LESSON PLAN: ANALOG ELECTRONICS LAB SUMMER 2024

Discipline: ELECTRICAL	Semester: 4th SUMMER 2024	Name of the teaching faculty: SHIBASHIS KAR
Subject: ANALOG ELECTRONICS LAB	No of days/per week class allotted: 03	Semester From Date: 16/01/2024 To Date: 26/04/2024 No of weeks:14
Week:	Class day:	Theory/practical topics:
1st:	1st 2nd 3rd	Construct Bridge Rectifier using different filter circuit and to determine Ripple factor & analyze wave form with filter & without filter.
2nd	1st 2nd 3rd	Construct & test the regulator using Zener diode
3rd	1st 2nd 3rd	Determine the input and output Characteristics of CE & CB transistor configuration
4th	1st 2nd 3rd	Construct different types of biasing circuit and analyze the wave form: Fixed bias, Emitter bias, Voltage divider bias
5th	1st 2nd 3rd	Study the single stage CE amplifier & find Gain
6th	1st 2nd 3rd	Study the multi stage CE amplifier & find Gain
7th	1st 2nd 3rd	Construct & test push pull amplifier & observer the wave form
8th	1st 2nd 3rd	Construct & Find the gain: Class A. Amplifier, Class B. Amplifier, Class C Tuned Amplifier
9th	1st 2nd 3rd	Construct & calculate the frequency of: Wein Bridge Oscillator
10th	1st 2nd 3rd	Construct & calculate the frequency of: R-C phase
11th	1st 2nd 3rd	Construct & calculate the frequency of: Collpit's Oscillator
12th	1st 2nd 3rd	Construct & calculate the frequency of: Hartly Oscillator
13th	1st 2nd 3rd	Determine Drain & Transfer Characteristics of JFET
14th	1st 2nd 3rd	Revision and Viva Voce

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LESSON PLAN

GOVT POLYTECHNIC KALAHANDI, BHAWANIPATNA

Faculty Name: KAMBHUDEEP BAG ***BRANCH*: ELECTRICAL** ***SEM*: 4TH** ***SESSION*:2023-24(S)**

SUBJECT: ANALOG ELECTRONICS LAB	**No. of days/ week** **Class allotted:** 6 **Total Periods**: 90	**w.e.f.** 16.01.2024 **to** 26.04.24
Week	**Class Period**	**Theory**
1st	2nd, 3rd, 4th	Construct Bridge Rectifier using different filter circuit and to determine Ripple factor & analyze wave form with filter & without filter.
	2nd, 3rd, 4th	-DO-
2nd	2nd, 3rd, 4th	Construct & test the regulator using Zener diode
	2nd, 3rd, 4th	-DO-
3rd	2nd, 3rd, 4th	Determine the input and output Characteristics of CE & CB transistor configuration
	2nd, 3rd, 4th	-DO-
4th	2nd, 3rd, 4th	Construct different types of biasing circuit and analyze the wave form: Fixed bias, Emitter bias, Voltage divider bias
	2nd, 3rd, 4th	-DO-
5th	2nd, 3rd, 4th	Study the single stage CE amplifier & find Gain
	2nd, 3rd, 4th	-DO-
6th	2nd, 3rd, 4th	Study multi stage R-C coupled amplifier & to determine frequency- response & gain.
	2nd, 3rd, 4th	-DO-
7th	2nd, 3rd, 4th	Construct & test push pull amplifier & observer the wave form
	2nd, 3rd, 4th	-DO-
8th	2nd, 3rd, 4th	Construct & Find the gain: Class A. Amplifier, Class B. Amplifier, Class C Tuned Amplifier
	2nd, 3rd, 4th	-DO-
9th	2nd, 3rd, 4th	Construct & calculate the frequency of: Wein Bridge Oscillator Construct & calculate the frequency of: R-C phase shift
	2nd, 3rd, 4th	-DO-
10th	2nd, 3rd, 4th	-DO-
	2nd, 3rd, 4th	Construct & calculate the frequency of: Collpit's Oscillator Construct & calculate the frequency of: Hartly Oscillator
11th	2nd, 3rd, 4th	-DO-
	2nd, 3rd, 4th	-DO-
12th	2nd, 3rd, 4th	Determine Drain & Transfer Characteristics of JFET
	2nd, 3rd, 4th	-DO-
13th	2nd, 3rd, 4th	Construct & Test Differentiator and Integrator using R-C Circuit.
	2nd, 3rd, 4th	-DO-
14th	2nd, 3rd, 4th	Study Multivibrator (Astable, Bistable, Monstable) Circuit & Draw its Wave forms
	2nd, 3rd, 4th	-DO-
15th	2nd, 3rd, 4th	Project submission
	2nd, 3rd, 4th	-DO-

LESSON PLAN:ANALOG ELECTRONICS AND OPAMP SUMMER 2024

Discipline: ELECTRICAL	Semester:4th SUMMER 2024	Name of the teaching faculty :SHIBASHIS KAR
Subject: ANALOG ELECTRONICS AND OP-AMP	No of days/per week class allotted:04	Semester From Date:16/01/2024 ToDate:26/04/2024 No of weeks:14
Week:	Class day:	Theory/practical topics:
1ST	1st	Working of Diode.V-I characteristic of PN junction Diode.
	2nd	DC load line, Ideal Diode, Knee voltage. Zener breakdown, Avalanche breakdown
	3rd	Thermistors, Sensors & barretters Zener Diode,
	4th	Tunnel Diode, PIN Diode
2ND	1st	P-N Diode clipping Circuit, clamping circuit
	2nd	Classification of rectifiers Analysis of half wave, full wave centre tapped and Bridge rectifiers. Calculate: DC output current and voltage, RMS output current and voltage, Rectifier efficiency, Ripple factor, Regulation, Transformer utilization factor, Peak inverse voltage
3RD	3rd	
	4th	
	1st	
	2nd	Filters: Shunt capacitor filter, Choke input filter, π-filter
4TH	3rd	
	4th	Different modes of operation of transistor.
	1st	Current components in a transistor , Transistor as an amplifier
	2nd	Transistor circuit configuration & its characteristics: CB Configuration, CE Configuration, CC Configuration
5TH	3rd	
	4th	
	1st	Transistor biasing, Stabilization: Stability factor, Different method of Transistors Biasing, Base resistor method, Collector to base bias Self bias or voltage divider method
	2nd	
6TH	3rd	
	4th	
	1st	**CLASSTEST-I**
	2nd	**INTERNALTEST**
7TH	3rd	Practical circuit of transistor amplifier, DC load line and DC equivalent circuit, AC loadline and AC equivalent circuit, Calculation of gain, Phase reversal
	4th	
	1st	
	2nd	
8TH	3rd	H-parameters of transistors, Simplified H-parameters of transistors Generalized approximate model, Analysis of CB, CE ,CC amplifier using generalized approximate model
	4th	
	1st	
	2nd	Multistage transistor amplifier, R.C.coupled amplifier, Transformer coupled amplifier,
9TH	3rd	
	4th	
	1st	General theory of feedback ,Negative feedback circuit, Feedback in amplifier, Advantage of negative feed back
	2nd	

10TH	3rd	Power amplifier and its classification, Difference between voltage, amplifier and power amplifier, Transformer coupled class A power amplifier, Class A push– pull amplifier, Class B push– pull amplifier
	4th	
	1st	
	2nd	
11TH	3rd	Oscillators, Types of oscillators, Essentials of transistor oscillator Principle of operation of tuned collector, Hartley, colpitt, phase shift, wein- bridge oscillator (no mathematical derivations)
	4th	
	1st	
	2nd	
12TH	3rd	Classification of FET, Advantages of FET over BJT, Principle of operation of FET.FET parameters(no mathematical derivation),DC drain resistance, AC drain resistance, Trans-conductance, Biasing of FET
	4th	
	1st	
	2nd	
13TH	3rd	General circuit simple of OP-AMP and IC – CA – 741 OPAMP Operational amplifier stages, Equivalent circuit of operational amplifier, Open loop OP-AMP configuration. OPAMP with feedback. Inverting OP-AMP, Non inverting OP-AMP.
	4th	
	1st	
	2nd	
14TH	3rd	Voltage follower & buffer, Differential amplifier, Adder or summing amplifier, Subtractor, Integrator, Differentiator, Comparator
	4th	
	1st	
	2nd	**CLASSTEST-II**
	3rd	**REVISION**
	4th	**REVISION**

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LESSON PLAN: BASIC ELECTRONICS SUMMER 2024

Discipline: MECHANICAl	Semester: 2ND SEMESTER	Name of the teaching faculty: KAMBHUDEEP BAG
Subject: BASIC ELECTRONICS	No of days/per week class allotted: 02	Semester From Date: 29 JAN 2024 To Date: 14 MAY 2024 No of weeks:15
Week:	Class day:	Theory/practical topics:
1st:	1st	Basic Concept of Electronics
	2nd	Electron Emission & its types.
2nd	1st	Classification of material according to electrical conductivity (Conductor, Semiconductor & Insulator) with respect to energy band diagram only.
	2nd	Difference between vacuum tube & semiconductor
3rd	1st	Difference between Intrinsic & Extrinsic Semiconductor.
	2nd	Principle of working and use of PN junction diode
4th	1st	Principle of working Zener diode and Light Emitting Diode.
	2nd	Basic concept of manufacturing integrated circuits (I.C) & its uses.
5th	1st	Rectifier & its uses.
	2nd	Principles of working of different types of Rectifiers with their merits and demerits
6th	1st	Functions of filters and classification of simple Filter circuit (Capacitor, choke input and π).
	2nd	Working of D.C power supply system (unregulated) with help of block diagrams only
7th	1st	Transistor, Different types of Transistor Configuration and state output and input current gain relationship in CE,CB and CC configuration(No mathematical derivation)
	2nd	Transistor, Different types of Transistor Configuration and state output and input current gain relationship in CE,CB and CC configuration(No mathematical derivation)
8th	1st	Need of biasing and explain different types of biasing with circuit diagram.(only CE configuration)
	2nd	
9th	1st	Amplifiers(concept) , working principles of single phase CE amplifier.
	2nd	Electronic Oscillator and its classification. Working of Basic Oscillator with different elements through simple Block Diagram
10th	1st	Basic communication system (concept & explanation with help of Block diagram)
	2nd	Concept of Modulation and Demodulation Different types of Modulation (AM, FM & PM) based on signal, carrier wave and modulated wave.
11th	1st	Concept of Transducer and sensor with their differences.
	2nd	Different type of Transducers & concept of active and passive transducer.
12th	1st	Working principle of photo emissive, photoconductive, photovoltaic transducer and its application.
	2nd	
13th	1st	Multimeter and its applications
	2nd	Analog and Digital Multimeter and their differences
14th	1st	Working principle of Multimeter with Basic Block diagram.
	2nd	
15th	1st	CRO, working principle of CRO with simple Block diagram
	2nd	

LESSON PLAN-2024(SUMMER)

GOVT POLYTECHNIC KALAHANDI, BHAWANIPATNA

FACULTY NAME: BHUBANTA KAND BRANCH: MECH & CIVIL SEM: 2nd SESSION:2023-24(S)

SUBJECT: BEE	**No. of days/ week** **Class allotted:** 02 **Total Periods**: 30	**w.e.f. 16.01.2024 to 14.05.2024**
Week	**Class Day**	**Theory**
1st	1st	1. FUNDAMENTALS 1.1 Concept of current flow. 1.2 Concept of source and load. 1.3 State Ohm's law and concept of resistance.
	2nd	1.4 Relation of V, I & R in series circuit. 1.5 Relation of V, I & R in parallel circuit. 1.6 Division of current in parallel circuit.
2nd	1st	1.7 Effect of power in series & parallel circuit. 1.8 Kirchhoff's Law.
	2nd	1.9 Simple problems on Kirchhoff's law.
3rd	1st	2. A.C. THEORY 2.1 Generation of alternating emf. 2.2 Difference between D.C. & A.C.
	2nd	2.3 Define Amplitude, instantaneous value, cycle, Time period, frequency, phase angle,phase difference.
4th	1st	2.4 State & Explain RMS value, Average value, Amplitude factor & Form factor with Simple problems.
	2nd	2.5 Represent AC values in phasor diagrams. 2.6 AC through pure resistance, inductance & capacitance
5th	1st	2.7 AC though RL, RC, RLC series circuits.
	2nd	2.8 Simple problems on RL, RC & RLC series circuits.
6th	1st	2.9 Concept of Power and Power factor 2.10 Impedance triangle and power triangle.
	2nd	3. GENERATION OF ELECTRICAL POWER 3.1 Give elementary idea on generation of electricity from thermal , hydro & nuclear power station with block diagram.
7th	1st	-DO-
	2nd	-DO-
8th	1st	4. CONVERSION OF ELECTRICAL ENERGY 4.1 Introduction of DC machines. 4.2 Main parts of DC machines.
	2nd	4.3 Principle of operation of DC generator 4.4 EMF equation of generator and simple problem.
9th	1st	4.5 Classification of DC generator 4.6 Principle of operation of DC motor. 4.7 Classification of DC motor
	2nd	4.8 Uses of different types of DC generators & motors. 4.9 Types and uses of single phase induction motors.
10th	1st	4.10 Types and uses of 3-phase induction motors. 4.11 Concept of transformer & its applications

	2nd	5. WIRING AND POWER BILLING 5.1 Types of wiring for domestic installations.
11th	**1st**	5.2 Layout of household electrical wiring (single line diagram showing all the important component in the system).
	2nd	5.3 List out the basic protective devices used in house hold wiring.
12th	**1st**	5.4 Calculate energy consumed in a small electrical installation modulated wave (only concept, No mathematical Derivation)
	2nd	6. MEASURING INSTRUMENTS 6.1 Introduction to measuring instruments. 6.2 Torques in instruments.
13th	**1st**	6.3 Different uses of PMMC type of instruments (Ammeter & Voltmeter). 6.4 Different uses of MI type of instruments (Ammeter & Voltmeter).
	2nd	6.5 Draw the connection diagram of A.C/ D.C Ammeter, voltmeter, energy meter and wattmeter. (Single phase only).
14th	**1st**	7. CONSERVATION OF ELECTRICAL ENERGY 7.1 Concept of Lumen. 7.2 Different types of Lamps (Filament, fluorescent, Mercury Vapour, Sodium Vapour, Neon, LED bulb) its Construction and Principle.
	2nd	-DO-
15th	**1st**	7.3 Star rating of home appliances (Terminology, Energy efficiency, Star rating Concept)
	2nd	Doubt Clearing Class

LESSON PLAN

GOVT POLYTECHNIC KALAHANDI, BHAWANIPATNA

Faculty Name: KAMBHUDEEP BAG ***BRANCH*: ELECTRICAL** ***SEM*: 6TH** ***SESSION*:2023-24(S)**

SUBJECT: Control System Engineering	**No. of days/ week Class allotted:** 5 **Total Periods**: 75	**w.e.f.** 16.01.2024 **to** 26.04.24
Week	**Class Day**	**Theory**
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	-DO-
	5th	TUTORIAL Chapter 1
2nd	1st	**2. MATHEMATICAL MODEL OF A SYSTEM** 2.1. Transfer Function & Impulse response
	2nd	2.2. Properties, Advantages & Disadvantages of Transfer Function
	3rd	2.3. Poles & Zeroes of transfer Function
	4th	2.4. Simple problems of transfer function of network 2.5. Mathematical modeling of Electrical Systems(R, L, C, Analogous systems
	5th	TUTORIAL Chapter 2
3rd	1st	**3. CONTROL SYSTEM COMPONENTS** 3.1. Components of Control System
	2nd	3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors.
	3rd	-DO-
	4th	-DO-
	5th	TUTORIAL Chapter 3
4th	1st	**4. BLOCK DIAGRAM ALGEBRA & SIGNAL FLOW GRAPHS** 4.1. Definition: Basic Elements of Block Diagram 4.2. Canonical Form of Closed loop Systems
	2nd	4.3. Rules for Block diagram reduction
	3rd	4.4. Procedure for of Reduction of Block Diagram
	4th	4.5. Simple Problem for equivalent transfer function
	5th	TUTORIAL Chapter 4
5th	1st	4.6. Basic Definition in Signal Flow Graph & properties
	2nd	4.7. Construction of Signal Flow graph from Block diagram
	3rd	4.8. Mason's Gain formula
	4th	4.9. Simple problems in Signal flow graph for network
	5th	TUTORIAL Chapter 4
6th	1st	**5. TIME RESPONSE ANALYSIS** 5 . 1 Time response of control system. 5 . 2 Standard Test signal.
	2nd	5.2.1. Step signal,
	3rd	5.2.2. Ramp Signal
	4th	5.2.3. Parabolic Signal
	5th	TUTORIAL Chapter 5
7th	1st	5.2.4. Impulse Signal
	2nd	5 . 3 Time Response of first order system with
	3rd	5.3.1. Unit step response

		5.3.2. Unit impulse response.
	4th	5 . 4 Time response of second order system to the unit step input. 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
	5th	TUTORIAL Chapter 5
8th	1st	5.4.3. Steady state error and error constants
	2nd	5 . 5 Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system] 5 . 6 Effect of adding poles and zero to transfer function. 5 . 7 Response with P, PI, PD and PID controller.
	3rd	TUTORIAL Chapter 5
	4th	**6.ANALYSIS OF STABILITY BY ROOT LOCUS TECHNIQUE** 6 . 1 Root locus concept.
	5th	-DO-
9th	1st	6 . 2 Construction of root loci
	2nd	-DO-
	3rd	6 . 3 Rules for construction of the root locus
	4th	-DO-
	5th	TUTORIAL Chapter 6
10th	1st	6 . 4 Effect of adding poles and zeros to G(s) and H(s).
	2nd	-DO-
	3rd	-DO-
	4th	-DO-
	5th	TUTORIAL Chapter 6
11th	1st	**7.FREQUENCY RESPONSE ANALYSIS** 7 . 1 Correlation between time response and frequency response.
	2nd	7 . 2 Polar plots.
	3rd	-DO-
	4th	7 . 3 Bode plots.
	5th	TUTORIAL Chapter 7
12th	1st	7 . 3 Bode plots
	2nd	7 . 4 All pass and minimum phase system.
	3rd	7 . 5 Computation of Gain margin and phase margin.
	4th	7 . 6 Log magnitude versus phase plot.
	5th	-DO-
13th	1st	7 . 7 Closed loop frequency response.
	2nd	TUTORIAL Chapter 7
	3rd	**8.NYQUIST PLOT** 8.1 Principle of argument.
	4th	8.2 Nyquist stability criterion.
	5th	-DO-
14th	1st	8.3 Niquist stability criterion applied to inverse polar plot
	2nd	8.4 Effect of addition of poles and zeros to G(S) H(S) on the shape of Niquist plot.
	3rd	-DO-
	4th	8.5 Assessment of relative stability.
	5th	TUTORIAL Chapter 8
15th	1st	8.6 Constant M and N circle
	2nd	-DO-
	3rd	8.7 Nicholas chart.
	4th	TUTORIAL Chapter 8

LESSON PLAN: ENERGY CONVERSION I SUMMER 2024

Discipline: ELECTRICAL	Semester: SUMMER 2024	Name of the teaching faculty: SHIBASHIS KAR
Subject: ENEGY CONVERSION I	No of days/per week class allotted: 05	Semester From Date: 16/01/2024 To Date: 26/04/2024 No of weeks:14 weeks
Week:	Class day:	Theory/practical topics:
1st	1st	1. D.C GENERATOR Operating principle of generator Constructional features of DC machine. Yoke, Pole & field winding, Armature, Commutator.
	2nd	Armature winding, back pitch, Front pitch, Resultant pitch and commutator- pitch.
	3rd	Simple Lap winding
	4th	Simple wave winding
	5th	Dummy coils. Different types of D.C. machines (Shunt, Series and Compound)
2nd	1st	Derivation of EMF equation of DC generators. (Solve problems)
	2nd	Losses and efficiency of DC generator. Condition for maximum efficiency and numerical problems.
	3rd	Armature reaction in D.C. machine
	4th	Commutation and methods of improving commutation.
	5th	Role of inter poles and compensating winding in commutation.
3rd	1st	Characteristics of D.C. Generators
	2nd	Application of different types of D.C. Generators Concept of critical resistance and
	3rd	Critical speed of DC shunt generator Conditions of Build-up of emf of DC generator
	4th	Parallel operation of D.C. Generators. Uses of D.C generators.
	5th	Solve numerical problems
4th	1st	2. D. C. MOTORS Basic working principle of DC motor Significance of back emf in D.C. Motor. .
	2nd	Voltage equation of D.C. Motor and condition for maximum power output(simple problems)
	3rd	Derive torque equation (solve problems) Speed-Back emf relationship
	4th	Characteristics of shunt, series and compound motors and their application.
	5th	Starting method of shunt, series and compound motors.

5th	1st	Speed control of D.C shunt motors by Flux control method. Armature voltage Control method.
	2nd	Solve numerical problems
	3rd	Speed control of D.C. series motors by Field Flux control method.
	4th	Speed control of D.C. series motors by Tapped field method and series-parallel method
	5th	Determination of efficiency of D.C. Machine by Brake test method
6th	1st	Determination of efficiency of D.C. Machine by Swinburne's Test method
	2nd	Losses, efficiency and power stages of D.C. motor Uses of D.C. motors
	3rd	Solve numerical problems
	4th	<u>3. SINGLE PHASE TRANSFORMER</u> Working principle of transformer. Constructional feature of Transformer.
	5th	Arrangement of core & winding in different types of transformer.
7th	1st	Brief ideas about transformer accessories such as conservator, tank, breather, and explosion vent etc.
	2nd	Explain types of cooling methods State the procedures for Care and maintenance
	3rd	EMF equation of transformer. Ideal transformer voltage transformation ratio
	4th	Operation of Transformer at no load, on load with phasor diagrams.
	5th	Equivalent Resistance, Leakage Reactance and Impedance of transformer. To draw phasor diagram of transformer on load, with winding Resistance and Magnetic leakage with using upf, leading pf and lagging pf load.
8th	1st	Equivalent Resistance, Leakage Reactance and Impedance of transformer.
	2nd	To draw phasor diagram of transformer on load, with winding Resistance and Magnetic leakage with using upf, leading pf and lagging pf load.
	3rd	To explain Equivalent circuit and solve numerical problems. Approximate & exact voltage drop calculation of a Transformer.
	4th	To explain Equivalent circuit and solve numerical problems. Approximate & exact voltage drop calculation of a Transformer.
	5th	Regulation of transformer. Different types of losses in a Transformer.
9th	1st	Explain Open circuit and Short Circuit test.(Solve numerical problems)

	2nd	Explain Open circuit and Short Circuit test.(Solve numerical problems)
	3rd	Explain Short Circuit test.(Solve numerical problems)
	4th	Explain Efficiency, efficiency at different loads and power factors, condition for maximum efficiency
	5th	Explain All Day Efficiency (solve problems)
	1st	Solve numerical problems
10th	2nd	Determination of load corresponding to Maximum efficiency.
	3rd	Parallel operation of single phase transformer.
	4th	Solve numerical problems
	5th	4. AUTO TRANSFORMER Constructional features of Auto transformer.
	1st	Working principle of single phase Auto Transformer.
	2nd	Comparison of Auto transformer with an two winding transformer (saving of Copper).
11th	3rd	Uses of Auto transformer. Explain Tap changer with transformer (on load and off load condition)
	4th	5. INSTRUMENT TRANSFORMERS Explain Current Transformer along with phasor diagrams
	5th	Explain Potential Transformer along with phasor diagrams
12th	1st	Name plate study of CT and PT
	2nd	Define Ratio error, Phase error, Burden etc
	3rd	Uses of C.T. and P.T.
	4th	Solving numerical problems of DC generators, Motors
	5th	Solving numerical problems of transformers
13th	1st	Revision of chapter 1
	2nd	Revision of chapter 2
	3rd	Revision of chapter 3
	4th	Revision of chapter 3
	5th	Revision of chapter 4
14th	1st	Revision of chapter 5
	2nd	Sample papers practice
	3rd	Sample papers practice
	4th	Sample papers practice
	5th	Sample papers practice

Shibashis Kar

LESSON PLAN

GOVT POLYTECHNIC KALAHANDI, BHAWANIPATNA

Faculty Name: SATYAPRAKASH OJHA ***BRANCH*: ELECTRICAL** ***SEM*: 4TH** ***SESSION*:2023-24(S)**

SUBJECT: ELECTRICAL DRAWING	**No. of days/ week Class allotted:** 6 **Total Periods**: 90	**w.e.f.** 16.01.24 to 14.05.2024
Week	Class Period	Theory
1st	1st 2nd 3rd	**1. WIRING DIAGRAM AND CONTROL CIRCUIT** 1.1 3 point D. C. motor starter.
	4th 5th 6th	1.2 4 point D.C. motor starter.
2nd	1st 2nd 3rd	1.3 DOL starter
	4th 5th 6th	1.4 Star delta starter.
3rd	1st 2nd 3rd	1.5 Auto Transformer Starter.
	4th 5th 6th	1.6 Rotor resistance starter
4th	1st 2nd 3rd	**2. DRAW D.C. M/C PARTS** (Dimensional Drawing) 2.1. Pole with pole shoes.
	4th 5th 6th	2.2.Commutator
5th	1st 2nd 3rd	2.3. Armature
	4th 5th 6th	2.4. DC. armature winding (a) Simple lap winding
6th	1st 2nd 3rd	-DO-
	4th 5th 6th	(b) Simple wave winding.
7th	1st 2nd 3rd	**3. DRAW 1-PHASE & 3-PHASE TRANSFORMER** (Assembly Drawing) 3.1 Stepped core type

	4th 5th 6th	-DO-
8th	1st 2nd 3rd	3.2 Plane shell type.
	4th 5th 6th	. -DO-
9th	1st 2nd 3rd	**4.DRAW SKETCHES OF THE FOLLOWING AS PER B.I.S AND REC SPECIFICATIONS** 5.1 Earthing installation.
	4th 5th 6th	-DO-
10th	1st 2nd 3rd	-DO-
	4th 5th 6th	5.2 Double pole structure for LT and HT distribution lines.
11th	1st 2nd 3rd	-DO-
	4th 5th 6th	-DO-
12th	1st 2nd 3rd	**5.DRAW SINGLE LINE DIAGRAM OF SUBSTATION** 6.1 Single line diagram of 33/11kV distribution substation
	4th 5th 6th	-DO-
13th	1st 2nd 3rd	. 6.2 Single line diagram of a 11/0.4 kV distribution substation.
	4th 5th 6th	**6.COMPUTER AIDED ELECTRICAL DRAWING USING SOFT WARE** 8.1 Draw Electrical symbols (take Print out)
14th	1st 2nd 3rd	8.2 Draw D.C. m/c parts (take print out)
	4th 5th 6th	8.3 Draw A. C. m/c parts (take print out)
15th	1st 2nd 3rd	8.4 Draw electrical layout of diagram of Electrical Installation of a building.
	4th 5th 6th	-DO-

LESSON PLAN

GOVT POLYTECHNIC KALAHANDI, BHAWANIPATNA

Faculty Name: KAMBHUDEEP BAG ***BRANCH*: ELECTRICAL** ***SEM*: 6TH** ***SESSION*:2023-24(S)**

SUBJECT: ELECTRICAL INSTALLATION AND ESTIMATING	**No. of days/ week** **Class allotted:** 5 **Total Periods**: 75	**w.e.f.** 16.01.2024 **to** 26.04.24
Week	Class Day	Theory
1st	1st	**1. INDIAN ELECTRICITY RULES** 1.1 Definitions, Ampere, Apparatus, Accessible, Bare, cable, circuit, circuit breaker, conductor voltage (low, medium, high, EH), live, dead, cut-out, conduit, system, danger, Installation, earthing system, span, volt, switch gear, etc.
	2nd	1.2 General safety precautions, rule 29, 30, 31, 32, 33, 34, 35, 36, 40, 41, 43, 44, 45, 46.
	3rd	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.
	4th	1.4 OH lines : Rule 74, 75, 76, 77, 78, 79, 80, 86, 87, 88, 89, 90, 91
	5th	**Tutorial**
2nd	1st	**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.
	2nd	-DO-
	3rd	-DO-
	4th	-DO-
	5th	**Tutorial**
3rd	1st	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.
	2nd	-DO-
	3rd	-DO-
	4th	2. 3 LIGHTING SCHEME: Aspects of good lighting services. Types of lighting schemes, design of lighting schemes, factory lighting, public lighting installations, street lighting,
	5th	**Tutorial**
4th	1st	general rules for wiring, determination of number of points (light, fan, socket, outlets), determination of total load, determination of Number of sub-circuits.
	2nd	-DO-
	3rd	-DO-
	4th	-DO-
	5th	**Tutorial**
5th	1st	**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.

	2nd	-DO-
	3rd	-DO-
	4th	3 .2 Prepare one estimate of materials required for CTS wiring for small domestic installation of one room and one verandah within 25 m^2 with given light, fan & plug points.
	5th	**Tutorial**
6th	1st	3 .2 Prepare one estimate of materials required for CTS wiring for small domestic installation of one room and one verandah within 25 m^2 with given light, fan & plug points.
	2nd	-DO-
	3rd	3 .3 Prepare one estimate of materials required for conduit wiring for small domestic installation of one room and one verandha within 25 m^2 with given light, fan & plug points.
	4th	-DO-
	5th	**Tutorial**
7th	1st	3 .4 Prepare one estimate of materials required for concealed wiring for domestic installation of two rooms and one latrine, bath, kitchen & verandah within 80m^2 with given light, fan & plug points.
	2nd	-DO-
	3rd	3 .5 Prepare one estimate of materials required for erection of conduct wiring to a small workshop installation about 30m^2 and load within 10 KW.
	4th	-DO-
	5th	**Tutorial**
8th	1st	**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.
	2nd	-DO-
	3rd	-DO-
	4th	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.
	5th	**Tutorial**
9th	1st	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.
	2nd	-DO-
	3rd	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.
	4th	-DO-
	5th	**Tutorial**
10th	1st	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 consider action using ACSR.

	2nd	-DO-
	3rd	-DO-
	4th	-DO-
	5th	**Tutorial**
11th	1st	**5. OVER HEAD SERVICE LINES** 5.1 Components of service lines, service line (cables and conductors), bearer wire, lacing rod. Ariel fuse, service support, energy box and meters etc.
	2nd	-DO-
	3rd	5. 2 Prepare and estimate for providing single phase supply of load of 5 KW (light, fan, socket) to a single stored residential building.
	4th	-DO-
	5th	**Tutorial**
12th	1st	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.
	2nd	-DO-
	3rd	5. 4 Prepare one estimate of materials required for service connection to a factory building with load within 15 KW using insulated wire.
	4th	-DO-
	5th	**Tutorial**
13th	1st	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.
	2nd	-DO-
	3rd	-DO-
	4th	**6. ESTIMATING FOR DISTRIBUTION SUBSTATIONS** 6.1 Prepare one materials estimate for following types of transformer substations.
	5th	**Tutorial**
14th	1st	6. 1 Prepare one materials estimate for following types of transformer substations.
	2nd	6.1.1 Pole mounted substation.
	3rd	-DO-
	4th	6.1.2 Plinth Mounted substation.
	5th	**Tutorial**
15th	1st	6.1.2 Plinth Mounted substation.
	2nd	-DO-
	3rd	-DO-
	4th	-DO-
	5th	**Tutorial**

LESSON PLAN-2024(SUMMER)

GOVT POLYTECHNIC KALAHANDI, BHAWANIPATNA

FACULTY NAME: BHUBANTA KAND **BRANCH: ELECTRICAL** **SEM: 6th** **SESSION:2023-24(S)**

SUBJECT: Electrical Work Shop	**No. of days/ week Class allotted:** 6 **Total Periods**: 90	**w.e.f. 16.01.2024 to 14.05.2024**
Week	**Class Period**	**PRACTICAL**
1st	**1st,2nd,3rd**	**1.** Identification of single core (sc), twin core (tc), three cores (3C), four cores (4C); copper and aluminum pvc, vir & weather proof (wp) wire and prepare britannia t- joint and married joint.
	4th,5th,6th	**-do-**
2nd	**1st,2nd,3rd**	**-do-**
	4th,5th,6th	**2.** Cutting copper and aluminum cable and crimping lug to them from 2.5MM2 to 6 mm2 cross section.
3rd	**1st,2nd,3rd**	-do-
	4th,5th,6th	**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 .
4th	**1st,2nd,3rd**	**-do-**
	4th,5th,6th	**-do-**
5th	**1st,2nd,3rd**	**4.** Study battery charger and make charging of lead acid battery (record charging voltage, current and specific gravity).
	4th,5th,6th	**-do-**
6th	**1st,2nd,3rd**	**-do-**
	4th,5th,6th	**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.
7th	**1st,2nd,3rd**	**-do-**
	1st,2nd,3rd	**-do-**
8th	**4th,5th,6th**	**6.** Fault finding & repairing of ceiling fan – prepare an inventory list of parts.
	1st,2nd,3rd	**-do-**
9th	**4th,5th,6th**	**-do-**
	1st,2nd,3rd	**7**. Find out fault of d.c. Generator, repair and test it to run.
10th	**4th,5th,6th**	**-do-**
	1st,2nd,3rd	**8.** Find out fault of d.c. Motor starters and a.c motor starter – prepare an inventory list of parts used in different starters.
11th	**4th,5th,6th**	**-do-**
	1st,2nd,3rd	**9**. Dismantle, over haul and assemble a single phase induction motor. Test and run it. – prepare an inventory list.
12th	**4th,5th,6th**	**-do-**
	1st,2nd,3rd	**-do-**

13th	**4th,5th,6th**	**10**. Dismantle over haul and assemble a three phase squirrel cage and phase wound motor. Test and run them.
	1st,2nd,3rd	10. Dismantle over haul and assemble a three phase squirrel cage and phase wound motor. Test and run them.
14th	**1st,2nd,3rd**	**-do-**
	4th,5th,6th	**11**. Overhaul a single phase and 3-phase variac.
15th	**1st,2nd,3rd**	**-do-**
	4th,5th,6th	**-do-**

LESSON PLAN

GOVT POLYTECHNIC KALAHANDI, BHAWANIPATNA

Faculty Name: SUJOGYA MISHRA ***BRANCH*: ELECTRICAL** ***SEM*: 4TH** ***SESSION*:2023-24(S)**

SUBJECT: ELECTRICAL MACHINE LAB-1	**No. of days/ week Class allotted:** 6 **Total Periods**: 90	**w.e.f.** 16.01.2024 **to** 26.04.24
Week	Class Period	Theory
1st	5th , 6th, 7th	1. Identification of different terminals of a DC machine by test lamp method and multi-meter method & to measure insulation resistance by megger.
	5th , 6th, 7th	-DO-
2nd	5th , 6th, 7th	-DO-
	5th , 6th, 7th	2. Dimensional and material study of various parts of a DC machine.
3rd	5th , 6th, 7th	-DO-
	5th , 6th, 7th	3. Plot OCC of a DC shunt generator at constant speed and determine critical resistance from the graph.
4th	5th , 6th, 7th	-DO-
	5th , 6th, 7th	4. Plot External Characteristics of a DC shunt generator at constant speed.
5th	5th , 6th, 7th	-DO-
	5th , 6th, 7th	5. Study of Three point starter, connect and run a DC shunt motor & measure the no load current.
6th	5th , 6th, 7th	-DO-
	5th , 6th, 7th	6. Study of Four point starter, connect and run a DC compound motor & measure no load current.
7th	5th , 6th, 7th	-DO-
	5th , 6th, 7th	-DO-
8th	5th , 6th, 7th	7. Control the speed of a DC shunt motor by field flux control method & armature voltage control method.
	5th , 6th, 7th	-DO-
9th	5th , 6th, 7th	8. Determine the armature current vs. speed characteristic of a DC motor
	5th , 6th, 7th	-DO-
10th	5th , 6th, 7th	9. Determine the efficiency of a DC machine by brake test method.
	5th , 6th, 7th	-DO-
11th	5th , 6th, 7th	10. Identification of terminals, determination of voltage transformation ratio of a single phase transformer.
	5th , 6th, 7th	-DO-
12th	5th , 6th, 7th	11. Perform OC Test and SC test of a single phase transformer.
	5th , 6th, 7th	-DO-
13th	5th , 6th, 7th	-DO-
	5th , 6th, 7th	12. Determine the voltage regulation of a single phase transformer at different loads.
14th	5th , 6th, 7th	-DO-
	5th , 6th, 7th	-DO-
15th	5th , 6th, 7th	13. Polarity test of single phase transformer and parallel operation of two single phase transformers.
	5th , 6th, 7th	-DO-

LESSON PLAN

GOVT POLYTECHNIC KALAHANDI, BHAWANIPATNA

Faculty Name: SATYAPRAKASH OJHA *BRANCH*: ELECTRICAL*SEM*: 4TH *SESSION*: 2023-24(S)

SUB: EMI	**No. of days/ week Class allotted:** 5 **Total Periods**: 70	**w.e.f.**16.01.2024**to**26.04.2024
Week	Class Day	Theory
1st	1st	**1. MEASURING INSTRUMENTS** 1.1 Define Accuracy, precision, Errors, Resolutions Sensitivity and tolerance.
	2nd	1.2 Classification of measuring instruments.
	3rd	1.3 Explain Deflecting, controlling and damping arrangements in indicating type of instruments.
	4th	-DO-
	5th	1.4 Calibration of instruments.
2nd	1st	**Tutorial Chapter 1**
	2nd	-DO-
	3rd	**2. ANALOG AMMETERS AND VOLTMETERS** 2.1. Describe Construction, principle of operation, errors, ranges merits and demerits of: 2.1.1 Moving iron type instruments.
	4th	2.1.1 Moving iron type instruments.
	5th	2.1.2 Permanent Magnet Moving coil type instruments.
3rd	1st	2.1.3 Dynamometer type instruments
	2nd	2.1.4 Rectifier type instruments
	3rd	2.1.5 Induction type instruments
	4th	2.2 Extend the range of instruments by use of shunts and Multipliers.
	5th	-DO-
4th	1st	2.3 Solve Numerical
	2nd	-DO-
	3rd	**Tutorial Chapter 2**
	4th	-DO-
	5th	**3. WATTMETERS AND MEASUREMENT OF POWER** 3.1 Describe Construction, principle of working of Dynamometer type wattmeter. (LPF and UPF type)
5th	1st	-DO-
	2nd	-DO-
	3rd	3.2 The Errors in Dynamometer type wattmeter and methods of their correction.
	4th	-DO-
	5th	-DO-
6th	1st	3.3 Discuss Induction type watt meters.
	2nd	-DO-
	3rd	**Tutorial Chapter 3**
	4th	-DO-
	5th	**4. ENERGYMETERS AND MEASUREMENT OF ENERGY** 4.1 Introduction
7th	1st	-DO-
	2nd	4.2 Single Phase Induction type Energy meters – construction, working principle and their compensation & adjustments.
	3rd	-DO-
	4th	-DO-
	5th	4.3 Testing of Energy Meters.

8th	1st	-DO-
	2nd	-DO-
	3rd	**Tutorial Chapter 4**
	4th	-DO-
	5th	**5. MEASUREMENT OF SPEED, FREQUENCY AND POWER FACTOR** 5.1 Tachometers, types and working principles
9th	1st	-DO-
	2nd	-DO-
	3rd	5.2 Principle of operation and construction of Mechanical and Electrical resonance Type frequency meters.
	4th	-DO-
	5th	5.3 Principle of operation and working of Dynamometer type single phase and three phase power factor meters.
10th	1st	-DO-
	2nd	**Tutorial Chapter 5**
	3rd	-DO-
	4th	**6. MEASUREMENT OF RESISTANCE, INDUCTANCE& CAPACITANCE** 6.1 Classification of resistance
	5th	6.1.1. Measurement of low resistance by potentiometer method.
11th	1st	6.1.2. Measurement of medium resistance by wheat Stone bridge method
	2nd	6.1.3. Measurement of high resistance by loss of charge method.
	3rd	6.2 Construction, principle of operations of Megger & Earth tester for insulation resistance and earth resistance measurement respectively
	4th	6.3 Construction and principles of Multimeter. (Analog and Digital)
	5th	6.4 Measurement of inductance by Maxewell's Bridge method.
12th	1st	6.5 Measurement of capacitance by Schering Bridge method
	2nd	**Tutorial Chapter 6**
	3rd	-DO-
	4th	**7. SENSORS AND TRANSDUCER** 7.1. Define Transducer, sensing element or detector element and transduction elements. 7.2. Classify transducer. Give examples of various class of transducer.
	5th	7.3. Resistive transducer 7.3.1 Linear and angular motion potentiometer.
13th	1st	7.3.2 Thermistor and Resistance thermometers. 7.3.3 Wire Resistance Strain Gauges
	2nd	7.4. Inductive Transducer
	3rd	7.4.1 Principle of linear variable differential Transformer (LVDT) 7.4.2 Uses of LVDT.
	4th	7.5. Capacitive Transducer. 7.5.1 General principle of capacitive transducer.
	5th	7.5.2 Variable area capacitive transducer.
14th	1st	7.5.3 Change in distance between plate capacitive transducer.
	2nd	7.6. Piezo electric Transducer and Hall Effect Transducer with their applications.
	3rd	**Tutorial Chapter 7**
	4th	**8. OSCILLOSCOPE** 8.1. Principle of operation of Cathode Ray Tube. 8.2. Principle of operation of Oscilloscope (with help of block diagram).
	5th	8.3. Measurement of DC voltage & current. 8.4. Measurement of AC Voltage, current, phase & frequency. **Tutorial Chapter 6**

LESSON PLAN-2024(SUMMER)

GOVT POLYTECHNIC KALAHANDI, BHAWANIPATNA

FACULTY NAME: BHUBANTA KAND **BRANCH: ELECTRICAL** **SEM: 6th** **SESSION:2023-24(S)**

SUBJECT: GTD	**No. of days/ week Class allotted:** 04 **Total Periods**: 60	**w.e.f. 16.01.2024 to 14.05.2024**
Week	Class Day	**Theory**
1st	1st	1. **GENERATION OF ELECTRICITY** 1.1 Elementary idea on generation of electricity from Thermal, Hydel, Nuclear, Power station.
	2nd	-DO-
	3rd	-DO-
	4th	-DO-
2nd	1st	1.2 Introduction to Solar Power Plant (Photovoltaic cells).
	2nd	1.3 Layout diagram of generating stations
	3rd	-DO-
	4th	**2. TRANSMISSION OF ELECTRIC POWER** 2.1 Layout of transmission and distribution scheme.
3rd	1st	-DO-
	2nd	2.2 Voltage Regulation & efficiency of transmission.
	3rd	2.3 State and explain Kelvin's law for economical size of conductor.
	4th	2.4 Corona and corona loss on transmission lines
4th	1st	**3. OVER HEAD LINES** 3.1 Types of supports, size and spacing of conductor.
	2nd	3.2 Types of conductor materials.
	3rd	-DO-
	4th	3.3 State types of insulator and cross arms.
5th	1st	3.4 Sag in overhead line with support at same level and different level. (approximate formula effect of wind, ice and temperature on sag).
	2nd	-DO-
	3rd	3.5 Simple problem on sag.
	4th	**4. PERFORMANCE OF SHORT & MEDIUM LINES** 4.1. Calculation of regulation and efficiency.
6th	1st	-DO-
	2nd	-DO-
	3rd	-DO-
	4th	-DO-
7th	1st	-DO-
	2nd	-DO-
	3rd	**5. EHV TRANSMISSION** 5.1 EHV AC transmission. 5.1..1. Reasons for adoption of EHV AC transmission. 5.1..2. Problems involved in EHV transmission.
	4th	-DO-
8th	1st	-DO-
	2nd	-DO-
	3rd	5.2 HV DC transmission. 5.2..1. Advantages and Limitations of HVDC transmission system.
	4th	-DO-
9th	1st	-DO-

	2nd	**6. DISTRIBUTION SYSTEMS** 6.1 Introduction to Distribution System.
	3rd	6.2 Connection Schemes of Distribution System: (Radial, Ring Main and Inter connected system)
	4th	-DO-
10th	1st	6.3 DC distributions. 6.3.1 Distributor fed at one End. 6.3.2 Distributor fed at both the ends. 6.3.3 Ring distributors.
	2nd	-DO-
	3rd	6.4 AC distribution system. 6.4.1. Method of solving AC distribution problem. 6.4.2. Three phase four wire star connected system arrangement.
	4th	-DO-
11th	1st	**7. UNDERGROUND CABLES** 7.1 Cable insulation and classification of cables.
	2nd	-DO-
	3rd	7.2 Types of L. T. & H.T. cables with constructional features
	4th	-DO-
12th	1st	7.3 Methods of cable lying.
	2nd	7.4 Localization of cable faults: Murray and Varley loop test for short circuit fault / Earth fault.
	3rd	**8. ECONOMIC ASPECTS** 8.1 Causes of low power factor and methods of improvement of power factor in power system.
	4th	8.2 Factors affecting the economics of generation: (Define and explain) 8.2.1 Load curves. 8.2.2 Demand factor. 8.2.3 Maximum demand. 8.2.4 Load factor. 8.2.5 Diversity factor. 8.2.6 Plant capacity factor.
13th	1st	-DO-
	2nd	-DO-
	3rd	-DO-
	4th	8.3 Peak load and Base load on power station.
14th	1st	**9. TYPES OF TARIFF** 9.1. Desirable characteristic of a tariff.
	2nd	9.2. Explain flat rate, block rate, two part and maximum demand tariff. (Solve Problems)
	3rd	-DO-
	4th	**10. SUBSTATION** 10.1 Layout of LT, HT and EHT substation.
15th	1st	-DO-
	2nd	10.2 Earthing of Substation, transmission and distribution lines.
	3rd	-DO-
	4th	DOUBT CLEARING CLASS

LESSON PLAN: ANALOG ELECTRONICS LAB SUMMER 2024

Discipline: ELECTRICAL	Semester: 4thSUMMER 2024	Name of the teaching faculty: SHIBASHIS KAR
Subject: ANALOG ELECTRONICS LAB	No of days/per week class allotted: 03	Semester From Date: 16/01/2024 To Date: 26/04/2024 No of weeks:14
Week:	Class day:	Theory/practical topics:
1st:	1st 2nd3rd	Construct Bridge Rectifier using different filter circuit and to determine Ripplefactor & analyze wave form with filter & withoutfilter.
2nd	1st 2nd3rd	Construct & test the regulator using Zenerdiode
3rd	1st 2nd3rd	Determine the input and output Characteristics of CE & CB transistorconfiguration
4th	1st 2nd3rd	Construct different types of biasing circuit and analyze the waveform: Fixed bias, Emitter bias, Voltage dividerbias
5th	1st 2nd3rd	Study the single stage CE amplifier & findGain
6th	1st 2nd3rd	Study the multi stage CE amplifier & findGain
7th	1st 2nd3rd	Construct&test push pull amplifier & observer the waveform
8th	1st 2nd3rd	Construct & Find thegain: Class A. Amplifier, Class B. Amplifier, Class C Tuned Amplifier
9th	1st 2nd3rd	Construct & calculate the frequencyof: Wein Bridge Oscillator
10th	1st 2nd3rd	Construct & calculate the frequencyof: R-Cphase
11th	1st 2nd3rd	Construct & calculate the frequencyof: Collpit's Oscillator
12th	1st 2nd3rd	Construct & calculate the frequencyof: Hartly Oscillator
13th	1st 2nd3rd	Determine Drain & Transfer Characteristics ofJFET
14th	1st 2nd3rd	Revision and Viva Voce

Shibashis Kar

LESSON PLAN: SIMULATION PRACTICE ON MATLAB SUMMER 2024

Discipline: ELECTRICAL	Semester: 4th SUMMER 2024	Name of the teaching faculty: SHIBASHIS KAR
Subject: SIMULATION PRACTICE ONMATLAB	No of days/per week class allotted: 03	Semester From Date: 16/01/2024 To Date: 26/04/2024 No of weeks:14 weeks
Week:	Class day:	Theory/practical topics:
1st	1st ,2nd ,3rd	**Introduction to MATLAB programming:** Functions and operation using variables and arrays. To learn algebraic, trigonometric and exponential manipulation.
2nd	1st ,2nd ,3rd	To learn Arithmetic, Relational and Logic operator. Matrix formation and its manipulation.
3rd	1st ,2nd ,3rd	Vector manipulation: Use of linspace to create vectors.
4th	1st ,2nd ,3rd	To create, add and multiply vectors. Use of sin and sqrt functions with vector arguments
5th	1st ,2nd ,3rd	Plotting: Two dimensional Plots and sub plots Label the plot and printing.
6th	1st ,2nd ,3rd	Write and execute a file to plot a circle, impulse, step, ramp, sine and cosine functions.
7th	1st ,2nd ,3rd	**Introduction to SIMULINK:** Use of Commonly used blocks, Math operation block and Display block from SIMULINK library.
8th	1st ,2nd ,3rd	Use of logical and relational operator block. Use of Sim-Power system block to use Electrical sources, elements and Power electronics devices.
9th	1st ,2nd ,3rd	SIMULATION: Verification of Network theorems.
10th	1st ,2nd ,3rd	Simulation of a half wave uncontrolled rectifier.
11th	1st ,2nd ,3rd	Simulation of 1-phase full bridge controlled rectifier.
12th	1st ,2nd ,3rd	Simulation of step-down chopper
13th	1st ,2nd ,3rd	Repractice of experiments
14th	1st ,2nd ,3rd	Viva Voce

Shibashis Kar

LESSON PLAN

GOVT POLYTECHNIC KALAHANDI, BHAWANIPATNA

Faculty Name: Kambhudeep Bag *BRANCH*: **ELECTRICAL** *SEM*: **4TH** *SESSION*:**2023-24(S)**

SUBJECT: MATLAB	**No. of days/ week** **Class allotted:** 3 **Total Periods**: 45	**w.e.f.** 16.01.2024 **to** 26.04.24
Week	**Class Period**	**Theory**
1st	**2nd, 3rd, 4th**	**Introduction to MATLAB programming** 1.1. Functions and operation using variables and arrays. 1.1.1. To learn algebraic, trigonometric and exponential manipulation. 1.1.2. To learn Arithmetic, Relational and Logic operator.
	2nd, 3rd, 4th	-do-
2nd	**2nd, 3rd, 4th**	-do-
	2nd, 3rd, 4th	-do
3rd	**2nd, 3rd, 4th**	1.2. Matrix formation and its manipulation.
	2nd, 3rd, 4th	-do-
4th	**2nd, 3rd, 4th**	1.3. Vector manipulation: 1.3.1. Use of linspace to create vectors. 1.3.2. To create, add and multiply vectors. 1.3.3. Use of sin and sqrt functions with vector arguments
	2nd, 3rd, 4th	-do-
5th	**2nd, 3rd, 4th**	1.4. Plotting: 1.4.1. Two dimensional Plots and sub plots 1.4.2. Label the plot and printing.
	2nd, 3rd, 4th	-do-
6th	**2nd, 3rd, 4th**	-do-
	2nd, 3rd, 4th	-do-
7th	**2nd, 3rd, 4th**	1.5. Write and execute a file to plot a circle, impulse, step, ramp, sine and cosine functions.
	2nd, 3rd, 4th	-do-
8th	**2nd, 3rd, 4th**	**Introduction to SIMULINK** 2.1. Use of Commonly used blocks, Math operation block and Display block from SIMULINK library.
	2nd, 3rd, 4th	-do-
9th	**2nd, 3rd, 4th**	2.2. Use of logical and relational operator block.
	2nd, 3rd, 4th	-do-
10th	**2nd, 3rd, 4th**	2.3. Use of Sim-Power system block to use Electrical sources, elements and Power electronics devices.
	2nd, 3rd, 4th	-do-
11th	**2nd, 3rd, 4th**	2.4. SIMULATION:
	2nd, 3rd, 4th	-do-
12th	**2nd, 3rd, 4th**	2.4.1. Verification of Network theorems
	2nd, 3rd, 4th	-do-
13th	**2nd, 3rd, 4th**	2.4.2. Simulation of a half wave uncontrolled rectifier
	2nd, 3rd, 4th	-do-
14th	**2nd, 3rd, 4th**	2.4.3. Simulation of 1-phase full bridge controlled rectifier
	2nd, 3rd, 4th	-do-.
15th	**2nd, 3rd, 4th**	2.4.4. Simulation of step-down chopper.
	2nd, 3rd, 4th	-do-

LESSON PLAN

GOVT POLYTECHNIC KALAHANDI, BHAWANIPATNA

Faculty Name: SATYAPRAKASH OJHA *BRANCH*: ELECTRICAL *SEM*: 6TH*SESSION*:2023-24(S)

SUBJECT: RES	**No. of days/ week Class allotted:** 5 **Total Periods**: 70	**w.e.f.**16.01.2024**to**26.04.2024
Week	Class Day	Theory
1st	1st	**1. Introduction to Renewable energy:** 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. 1.5. Limitations of RE sources.
	5th	1.6. Present Indian and international energy scenario of conventional and RE sources
2nd	1st	TUTORIAL Chapter 1
	2nd	-do-
	3rd	-do-
	4th	**2. Solar Energy:** 2.1. Solar photovoltaic system-Operating principle.
	5th	2.2. Photovoltaic cell concepts
3rd	1st	2.2.1. Cell, module, array, Series and parallel connections. Maximum power point tracking (MPPT).
	2nd	-DO-
	3rd	-DO-
	4th	-DO-
	5th	2.3. Classification of energy Sources.
4th	1st	2.4. Extra-terrestrial and terrestrial Radiation.
	2nd	-DO-
	3rd	2.5. Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant.
	4th	-DO-
	5th	2.6. Solar collectors, Types and performance characteristics,
5th	1st	2.7. Applications: Photovoltaic - battery charger, domestic lighting, street lighting, water pumping, solar cooker, Solar Pond.
	2nd	-DO-
	3rd	-DO-
	4th	-DO-
	5th	TUTORIAL Chapter 2
6th	1st	-do-
	2nd	-do-
	3rd	**3. Wind Energy:** 3.1. Introduction to Wind energy.
	4th	3.2. Wind energy conversion.
	5th	3.3. Types of wind turbines
7th	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	-DO-
8th	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	TUTORIAL Chapter 3
	5th	-do-
9th	1st	-do-
	2nd	CLASS TEST
	3rd	**4. Biomass Power:** 4.1. Energy from Biomass 4.2. Biomass as Renewable Energy Source
	4th	4.3. Types of Biomass Fuels - Solid, Liquid and Gas.
	5th	-DO-
10th	1st	4.4. Combustion and fermentation.
	2nd	-DO-
	3rd	4.5. Anaerobic digestion.
	4th	4.6. Types of biogas digester
	5th	4.7. Wood gassifier.
11th	1st	4.8. Pyrolysis,.
	2nd	4.9. Applications: Bio gas, Bio diesel
	3rd	-DO-
	4th	TUTORIAL Chapter 4
	5th	-do-
12th	1st	-do-
	2nd	**5. Other Energy Sources** 5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems
	3rd	-DO-
	4th	5.2. Ocean Thermal Energy Conversion (OTEC).
	5th	-DO-
13th	1st	5.3. Geothermal Energy – Classification.
	2nd	-DO-
	3rd	5.4. Hybrid Energy Systems.
	4th	-DO-
	5th	-DO-
14th	1st	5.5. Need for Hybrid Systems
	2nd	-DO-
	3rd	5.6. Diesel-PV, Wind-PV, Microhydel-PV.
	4th	TUTORIAL Chapter 5
	5th	Doubt clearing Session

LESSON PLAN-2024(SUMMER)

GOVT POLYTECHNIC KALAHANDI, BHAWANIPATNA

FACULTY NAME: BHUBANTA KAND **BRANCH: ELECTRICAL** **SEM: 6th** **SESSION:2023-24(S)**

SUBJECT: SGPD	**No. of days/ week** **Class allotted:** 5 **Total Periods**: 75	**w.e.f. 16.01.2024 to 14.05.2024**
Week	Class Day	Theory
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	1.6 Short Circuit Current
2nd	1st	1.7 Faults in a power system.
	2nd	TUTORIAL Chapter 1
	3rd	-do-
	4th	**2. FAULT CALCULATION** 2.1 Symmetrical faults on 3-phase system.
	5th	2.2 Limitation of fault current.
3rd	1st	2.3 Percentage Reactance.
	2nd	2.4 Percentage Reactance and Base KVA.
	3rd	2.5 Short – circuit KVA.
	4th	2.6 Reactor control of short circuit currents.
	5th	2.7 Location of reactors.
4th	1st	2.8 Steps for symmetrical Fault calculations.
	2nd	-do-
	3rd	2.9 Solve numerical problems on symmetrical fault.
	4th	-do-
	5th	TUTORIAL Chapter 2
5th	1st	**3. FUSES** 3.1 Desirable characteristics of fuse element.
	2nd	3.2 Fuse Element materials.
	3rd	3.3 Types of Fuses and important terms used for fuses.
	4th	3.4 Low and High voltage fuses.
	5th	3.5 Current carrying capacity of fuse element.
6th	1st	3.6 Difference Between a Fuse and Circuit Breaker.
	2nd	TUTORIAL Chapter 3
	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	4.5 Classification of circuit Breakers. 4.6 Oil circuit Breaker and its classification.
7th	1st	4.7 Plain brake oil circuit breaker. 4.8 Arc control oil circuit breaker.
	2nd	4.9 Low oil circuit breaker. 4.10 Maintenance of oil circuit breaker.
	3rd	4.11 Air-Blast circuit breaker and its classification.

	4th	4.12 Sulphur Hexa-fluoride (SF6) circuit breaker.
	5th	4.13 Vacuum circuit breakers.
8th	1st	4.14 Switchgear component.
	2nd	4.15 Problems of circuit interruption.
	3rd	4.16 Resistance switching. 4.17 Circuit Breaker Rating.
	4th	TUTORIAL Chapter 4
	5th	-do-
9th	1st	**5. PROTECTIVE RELAYS** 5.1 Definition of Protective Relay. 5.2 Fundamental requirement of protective relay. 5.3 Basic Relay operation
	2nd	5.3.1. Electromagnetic Attraction type 5.3.2. Induction type
	3rd	5.4 Definition of following important terms 5.5 Definition of following important terms. 5.5.1. Pick-up current. 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	5.8 Induction type directional power relay.
10th	1st	5.9 Induction type directional over current relay.
	2nd	5.10 Differential relay 5.10.1. Current differential relay
	3rd	5.10.2. Voltage balance differential relay. 5.11 Types of protection
	4th	TUTORIAL Chapter 5
	5th	-do-
11th	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.
	5th	6.7 Protection of Transmission line. 6.8 Different pilot wire protection (Merz-price voltage Balance system)
12th	1st	6.9 Explain protection of feeder by over current and earth fault relay.
	2nd	TUTORIAL Chapter 6
	3rd	-do-
	4th	**7. PROTECTION AGAINST OVER VOLTAGE AND LIGHTING** 7.1. Voltage surge and causes of over voltage.
	5th	7.2. Internal cause of over voltage.
13th	1st	7.3. External cause of over voltage (lighting)
	2nd	7.4. Mechanism of lightning discharge.
	3rd	7.5. Types of lightning strokes.
	4th	7.6. Harmful effect of lightning.
	5th	7.7. Lightning arresters and Type of lightning Arresters. 7.7.1. Rod-gap lightning arrester. 7.7.2. Horn-gap arrester. 7.7.3. Valve type arrester.

14th	1st	7.8. Surge Absorber
	2nd	TUTORIAL Chapter 7
	3rd	-do-
	4th	**8. STATIC RELAY:** 8.1 Advantage of static relay.
	5th	8. 2 Instantaneous over current relay.
15th	1st	8. 3 Principle of IDMT relay.
	2nd	-do-
	3rd	TUTORIAL Chapter 8
	4th	-do-
	5th	Doubt Clearing