.3 Principle of IDMT relay.
	5 th	Tutorial Period

Jayanta kumar panda
Signature of Teaching Faculty

ACADEMIC LESSON PLAN OF SUMMER 2023

Discipline: Electrical Engg.	Semester: 6 th	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: 14 th Feb 2023 to 23 rd May2023 No. of weeks:15 weeks
Week	Class Day	Theory Topics
1 st	1 st	1. FUNDAMENTAL OF CONTROL SYSTEM 1.1. Classification of Control system 1.2. Open loop system & Closed loop system and its comparison
	2 nd	1.3. Effects of Feed back 1.4. Standard test Signals(Step, Ramp, Parabolic, Impulse Functions)
	3 rd	1.5. Servomechanism
	4 th	2. MATHEMATICAL MODEL OF A SYSTEM 2.1. Transfer Function & Impulse response, 2.2. Properties, Advantages & Disadvantages of Transfer Function
	5 th	Tutorial
2 nd	1 st	2.3. Poles & Zeroes of transfer Function 2.4. Simple problems of transfer function of network.
	2 nd	2.5. Mathematical modeling of Electrical Systems(R, L, C, Analogous systems)
	3 rd	Tutorial
	4 th	3. CONTROL SYSTEM COMPONENTS 3.1. Components of Control System
	5 th	3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors.(Contd)
3 rd	1 st	3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors.(Contd)
	2 nd	3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors.
	3 rd	Tutorial
	4 th	4. BLOCK DIAGRAM ALGEBRA & SIGNAL FLOW GRAPHS 4.1. Definition: Basic Elements of Block Diagram
	5 th	4.2. Canonical Form of Closed loop Systems 4.3. Rules for Block diagram reduction(Contd)
4 th	1 st	4.3. Rules for Block diagram reduction(Contd) 4.4. Procedure for of Reduction of Block Diagram
	2 nd	4.5. Simple Problem for equivalent transfer function(Contd.)
	3 rd	Tutorial
	4 th	4.5. Simple Problem for equivalent transfer function 4.6. Basic Definition in Signal Flow Graph & properties
	5 th	4.7. Construction of Signal Flow graph from Block diagram 4.8. Mason's Gain formula
5 th	1 st	4.9. Simple problems in Signal flow graph for network(Contd.)
	2 nd	4.9. Simple problems in Signal flow graph for network.
	3 rd	Tutorial
	4 th	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
	5 th	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.)

6 th	1 st	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.)
	2 nd	5.4.2. Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error.
	3 rd	Tutorial
	4 th	5.4.3. Steady state error and error constants(cont.)
	5 th	5.4.3. Steady state error and error constants
7 th	1 st	5 .5 Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system]
	2 nd	5 .6 Effect of adding poles and zero to transfer function.
	3 rd	Tutorial
	4 th	5 .7 Response with P, PI, PD and PID controller(Contd.)
	5 th	5 .7 Response with P, PI, PD and PID controller
8 th	1 st	6. ANALYSIS OF STABILITY BY ROOT LOCUS TECHNIQUE. 6.1 Root locus concept.(cont.)
	2 nd	6. 1 Root locus concept.
	3 rd	Tutorial
	4 th	6. 2 Construction of root loci.(cont.)
	5 th	6. 2 Construction of root loci.
9 th	1 st	6. 3 Rules for construction of the root locus. (cont.)
	2 nd	6. 3 Rules for construction of the root locus.(cont.)
	3 rd	Tutorial
	4 th	6. 3 Rules for construction of the root locus.(cont.)
	5 th	6. 3 Rules for construction of the root locus.(cont.)
10 th	1 st	6. 3 Rules for construction of the root locus.
	2 nd	6. 4 Effect of adding poles and zeros to G(s) and H(s).
	3 rd	Tutorial
	4 th	7. FREQUENCY RESPONSE ANALYSIS. 7.1 Correlation between time response and frequency response.
	5 th	7. 2 Polar plots.(cont.)
11 th	1 st	7. 2 Polar plots.(cont.)
	2 nd	7. 2 Polar plots.(cont.)
	3 rd	Tutorial
	4 th	7. 3 Bode plots.(cont.)
	5 th	7. 3 Bode plots.(cont.)
12 th	1 st	7. 3 Bode plots.(cont.)
	2 nd	7. 4 All pass and minimum phase system. 7. 5 Computation of Gain margin and phase margin(contd.)
	3 rd	7. 4 All pass and minimum phase system. 7. 5 Computation of Gain margin and phase margin
	4 th	Tutorial
	5 th	7. 6 Log magnitude versus phase plot.
13 th	1 st	7. 7 Closed loop frequency response.
	2 nd	8. NYQUIST PLOT 8.1 Principle of argument
	3 rd	8.2 Nyquist stability criterion.(cont.)
	4 th	Tutorial
	5 th	8.3 Nyquist stability criterion applied to inverse polar plot.(cont.)

14 th	1 st	8.3 Nyquist stability criterion applied to inverse polar plot.(cont.)
	2 nd	8.3 Nyquist stability criterion applied to inverse polar plot.
	3 rd	8.4 Effect of addition of poles and zeros to $G(S)$ $H(S)$ on the shape of Nyquist plot.
	4 th	Tutorial
	5 th	8.5 Assessment of relative stability.
15 th	1 st	8.6 Constant M and N circle.(cont.)
	2 nd	8.6 Constant M and N circle
	3 rd	8.7 Nicholas chart.(contd.)
	4 th	8.7 Nicholas chart.
	5 th	Tutorial

sangram kesari nayak

Signature of Teaching Faculty

ACADEMIC LESSON PLAN OF SUMMER 2023

Discipline: Electrical	Semester: 6 th	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: 14 th Feb 2023 to 23 rd May 2023 No. of weeks: 15 weeks
Week	Class/week	Theory Topics
1 st	1 st	1.1. Environmental consequences of fossil fuel use.
	2 nd	1.2. Importance of renewable sources of energy.
	3 rd	1.3 Sustainable Design and development.
	4 th	1.4. Types of RE sources.
	5 th	Tutorial
2 nd	1 st	1.5. Limitations of RE sources
	2 nd	1.6. Present Indian and international energy scenario of conventional and RE sources
	3 rd	2.1. Solar photovoltaic system-Operating principle.
	4 th	2.2. Photovoltaic cell concepts
	5 th	Tutorial
3 rd	1 st	2.2.1. Cell, module, array, Series and parallel connections.
	2 nd	2.3. Classification of energy Sources.
	3 rd	2.4. Extra-terrestrial and terrestrial Radiation.
	4 th	2.5. Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant.
	5 th	Tutorial
4 th	1 st	2.6. Solar collectors, Types, and performance characteristics,
	2 nd	2.6. Solar collectors, Types, and performance characteristics,
	3 rd	2.7. Applications: Photovoltaic - battery charger, domestic lighting, street lighting.
	4 th	2.7. Applications: Photovoltaic - water pumping, solar cooker, Solar Pond.
	5 th	Tutorial
5 th	1 st	3.1. Introduction to Wind energy.
	2 nd	3.2. Wind energy conversion.
	3 rd	3.3. Types of wind turbines
	4 th	3.3. Types of wind turbines
	5 th	Tutorial
6 th	1 st	3.4. Aerodynamics of wind rotors.
	2 nd	3.5. Wind turbine control systems; conversion to electrical power:
	3 rd	3.6. Induction and synchronous generators.
	4 th	3.7. Grid connected and self-excited induction generator operation.
	5 th	Tutorial
7 th	1 st	3.8. Constant voltage and constant frequency generation with power electronic control.
	2 nd	3.9. Single and double output systems.

	3 rd	3.10. Characteristics of wind power plant.
	4 th	4.1. Energy from Biomass.
	5 th	Tutorial
8 th	1 st	4.2. Biomass as Renewable Energy Source
	2 nd	4.3. Types of Biomass Fuels - Solid, Liquid and Gas.
	3 rd	4.3. Types of Biomass Fuels - Solid, Liquid and Gas.
	4 th	4.4. Combustion and fermentation.
	5 th	Tutorial
9 th	1 st	4.5. Anaerobic digestion
	2 nd	4.6. Types of biogas digester.
	3 rd	4.6. Types of biogas digester.
	4 th	4.6. Types of biogas digester.
	5 th	Tutorial
10 th	1 st	4.7. Wood gasifier.
	2 nd	4.8. Pyrolysis,.
	3 rd	4.9. Applications: Bio gas, Bio diesel
	4 th	5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.
	5 th	Tutorial
11 th	1 st	5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.
	2 nd	5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.
	3 rd	5.2. Ocean Thermal Energy Conversion (OTEC).
	4 th	5.2. Ocean Thermal Energy Conversion (OTEC).
	5 th	Tutorial
12 th	1 st	5.3. Geothermal Energy – Classification.
	2 nd	5.3. Geothermal Energy – Classification.
	3 rd	5.3. Geothermal Energy – Classification.
	4 th	5.4. Hybrid Energy Systems.
	5 th	Tutorial
13 th	1 st	5.3. Geothermal Energy – Classification.
	2 nd	5.4. Hybrid Energy Systems.
	3 rd	5.6. Diesel-PV, Wind-PV, Microhydel-PV.
	4 th	5.6. Diesel-PV, Wind-PV, Microhydel-PV.
	5 th	Tutorial
14 th	1 st	5.6. Diesel-PV, Wind-PV, Microhydel-PV.
	2 nd	5.7. Electric and hybrid electric vehicles.
	3 rd	5.7. Electric and hybrid electric vehicles.
	4 th	5.7. Electric and hybrid electric vehicles.
	5 th	Tutorial
15 th	1 st	5.4. Hybrid Energy Systems.
	2 nd	5.5. Need for Hybrid Systems.
	3 rd	Revision - Biomass Power
	4 th	Revision - Biomass Power
	5 th	Tutorial

Rajesh kumar jena

Signature of Teaching Faculty

ACADEMIC LESSON PLAN FOR SUMMER 2023

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: 14 th Feb 2023 to 23 rd May2023 No. of weeks:15 weeks
Week	Class Day	Theory/ Practical Topics
1 st	1 st	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)
	2 nd	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)
2 nd	1 st	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.)
	2 nd	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.)
3 rd	1 st	2. Cutting copper and aluminium cable and crimping lug to them from 4mm ² to 25mm ² cross section. .(Theory)
	2 nd	2. Cutting copper and aluminium cable and crimping lug to them from 4mm ² to 25mm ² cross section. (Practical)

4 th	1 st	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)
	2 nd	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.)
5 th	1 st	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.)
	2 nd	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.)
6 th	1 st	4. Study battery charger and make charging of lead acid battery (record charging voltage, current and specific gravity). (Theory)
	2 nd	4. Study battery charger and make charging of lead acid battery (record charging voltage, current and specific gravity). (Practical)
7 th	1 st	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)
	2 nd	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)
8 th	1 st	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.)
	2 nd	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)
9 th	1 st	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.)
	2 nd	6. Fault finding & repairing of Fan – prepare an inventory list of parts. (Theory)
10 th	1 st	6. Fault finding & repairing of Fan – prepare an inventory list of parts. (practical)
	2 nd	6. Fault finding & repairing of Fan – prepare an inventory list of parts. (practical)(contd.)
11 th	1 st	7. Find out fault of D.C. generator, repair and test it to run. (Theory)
	2 nd	7. Find out fault of D.C. generator, repair and test it to run. (practical)
12 th	1 st	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)
	2 nd	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)
13 th	1 st	9. Dismantle, over haul and assemble a single-phase induction motor. Test and run it. – prepare an inventory list. (Theory)
	2 nd	9. Dismantle, over haul and assemble a single-phase induction motor. Test and run it. – prepare an inventory list. (Practical)
14 th	1 st	10. Dismantle over haul and assemble a three-phase squirrel cage and phase wound motor. Test and run them. (Theory)
	2 nd	10. Dismantle over haul and assemble a three-phase squirrel cage and phase wound motor. Test and run them. (Practical)
15 th	1 st	11. Overhaul a single phase / 3 phase variac. (Theory)
	2 nd	11. Overhaul a single phase / 3 phase variac. (Practical)

pradosh mohapatra

Signature of Teaching Faculty