ACADEMIC LESSON PLAN OF SUMMER 2024

Discipline: ELECTRICAL	Semester: 4th Sem	Name of the Teaching Faculty: SANGRAM KESARI NAYAK
Subject: ENERGY CONVERSION-I TH. 1	No. of days/per week class allotted:4p/week Tutorial:1p/week	Semester From: 14th February 2024 to 23rd May 2024 No. of Weeks: 17 weeks
Week	Class Day	Theory Topics
1st		**1.D.C GENERATOR:** 1.1 Operating principle of generator
		1.2 Constructional features of DC machine 1.2.1 Yoke, Pole & field winding, Armature, Commutator
		1.2.2 Armature winding, back pitch, Front pitch, Resultant pitch and commutator- pitch.
		1.2.3 Simple Lap and wave winding, Dummy coils
		Tutorial
2nd		1.3 Different types of D.C. machines (Shunt, Series and Compound)(contd…)
		1.3 Different types of D.C. machines (Shunt, Series and Compound)
		1.4 Derivation of EMF equation of DC generators. (Solve problems) (contd…)
		1.4 Derivation of EMF equation of DC generators. (Solve problems)
3rd		Tutorial
		1.5 Losses and efficiency of DC generator. Condition for maximum efficiency and numerical problems(contd..)
		1.5 Losses and efficiency of DC generator. Condition for maximum efficiency and numerical problems.
		1.6. Armature reaction in D.C. machine (contd…)
		1.6. Armature reaction in D.C. machine
4th		Tutorial
		1.7. Commutation and methods of improving commutation
		1.7 Commutation and methods of improving commutation (contd…)
		1.8 Characteristics of D.C. Generators 1.9. Application of different types of D.C. Generators.
5th		1.10. Concept of critical resistance and critical speed of DC shunt generator 1.11. Conditions of Build-up of emf of DC generator.
		Tutorial
		1.12. Parallel operation of D.C. Generators. 1.13. Uses of D.C generators.
		2.D. C. MOTORS 2.1 Basic working principle of DC motor.
		2.2 Significance of back emf in D.C. Motor
6th		
		2.3 Voltage equation of D.C. Motor and condition for maximum power output (simple Problems)(contd…)
		Tutorial
7th		2.3 Voltage equation of D.C. Motor and condition for maximum power output(simple problems)
		2.4. Derive torque equation (solve problems)(contd…)
		2.4. Derive torque equation (solve problems)

		2.5. Characteristics of shunt, series and compound motors and their application.
		Tutorial
8th		2.6. Starting method of shunt, series and compound motors.
		2.7. Speed control of D.C shunt motors by Flux control method. Armature voltage Control method. Solve problems(contd…)
		2.7. Speed control of D.C shunt motors by Flux control method. Armature voltage Control method. Solve problems
		2.8. Speed control of D.C. series motors by Field Flux control method, Tapped field method and series-parallel method
		Tutorial
9th		2.9. Determination of efficiency of D.C. Machine by Brake test method (solve numerical problems)
		2.10. Determination of efficiency of D.C. Machine by Swinburne's Test method (solve numerical problems)
		2.11. Losses, efficiency and power stages of D.C. motor (solve numerical problems) (contd…)
		2.11. Losses, efficiency and power stages of D.C. motor (solve numerical problems) 2.12. Uses of D.C. motors
		Tutorial
10th		**3. SINGLE PHASE TRANSFORMER** 3.1 Working principle of transformer
		3.2 Constructional feature of Transformer.
		3.2.1 Arrangement of core & winding in different types of transformer.
		3.2.2 Brief ideas about transformer accessories such as conservator, tank, breather, and explosion vent etc.
11th		Tutorial
		3.2.3 Explain types of cooling methods 3.3 State the procedures for Care and maintenance
		3.4 EMF equation of transformer.
		3.5 Ideal transformer voltage transformation ratio
		3.6 Operation of Transformer at no load, on load with phasor diagrams.(contd…)
12th		Tutorial
		3.6 Operation of Transformer at no load, on load with phasor diagrams.
		3.7 Equivalent Resistance, Leakage Reactance and Impedance of transformer.
		3.8 To draw phasor diagram of transformer on load, with winding Resistance and Magnetic leakage with using UPF, leading pf and lagging pf load.(contd…)
13th		3.8 To draw phasor diagram of transformer on load, with winding Resistance and Magnetic leakage with using UPF, leading pf and lagging pf load.
		Tutorial
		3.9 To explain Equivalent circuit and solve numerical problems
		3.10 Approximate & exact voltage drop calculation of a Transformer 3.11 Regulation of transformer.
		3.12 Different types of losses in a Transformer. Explain Open circuit and Short Circuit test. (Solve numerical problems)(contd…)
14th		3.12 Different types of losses in a Transformer. Explain Open circuit and Short Circuit test.(Solve numerical problems)
		Tutorial
		3.13 Explain Efficiency, efficiency at different loads and power factors, condition for maximum efficiency (solve problems) (contd..)
	Extra Class	3.13 Explain Efficiency, efficiency at different loads and power factors, condition for maximum efficiency (solve problems)
	Extra Class	3.14 Explain All Day Efficiency (solve problems)
15th	Extra Class	3.15 Determination of load corresponding to Maximum efficiency.

	Extra Class	Tutorial
	Extra Class	3.16 Parallel operation of single phase transformer.
	Extra Class	**4. AUTO TRANSFORMER** 4.1. Constructional features of Auto transformer. 4.2. Working principle of single phase Auto Transformer
	Extra Class	4.3. Comparison of Auto transformer with an two winding transformer (saving of Copper). 4.4. Uses of Auto transformer
16th	Extra Class	4.5. Explain Tap changer with transformer (on load and off load condition)
	Extra Class	Tutorial
	Extra Class	**5. INSTRUMENT TRANSFORMERS** 5.1 Explain Current Transformer and Potential Transformer
	Extra Class	5.1 Explain Current Transformer and Potential Transformer(contd…)
	Extra Class	5.2 Define Ratio error, Phase angle error, Burden.
17th	Extra Class	5.3 Uses of C.T. and P.T
	Extra Class	Tutorial

sangram kesari nayak

Signature of Teaching Faculty

Department: Electrical Engineering

Lesson plan

Name of Faculty	**RAJESH KUMAR JENA**
Discipline	**Electrical Engineering**
Semester	**4TH**
Subject	**Analog Electronic& OPAMP**
Lesson Plan Duration	**From Sep 2023**
Work load [Theory + Practical] Per Week	**[03+04]**

Week	Day	Theory Topic/ Assignment/ Test	No.	Practical
1st	1	Unit1: Concept of insulators, conductors and semiconductors.	1	To Plot V-I characteristics of a PN junction diode
	2	Intrinsic and extrinsic		
	3	P and N type semiconductor and their conductivity.		
2nd	1	Effect of temperature on conductivity of intrinsic semiconductor	2	To Plot V-I characteristics of a Zener diode
	2	PN junction diode, mechanism of current flow in PN junction,		
	3	forward and reverse biased PN junction, potential barrier,		
3rd	1	drift and diffusion currents, depletion layer	3	Half-wave rectifier circuit using one diode
	2	. V-I characteristics of diodes		
	3	Diode as half-wave, full wave.		
4th	1	Bridge rectifiers	4	Full-wave rectifier circuit using two diodes
	2	Peak Inverse Voltage, rectification efficiencies and ripple factor calculations,		
	3	Concept of filters..		
5th	1	Types of diode, characteristics and applications of Zener diodes	5	Observe the output of waveform of Bridge-rectifier circuit using four diodes.
	2	Revision		
	3	Revision		
6th	1	UNIT:2 Concept of a bipolar transistor, PNP and NPN transistors.	6	Plotting of input and output characteristics and calculation of parameters of transistors in CE configuration
	2	CB, CE, CC configurations of a transistor.		
	3	Transistor as an amplifier in CE Configuration,		
7th	1	Current amplification factors,	7	Plotting of input and output characteristics and calculation of parameters of transistors in CB configuration
	2	Comparison of CB, CE and CC Configurations.		
	3	Construction, operation		

8th	1	Characteristics of FETs. FET as an amplifier.	8	Plotting of V-I characteristics of a FET
	2	Construction, operation and characteristics of a MOSFET.		
	3	Comparison of JFET, MOSFET and BJT.		
9th	1	Revision	9	Basic logic operations of AND, OR, NOT gates
	2	Revision		
	3	UNIT 3 Distinction between analog and digital signal.		
10th	1	Decimal, Binary, octal and hexadecimal number system.	10	Verification of truth tables for NAND, NOR and Exclusive OR (EX-OR) and Exclusive NOR (EX-NOR) gates.
	2	Conversion from decimal and hexadecimal to binary and vice-versa.		
	3	Binary addition		
11th	1	Binary subtraction.	11	Realization of logic functions with the help of NAND or NOR gates
	2	Binary division and multiplication		
	3	Definition, symbols and truth tables of Logic gates		
12th	1	Revision	12	To design a half adder using XOR and NAND gates and verification of its operations
	2	Revision		
	3	UNIT 4 Difference between Sequential Circuits and combinational ciricuit		
13th	1	Half adder, Full adder	13	Construction of a fu Construction of a full adder circuit using XOR and NAND gates and verify its operation
	2	Mux, De-Mux,		
	3	Encoder and Decoder.		
14th	1	Combinational Circuits like Latch, Flip Flops	14	Verification of truth table for IC flip-flops (At least one IC each of D latch, D flip-flop, JK flip- flops).
	2	Shift registers.		
	3	counters.		
15th	1	A/D Converters	15	Verification of truth table for encoder and decoder ICs Verification of truth table for Mux and De-Mux
	2	D/A Converters		
	3	Applications of A/D and D/A Converters		
	2	Revision of Old Question Papers		
	3	Revision of Old Question Papers		

Rajesh kumar jena

Signature of Teaching Faculty

ACADEMIC LESSON PLAN OF SUMMER 2024

Discipline: Electrical	**Semester: 4th**	**Name of the Teaching Faculty:** JAYANTA KUMAR PANDA
Subject: Electrical measurement & instrumentation	**No. of days/per week class allotted:4p/week Tutorial:1p/week**	Semester From: 14th February 2024to 23rd May 2024 No. of Weeks: 17 weeks
Week	**Class Day**	**Theory Topics**
1st	1st	**1. MEASURING INSTRUMENTS** **1.1.** Definition of accuracy, precision, errors, resolution sensitivity and tolerance
	2nd	**1.2.** Classification of measuring instruments**.**
	3rd	**1.3.** Explaining Deflecting, controlling and damping arrangements in indicating type of instruments
	4th	**1.4.**Explaining Deflecting, controlling and damping arrangements in indicating type of instruments
	5th	**Tutorial**
2nd	1st	**1.5.** Calibration of instruments**.**
	2nd	2. ANALOG AMMETERS AND VOLTMETERS Describe Construction, principle of operation, errors, ranges merits and demerits of: 2.1 Moving iron type instruments.
	3rd	2.1 Moving iron type instruments.(contd.)
	4th	2.2 Permanent Magnet Moving coil type instruments.
	5th	**Tutorial**
3rd	1st	2.3 Dynamometer type instruments
	2nd	2.4 Rectifier type instruments
	3rd	2.5 Induction type instruments
	4th	2.6 Extend the range of instruments by use of shunts and Multipliers
	5th	**Tutorial**
4th	1st	2.6 Extend the range of instruments by use of shunts and Multipliers(contd.)
	2nd	2.7 Solving numerical
	3rd	2.7 Solve Numerical(contd.)
	4th	3. WATTMETERS AND MEASUREMENT OF POWER 3.1 Described Construction Dynamometer type wattmeter. (LPF and UPF type)
	5th	**Tutorial**
5th	1st	3.2 Described principle of working of Dynamometer type wattmeter. (LPF and UPF type)
	2nd	3.2 Described principle of working of Dynamometer type wattmeter. (LPF and UPF type)(contd.)
	3rd	3.2 Described principle of working of Dynamometer type wattmeter. (LPF and UPF type)(contd)
	4th	3.3 The Errors in Dynamometer type wattmeter and methods of their correction.
	5th	**Tutorial**
6th	1st	3.3 The Errors in Dynamometer type wattmeter and methods of their correction. (contd)
	2nd	3.5 Discuss Induction type watt meters
	3rd	3.5 Discuss Induction type watt meters(contd.)

	4th	**4. ENERGYMETERS AND MEASUREMENT OF ENERGY** **4.1.** Introduction
	5th	**Tutorial**
7th	1st	4.2. Single Phase Induction type Energy meters – construction.
	2nd	4.3. Single Phase Induction type Energy meters – working principle
	3rd	4.3. Single Phase Induction type Energy meters – working principle (contd.)
	4th	4.4 Single Phase Induction type Energy meters – their compensation and adjustment
	5th	**Tutorial**
8th	1st	4.4 Single Phase Induction type Energy meters – their compensation and adjustment(contd.)
	2nd	4.5.Testing of Energy Meters.
	3rd	4.5.Testing of Energy Meters.(contd.)
	4th	5. **MEASUREMENT OF SPEED, FREQUENCY AND POWER FACTOR** 5.1 Tachometers, types and working principles 5.2 Principle of operation and construction of Mechanical resonance Type frequency meters**.**
	5th	**Tutorial**
9th	1st	5.3 Principle of operation and construction of Electrical resonance Type frequency meters.
	2nd	5.3 Principle of operation and construction of Electrical resonance Type frequency meters.(contd)
	3rd	5.4.Principle of operation and working of Dynamometer type single phase and three phase power factor meters.(contd.)
	4th	5.5.Principle of operation and working of Dynamometer type single phase and three phase power factor meters.(contd.)
	5th	**Tutorial**
10th	1st	**6. MEASUREMENT OF RESISTANCE, INDUCTANCE& CAPACITANCE** 6.1. Classification of resistance 6.2 Measurement of low resistance by potentiometer method. .
	2nd	6.3 Measurement of medium resistance by wheat Stone bridge method.
	3rd	6.4 Measurement of high resistance by loss of charge method
	4th	6.5 Construction, principle of operations of Megger & Earth tester for insulation resistance and earth resistance measurement respectively
	5th	**Tutorial**
11th	1st	6.6 Construction and principles of Multimeter. (Analog and Digital)
	2nd	6.6 Construction and principles of Multimeter. (Analog and Digital)
	3rd	6.7 Measurement of inductance by Maxewell's Bridge method
	4th	6.8 Measurement of capacitance by Schering Bridge method
	5th	**Tutorial**
12th	1st	7. **SENSORS AND TRANSDUCER** 7.1. Define Transducer, sensing element or detector element and transduction elements
	2nd	7.2. Classify transducer. Give examples of various class of transducer
	3rd	7.3 Linear and angular motion potentiometer.
	4th	7.3 Linear and angular motion potentiometer..(contd)
	5th	**Tutorial**
13th	1st	7.4Thermistor and Resistance thermometers
	2nd	7.5 Wire Resistance Strain Gauges
	3rd	7.6 Principle of linear variable differential Transformer (LVDT) AND USES OF LVDT

	4th	7.6 Principle of linear variable differential Transformer (LVDT) AND USES OF LVDT
	5th	**Tutorial**
14th	1st	General principle of capacitive transducer AND 7.7 Variable area capacitive transducer.
	2nd	7.8 Change in distance between plate capacitive transducer.
	3rd	7.9 Piezo electric Transducer and Hall Effect Transducer with their applications.
	4th	**8. OSCILLOSCOPE** 8.1. Principle of operation of Cathode Ray Tube.
	5th	**Tutorial**
15th	1st	8.2. Principle of operation of Oscilloscope (with help of block diagram)
	2nd	8.2. Principle of operation of Oscilloscope (with help of block diagram)(contd.).
	3rd	8.3Measurement of DC Voltage and current
	4th	8.4 Measurement of AC voltage,current,phase and frequency
	5th	**Tutorial**

Jayanta kumar panda

Signature of Teaching Faculty

ACADEMIC LESSON PLAN OF SUMMER-2024

Discipline: EE	Semester: 4rdSem	Name of the Teaching Faculty: SANGRAM KESHARI NAYAK
Subject: Generation, Transmission, Distribution(TH 4)	No. of days/per week class allotted: 4p/week	Semester From: 14th February 2023 to 23rd May 2023 No. of Weeks: 17 weeks
1st	1st	**Unit 1: GENERATION OF ELECTRICITY** 1.1 Elementary idea on generation of electricity from Thermal, Hydel, Nuclear, Power station.
	2nd	1.1 Elementary idea on generation of electricity from Thermal, Hydel, Nuclear, Power station.
	3rd	1.1 Elementary idea on generation of electricity from Thermal, Hydel, Nuclear, Power station.
	4th	1.1 Elementary idea on generation of electricity from Thermal, Hydel, Nuclear, Power station.
2nd	1st	1.1 Elementary idea on generation of electricity from Thermal, Hydel, Nuclear, Power station.
	2nd	1.2 Introduction to Solar Power Plant (Photovoltaic cells)
	3rd	1.3 Layout diagram of generating stations
	4th	**Unit2: TRANSMISSION OF ELECTRIC POWER** 2.1 Layout of transmission and distribution scheme.
3rd	1st	2.2 Voltage Regulation & efficiency of transmission.
	2nd	2.3 State and explain Kelvin's law for economical size of conductor.
	3rd	2.4 Corona and corona loss on transmission lines.
	4th	2.4 Corona and corona loss on transmission lines.
4th	1st	**Unit 3: OVER HEAD LINES** 3.1 Types of supports, size and spacing of conductor.
	2nd	3.2 Types of conductor materials
	3rd	3.3 State types of insulator and cross arms.
	4th	3.4 Sag in overhead line with support at same level and different level. (approximate formula effect of wind, ice and temperature on sag)
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	3.4 Sag in overhead line with support at same level and different level. (approximate formula effect of wind, ice and temperature on sag)
	3rd	3.5 Simple problem on sag.
	4th	**Unit 4: PERFORMANCE OF SHORT & MEDIUM LINES** 4.1. Calculation of regulation and efficiency.
6th	1st	4.1. Calculation of regulation and efficiency.
	2nd	4.1. Calculation of regulation and efficiency.
	3rd	4.1. Calculation of regulation and efficiency.
	th	4.1. Calculation of regulation and efficiency.
7th	1st	4.1. Calculation of regulation and efficiency.
	2nd	4.1. Calculation of regulation and efficiency.
	3rd	**Unit 5: EHV TRANSMISSION** 5.1 EHV AC transmission.
	4th	5.1..1. Reasons for adoption of EHV AC transmission
8th	1st	5.1..2. Problems involved in EHV transmission.
		5.1..2. Problems involved in EHV transmission.
	3rd	5.2 HV DC transmission.
	4th	5.2 HV DC transmission.
	1st	5.2..1. Advantages and Limitations of HVDC transmission system.

9th	2nd	**Unit 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	6.3 DC distributions. 6.3.1 Distributor fed at one End.
10th	1st	6.3.2 Distributor fed at both the ends. 6.3.3 Ring distributors.
	2nd	6.4 AC distribution system
	3rd	6.4.1. Method of solving AC distribution problem.
	4th	6.4.2. Three phase four wire star connected system arrangement.
11th	1st	**Unit 7: UNDERGROUND CABLES** 7.1 Cable insulation and classification of cables.
	2nd	7.2 Types of L. T. & H.T. cables with constructional features.
	3rd	7.2 Types of L. T. & H.T. cables with constructional features.
	4th	7.3 Methods of cable lying.
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	**Unit 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.
13th	1st	8.2.2 Demand factor. 8.2.3 Maximum demand.
	2nd	8.2.4 Load factor. 8.2.5 Diversity factor.
	3rd	8.2.6 Plant capacity factor.
	4th	8.3 Peak load and Base load on power station.
14th	1st	**Unit 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	9.2. Explain flat rate, block rate, two part and maximum demand tariff. (Solve Problems)
	4th	**Unit 10. SUBSTATION** 10.1 Layout of LT, HT and EHT substation.
15th	1st	10.1 Layout of LT, HT and EHT substation.
	2nd	10.1 Layout of LT, HT and EHT substation.
	3rd	10.2 Earthing of Substation, transmission and distribution lines.
	4th	10.2 Earthing of Substation, transmission and distribution lines

sangram kesari nayak

Signature of Teaching Faculty