

Course Name : Diploma in Electrical Engineering
Course Code : DEE
Semester : Fifth
Subject Title : Power System - II
Subject Code : 132EE51

Teaching and Examination Scheme:–

Teaching Scheme			Paper Hours	Examination Scheme										Total Marks	
L	T	P		Theory		Test	Total		Practical		OR		TW		
				Max	Min		Max	Min	Max	Min	Max	Min	Max		Min
3	1	-	3	80	32	20	100	40	-	-	-	-	25	10	125

Rationale:– After getting an introductory course in power system in previous semester it is now time for the student to get the knowledge of power system characteristics. This subject aims at making student familiar with certain problems and conditions under which power system operates and their significance.

Objectives:– To have profound knowledge of power system
 To be able to understand the problems of power system

Learning Structure:-

Syllabus

Part I:- Theory

Sr. No	Contents	L	M
	Section I		
1	Per Unit System Per Unit Method Advantages of Per Unit Systems Per Unit Impedances of Transformer Simple problems on P. U. system	4	05
2	Performance of Transmission Lines Short Transmission Lines Medium Transmission Lines Long Transmission Lines Evaluation of ABCD parameters Equivalent π and T Circuits Ferranti Effect	12	20
3	E.H.V.A.C and H.V.D.C Transmission Systems. H.V.D.C System, Types of H.V.D.C systems Merits and demerits of H.V.D.C systems Configuration of E.H.V.A.C transmission system. Merits and Demerits of E.H.V.A.C transmission system. Comparison of H.V.D.C and E.H.V.A.C transmission systems.	8	15

Section II			
4	Power System Earthing Earth Electrode, Earth Current, Resistance of Earth Electrode Step potential, Touch Potential, Transferred Potential Tolerable Limits of Body Currents Soil resistivity, Earth Resistance Tolerable Step and Touch voltage Actual Touch and Step voltages Design of Earthing Grid, Neutral Earthing	6	10
5	Faults Symmetrical Fault Symmetrical components Unsymmetrical Faults Single Line to Ground Fault Line to Line Fault Double Line to Ground Fault Calculations and problems on above faults	10	15
6.	Corona The Phenomenon of Corona Disruptive Critical Voltage Visual Critical Voltage Corona Loss Factors and conditions affecting Corona Loss Radio Interference due to corona Loss Corona calculations	6	10
7	Issues of Smart Grid	2	5
Total		48	80

Part II:- Practicals

List of Laboratory Experiments:-

- 5 assignments on the given syllabus.
- Introduction to MATLAB software (SIM Power System Tool used in Simulink).
- Tutorials based on the problems given in the syllabus

Learning Resources:-

Text Book: -

Power System Analysis and Design, 4th Edition by B. R. Gupta, S. Chand Publisher.

Reference Book:-

Modern Power System Analysis, 3rd Edition by D. P. Kothari and I. J. Nagrath,
Tata McGraw- Hill Publishing Co. Ltd., New Delhi, 1994.

Websites:-

www.wikipedia.org
 www.mahatransco.in
 www.powergridindia.com

Course Name : Diploma in Electrical Engineering
Course Code : DEE
Semester : Fifth
Subject Title : Electrical Machines - II
Subject Code : 132EE52

Teaching and Examination Scheme:–

Teaching Scheme			Paper Hours	Examination Scheme										Total Marks	
L	T	P		Theory		Test	Total		Practical		OR		TW		
				Max	Min		Max	Min	Max	Min	Max	Min	Max		Min
3	1	3	3	80	32	20	100	40	50	20	-	-	25	10	175

Rationale:–

This subject is classified under core technology group intended to teach students facts, concepts, principles & procedure for operations and testing of electrical machines such as induction motor, alternator and synchronous motor. Student will be able to analyze the characteristics and qualitative parameters of these machines.

These machines are widely used in industries and for generation of electricity. The knowledge gained by the student is useful in the study of technological subjects such as Utilization System, Manufacturing Processes and Testing and Maintenance of Electrical Machines .

The knowledge and skills obtained will be helpful in discharging technical functions such as supervision, controlling and as R & D technician.

Objectives:–

Student will be able to:-

- 1) Know the constructional details & working principle of various types of AC Machines.
- 2) Operate given machine properly.
- 3) Use the knowledge for testing of machine.
- 4) Select motors of proper rating for particular use.
- 5) Relate this knowledge to understand the subject of higher semester.

Learning Structure:-

Syllabus

Part I:- Theory

Sr. No	Contents	L	M
	Section I		
1	Synchronous Machine Construction and working Principle Concepts of general terms of alternator and motor Generated EMF and EMF polygon, Distribution Factor, Pitch Factor	17	30

	<p>Elimination of harmonics from alternator EMF waveform Excitation system for synchronous machine Flux and MMF phasors in synchronous machine Cylindrical rotor Salient pole Machine Phasor diagram of cylindrical rotor alternator The Open Circuit and Short circuit characteristic of machines Zero Power factor characteristic and potier triangle Voltage Regulation of an alternator The electromotive force (EMF) method The magnetomotive force(MMF) method zero power factor method (ZPFC) Physical concept of synchronous machine Operation Synchronous motor phasor diagram Operating characteristic of an alternator and their rating External load Characteristic Compounding characteristic Rating of alternator Power flow through inductive impedance Power control of Synchronous machine Power factor control of synchronous motor Power factor control of alternator Two reactance theory of salient pole machine Power Angle Characteristic of cylindrical rotor machine Hunting and damper winding Efficiency of synchronous machine Power Factor Correction by Synchronous Condenser Starting of Synchronous machine against High Starting Torque Synchronous machine applications Effect of load on a synchronous motor Effect of varying excitation on armature current and power factor</p>		
2	<p>Parallel operation of Alternator Requirement of parallel operation Condition for proper synchronizing Synchronizing of single phase and three phase alternator Condition necessary for successful parallel operation Synchronizing current , power and torque Effect of increasing the excitation of one of alternator Effect of incising the driving torque of one of alternator Effect change in speed of one of alternator Load sharing between two alternator Synchronous machine on infinite bus bar</p>	07	10

Section II			
3	Poly Phase Induction Motor Production of rotating magnetic field, , construction, types of three induction machine Principal of operation Induction motor as transformer Flux and MMF phasors in induction machine Rotor frequency, EMF, Current and power Loss and Efficiency Induction Motor and Phasor Diagram Equivalent Circuit Analysis of equivalent circuit Torque- Slip characteristic Power- Slip characteristic Performance of Induction Machine Determination of equivalent circuit parameters Circle Diagram Power factor Control of three phase induction motor Starting of induction motor Squirrel cage motor Wound Rotor Application	17	30
4	Special Purpose Machines (Basics) Single Phase induction motor Equivalent Circuit A.C. series motor Universal Motor Stepper motor Brushless DC motor	07	10
	Total	48	80

Part II:- Practicals

Skills to be developed –

- 1. Intellectual skills–**
 - a) Analytical Skills
 - b) Identification Skills
- 2. Motor skills –**
 - a) Measuring Skills
 - b) Connecting instruments / machines

List of Laboratory Experiments:-

- 1) To reverse the direction of rotation of 3-phase IM.
- 2) To measure the performance of 3-phase IM by direct loading.
- 3) Perform speed control on 3-phase induction motor.
- 4) Using an MG set (DC motor-Alternator) observe the effect of excitation & speed on induced e.m.f. & plot O.C.C. of the given alternator.
- 5) To find the percentage regulation of 3-phase alternator by synchronous impedance method at various power factors.
- 6) To find the percentage regulation of 3-phase alternator by Zero power factor method at various power factors.
- 7) To list & explain various starting methods of synchronous motor & applying one of them to start the synchronous motor. Plot V & inverted V curve of the same.
- 8) To list the various types of 1-phase IM, Collect the literature for them from dealers/manufacturers of local places & compare on the following pts.
 - i) Method of starting ii) Cost iii) Performance iv) Starting torque etc.Prepare a report

Part III :- Tutorials

At least four problems to be solved in each of the above sub topics.

Learning Resources:-

Text Book:-

Electrical Machines, 3rd Edition by S K Bhattacharya,
Tata McGraw- Hill Publishing Company Limited.

Reference Books:-

- 1) Electrical Machinery, 5th Edition by P.S. Bhimbhra, Khanna Publishers.
- 2) Electrical Technology, 7th Edition by H. Cotton, CBS Publishers and Distributors.
- 3) Electrical Technology -Vol. II, 23rd Revised Edition by B.L Theraja , and A K Theraja, S Chand & Company Ltd.
- 4) Electrical Machines, 1st Edition by Samarjit Ghosh, Pearson Education.

Course Name : Diploma in Electrical Engineering
Course Code : DEE
Semester : Fifth
Subject Title : Control System
Subject Code : 132EE53

Teaching and Examination Scheme:-

Teaching Scheme			Paper Hours	Examination Scheme										Total Marks	
L	T	P		Theory		Test	Total		Practical		OR		TW		
				Max	Min		Max	Min	Max	Min	Max	Min	Max		Min
3	-	2	3	80	32	20	100	40	50	20	-	-	25	10	175

Rationale:-

The advancement of both knowledge and technique has resulted in the development of controls in process industry. The progression of human existence from a primitive state to the present complex technological world was paced by learning new and improved methods to control the environment.

Objectives:-

The student will be able to:

1. Learn and understand about open loop and closed loop systems.
2. Feedback control and Modeling of Systems (Transfer Function).
3. Steady state, time response, and frequency response analysis.
4. Concept of stability

Syllabus

Part I:- Theory

Sr.No.	Contents	L	M
	Section I		
1	Overview of Control Systems - Introduction - Types of Control Systems with examples Open Loop & Closed Loop Control Systems: Definition, Block Diagram, Linear & Nonlinear Systems Time Varying & Invariant Systems Discrete and Analog Systems	04	06

2	Mathematical Modeling of Dynamic Systems <ul style="list-style-type: none"> - Introduction - Modeling in Frequency Domain (Transfer Function Approach for RLC circuits) - Block Diagram Reduction Algebra, Signal Flow Graphs and Mason's Gain Formula 	8	14
3	Time Domain Analysis <ul style="list-style-type: none"> - Laplace Transforms of Standard Test Signals: unit step, unit ramp, unit parabolic and unit impulse. - Transient response of first order system to standard test inputs - Transient response of Second order system to unit step input. - Time Domain Performance Specifications.(no derivation) - Steady-state Error Analysis "Type" of the systems, Static Error Coefficients and Steady-State Errors. 	12	20
Section II			
4	Root locus method <ul style="list-style-type: none"> - Root locus concept, rules and construction of approximate (without scale) root loci. 	05	08
5	Stability Analysis <ul style="list-style-type: none"> - Concept of Stability, Routh-Hurwitz stability criterion, Relative stability 	05	08
6	Frequency Domain Analysis <ul style="list-style-type: none"> - Frequency domain specifications(no derivation) - Relationship between Time and Frequency domain specifications. - Bode Plots, Polar Plots, Gain margin and phase margin - Nyquist Stability criterion 	14	24
Total		48	80

Part II:- Practicals

List of Laboratory Experiments:-

1. Time response of First order systems.
2. Time response of Second order systems (Over damped).
3. Time response of Second order systems (Critically damped).
4. Time response of Second order systems (under damped).
5. Bode Plot of First order systems.
6. Bode Plot of Second order systems (Over damped).
7. Bode Plot of Second order systems (Critically damped).
8. Bode Plot of Second order systems (under damped).
9. Determination of Transfer Function by Drawing Bode Plot

Learning Resources:-

Text Books:-

- 1) Modern Control Engineering, 4th Edition by Katsuhiko Ogata, Prentice Hall Of India Ltd.
- 2) Control Systems Engineering, 5th Edition by I J Nagrath and M Gopal, New Age International.

Reference Books:-

- 1) Control Systems Engineering, 5th Edition by Norman S Nise, Wiley India Pvt.Ltd.
- 2) Automatic Control System, 8th Edition by B C Kuo and F Golnaraghi, Wiley India Pvt. Ltd.

Course Name : Diploma in Electrical Engineering
Course Code : DEE
Semester : Fifth
Subject Title : Microprocessor
Subject Code : 132EE52

Teaching and Examination Scheme:–

Teaching Scheme			Paper Hours	Examination Scheme										Total Marks	
L	T	P		Theory		Test	Total		Practical		OR		TW		
				Max	Min		Max	Min	Max	Min	Max	Min	Max		Min
3	-	3	3	80	32	20	100	40	50	20	-	-	25	10	175

Rationale:–

Microprocessors have a wide range of applications in most of the consumer, industrial and computer industries. 8085 is the 8-bit CPU and 8086 is the 16-bit CPU. 8085 and 8086 is the base of all upward developed processors.

This subject covers basics, architecture, instruction set and programming of 8085. It Also covers interfacing with memory devices & Introduction & Architecture of 8086.

Objectives:–

Students will be able to:

- 1) Draw block diagram for architecture of 8085.
- 2) Write syntax of given instructions along with their timing diagram.
- 3) Describe concepts of Stack, Subroutine, Interrupts and Control signal.
- 4) Write the Assembly Language Program for given problem statements.
- 5) Interface of microprocessor with memory chips and Interfacing Devices.
- 6) Introduction of 8086 Microprocessor.
- 7) Able to compare 8086 with 8085.

Learning Structure:-

Syllabus

Part I:- Theory

Sr. No	Contents	L	M
Section I			
1	Introduction to 8085 Microprocessor: 1.1 Hardware, software, Bus, Address Bus, Data Bus, control Bus, Comparison of machine language, assembly language and high-level language. Microprocessor, Microcomputer and Micro controller comparison and their application areas. 1.2 Schematic diagram of microcomputer. General function of microprocessor and interfacing devices like latches, buffers, decoders, encoders.	12	20

	<p>1.3 Evolution of microprocessors. 1.4 Silent features of 8085 Microprocessor, 1.5 Architecture of 8085 microprocessor. 1.6 Pin definition of 8085 microprocessor.</p>		
2	<p>8085 Instructions Set, Programming and Timing Diagrams: 2.1 Instruction Format (one byte, two byte and three byte instruction), Addressing modes of 8085, 8085 Instruction set (Arithmetic, logical, data transfer, program control transfer, Machine control, I/O control), Instructions related with interrupts. 2.2 8085 programming with examples. 2.3 Definition of machine cycle (Fetch Cycle and Execution Cycle), T state and Instruction cycle, calculation of time delay. Timing diagram of opcode fetch cycle or Memory read cycle, Memory write, I/O read and I/O write cycle, MVI A, 8 bit data, LXI rp, 16 bit data, STA, 16 bit address.</p>	12	20
Section II			
3	<p>8085 Stack, Subroutine, Interrupts and Control signal: 3.2 Concept of stack, subroutine and interrupts. CALL and RET instruction Hardware and software interrupts, maskable and non-maskable interrupts, vectored interrupts. Hardware structure of the interrupts of 8085. 3.3 Demultiplexing of address and data bus by ALE signal. 3.4 Generation of system control signals (MEMR, MEMWR, IOR,IOW) using SSI and MSI</p>	10	20
4	<p>8085 Interfacing with Memory and Interfacing Devices: 4.1 Address decoding techniques 4.2 Simple example of RAM/ROM memory interfacing with microprocessor 4.3 Comparison of I/O mapped I/O & memory mapped I/O system 4.4 Block diagram, function of each block and interfacing of following peripheral chips with the 8085 Microprocessor. 8155 - Multi-purpose programmable device, 8255 - Programmable peripheral interface. 4.5 Interfacing example: - Traffic Light Controller. - Temperature Controller. - Speed control of Stepper Motor. - Level Controller. 4.5 Introduction of 8086 Microprocessor. 4.6 Comparison of 8085 with 8086 Microprocessor.</p>	14	20
	Total	48	80

Part II:- Practicals

Skills to be developed –

Intellectual skills–

Ability to understand how the Microprocessor logically works.

To be able to apply different logics to solve given problem.

To be able to write program using different logic for the same problem

Motor skills –

To load the program in microprocessor kit.

To observe the result in register, stacks.

List of Laboratory Experiments:-

Write an Assembly Language Program to

- 1) Add / Sub two 8 bit numbers.
- 2) Add/ Sub of two Multibyte numbers. e.g. Two 3 Byte Numbers.
- 3) Find sum of series of 8 bit numbers.
- 4) Multiply two 8 bit numbers.
- 5) Divide two 8 bit numbers.
- 6) Add / Sub two BCD numbers.
- 7) Find No. of 0's and 1's from 8 bit Binary number.
- 8) Transfer block of data from Source memory location to Destination memory location.
- 9) Find smallest/ largest number from array of n numbers.
- 10) Arrange numbers in array in ascending/ descending order.
- 11) Find one's and two's complement of a given number.
- 12) Write Assembly Language Programme to exchange the lower & upper nibble of a byte.
- 13) Sort odd and even byte from given 10 bytes.

Learning Resources:-

Text Books: -

- 1) Microprocessor Architecture, Programming, and Applications with the 8085, 5th Edition by Ramesh S. Gaonkar, Penram International Publisher.
- 2) Microprocessors & Interfacing, 2nd Edition by Douglas V Hall, Tata McGraw –Hill Publications.

Reference Books:-

- 1) 8085 Microprocessor Programming & Interfacing, 1st Edition by N K Srinath, Prentice Hall of India Pvt. Ltd.
- 2) Fundamentals of Microprocessor and Microcomputers, 1st Edition by B Ram, Dhanpat Rai and Sons.

Course Name : Diploma in Electrical Engineering
Course Code : DEE
Semester : Fifth
Subject Title : PLC & SCADA
Subject Code : 132 EE55E1

Teaching and Examination Scheme:–

Teaching Scheme			Paper Hours	Examination Scheme										Total Marks	
L	T	P		Theory		Test	Total		Practical		OR		TW		
				Max	Min		Max	Min	Max	Min	Max	Min	Max		Min
3	-	2	3	80	32	20	100	40	-	-	25	10	25	10	150

Rationale:–

The advancement of both knowledge and technique has resulted in the development of PLC's in process industry. The progression of human existence from a primitive state to the present complex technological world was paced by learning new and improved methods to control the industrial processes.

Objectives:-

The student will be able to:

- Explain the operation of relays, pushbuttons, limit switches, and other basic control devices.
- Using ladder diagrams, design basic motor control circuits.
- Describe the hardware of a PLC, identifying the functions of the main components.
- Read and interpret ladder logic diagrams for specified control jobs.
- Properly configure a PLC, including choosing appropriate addressing for I/O for a specified application.

Syllabus

Part I:- Theory

Sr. No	Contents	L	M
Section I			
1	Ladder Diagram Fundamentals Basic Components and Their Symbols: Control transformers, Fuses, Switches, Indicator lamps, Relays, Timers. Fundamentals of Ladder Diagrams. Machine Control Terminology.	04	08
2	Programmable logic controller Basic history PLC Configurations Programmable Controller Input / output Modules Power supply Programming unit System Block Diagram	04	08

3	Fundamental PLC programming Physical Components vs. Program Components PLC wiring diagram Ladder diagram for basic logic circuits and their hardware connections(AND,OR, XOR--etc) Oscillator Holding (also called Sealed, or Latched) Contacts Ladder Diagrams Having More Than One Rung	08	12
4	Advanced Programming Techniques Introduction Ladder program Execution sequence RS Flip Flop One shot D Flip Flop, T Flip Flop, JK Flip Flop Timers and Counters Sequences Data Transfer Instructions	08	12
Section II			
5	Mnemonic Programming Code Introduction AND Ladder Rung Handling Normally Closed Contacts OR Ladder Rung Simple Branches Complex Branch	05	08
6	Wiring Techniques PLC Power Connection Input Wiring Inputs Having a Single Common Output Wiring Relay Outputs Solid State Outputs	05	08
7	Analog I/O Introduction Analog (A/D) Input Analog (D/A) Output Analog Data Handling Analog I/O Potential Problems	05	08
8	Discrete Position Sensors Sensor Output Classification Connecting Discrete Sensors to PLC Inputs Proximity Sensors Optical Proximity Sensors	05	08
9	Definition of SCADA Functional Block Diagram Function of SCADA Communication between PLC and SCADA	04	08

	SCADA Applications		
		Total	48 80

Part II:- Practicals

1) List of Laboratory Experiments:-

Introduction to PLC Components
 Introduction to Ladder Diagram
 Ladder Diagram for Logic Gate
 AND
 OR
 NOT
 NAND
 NOR
 Ex-NOR
 Ex-OR
 Flipflops using Ladder logic
 Timer using Ladder logic
 Counters using Ladder logic
 Introduction to Logic Gates for following Applications
 Adder
 Subtractor

2) Perform Exercises on NI Multisim 11 Software Package like:

- i) Creating a Ladder Diagram.
- ii) AND Rungs and OR Rungs.
- iii) Sample circuits: Holding Tank, Conveyor Belt, Traffic Light.

Learning Resources:-

Text Book:

“Programmable Logic Controllers: Programming Methods and Applications”,
 1st Edition, by John R. Hackworth & Frederick D. Hackworth, Jr., Pearson Education.

Reference Books:

1. Industrial Control Electronics: Devices, Systems and Applications,
 2nd Edition, by Terry L. M. Bartelt , Thomson Delmar Learning.
2. Introduction to Programmable Logic Controllers, 2nd Edition,
 by Gary Dunning, Delmar Thomson Learning.
3. NIIT-Programmable Logic control-Principles and applications
 Prentice Hall India
4. Madhuchand A Mitra & Samarjit Sen Gupta-Programmable logic controllers and Industrial
 automation
 Penram International
5. C D Johnson-Process Control InstrumentationTechnology
 Prentice Hall India
6. Petruzella- Programmable Logic Controller
 McGraw Hill

Course Name : Diploma in Electrical Engineering
Course Code : DEE
Semester : Fifth
Subject Title : Testing and Maintenance of Electrical Machines
Subject Code : 132EE55E2

Teaching and Examination Scheme:–

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		P		OR		TW		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	-	2	3	80	32	20	100	40	-	-	25	10	25	10	150

Rationale:– To make the Student aware of testing of the machines & BIS Tests.

Learning Structure:-

Syllabus

Part I:- Theory

Sr. No	Contents	L	M
Section I			
1	Insulation: Factors affecting life of insulation. Classification of insulating materials Measurement of insulation resistance Drying electrical insulation Temperature measurement methods Transformer oil and oil tests	9	15
2	Testing of Transformers: Routine tests Type tests Efficiency test, Back-to-Back test Special tests- noise level, harmonics, zero-phase sequence, impedance of three-phase transformer testing	9	15
3	Testing of Three Phase Induction Motors: Routine tests Type tests Special tests	6	10
Section II			
4	Preventive Maintenance of Machines: Importance of Preventive Maintenance schedule Fault due to poor or absence of maintenance Maintenance schedule of distribution transformer Maintenance schedule of Induction Motor.	9	15

5	Earthing: Purpose of earthing the equipment, plate earthing pipe earthing , Earth resistance , Depending factors, Methods of reducing earth moisture.	6	10
6.	Prevention of Accidents & Safety Precautions: Act & statutory Regulations General safety practices in electrical work Electrical accidents: Meaning & causes, Severity of Shock & rescuing a person, Immediate action to recover patient, first aid treatment, artificial respiration Electrical Fire:- Causes of Fire & precautions to avoid fire , fire extinguishers.	9	15
	Total	48	80

Part II:- Practicals

List of Laboratory Experiments:-

1. Measure Impedance, Voltage and Load losses of Three phase Transformer.
2. Perform reduced voltage running up test on Three Phase Induction Motor as per IS 325:1967.
3. Perform No Load and Blocked Rotor Test on Three Phase Induction Motor as per IS 325:1967. And Draw Circle diagram and Calculate performance Indicator.
4. Calculate Regulation and Efficiency by Back to Back connection of single phase Transformer.
5. Determine Breakdown Strength of Transformer Oil by using Oil Testing Kit.
6. Measure Insulation resistance of Transformer winding , Stator and Rotor of A.C. Rotating Machines using Megger.
7. Measure the Resistance of Earth Electrode using Earth Tester.
8. Understand the operation of Fire Extinguisher by giving Demonstration.
9. Prepare Troubleshooting Charts for Single Phase and Three Phase Induction Motor
10. Use different maintenance tools such as Bearing Puller, Growler, Dial-Test Indicators, Filler Gauge, Spirit Level, etc.

Study of IS/IEEE Standards:

1. IS : 1180 – Distribution Transformer
2. IS : 2026 – Power Transformer
3. IS : 4029 – Testing of 3 Phase Induction Motor.
4. IS : 694:1986 – PVC insulated cables for working voltages upto and including 1100 V
5. IS : 900:1992 – Code of practice for installation and maintenance of Induction Motors
6. IEEE 80:2000 – IEEE Guide for Safety in AC Substation Grounding.

Learning Resources:-

Text Book/Reference Book:-

Testing and Maintenances of electrical machines by B. P. Patil

Electrical Equipment HandBook: Troubleshooting and Maintenances By Philip Kiameh

Text Books:

1. S. Rao, Testing Commissioning Operation and Maintenance of Electrical Equipment, Khanna publishers.
2. S.L.Uppal - Electrical Power - Khanna Publishers Delhi.
3. Hand book of condition monitoring by B.K.N.Rao, Elsevier Advance Tech.,Oxford(UK). T.E. Electrical Engineering(2012 course)- University of Pune Page 13
4. S. K. Shastri – Preventive Maintenance of Electrical Apparatus – Katson Publication House
5. B. V. S. Rao – Operation and Maintenance of Electrical Equipment – Asia Publication

Course Name : Diploma in Electrical Engineering
Course Code : DEE
Semester : Fifth
Subject Title : Software Skills
Subject Code : 132EE56

Teaching and Examination Scheme:–

Teaching Scheme			Paper Hours	Examination Scheme										Total Marks	
L	T	P		Theory		Test	Total		Practical		OR		TW		
				Max	Min		Max	Min	Max	Min	Max	Min	Max		Min
1	-	2	-	-	-	-	-	-	-	25	10	25	10	50	

Rationale:–

This subject will help the students to implement the circuit design and pcb layout before actually fabricating the hardware circuit. Simulation softwares can also allow the students to change the component values and observe the change in results.

Objectives:–

The students should be able to:

- 1) Draw the circuit layout on NI Circuit Design Suite (Multisim) software(and other softwares also).
- 2) Perform simulation and obtain the required observations and results.
- 3) Compare the results obtained by software simulation with the actual Hardware circuit.
- 4) Prepare Printed Circuit Board artwork design on NI Ultiboard simulation.

Learning Structure:-

Syllabus

Sr. No	Contents	L
1	NI Circuit Design Suite 13 (Multisim 13): Selection of component from the master data base, placement of the component in the workbench area, completing the circuit layout, connecting required instruments like power supplies, signal generators, voltmeter, ammeter, Digital Storage Oscilloscope etc. Observing and noting the simulation results. Exporting the circuit to the Ultiboard extension and preparing the PCB layout artwork on ultiboard.	4
2	Tina –TI (The complete Electronic Lab) by Texas	

	Instruments: Selection of component from the master data base, placement of the component in the workbench area, completing the circuit layout, connecting required instruments like power supplies, signal generators, voltmeter, ammeter, Digital Storage Oscilloscope etc. Observing and noting the simulation results	3
3	Matlab Introduction Basic Commands	3
4	SCI Lab Introduction Basic Commands	2
5	PowerEsim software. (Free on line tool for SMPS design) SMPS circuit and transformer design, input component analysis, input harmonic analysis, essential waveforms, MTBF prediction.	2
6	CASPOC software: Power Electronics & Electrical Drives Modelling & simulation software.	2
	Total	16

Practical list:

Simulation of following experiments on NI multsim, TINA – TI, SCI Lab, PowerEsim, COSPOC and Powersim softwares:

- 1) Superposition Theorem, Norton Theorem, Thevenin Theorem, Norton Theorem, RC Transients (Charging & Discharging), Astable Multivibrator, Monostable multivibrator, Schmitt trigger using IC 555 & IC 741, Comparator IC LM339 applications.
- 2) Modelling of controlled rectifier – Single and Three Phase
- 3) Modelling & simulation of buck and boost converter
- 4) Speed torque characteristics and control of separately excited dc motor
- 5) Speed torque characteristics and control of induction motor.
- 6) Stepper motor drive.
- 7) Brushless DC drive- 6 Step.
- 8) Three phase inverter.
- 9) Coupled Shaft machine drives.
- 10) Vector Control of a Permanent Magnet Synchronous Machine.

Course Name : Diploma in Electrical Engineering
Course Code : DEE
Semester : Fifth
Subject Title : Project
Subject Code : 132EE57

Teaching and Examination Scheme:-

Teaching Scheme			Paper Hours	Examination Scheme										Total Marks
L	T	P		Theory		Test	Total		Practical		OR		TW	
			Max	Min	Max		Min	Max	Min	Max	Min	Max	Min	
-	-	3	-	-	-	-	-	-	-	50	20	50	20	100

Rationale:-

Diploma holders need to be capable of doing self study throughout their life as the technology is developing with fast rate. Student will be able to find out various sources of technical information and develop self-study techniques to prepare a project and write a project report. This subject is intended to teach students to understand facts, concepts and techniques of electrical equipments, its repairs, fault finding and testing, estimation of cost and procurement of material, fabrication and manufacturing of various items used in electrical field. This will help the students to acquire skills and attitudes so as to discharge the function of supervisor in industry and can start his own small-scale enterprise.

Objectives:-

The students will be able to:

1. Work in Groups, Plan the work, and Coordinate the work.
2. Develop leadership qualities.
3. Analyse the different types of Case Studies.
4. Develop innovative ideas.
5. Develop basic technical skills by hands on experience.
6. Write project report.
7. Develop skills to use latest technology in Electrical field.

Course Contents:

Following activities related to project are required to be dealt with, during this semester

1. Form project batches & allot project guide to each batch. (Maximum 5 students per batch)
2. Each project batch should select topic / problem / work by consulting the guide
Topic / Problem / Work should be approved by Head of Department.
3. Each project batch should prepare action plan of project activities & submit the same to respective guide.

4. At the end of semester, each project batch should submit the action plan and abstract of the project along with list of materials required if project involves fabrication or other facilities required in other kinds of project.
5. Action Plan should be part of the project report.

NOTE:

The students may select different project for Semester VI.

OR

This project may be the continuation (2nd Part) of Semester V

Learning Resources:

Books/Magazines:

1. IEEE Transactions/Journals
2. Electrical India
3. IEEMA Journal
4. Elecrama
5. Technorama
6. Urja
7. Industrial Automation
8. Electronics for You
9. Electronics Projects
10. Computer World
11. Chip
13. Computer Active
12. Any Journal Related to Electrical Engg./Electronics/Computer/Information Technology.

Course Name : Diploma in Electrical Engineering

Course Code : DEE

Semester : Fifth

Subject Title : Student Centered Activity/Test

Teaching Scheme			Paper Hours	Examination Scheme										Total Marks	
L	T	P		Theory		Test	Total		P		O		TW		
				Max	Min		Max	Min	Max	Min	Max	Min	Max		Min
-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-

Rationale:–

Most of the diploma holders join industries. Due to globalization and competition in the industrial and service sectors the selection for the job is based on campus interviews or competitive tests.

While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and attitude, in addition to basic technological concepts.

The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Expert lectures, E-learning sources, E-library, Internet, seminars on technical topics and group discussion are planned in a semester so that there will be increased participation of students in learning process.

Objectives:

The Student will be able to:

1. Acquire information from different sources
2. Prepare notes for given topic
3. Present given topic in a seminar
4. Interact with peers to share thoughts
5. Take the advantages of E-learning sources