LESSON PLAN

Name of the Teaching Faculty: Sri Nitesh Kumar Acharya
Designation: Lecturer in Electrical
Discipline: Electrical Engg.
Semester: 4TH
Subject: Energy Conversion-I
Subject code: Th-1
No of Days/week class allotted: 05 (4L+1T)
Session: 2019-20

Week	Class Day	Theory/Practical Topics	Remarks
1	1-4	**D.C GENERATOR** ->>Operating principle of generator ->>Constructional features of DC machine. ->> Yoke, Pole & field winding, Armature, Commutator. ->> Armature winding, back pitch, Front pitch, Resultant pitch and commutator- pitch. ->>Simple Lap and wave winding, Dummy coils.	
	5	TUTORIAL-1	
2	6-9	->> Different types of D.C. machines (Shunt, Series and Compound) ->> Derivation of EMF equation of DC generators. (Solve problems) ->> Losses and efficiency of DC generator. ->> Condition for maximum efficiency and numerical problems.	
	10	TUTORIAL-2	
3	11-14	->> Armature reaction in D.C. machine ->> Commutation and methods of improving commutation. ->> Role of inter poles and compensating winding in commutation. ->> Characteristics of D.C. Generators ->>Application of different types of D.C. Generators.	
	15	TUTORIAL-3	
4	16-19	->> Concept of critical resistance and critical speed of DC shunt generator ->>Conditions of Build-up of emf of DC generator. ->> Parallel operation of D.C. Generators. ->> Uses of D.C generators.	
	20	TUTORIAL-4	

5	21-24	**D. C. MOTORS** ->> Basic working principle of DC motor ->>Significance of back emf in D.C. Motor. ->> Voltage equation of D.C. Motor and condition for maximum power output(simple problems) ->> Derive torque equation (solve problems) ->>Characteristics of shunt, series and compound motors and their application.	
	25	TUTORIAL-5	
6	26-29	->>Starting method of shunt, series and compound motors. ->>Speed control of D.C shunt motors by Flux control method. Armature voltage Control method. Solve problems ->> Speed control of D.C. series motors by Field Flux control method, Tapped field method and series-parallel method	
	30	TUTORIAL-6	
7	31-34	->> Determination of efficiency of D.C. Machine by Brake test method(solve numerical problems) ->> Determination of efficiency of D.C. Machine by Swinburne's Test method(solve numerical problems) ->> Losses, efficiency and power stages of D.C. motor(solve numerical problems) ->> Uses of D.C. motors	
	35	TUTORIAL-7	
8	36-39	SINGLE PHASE TRANSFORMER ->>Working principle of transformer. ->> Constructional feature of Transformer. ->> Arrangement of core & winding in different types of transformer. ->>Brief ideas about transformer accessories such as conservator, tank, breather, and explosion vent etc. ->> Explain types of cooling methods	
	40	TUTORIAL-8	
9	41-44	->> State the procedures for Care and maintenance. ->>EMF equation of transformer. ->> Ideal transformer voltage transformation ratio ->> Operation of Transformer at no load, on load with phasor diagrams.	
	45	TUTORIAL-9	
10	46-49	->> Equivalent Resistance, Leakage Reactance and Impedance of transformer. ->>To draw phasor diagram of transformer on load, with winding Resistance and Magnetic leakage with using unity pf, leading pf and lagging pf load. ->> To explain Equivalent circuit and solve numerical problems	
	50	TUTORIAL-10	

11	51-54	->>Approximate & exact voltage drop calculation of a Transformer. ->> Regulation of transformer. ->> Different types of losses in a Transformer. Explain Open circuit and Short Circuit test.(Solve numerical problems)	
	55	TUTORIAL-11	
12	56-59	->> Explain Efficiency, efficiency at different loads and power factors, condition for maximum efficiency (solve problems) ->>Explain All Day Efficiency (solve problems) ->> Determination of load corresponding to Maximum efficiency.	
	60	TUTORIAL-12	
13	61-64	->>Parallel operation of single phase transformer **AUTO TRANSFORMER** ->>Constructional features of Auto transformer. ->>Working principle of single phase Auto Transformer.	
	65	TUTORIAL-13	
14	66-69	->>Comparison of Auto transformer with an two winding transformer (saving of Copper). ->> Uses of Auto transformer. ->>Explain Tap changer with transformer (on load and off load condition)	
	70	TUTORIAL-14	
15	71-74	**INSTRUMENT TRANSFORMERS** ->> Explain Current Transformer and Potential Transformer ->> Define Ratio error, Phase angle error, Burden. ->> Uses of C.T. and P.T.	
	75	TUTORIAL-15	

9.12.19
Signature of Faculty

9.12.19
Signature of HOD

LESSON PLAN

Discipline: Electrical Engg. GP,Bargarh
Semester: 4th
Name of the Teaching Faculty: Sri Niranjan Nayak,Lect.(I &C Engg.)
Subject: Analog Electronics And OP-Amp (TH 2)
No of Days/week class allotted: 04
Session: 2019-20

Week	Class Day	Theory/Practical Topics	Remarks
1	1-4	**P-N JUNCTION DIODE.** P-N Junction Diode . Working of Diode V-I characteristic of PN junction Diode. DC load line. Important terms such as Ideal Diode, Knee voltage	
2	5-8	**Breakdown .** Junctions break down. Zener breakdown .Avalanche breakdown .P-N Diode clipping Circuit. P-N Diode clamping Circuit	
3	9-12	**SPECIAL SEMICONDUCTOR DEVICES.** Thermistors, Sensors & barretters , Zener Diode Tunnel Diode ,PIN Diode.	
4	13-16	**RECTIFIER CIRCUITS & FILTERS.** Classification of rectifiers. Analysis of half wave, full wave centre tapped and Bridge rectifiers and calculate: DC output current and voltage.RMS output current and voltage. Rectifier efficiency. Ripple factor Regulation Transformer utilization factor. Peak inverse voltage Filters Shunt capacitor filter. Choke input filter. π filter	
5	17-20	**TRANSISTORS .** Principle of Bipolar junction transistor. Different modes of operation of transistor. Current components in a transistor Transistor as an amplifier.	
6	21-24	**Transistor circuit configuration & its characteristics.** CB Configuration. CE Configuration CC Configuration.	

7	25-28	**TRANSISTOR CIRCUITS.** Transistor biasing . Stabilization Stability factor	
8	28-32	**Different method of Transistors Biasing.** Base resistor method. Collector to base bias. Self bias or voltage divider method.	
9	32-36	**TRANSISTOR AMPLIFIERS.** Practical circuit of transistor amplifier. DC load line and DC equivalent circuit.AC load line and AC equivalent circuit Calculation of gain. Phase reversal. H-parameters of transistors .Simplified H-parameters of transistors	
10	37-40	**Generalised approximate model.** Analysis of CB, CE, CC amplifier using generalised approximate model. Multi stage transistor amplifier. R.C. coupled amplifier. Transformer coupled amplifier. Feed back in amplifier	
11	41-44	**General theory of feed back.** Negative feedback circuit. Advantage of negative feed back 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	
12	45-48	Oscillators. Types of oscillators. Essentials of transistor oscillator Principle of operation of tuned collector, Hartley, colpitt, phase shift, wein- bridge oscillator (no mathematical derivations)	
13	48-52	**FIELD EFFECT TRANSISTOR.** Classification of FET. Advantages of FET over BJT. Principle of operation of BJT .FET parameters (no mathematical derivation).DC drain resistance .AC drain resistance. Trans-conductance .Biasing of FET	
14	52-56	**OPERATIONAL AMPLIFIERS.** General circuit simple of OP-AMP and IC – CA – 741 OP AMP. Operational amplifier stages. Equivalent circuit of	

		operational amplifier. Open loop OP-AMP configuration	
15	56-60	**OPAMP with fed back** Inverting OP-AMP. Non inverting OP-AMP .Voltage follower & buffer. Differential amplifier. Adder or summing amplifier. Sub tractor. Integrator. Differentiator Comparator.	
	Signature of Faculty: 09-12-19 Signature of HOD: 9.12.'19		

LESSON PLAN

Name of the Teaching Faculty: Smt. Rashmita Gouda
Designation: Lecturer (Instrumentation & Control)
Discipline: Electrical Engg. (Govt. Polytechnic , Bargarh)
Semester: 4TH
Subject: Electrical Measurement & Instrumentation
Subject code: Th-3
No of Days/week class allotted: 05 (4L+1T)
Session: 2019-20

Week	Class Day	Theory/Practical Topics	Remarks
1	1-4	**1. MEASURING INSTRUMENTS** 1.1 Define Accuracy, precision, Errors, Resolutions Sensitivity and tolerance. 1.2 Classification of measuring instruments. 1.3 Explain Deflecting, controlling and damping arrangements in indicating type of instruments.	
	5	TUTORIAL-1	
2	6-9	1.4 Calibration of instruments. **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	
	10	TUTORIAL-2	
	11-14	2.1.2 Permanent Magnet Moving coil type instruments. 2.1.3 Dynamometer type instruments 2.1.4 Rectifier type instruments	
3	15	TUTORIAL-3	
	16-19	2.1.5 Induction type instruments 2.2 Extend the range of instruments by use of shunts and Multipliers. 2.3 Solve Numerical	
	20	TUTORIAL-4	
4	21-24	**3. WATTMETERS AND MEASUREMENT OF POWER** 3.1 Describe Construction, principle of working of Dynamometer type wattmeter. (LPF and UPF type) 3.2 The Errors in Dynamometer type wattmeter and methods of their correction.	
	25	TUTORIAL-5	
5	26-29	3.3 Discuss Induction type watt meters. **4. ENERGYMETERS AND MEASUREMENT OF ENERGY** 4.1 Introduction	

		4.2 Single Phase Induction Type Energy meters – construction, working principle and their compensation & adjustments.	
	30	TUTORIAL-6	
	31-34	4.3 Testing of Energy Meters. **5. MEASUREMENT OF SPEED, FREQUENCY AND POWER FACTOR** 5.1 Tachometers, types and working principles 5.2 Principle of operation and construction of Mechanical and Electrical resonance Type frequency meters.	
	35	TUTORIAL-7	
6	36-39	5.3 Principle of operation and working of Dynamometer type single phase and three phase power factor meters. **6. MEASUREMENT OF RESISTANCE, INDUCTANCE& CAPACITANCE** 6.1 Classification of resistance 6.1.1. Measurement of low resistance by potentiometer method.	
	40	TUTORIAL-8	
7	41-44	6.1.2. Measurement of medium resistance by wheat Stone bridge method. 6.1.3. Measurement of high resistance by loss of charge method. 6.2 Construction, principle of operations of Megger & Earth tester for insulation resistance and earth resistance measurement respectively.	
	45	TUTORIAL-9	
	46-49	6.3 Construction and principles of Multimeter. (Analog and Digital) 6.4 Measurement of inductance by Maxwell's Bridge method. 6.5 Measurement of capacitance by Schering Bridge method	
8	50	TUTORIAL-10	
	51-54	**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. 7.3. Resistive transducer 7.3.1 Linear and angular motion potentiometer. 7.3.2 Thermistor and Resistance thermometers. 7.3.3 Wire Resistance Strain Gauges	
	55	TUTORIAL-11	
9	56-59	7.4. Inductive Transducer 7.4.1 Principle of linear variable differential Transformer (LVDT) 7.4.2 Uses of LVDT. 7.5. Capacitive Transducer. 7.5.1 General principle of capacitive transducer. 7.5.2 Variable area capacitive transducer. 7.5.3 Change in distance between plate capacitive transducer. 7.6. Piezo electric Transducer and Hall Effect Transducer with their applications.	

	60	TUTORIAL-12	
10	61-64	**8. OSCILLOSCOPE** 8.1. Principle of operation of Cathode Ray Tube. 8.2. Principle of operation of Oscilloscope (with help of block diagram). 8.3. Measurement of DC Voltage & current. 8.4. Measurement of AC Voltage, current, phase & frequency.	

1)

Signature of Faculty: 9/12/2019

Signature of HOD: 9.12.19

LESSON PLAN

Discipline: Electrical Engg. Govt Polytechnic Bargarh
Semester: 4TH
Name of the Teaching Faculty: . Swati Sharma, PTGF (Electrical Engg.)
Subject: Generation transmission and distribution (Th4)
No of Days/week class allotted: 04
Session: 2019-20

Week	Class Day	Theory/Practical Topics	Remarks
1	1-4	1. **GENERATION OF ELECTRICITY** 1.1 Elementary idea on generation of electricity from Thermal, Hydel, Nuclear Power station.	
2	5-8	1.2 Introduction to Solar Power Plant (Photovoltaic cells). 1.3 Layout diagram of generating stations. 2. **TRANSMISSION OF ELECTRIC POWER** 2.1 Layout of transmission and distribution scheme.	
3	9-12	2.2 Voltage Regulation & efficiency of transmission. 2.3 State and explain Kelvin's law for economical size of conductor. 2.4 Corona and corona loss on transmission lines.	
4	13-16	**3. OVER HEAD LINES** 3.1 Types of supports, size and spacing of conductor. 3.2 Types of conductor materials.	
5	17-20	3.3 State types of insulator and cross arms. 3.4 Sag in overhead line with support at same level and different level. (approximate formula effect of wind, ice and temperature on sag)	
6	21-24	3.5 Simple problem on sag. **4. PERFORMANCE OF SHORT & MEDIUM LINES** 4.1. Calculation of regulation and efficiency.	
7	25-28	4.2short and medium transmission line phasor diagram 4.3problems of short transmission lines	
8	29-32	**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.	

9	33-36	5.2 HV DC transmission. 5.2.1Advantages and Limitations of HVDC transmission system.	
10	37-40	**6.DISTRIBUTION SYSTEMS** 6.1Introduction to Distribution System 6.2Connection Schemes of Distribution System: (Radial, Ring Main and interconnected system) 6.3DC distributions	
11	41-44	6.3.1 Distributor fed at one End. 6.3.2 Distributor fed at both the ends. 6.3.3 Ring distributors 6.4 AC distribution system.	
12	45-48	6.4.1. Method of solving AC distribution problem. 6.4.2. Three phase four wire star connected system arrangement **7. UNDERGROUND CABLES** 7.1 Cable insulation and classification of cables	
13	49-52	7.2 Types of L. T. & H.T. cables with constructional features. 7.3 Methods of cable lying. 7.4 Localization of cable faults: Murray and Varley loop test for short circuit fault /Earth fault.	
14	53-56	**8. ECONOMIC ASPECTS** 8.1 Causes of low power factor and methods of improvement of power factor in power system 8.2 Factors affecting the economics of generation: (Define and explain)	
15	57-60	8.2.1 Load curves. 8.2.2 Demand factor. 8.2.3 Maximum demand. 8.2.4 Load factor.	
16	61-64	**9. TYPES OF TARIFF** 9.1. Desirable characteristic of a tariff. 9.2. Explain flat rate, block rate, two part and maximum demand tariff. (Solve Problems)	
17	65-68	**10. SUBSTATION** 10.1 Layout of LT, HT and EHT substation. 10.2 Earthing of Substation, transmission and distribution lines	

Signature of Faculty:

9.12.19
Signature of HOD

LESSON PLAN

Name of the Teaching Faculty: Sri. Deepak Patra
Designation: Lecturer in Electrical
Discipline: Electrical Engg.
Semester: 4TH
Subject: Electrical Drawing
Subject code: PR4
No of Days/week class allotted: 06 (6L)
Session: 2019-20

Week	Class Day	Theory/Practical Topics	Remarks
1	1-6	**WIRING DIAGRAM AND CONTROL CIRCUIT** 1.1 3 point D. C. motor starter. 1.2 4 point D.C. motor starter.	
2	7-12	1.3 DOL starter 1.4 Star delta starter	
3	13-18	1.5 Auto Transformer Starter. 1.6 Rotor resistance starter	
4	19-24	**DRAW D.C. M/C PARTS** (Dimensional Drawing) 2.1. Pole with pole shoes.	
5	25-30	2.2. Commutator	
6	31-36	2.3. Armature 2.4. DC. armature winding (a) Simple lap winding	
7	37-42	(b) Simple wave winding	
8	43-48	**DRAW 1-PHASE & 3-PHASE TRANSFORMER** (Assembly Drawing) 3.1 Stepped core type	
9	49-54	3.2 Plane shell type	
10	55-60	**DRAW SKETCHES OF THE FOLLOWING AS PER B.I.S AND REC SPECIFICATIONS** 5.1 Earthing installation	
11	61-66	5.2 Double pole structure for LT and HT distribution lines	

12	67-72	**DRAW SINGLE LINE DIAGRAM OF SUBSTATION** 6.1 Single line diagram of 33/11kV distribution substation. 6.2 Single line diagram of a 11/0.4 kV distribution substation	
13	73-78	**COMPUTER AIDED ELECTRICAL DRAWING USING SOFT WARE** 8.1 Draw Electrical symbols (take Print out)	
14	79-84	8.2 Draw D.C. m/c parts (take print out) 8.3 Draw A. C. m/c parts (take print out)	
15	85-90	8.4 Draw electrical layout of diagram of Electrical Installation of a building	

09/12/19

Signature of Faculty:

Signature of HOD: 9.12.19

LESSON PLAN

Discipline: ELECTRICALEngg. GP,Bargarh

Semester: 6TH

Name of the Teaching Faculty: Sri Niranjan Nayak, Lect.(I &C Engg.)

Subject: ENVIRONMENTAL STUDIES(BST501)

No of Days/week class allotted: 05

Session: 2019-20

Week	Class Day	Theory/Practical Topics	Remarks
1	1-5	**The Multidisciplinary nature ofenvironmentalstudies** Definition, scope and importance, Need for public awareness.	
2	6-10	**NaturalResources** **Renewable and non renewable resources:** Naturalresourcesandassociatedproblems. Forestresources:Useandover-exploitation,deforestation,casestudies, Timberextractionmining,damsandtheireffectsonforestsand tribal people. Waterresources:Useandover-utilizationofsurfaceandgroundwater, floods,drought,conflictsoverwater,dam'sbenefitsandproblems. Mineral Resources: Use and exploitation, environmental effects of extractingandusingmineralresources.	
3	11-15	Food Resources: World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizers-pesticides problems,waterlogging,salinity,. EnergyResources:Growingenergyneed,renewableandnon-renewable energysources,useofalternateenergysources,casestudies. LandResources:Landasaresource,landdegradation,manind uces landslides,soilerosion,anddesertification. Roleofindividualinconservationofnaturalresources.	

		Equitableuseofresourcesforsustainablelifestyles.	
4	16-20	**Systems** Conceptofanecosystem. Structureandfunctionofanecosystem. Producers, consumers,decomposers. Energyflowintheecosystems.	
5	21-25	Ecologicalsuccession. Foodchains,foodwebsandecologicalpyramids. Introduction,types,characteristicfeatures,structureandfunc tionofthe following ecosystem:	
6	26-30	Forestecosystem: Aquaticecosystems(ponds,streams,lakes,rivers,oceans,estuaries).	
8	31-35	**Biodiversity andit'sConservation** Introduction-Definition:genetics,speciesandecosystemdiversity. Biogeographicallyclassificationofindia. Valueofbiodiversity:consumptiveuse,productiveuse,sociale thical, aesthetic and optionvalues.	
9	36-40	Biodiversityatglobal,nationalandlocallevel. Threatstobiodiversity:Habitatsloss,poachingofwildlife,man wildlife conflicts.	
10	41-45	Definition Causes, effects and control measures of: Airpollution. Waterpollution. Soilpollution Marinepollution	
11	46-50	Noisepollution. Thermalpollution Nuclearhazards.	

12	55-60	SolidwasteManagement: Causes, effects and control measures of urban and industrialwastes. Role of an individual in prevention of pollution. Disaster management: Floods, earth quake, cyclone and landslides.	
13	61-65	**Social issues andtheEnvironment** Formunsustainabletosustainabledevelopment. Urbanproblemsrelatedtoenergy. Waterconservation,rainwaterharvesting,watershedmanagement. Resettlementandrehabilitationofpeople;itsproblemsndconcern. Environmentalethics:issueandpossiblesolutions..	
14	66-70	Climate change, global warming, acid rain, ozone layer depletion, nuclearaccidentsandholocaust,casestudies. Air(preventionandcontrolofpollution)Act. Water(preventionandcontrolofpollution)Act. Publicawareness.	
15	71-75	**Human population andthe environment** Populationgrowthandvariationamongnations. Populationexplosion-familywelfareprogram. Environment and humanhealth.	
16	56-60	Humanrights. Valueeducation Roleofinformationtechnologyinenvironmentandhumanhealth.	
		Signature of Faculty: Niranjan Nayak Signature of HOD: 9.12.19	

LESSON PLAN

Discipline: Electrical Engg., Govt Polytechnic Bargarh
Semester: 6TH
Name of the Teaching Faculty: Ms. Swati Sharma, PTGF (Electrical Engg.)
Subject: switch Gear and Protective Devices (EET 601)
No of Days/week class allotted: 05 (4L+1T)
Session: 2019-20

Week	Class Day	Theory/Practical Topics	Remarks
1	1-4	**1. INTRODUCTION TO SWITCHGEAR** 1.1 Essential Features of switchgear. 1.2 Switchgear Equipment. 1.3 Bus-Bar Arrangement. 1.4 Switchgear Accommodation.	
	5	TUTORIAL-1	
2	6-9	1.5 Short Circuit. 1.6 Short Circuit Current. 1.7 Faults in a power system. **2. FAULT CALCULATION** 2.1 Symmetrical faults on 3-phase system. 2.2 Limitation of fault current.	
	10	TUTORIAL-2	
3	11-14	2.3 Percentage Reactance. 2.4 Percentage Reactance and Base KVA. 2.5 Short – circuit KVA. 2.6 Reactor control of short circuit currents.	
	15	TUTORIAL-3	
4	16-19	2.7 Location of reactors. 2.8 Steps for symmetrical Fault calculations. 2.9 Solve numerical problems on symmetrical fault. **3. FUSES** 3.1 Desirable characteristics of fuse element.	
	20	TUTORIAL-4	
5	21-24	3.2 Fuse Element materials. 3.3 Types of Fuses and important terms used for fuses. 3.4 Low and High voltage fuses. 3.5 Current carrying capacity of fuse element. 3.6 Difference Between a Fuse and Circuit Breaker	
	25	TUTORIAL-5	
6	26-29	**4. CIRCUIT BREAKERS** 4.1 Definition and principle of Circuit Breaker. 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.	

	30	TUTORIAL-6	
7	31-34	4.5 Classification of circuit Breakers. 4.6 Oil circuit Breaker and its classification. 4.7 Plain brake oil circuit breaker. 4.8 Arc control oil circuit breaker. 4.9 Low oil circuit breaker. 4.10 Maintenance of oil circuit breaker. 4.11 Air-Blast circuit breaker and its classification.	
	35	TUTORIAL-7	
8	36-39	4.12 Sulphur Hexa-fluoride (SF6) circuit breaker. 4.13 Vacuum circuit breakers 4.14 Switchgear component. 4.15 Problems of circuit interruption. 4.16 Resistance switching. 4.17 Circuit Breaker Rating.	
	40	TUTORIAL-8	
9	41-44	**5. PROTECTIVE RELAYS** 5.1 Definition of Protective Relay. 5.2 Fundamental requirement of protective relay. 5.3 Basic Relay operation a) Electromagnetic Attraction type b) Induction type 5.4 Definition of following important terms	
	45	TUTORIAL-9	
10	46-49	5.5 Definition of following important terms. a) Pick-up current. b) Current setting. c) Plug setting Multiplier. d) Time setting Multiplier. 5.6 Classification of functional relays	
	50	TUTORIAL-10	
11	51-54	5.7 Induction type over current relay (Non-directional) 5.8 Induction type directional power relay. 5.9 Induction type directional over current relay 5.10 Differential relay a) Current differential relay b) Voltage balance differential relay. 5.11 Types of protection.	
	55	TUTORIAL-11	
12	56-59	**6. PROTECTION OF ELECTRICAL POWER EQUIPMENT AND LINES** 6.1 Protection of alternator. 6.2 Differential protection of alternators. 6.3 Balanced earth fault protection. 6.4 Protection systems for transformer. 6.5 Buchholz relay. 6.6 Protection of Bus bar. 6.7 Protection of Transmission line.	
	60	TUTORIAL-12	
13	61-64	6.8 Different pilot wire protection (Merz-price voltage	

		Balance system) 6.9 Explain protection of feeder by over current and earth fault relay. **7. PROTECTION AGAINST OVER VOLTAGE AND LIGHTING** 7.1 Voltage surge and causes of over voltage. 7.2 Internal cause of over voltage. 7.3 External cause of over voltage (lighting) 7.4 Mechanism of lightning discharge.	
	65	TUTORIAL-13	
14	66-69	7.5 Types of lightning strokes. 7.6 Harmful effect of lightning. 7.7 Lightning arresters. 7.8 Type of lightning Arresters. a) Rod-gap lightning arrester. b) Horn-gap arrester. c) Valve type arrester. 7.9 Surge Absorber	
	70	TUTORIAL-14	
15	71-74	**8. STATIC RELAY** 8.1 Advantage of static relay. 8.2 Instantaneous over current relay. 8.3 Principle of IDMT relay	
	75	TUTORIAL-15	

Signature of Faculty: Swati Sharma

Signature of HOD: 9.12.19

LESSON PLAN

Name of the Teaching Faculty: Sri. Nitesh Kumar Acharya
Designation: Lecturer in Electrical
Discipline: Electrical Engg.
Semester: 6TH
Subject: UEET
Subject code: EET602
No of Days/week class allotted: 04 (4L)
Session: 2019-20

Week	Class Day	Theory/Practical Topics	Remarks
1	1-4	**ELECTROLYTIC PROCESS** ->>Definition and Basic principle of Electro Deposition. ->>Important terms regarding electrolysis. ->>Faradays Laws of Electrolysis. ->>Definitions of current efficiency, Energy efficiency.	
2	5-8	->>Principle of Electro Deposition. ->>Factors affecting the amount of Electro Deposition. ->>Factors governing the electro deposition. ->>State simple example of extraction of metals. ->>Application of Electrolysis	
3	9-12	**ELECTRICAL HEATING** ->>Advantages of electrical heating. ->>Explain mode of heat transfer and Stephen's Law. ->>Discuss principle of Resistance heating. ->>Direct Resistance heating. ->>Indirect Resistance heating. ->>Explain working principle of direct arc furnace and indirect arc furnace.	
4	13-16	->>Principle of Induction heating. ->>Working principle of direct core type, vertical core type and indirect core type Induction furnace. ->>Principle of coreless induction furnace and skin effect. ->>Principle of dielectric heating and its application. ->>Principle of Microwave heating and its application.	
5	17-20	**PRINCIPLES OF ARC WELDING** ->>Explain principle of arc welding. ->>Discuss D. C. & A. C. arc phenomena ->>D.C. & A. C. arc welding plants of single and multi-operation type.	
6	21-24	->>Types of arc welding. ->>Explain principles of resistance welding. ->>Descriptive study of different resistance welding methods.	
7	25-28	**ILLUMINATION** ->>Nature of Radiation and its spectrum. ->>Terms used in Illuminations. i. Luminous intensity ii. Lumen	

		iii. Intensity of illumination iv.MHCP v. MSCP vi. MHSCP vii. Brightness viii Solid angle ix. Luminous efficiency ->>Explain the inverse square law and the cosine law.	
8	29-32	->>Explain polar curves. ->>Describe light distribution and control. ->> Explain related definitions like maintenance factor and depreciation factors. ->>Design simple lighting schemes and depreciation factor. ->>Constructional feature and working of Filament lamps, effect of variation of voltage on working of filament lamps. ->>Explain Discharge lamps. ->>State Basic idea about excitation in gas discharge lamps. ->>State constructional factures and operation of: - Fluorescent lamp. (PL and PLL Lamps)	
9	33-36	->>Sodium vapour lamps. ->>High pressure mercury vapour lamps. ->>Neon sign lamps. ->>High lumen output & low consumption fluorescent lamps.	
10	37-40	**INDUSTRIAL DRIVES** ->>State group and individual drive. ->>Method of choice of electric drives. ->>Explain starting and running characteristics of DC and AC motor.	
11	41-44	->>State Application of : DC motor phase induction motor phase synchronous motors.	
12	45-48	->>Single phase induction, series motor, universal motor and repulsion motor.	
13	49-52	**ELECTRIC TRACTION** ->>Explain system of traction. ->>System of Track electrification. ->>Running Characteristics of DC and AC traction motor.	
14	53-56	->>Explain control of motor ->>Tapped field control ->>Rheostatic control ->>Series parallel control ->>Metadyne control	
15	57-60	->>Explain Braking of the following types. ->>Regenerative Braking ->>Braking with 1-phase series motor ->>Magnetic Braking	

9.12.19

Signature of Faculty

9.12.19

Signature of HOD

LESSON PLAN

Name of the Teaching Faculty: Sri Deepak Patra
Designation: Lecturer in Electrical
Discipline: Electrical Engg. (Govt. Polytechnique, Bargarh)
Semester: 6TH
Subject: Electrical Installation and Estimating
Subject code: EET 603
No of Days/week class allotted: 05 (4L+1T)
Session: 2019-20

Week	Class Day	Theory/Practical Topics	Remarks
1	1-5	**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.	
2	6-10	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. 1.4 OH lines : Rule 74, 75, 76, 77, 78, 79, 80, 86, 87, 88, 89, 90, 91	
3	11-15	**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 2.2 ACCESSORIES : Main switch and distribution boards,conduits,conduit accessories and fittings,lighting accessories and fittings, fuses, important definitions,determinations of size of a fuse wire, fuse units.Earthing conductor, earthing, IS specification regarding earthing of a electrical installations,points to be earthed. Determination of a size of earth wire and earth plate fot domestic and industrial installations. Material required for GI pipe earthing.	
5	21-25	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	
6	26-30	**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. 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.	
7	31-35	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 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.	
8	36-40	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 **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.	
9	41-45	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. 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.	
10	46-50	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.	

11	51-55	**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	
12	56-60	5.2 Prepare and estimate for providing single phase supply of load of 5 KW (light, fan, socket) to a single stored residential building .	
13	61-65	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	
14	66-70	5.4 Prepare one estimate of materials required for service connection to a factory building with load within 15 KW using insulated wire. 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	
15	71-75	. **ESTIMATING FOR DISTRIBUTION SUBSTATIONS** 6.1 Prepare one materials estimate for following types of transformer substations. 6.1.1 Pole mounted substation 6.1.2 Plinth Mounted substation	

09/12/19

Signature of Faculty

9.12.19

Signature of HOD:

LESSON PLAN

Name of the Teaching Faculty: Smt. Rashmita Gouda
Designation: Lecturer (Instrumentation & Control)
Discipline: Electrical Engg.(Govt. Polytechnic, Bargarh)
Semester: 6TH
Subject: Control System Engg.
Subject code: EET604
No of Days/week class allotted: 05 (4L+1T)
Session: 2019-20

Week	Class Day	Theory/Practical Topics	Remarks
1	1-4	1.**SIGNAL FLOW GRAPH.** 1.1 Review of block diagrams and transfer functions ofmultivariable systems. 1.2 Construction of signal flow graph. 1.3 Basic properties of signal flow graph. 1.4 Signal flow graph algebra.	
	5	TUTORIAL-1	
2	6-9	1.5 Construction of signal flow graph for control system. **2. TIME RESPONSE ANALYSIS.** 2. 1 Time response of control system. 2. 2 Standard Test signal. 2.2.1. Step signal, 2.2.2. Ramp Signal 2.2.3. Parabolic Signal 2.2.4. Impulse Signal	
	10	TUTORIAL-2	
	11-14	2. 3 Time Response of first order system with: 2.3.1. Unit step response 2.3.2. Unit impulse response. 2. 4 Time response of second order system to the unit step input. 2.4.1. Time response specification.	
3	15	TUTORIAL-3	
	16-19	2.4.2. Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error. 2.4.3. Steady state error and error constants. 2. 5 Types of control system.[Steady state errors in Type-0, Type-1, Type-2system]	
	20	TUTORIAL-4	
4	21-24	2. 6 Effect of adding poles and zero to transfer function. 2. 7 Response with P, PI, PD and PID controller. **3. ANALYSIS OF STABILITY BY ROOT LOCUSTECHNIQUE.** 3. 1 Root locus concept. 3. 2 Construction of root loci.	
	25	TUTORIAL-5	
5	26-29	3. 3 Rules for construction of the root locus.	

		3. 4 Effect of adding poles and zeros to G(s) and H(s).	
	30	TUTORIAL-6	
	31-34	**4. FREQUENCY RESPONSE ANALYSIS.** 4. 1 Correlation between time response and frequency response 4. 2 Polar plots.	
	35	TUTORIAL-7	
6	36-39	4. 3 Bode plots.	
	40	TUTORIAL-8	
7	41-44	4. 4 All pass and minimum phase system. 4. 5 Computation of Gain margin and phase margin.	
	45	TUTORIAL-9	
	46-49	4. 6 Log magnitude versus phase plot. 4. 7 Closed loop frequency response	
8	50	TUTORIAL-10	
	51-54	**5.NYQUIST PLOT** 5.1 Principle of argument. 5.2 Nyquist stability criterion. 5.3 Nyquist stability criterion applied to inverse polar plot. 5.4 Effect of addition of poles and zeros to G(S) H(S) on the shape of Nyquistplot.	
	55	TUTORIAL-11	
9	56-59	5.5 Assessment of relative stability. 5.6 Constant M and N circle 5.7 Nicholas chart.	
	60	TUTORIAL-12	

Signature of Faculty: 9/12/2019

Signature of HOD: 9.12.19