ENTREPRENEURSHIP DEVELOPMENT

L T P **Curri. Ref. No.: G304**
3 0 0
Total Contact Hrs.:45 **Total Marks: 100** **Theory:**
Theory: 45 End Exam :70
Practical: 0 P.A.: 30
Prerequisite: Nil **Practical: 0**
Credit: 3 . End Exam.:0
P.A. :0

RATIONALE / AIM :-

The course intends to provide the fundamental aspects of entrepreneurship as a means for self employment and culminating in economic development of the country. It deals with basic issues like entrepreneurial characteristics and quality, governmental policy support and overall scenario along with opportunities and the facilities available for entrepreneurship development.

COURSE OUTCOME :-	
Module /Unit	After completion of the course, the students will be able to:
1.	Identify different functions and scopes of entrepreneurship.
2.	Distinguish different types of company with registration procedure
3.	Define scope & functions of small scale & ancillary industries.
4.	Identify different characteristic and functions of sales organization.
5.	Identify basic guidelines of pricing of product
6.	Collect basic quarries and information's from different business organizations.
7.	Write preliminary report incorporating feasieility study finance, time etc.
8	Define different environmental legislation acts and guidelines.

COURSE CONTENTS (THEORY):

UNIT	TOPIC/SUB-TOPIC	Total hrs.
1	**INTRODUCTION:**	**10**
	1.1 Definition and functions of Entrepreneur, entrepreneurship quality, entrepreneurial spirit, need for entrepreneurship.	
	1.2 Individual and social aspects of business – achievement motivation theory	
	1.3 Social responsibilities of Entrepreneurs	
2	**FORMS OF BUSINESS ORGANISATION**	**4**
	2.1 Types of company	
	2.2 Merits and demerits of different types	
	2.3 Registration of small scale industries	
	2.4 Conglomeration.	
3	**SMALL SCALE AND ANCILLARY INDUSTRIES**	**8**
	3.1 Definition – scope with special reference to self employment.	
	3.2 Procedure to start small scale and Ancillary industries	
	3.3 Pattern on which the Scheme/Project may be prepared	
	3.4 Sources of finance - Bank, Govt., and other financial institutions.	
	3.5 Selection of site for factory	
	3.6 Factors of selection	
	3.7 N.O.C. from different authorities, e.g., Pollution Control Board, Factories Directorate etc.	
	3.8 Trade License	
4	**SYSTEM OF DISTRIBUTION**	**1**
	4.1 Wholesale Trade	
	4.2 Retail trade	
5	**SALES ORGANISATION**	**3**
	5.1 Market survey, marketing trends, knowledge of competitors, product selection & its basis .	

	5.2 Sales promotion	
	5.3 Advertisement	
	5.4 Public relations and selling skills	
6	**PRICING THE PRODUCT**	**1**
	6.1 Basic guidelines.	
7	**INTRODUCTION TO IMPORT AND EXPORT**	**6**
	7.1 Procedures for export	
	7.2 Procedures for import	
	7.3 Technical collaboration – international trade	
	7.4 Business insurance	
	7.5 Rail and road transport	
	7.6 Forwarding formalities, FOR, FOB, CIF, etc.	
8	**BUSINESS ENQUIRIES**	**4**
	8.1 Enquiries: From SISI, DIC, SFC Dept. of Industrial Development Banks.	
	8.2 Offers and Quotations	
	8.3 Orders	
9	**PROJECT REPORT**	**6**
	9.1 Project Report on feasibility studies for small scale industries, proposal for finances from bank and other financial institutions for establishing new industries and its extension, obtaining License enlistment as suppliers, different vetting organizations for Techno Economic feasibility report.	
	9.2 Breakeven analysis, Breakeven point.	
10		**2**
	10.1 Air Pollution Act	
	10.2 Water Pollution Act	
	10.3 Smoke Nuisance Control Act	
	10.4 ISO: 14000, OSHA	
	TOTAL:	**45**

TEXT /REFERENCE BOOKS:

Sl No.	Book Title	Author	Publisher
1	Entrepreneurship Development	CTSC Manila	Tata McGraw Hill Publishing Co. Ltd
2	Small Enterprise Management		ISTE, Mysore
3	Motivation		ISTE, Mysore
4	Entrepreneurship Development	Jose Pauletal	Himalaya Publishing House, 1996
5	A Handbook of Entrepreneurship	Rathore, B.S. and J.S. Saini (Ed)	Panchkula : Aapga, 1997
6	Entrepreneurship Development	Khanka, S.S	S. Chand and Co. New delhi. 2001

ELECTRICAL MACHINE - II

L	T	P	Curri. Ref. No.: EE404
3	1	2	

Total Contact Hrs.:45 **Total Marks: 150**

Theory: 45

Practical: 30

Prerequisite: Nil

Credit: 5 .

Theory:
End Exam :70
(*35 from each half*)
P.A.: 30
Practical: 50
End Exam.:25
P.A. :25

RATIONALE/AIM:

The subject Machine II is a subject, which deals with the Induction Machine, Synchronous Machine and fractional Horse Power Motors. In this subject the construction, working principles, starting principles are to be studied. The testing of the machines and the brief design ideas have also been included here. In addition to the theoretical study of the topics as mentioned above care has been taken for including the practical aspects of the topics. A few problems have also been included here, so that the student can develop the problem solving attitude during their service career.

AIM:

- To describe the construction and working principles of induction motor
- To describe the construction and working principles of synchronous machines
- To describe the construction and design principles of fractional horse power motors
- To describe the construction and working principles of special type of motors eg D.C. brushless motor and stepper motor
- To describe the method of starting of induction motor
- To describe the testing and installation procedure of induction motor and synchronous machines

COURSE OBJECTIVE:

Module/Unit After completion of the course, students will be able to

1. Explain the construction and working principles of induction motor
2. Describe the construction and working principles of synchronous machines
3. Explain the construction and design principles of fractional horse power motors
4. Discuss working principles of D.C. brushless motor and stepper motor, starting of induction motor.

COURSE CONTENTS:

THEORY:

UNIT	TOPIC/SUB-TOPIC	Total hrs.
1	**Induction Motor:**	**15**
1.1	To explain the constructional features of three phase Induction Motor	
1.2	To explain the method of the production of rotating magnetic field produced in a three phase stator winding when three phase supply is applied in it.	
1.3	To define slip, synchronous speed	
1.4	To describe the working principle of a three phase induction motor	
1.5	To develop an expression for torque in three phase induction Motor	
1.6	To draw the torque speed characteristics of a three phase induction motor	
1.7	To explain (a) the effect of variation of applied voltage of torque speed characteristics (b) the effect of variation of rotor resistance on torque speed characteristics	
1.8	To explain various methods for starting Induction Motor	
1.9	To explain the modern techniques of starting different type of Induction Motor	

1.10 Explain different method of speed control in three phase induction motor (conventional Method)
1.11 Explain the modern method of speed control of three phase induction motor
1.12 State and enumerate different losses in three phase induction motor
1.13 To determine the efficiency of three phase induction motor considering the losses in the motor
1.14 To develop the Electrical equivalent circuit of three phase induction motor
1.15 To calculate the torque developed, current drawn, power factor, motor speed of three phase induction motor (usage of standard equation) and data
1.16 To describe the testing procedure of three phase induction motor for determining the performance characteristics
1.17 State various factors involved in installation of a three phase induction Motor
1.18 To state various steps for the maintenance of induction motor
1.19 To state the various faults and testing methods for remedial measures
1.20 To explain the working principle of single and three phase induction regulator

2 Three Phase Synchronous Machine **10**

2.1 To explain the constructional detail of three phase Synchronous Machine
2.2 To explain the method of inducing polyphase voltage in a synchronous generator
2.3 To describe the advantages of a rotating magnetic field system in a synchronous machine over a rotating armature system
2.4 To explain the basic principle of developing three phase armature windings
2.5 To derive the emf Equation and explain the need for (a) distributed winding (b) making a short pitched winding
2.6 To explain the armature reaction and its effect on different load of different power factor
2.7 To determine voltage regulation by synchronous impedance method.
2.8 To describe the methods of testing the synchronous machines and to determine their performance characteristics.
2.9 To describe the method of synchronising the incoming. alternator with three phase bus bar or a running alternator.
2.10 To state the conditions for load sharing between two alternators in synchronised mode.
2.11 To explain why synchronous motor is not self-starting.
2.12 To explain the effect of change in excitation of a synchronous motor on armature current.
2.13 To state application of synchronous machine.
2.14 To state the condition/factors for the application of synchronous machine

3 Single Phase Motors **10**

3.1 To list various type of single phase motors
3.2 To explain the construction & operating principle of various type of inductor motor (split phase type).
3.3 To explain the double revolving field theory.
3.4 To explain double revolving field theory.
3.5 To explain the construction and working principles of single phase commutator motor.
3.6 To explain the construction and working principle of shaded pole type single phase induction motor
3.7 To draw the performance characteristics of all above type of single phase motors
3.8 To describe the testing procedure of single phase induction motor and measurement of (1) speed (2) power consumption (3) torque

4 Special Machines **6**

To explain the construction and working principle of

4.1 Linear A.C Motor
4.2 Brush less D. C. Motor
4.3 Stepper Motor
4.4 A.C. Drag cup type servomotor
4.5 D. C. Servomotor

5 Class Test **4**

Total: 45

PRACTICAL :

List of Experiments -

1. To determine the slip of an induction motor
2. To perform the insulation resistance test of three phase induction motor
3. To perform the no-load test of the three phase induction motor
4. To perform the blocked rotor test of a three phase induction motor
5. To perform the pony brake method of the speed-current and speed-torque characteristics
6. To determine the effect of rotor resistance on the torque speed curves of an induction motor
7. Determination of magnetisation characteristics of an alternator (a) at no load rated speed (b) at no load half rated speed (c) at full load rated speed
8. Determination of the relationship between terminal voltage and load current of an alternator, keeping excitation and speed constant.
9. Determination of regulation and efficiency of an alternator from open circuit and short circuit
10. Synchronization of alternator to infinite bus/another alternator.
11. Determination of V-curves of a synchronous machine.
12. Parallel operation of three-phase alternator and load sharing

TEXT / REFERENCE BOOKS:

1) Electrical Machines by Dr. S. K. Bhattacharya, T.M.H.
2) Electrical Machines by J. D. Edwards, Mackmillan.

ELECTRICAL POWER SYSTEM - II

L	T	P		Curri. Ref. No.: EE406
3	0	0		
Total Contact Hrs.:			**Total Marks: 100**	**Theory:**
Theory: 45				End Term Exam :70
Practical:0				P.A.: 30
Prerequisite: Nil				**Practical: 0**
Credit: 3 .				P.A.:0

RATIONALE:

The subject power system has different parts like power generation, transmission, distribution, switch gear and protection. Since the topics in the above sections covers very vast areas, it is required to drive the subject into three different major parts e.g. (a) Power generation (b) Power Transmission & Distribution (c) Switch Gear & Protection. As the subject power Transmission and Distribution is more or less descriptive and based on the study of structure of transmission line. Construction of lines, overhead safety device, services, service connections, estimating work, these topics are included in power system. Some care has been taken to include the study of the equipment, accessories and systems which have been developed very recently. The related IE rules and Bureau of Indian Standard Specifications have also been included here.

AIM:

- To acquire knowledge on
- Principles of Distribution System
- Materials of Overhead Lines
- Concept on Line Design
- Concept on Line Construction
- Concept on Lighting Arrestors
- Details of Service Connection
- Construction Details of underground cables
- Maintenance of Transmission & Distribution Lines
- HVDC transmission lines
- IE Rules

Course Objective :-

Module/Unit ***After completion of the course, students will be able to***

1. Describe the principles of distribution system
2. Explain the concept of transmission line design, construction
3. Discuss the operation of lighting arrestors
4. Draw the construction details of underground cables and use of cables in transmission line.

COURSE CONTENTS:

THEORY:

UNIT	TOPIC/SUB-TOPIC	Total hrs.
1	**Principles of Transmission and Distribution**	**4**

1.1 To describe the transmission System and Distribution System

1.2 Short and Medium Transmission line, current voltage relation, Performance of Short Transmission line.

1.3 To describe the distribution systems eg.
- a) Radial system
- b) Ring main system

1.4 To describe
- a) D.C. two wire system
- b) D.C. three wire system
- c) Single phase A.C.
- d) Three phase A.C. System

1.5 To determine the copper efficiency of D.C. two wire & three wire system
- a) Single phase A.C
- b) Three phase 3 wire. System
- c) Three phase 4 Wire system

1.7 To determine the voltage drop in A.C Feeder (Single phase)

1.8 To determine the voltage drop in three phase AC Feeder

1.9 To describe the A.C distributor and determining the sending end voltage

2 Materials of Overhead Line **4**

2.1 To describe the construction characteristics and their applications of
- a) Line Conductor (types & properties)
- b) Poles
- c) Wooden poles and their Treatment
- d) Concrete Poles
- e) Steel tubular poles
- f) Rail Poles
- g) Steel towers with cross arms brackets
- h) Stays, struts and other line accessories like Arcing Horns etc. suspension clamp, strain clamp, snail clamp, tubular compression dead end, etc and binding wires dampers etc

2.2 To describe the construction, characteristics and field of application of
- a) Shackle Insulators
- b) Pin Insulators
- c) Post Insulators
- d) Disc Insulator
- e) String Insulators

3 Concepts on line Design **3**

3.1 To describe the rules and practices on
- a) Selection of Number of phases
- b) Selection of conductor size
- c) Arrangement and spacing of conductor
- d) Selection of height of poles or Towers
- e) Clearances between power lines
- f) Selection of span
- g) Calculation of Sag
- h) Maintaining the clearance from building (Vertical and Horizontal)
- i) Maintaining the clearance between power lines& telelines, railway crossing, River crossing
- j) Earthing and counterpoise of transmission and distribution line

4 Line Construction **4**

To describe different steps in line construction

4.1 Using Poles e.g.
- a) Methods of line survey
- b) Installation procedure of poles
- c) Fixing of fittings and fixtures

4.2 Using Towers
- a) Construction of Towers
- b) Method of Tower Earthing
- c) Method of installing insulator string, dampers
- d) Paying out & stringing of conductors
- e) Preparing different type of conductor joints

5 Service Connection and Tests **5**

To describe

5.1 Layout of the low and Medium voltage Distribution system

5.2 To describe the detail of service connection of overhead line (low and Medium voltage)

5.3 To describe the detail of service connection of underground system

5.4 To describe the detail of service connection of high Tension supply system

5.5 To state the relevant IE Rules and IS specification regarding the tests before giving service connections

5.6 Insulation Testing & Earth Testing

6 Underground cables **8**

6.1 To describe the types of cables and their properties.

6.2 To describe Ionisation cables

6.3 To describe the construction of Extra High voltage cables

6.4 To state the standard size of cables and their field of applications

6.4.1 To write the specification of underground cable

6.5 To describe the construction of (a) PILC Cable (b) XLPE Cable (c) PVC Cable

6.6 Describe the testing of cables (as per IS Specification)

6.7 To compare the overhead & underground Distribution system.

6.8 To describe the methods of cable laying

6.8.1 To describe the method of Cable joints for (a) PILC Cable (b) XLPE Cable (c) PVC Cable

6.8.2 To describe Cable end Boxes

6.8.3 To state the type of Tests for commissioning of cables

7 Maintenance and Repair of Transmission and Distribution Line **6**

7.1 To describe the method inspection

7.2 To describe the method of repairing of line and snapped conductor

7.3 To describe the rules for safety precautions

8 HVDC Transmission line **3**

8.1 To describe the HVDC Transmission system

8.2 To compare the HVDC Transmission system with HVAC Transmission system

9 IE Rules 1956 **5**

9.1 To state the IE Rules related to
- a) Overhead lines
- b) Conductors at different voltages on same supports
- c) Erection of alteration to building structure, flood banks and elevation of roads
- d) Clearance
- e) Routes
- f) Maximum intervals between supports
- g) same structure carrying the Telecommunication lines
- h) Lines crossing or approaching each other
- i) Guarding
- j) Service from OH Line
- k) Earthing
- l) Metallic bearer wire used for supporting insulated cables
- m) Protection against lighting
- n) Unused overhead lines

Class Test: 3

TOTAL 45

REFERENCE :

1) Power Installation (Overhead lines) by S. R. Chakravorty, Venus publishers
2) Electrical Power by S. R. Chakravorty, Venus publishers
3) IE Rules
4) Relevant B.I.S. Specifications

DIGITAL ELECTRONICS & MICROPROCESSOR -II

L	T	P		
3	0	2		**Curri. Ref. No.: EE504**
Total Contact Hrs.:			**Total Marks: 150**	**Theory:**
Theory: 45				End Term Exam :70
Practical: 30				P.A.: 30
Prerequisite:				**Practical: 50**
Credit: 4 .				P.A.:25

RATIONALE:

Digital Electronics & Microprocessor is not a new subject. Though the progress and advancement in this area is very fast, the study of the basic principles e.g. the study of digital building blocks and 8085A system is still continuing. As the field is very vast, the whole subject is divided into two parts. The study of microprocessor and its peripheral devices, advance level microprocessor and microcontrollers are included in the second part. A lot of emphasis has been given to do some exercise on design aspects for the better understanding. A lot of lab exercises have been included for better understand of the subject.

AIM:

1) To appreciate the importance of microprocessors in flexible system design
2) To acquire thorough knowledge about the architecture, memory organization, instruction set, interrupt control and programming methodology of 8085A system
3) To acquire thorough knowledge of using the peripheral and interfacing devices e.g. 8251,8255,8253,8257,8279
4) To acquire the first hand knowledge of system design
5) To acquire knowledge on fault diagnosis and maintenance of Microprocessors Based system
6) To acquire knowledge on 16 Bit Microprocessor
7) To acquire knowledge on 8251 Microcontroller

Course Objective :-

Module/Unit After completion of the course, students will be able to

1. Explain the architecture, memory organization, instruction set, and programming of 8085 microprocessor.
2. 'ace the peripheral and interfacing devices e.g. 8251,8255,8253,8257 and 8279 with 8085 microprocessor.
3. Describe the architecture and instruction set of 8086 microprocessor.
4. Describe the architecture and instruction set of 8251 microcontroller.

COURSE CONTENTS:

THEORY:

UNIT	TOPIC/SUB-TOPIC	Total hrs.
1	**Micro Computer System and Hardware**	**4**
	1.1 To describe the structure of a micro computer	
	1.2 Define (i) Programmable (ii) Memory (iii) Input/Output (iv) CPU	
	1.3 To describe the micro computer organization and the function of a micro processor	
	1.4 To describe the principle of operation of a micro-processor	
	1.5 To describe the generic architecture of a microprocessor with its functional components (e.g. registers ALU, timing & control unit and control signals)	
	1.5.1 To describe (a) various registers (general purpose register and special purpose register) (b) general capability of ALU (c) various control signals (d) functions of internal and external buses.	
	1.6 To explain with sketch various functional components of 8085A Microprocessor	
2.0	**Memory and Memory Organization**	**3**
	2.1 To describe memory organization with reference to microprocessor	
	2.2. To define static and dynamic RAM	
	2.3. To compare advantages and disadvantages of static and dynamic RAMs	
	2.4. To describe (a) ROM, PROM, EPROM (b) important memory timing parameters (c) memory address decoding (d) various forms of storage in microprocessor	
3	**Elements of Programming**	**3**
	3.1 To use Binary and Hexadecimal number systems	
	3.2 To explain (a) instruction code (b) the need for assembly language (c) role of assembler	
	3.3 To state the merit and demerit of instruction length	
	3.4 To identify the field of instruction	
	3.5 To differentiate execution efficiency of various types of instructions	
	3.6 To describe the role of flags	
	3.7 To explain op-code fetching modes	
	3.8 To describe time requirements of instructions	
	3.9 To identify the blocks of a flow chart.	
4	**Instruction Set**	**5**
	4.1 Data Transfer and Arithmetic group of Instruction of 8085A	
	4.1.1 To identify and use the data transfer and arithmetic group of instructions	
	4.1.2 a) to recognize the number of T states, machine cycles, addressing modes associated with each instruction (b) to describe the effect of the instruction on flags if any	
	4.1.3 To write small programs using these instructions.	
	4.2 Logical group and Branch group of Instruction for 8085A	
	4.2.1 To identify and explain the logic and branch group of restriction	
	4.2.2. a) To recognize the number of T states, machine cycles, addressing modes associated with each instruction b)To recognize the effect of execution of instructions, on the various flags	
	4.2.3 To write sets of instruction to illustrate logic and branch operations.	
	4.2.4 To explain the use of logic instruction making or resetting of individual bus	

5 Interfacing of INPUT/OUTPUT Devices **5**

5.1 To decode the address assigned to an Input / Output part.
5.2 To explain the process of interfacing and I/O device with microprocessor for a specified device address
5.3 To explain the process of interfacing non-multiplexed and multiplexed display output port with microprocessor
5.4 To compare the software/hardware overheads of interfacing multiple ports using decoders
5.5 To compare I/O mapped I/O and memory mapped I/O interfacing with microprocessor

6 Analog Signal Interfacing **5**

6.1 To explain the need of Analog Interfacing
6.2 To explain interfacing techniques of 8 bit or higher word length Digital to Analog converters (DAC) with microprocessor
6.3 To explain interfacing techniques of 8 bits or higher word length Analog to Digital Converters (ADC) with microprocessors
6.4 To explain the need and use of Opto-isolator
6.5 To explain with examples of interfacing of 8 bit ADC/DAC with microprocessor

7 Interrupts **3**

7.1 To describe basic techniques of data transfer

8 Programmable Peripheral Interface 8255 and applications **2**

8.1 To explain the internal structure of 8255A. To describe (a) the programming methodology of the 8255A.
(b) method of interfacing 8255A I/O devices in simple mode.
(c) method of interfacing 8255A devices in hand shake technique

9 Programmable Interval Timer/Counter 8253 **2**

9.1 To describe (a) the internal architecture of 8253 (b) programming technique of 8253 Timer/Counter (c) the application of 8253 timer

10 Direct Memory Access and DMA Controller 8257 **2**

10.1 To describe (a) Direct Memory Access operation (b) the internal structure of 8251(c) method of use of DMA Controller 8257

11 Programmable Keyboard and Display Interface – 8279 **2**

11.1 To describe (a) the internal structure of 8279 (b) the programming methodology of 8279 (c) the use of 8279 for keyboard and display interface

12 Microcontroller **5**

12.1 To define Microcontroller
12.2 To compare the Microcontroller 8051 with 8bit microprocessor
12.3 To describe the 8051 Microcontroller hardware
12.4 To describe (a) the Input/Output Pins, Ports and Circuits. (b) External memory (c) counters and Timers.
(d) Serial Data Input/Output (e) Interrupts

13 16 -bit Microprocessor and Current Trends **4**

13.1 To describe basic features of 16 bit microprocessor
13.2 To describe architecture and main feature of 8086

Total: 45

List of Experiments

1. To examine the 8085A training Kit, identify the microprocessor, Keyboard interface chip, Input Output Interface Chip, Programmable timer/counter chip, serial communication chip, interrupt controller chip, RAM and ROM area.
2. To move a data (a) by immediate addressing (b)from register to register (c) register to memory(d)memory to registers
3. To add two hexadecimal numbers
4. To subtract one hexadecimal number from other
5. To add five hexadecimal numbers which are stored in 5 successive memory location
6. To arrange five random hexadecimal numbers in memory locations in a sequential order (Starting from highest to lowest)
7. To divide two hexadecimal numbers and convert the result from hexadecimal to decimal value
8. (a) To develop a time delay subroutine (b) To convert 5 hexadecimal (number into its corresponding Analog Value and display it on CRO screen using the time delay subroutine as per Sl No. 8(a)

9. To convert the analog values into its corresponding digital value and display it in the address and data field

10. To develop a Programme for driving a stepper motor
11. To develop a Programme for a Running display of HELP US in Address and Data field
12. To develop a Programme for Traffic Control System
13. To develop a Programme to display the second and Minute of a clock
14. To develop a Programme to control a Coffee Vending Machine
15. To develop a Programme for the operation of a counter

REFERENCE BOOKS:

1. Microprocessors and Microcontrollers Architecture, Programming and Interfacing using 8085, 8086 and 8051 by S. K. Mandal, Mc Graw Hill Education
2. Microprocessor, Architecture, Programming and Application with the 8085/8080A by Rames S.Gaonkar, PHI
3. Introduction to Microprocessor by A.P. Mathur, TMH
4. Microprocessor by Rafiquazzaman
5. Microprocessor & Microcomputer by Malvino

TESTING & MAINTENANCE OF ELECTRICAL MACHINES/EQUIPMENTS

L	T	P		
1	0	6		**Curri. Ref. No.: EE508**
Total Contact Hrs.:			**Total Marks: 150**	**Theory:**
Theory: 15				End Term Exam :0
Practical: 90				P.A.: 0
Prerequisite: Nil				**Practical: 75**
Credit: 3				P.A.:25

RATIONALE:

It is needed that the shop floor experience on dismantling and assembly of Electrical machines and household equipments within the curriculum of Diploma in Electrical Engineering. The learning of the procedure may be possible within a few lecture classes, but the practice should also be arranged in the workshop. This subject is designed to provide the scope of acquiring knowledge both theoretically and practically.

AIM:

To acquire skill and knowledge in

a) Dismantle and assemble of Electrical machines like motor, transformer, switch units and starter.
b) Repairing techniques of the above machines.
c) Repairing of Electric Iron, OTG, Electric Oven, Water Heater / Geyser, Vacuum Cleaner, Split type / Window Air-Conditioning.

Course Objective :-

Module/Unit After completion of the course, students will be able to

1. Dismantle and assemble of Electrical machines like motor, transformer, switching units and starters
2. Explain different repairing techniques of electrical equipments
3. Repair Electric Iron, OTG, Electric Oven, and Water Heater / Geyser
4. Repair Vacuum Cleaner, and Split type / Window Air-Conditioning.

COURSE CONTENT:

THEORY:

UNIT	TOPIC/SUB-TOPIC	Total hrs.
1.	**Repair of Electrical Machines** 1.1 List the troubles of Electrical Machines: DC motor, DC Generator, Induction Motor 1.2 Repairing of Electrical Machines: DC motor, DC Generator, Induction Motor	**3**
2.	**Transformer Repairing** 2.1 To describe the repair of low and medium rating power transformer 2.2 To list the factors for inspection before the repair of faults	**3**
3.	**Electrical Panel Repairing** 3.1 To describe the periodic maintenance of switch, fuse unit changeover, bus bar and different type starters	**3**
4.	**Ceiling Fan/Exhaust Fan Repairing** 4.1 To describe the repairing of ceiling/exhaust fan	**3**
5.	**Fluorescent Lamp/Sodium Vapour Lamp and House Hold Appliances** 5.1 To describe the repair work and testing procedure of Fluorescent lamp and Sodium Vapour Lamp Electric Iron, OTG, Electric Oven, Water Heater / Geyser, Vacuum Cleaner, Split type / Window Air-Conditioning	**4**
	Total:	**15**

List of Experiments

1. To state the method of inspection and determination of defects in an assembled electrical machine
2. To dismantle electrical machines and determine the defects in a disassemble machine
3. To repair and reassemble the electrical machines
4. To repair the ship ring and commutator of electrical machines
5. To repair shaft of electrical machines
6. To repair winding of electrical machines
7. To state the method of inspection and determination of defects in an assembled transformer
8. To repair core and windings of transformer
9. To repair top changer, tanks, conservators and fillings of transformer
10. To assemble transformer
11. To test and measure parameters of transformer as per Bureau of Indian Standard Specification.
12. To state the periodic maintenance of switch, fuse unit changeover, bus bar and different type starters
13. To dismantle and repair of ceiling /exhaust fan, Electric Iron, OTG, Electric Oven, Water Heater / Geyser, Vacuum Cleaner, Split type / Window Air-Conditioning
14. To state the method of the fault detecting procedure of the ceiling/exhaust fan
15. To test the ceiling/exhaust fan as per Bureau of Indian Standard Specification.
16. To repair lamp fitting
17. To prepare the operation and maintenance schedule of a diesel generating set

REFERENCE BOOKS:

1. Testing Commissing Operation & Maintenance of Electrical Equipment, S.Rao, Khanna Publisher
2. Electrical Equipment Handbook: Troubleshooting and Maintenance, Phillip Kiameh, McGraw-Hill
3. Electrical Power Equipment Maintenance and testing, Paul Gill, CRC Press
4. Fundamentals of Maintenance of Electrical equipments, K.B.Bhatia, Khanna Publishers

NON-CONVENTIONAL SOURCES OF ENERGY (Elective – I)

L T P **Curri. Ref. No.: EE604**

3 0 2

Total Contact Hrs.: **Total Marks: 150** **Theory:**

Theory: 45 End Term Exam :70

Practical: 30 P.A.: 30

Prerequisite: Nil **Practical: 50**

End Term Exam: 25

Credit: 3 P.A.:25

RATIONALE:

In view of the fast depleting resources of conventional energy, it has become imperative to search for alternative sources of energy, which are not only renewable, but also environment friendly and economically viable. Solar energy, wind energy, biomass energy and hydropower energy etc. are some of the alternatives, which could be banked upon to meet the energy crisis. This course is intended to provide the requisite knowledge and skills of different aspects of these technologies to cope up with the present energy crisis and challenges of the future.

AIM:

1. To describe the construction and working principles of wind energy systems
2. To describe the construction and working principles of Solar PV system such as Street lights Solar pumps, Solar lanterns and its application
3. To describe the construction and design principles of Bio-gas plant
4. To describe the construction and working principles of Mini and Micro-hydro power plant, Tidal and Ocean energy
5. To describe the method of Renewable energy system management.

Course Objective :-	
Module/Unit	After completion of the course, students will be able to
1.	Explain the construction and working principles of wind energy systems and Solar PV systems
2.	Describe the construction and working principles of Bio-gas plant
3.	Explain the construction and design principles of Mini and Micro-hydro power plant, Tidal and Ocean energy
4.	Discuss working principles of renewable energy system management.

COURSE CONTENT:

THEORY:

UNIT	**TOPIC/SUB-TOPIC**	**Lecture hrs.**
1.	**Introduction To Renewable Energy Sources**	**5**
	• Overview of renewable energy sources - Need & importance - Scope & limitations of their use • Types of renewable energy sources - Wind energy - Solar energy - Ocean Energy - Mini & Micro-hydro energy - Bio mass energy - Geo-thermal Energy • Government support &incentive for budget in North-Eastern states - Types of incentive - Product range covered • Advantages and disadvantages of renewable energy sources	

2.	**Wind Energy Systems**	10
	• Concept of wind energy • Wind turbines: • Types, basic terminology like mean wind speed, power coefficient, cut-in speed, cut-out speed, torque and torque coefficient, solidity ratio, swept area, air mass density, velocity index, roughness index of terrain, power curve of wind turbine • Various components of horizontal and vertical axis wind turbines • Maximum power in the wind- Betz coefficient • Local effects on wind flow • Small wind turbine – Construction & Working • Electric generators in small wind turbines • Electric generators in large wind turbines • Operation and maintenance of horizontal and vertical axis wind turbines • Selection of site for sitting of wind turbines • Planning the layout of a wind farm in the hilly terrain of North-Eastern states	
3.0	**Solar Energy**	**10**
	• Basic principles of harnessing solar energy • Solar energy for heating water - Consideration and installation - Specification and list of materials required - Repair and maintenance • Solar energy systems and its application - Street lights - Solar pumps - Solar lanterns - Calculation of energy consumption • Installation, operation and maintenance of solar PV modules	

4.	**Bio-Mass Energy**	10
	• Concept of Bio-mass energy - Classification of Bio –mass; Sources of Bio-mass; Energy content in Bio-mass • Energy Plantation • Chemical process of converting biomass into useful energy - Anaerobic fermentation, Pyrolysis, gasification • Mechanical process of converting biomass into useful energy - Biomass briquetting, Mixing of biomass with coal • Basics of anaerobic fermentation • Types of Bio-gas plant based on - Construction, Feed materials, Use pattern • Factors affecting Bio-gas yield - Temperature, C.N ratio, pH value, total dissolved solid, Moisture content • Commonly used feed stock • Properties & application of Bio gas • Construction details with sketches - Fixed-Dome bio-gas plant - Floating-Drum bio-gas plant	
5.	**Overview Of Other Renewable Energy Sources**	**5**
	• Mini and Micro-hydro power plant - Advantages of Mini and Micro-hydro power plants - Construction and working with sketches of the micro hydro power plants - Operation of Mini and Micro-hydro power plants • Tidal and Ocean energy - Working principle of tidal and ocean energy power plant - Advantages and disadvantages of tidal and ocean energy power plant • Scope of tidal and ocean energy development in India • Incineration power plant - Working principle of Incineration power plant - Sources of feed materials for this plant - Advantages of Incineration power plant • Geo-thermal energy systems - Working principle of geothermal power plant	

	- Advantages of geothermal energy systems - Geothermal energy systems being used in India • Hydrogen energy - Hydrogen energy as sustainable future fuel - Advantages and disadvantages of hydrogen energy • Present applications of hydrogen energy in India and abroad	
6.	**Introduction To Renewable Energy System Management**	**5**
	• Factors affecting production utilization • Government policies • Procedure for adoption of Renewable Energy Sources as effective alternative for conventional system • Evaluation and analysis procedures for cost effectiveness	
	TOTAL:	**45**

PRACTICAL	**30 Hours**
List of Experiments:	
1. Study of Solar Radiation Measurement 2. Study of Solar Distillation or Solar Still 3. Study of Solar Water Pumping 4. To study the construction details of a box type Solar Cooker 5. Preparation of delicious food by using solar cooker. 6. Study of Solar Water Heater (Thermosiphon) system 7. Study of Solar Water Heater (Forced Circulation) system 8. Study of Solar Lanterns and Street light 9. Study of Bio gas plant 10. Study of Janata Bio gas plant 11. Study of Deenabandhu Biogas plant 12. Study of fuel cells. 13. Study of Horizontal Wind Mill	

REFERENCE BOOKS:

S. No.	Title	Author, Publisher, Edition & Year
1.	Biogas Energy in India	Academic book centre Ahmedabad, 1996
2.	Renewable energy: power for a sustainable future	Boyle G, Oxford University Press, New Delhi, 1999
3.	Renewable energy: Environment & Development	Dayal M.Konark Publisher Pvt. Ltd., New Delhi, 2000
4.	Solar Energy System utilization	G.D Rai / R.K KhannaPublishers, New Delhi, 2001
5.	Solar energy fundamentals and applications	H.P.Garg& J.Prakash Tata Mcgraw Hill; New Delhi, 1998
6.	Renewable Energy	Island Press Earthscan Kogan Page, 2000
7.	Bio gas Technology, A practical hand book	Khandelwal K.C.& Mehdiss Tata Mc Graw Hill; New Delhi, 1999
8.	Bio gas systems: Principles and application	Mittal K.M., New age International Ltd. New Delhi 2000
9.	Renewable energy sources and conversion technology	N.K Bansal, Manfred Kleemann, Michael Maliss, Tata Mcgraw Hill; New Delhi, 2000
10.	Advances in Biogas technology	O.P Chawla ICAR, New Delhi, 1998
11.	Institutional finance for renewable energy development in India	Sekhar R.C. Urja Bharti, 1995

PROFESSIONAL PRACTICE – IV

L	T	P	Curri. Ref. No.: EE512
0	0	3	

Total Contact Hrs.: **Total Marks: 50** **Practial:**
Practical: 45 P.A.: 50
Pre-requisite:Nil
Credit :2

COURSE CONTENTS:

Sl. No.	TOPIC / SUB-TOPIC	Hrs.
1	**Industrial / Field Visit :** Structured Field visits be arranged and report of the same should be submitted by the individual student, to form part of the term work. Visits to any ONE from the list below (should not have completed in earlier semester): i) Multistoried building for power distribution ii) Any industry with process control and automation iii) District Industries Centre (to know administrative set up, activities, various schemes etc) iv) Railway / metro railway signaling system v) Motor rewinding in a motor rewinding shop vi) Visit warehouse / Rail yard / port and observe Material Handling, Management & documentation. vii) A thermal / Hydel power generating station viii) A Wind mill and / or Hybrid power station of wind and solar ix) An electrical substation x) A switchgear manufacturing / repair industry xi) Protection system in a large industry. xii) Visit to maintenance dept of a large industry. xiii)A large industry to study protection system xiv) Industry of power electronics devices xv) Transmission tower project area xvi) Any contemporary industry under MSME sector to understand detail of operation and starting of a new venture. xvii) A large industry to study protection system xviii) Industry of power electronics devices xix)Transmission tower project area xx) Any contemporary industry under MSME sector to understand detail of operation and starting of a new venture. xix) Any other technical field area as may be found suitable alternative to above list.	12
2	**Guest Lecture by professional / industrial expert:** The guest lecture (s) any three of two hours duration each from the field/industry experts, professionals or from experienced faculty members (from own department or other departments) will be encouraged) are to be arranged from the following or alike topics. A brief report to be submitted on the guest lecture by each student as a part of term work. **Group A (at least one)** i) Career opportunities for diploma engineers ii)Industrial Dispute and Labour Laws iii) Challenges in industrial working environment for diploma engineers iv) Scope for diploma electrical engineers v) Working in shop floor. vi) Opportunities in the service sector vii) Any other topic of relevance as may be deemed fit for fresh engineers as he starts his career in industry. **Group B (at least one)** i) Eco friendly air conditioning / refrigeration. ii) Modern trends in AC machine iii) Testing of switchgear iv) Biomedical instruments – working, calibration etc. v) Automobile pollution, norms of pollution control. vi) nanotechnology vii) Modern techniques in Power Generation viii) New trends in power electronics devices ix) TQM x) Recent modification in IE rules	12

	xi) standardization / ISO certification xii) Role of micro, small and mediun enterprise. In Indian economy. xiii) Entrepreneurship development and opportunities xiv) Interview techniques xv) Any topic that could not be covered in earlier semesters and having relevance to technical knowledge gathered in all semesters.	
3	**Information search :** Information search can be done through manufacturers, catalogue, internet, magazines, books etc and a report need to be submitted. Can be done in a group of 2/3 students Topic suggested (any two)Teachers may assign work on any other cross disciplinary subjects for enrichment of knowledge outside course work of Electrical discipline) 1. Blue tooth technology 2. Artificial technology 3. Data warehousing 4. Cryptography 5. Digital signal processing 6. Bio-informatics 7. Magnetic levitation system 8. Recent development in electrically operated vehicles for mass transport 9. Comparative study of metro railway in Kolkata and Delhi 10. Alternative fuel and energy options 11. Comparison of transformer companies 12. Latest trends in classification of insulating materials 13. Design consideration for dry type transformers 14. State and national statistics of power generation 15. Market survey of contactors, relays and their comparative analysis. 16. Market survey of any other electrical product which must include among other things various manufacturers, cost, specification, application areas etc.	12

4	**Group Discussion**	14
	The students should discuss in a group of six to eight students. Each group to perform any TWO group discussions. Topics and time duration of the group discussion to be decided by concerned teacher. Concerned teacher may modulate the discussion so as to make the discussion a fruitful one. At the end of each discussion each group will write a brief report on the topic as discussed in the group discussion. Some of the suggested topics are – i) Scope of outsourcing of electrical Engineering services. ii) Pollution Control iii) Rain water harvesting iv) Trends in energy conservation v) Safety in day to day life vi) Use of plastic carry bag (social & domestic Hazard) vii) Pollution control viii) Any other common topic related to electrical field as directed by concerned teacher.	
5	**Seminar / Poster presentation:**	14
	Students should select a topic for seminar based on recent development in Electrical Engineering fields, emerging technology etc. Concerned Teachers will guide students in selecting topic.	

EXAMINATION SCHEME (SESSIONAL)

Continuous internal assessment of 50 marks is to be carried out by the teachers throughout the sixth semester. Distribution of marks: Information search = 10, seminar = 10, Group discussion = 5, field visit = 10, guest lecture attendance and report = 15

Sample path for Term V in Civil Engineering.

Sl. No	Code	Course	Study Scheme				Evaluation Scheme							Total Marks	Credit
			Pre-requisite	Contact Hours / Week			Theory				Practical				
				L	T	P	End Exam	Progressive Assessment			End Exam	Progressive Assessment			
								Class Test	Assignment	Attendance		Sessional	Viva voce		
1	G304	Soft Core-II (Entrepreneurship development)		3	0	0	70	15	10	5	0	0	0	100	3
2	CE509	Water Supply & Sanitary Engineering	CE406	3	0	2	70	15	10	5	25	25	0	150	4
3	CE505	Estimating - II	CE504	2	0	4	70	15	10	5	0	25	0	125	4
4	CE501	Design & Detailing – I	CE405	3	0	2	70	15	10	5	25	25	0	150	4
5	CE506	Geo-Technical Engineering -I	CE401	3	0	2	70	15	10	5	25	25	0	150	4
6	CE510	Highway Engg.		3	0	2	70	15	10	5	25	25	0	150	4
7	CE515	Proffesional Practice-IV		0	0	2	0	0	0	0	0	50	0	50	1
TOTAL				**17**	**0**	**14**	**420**	**90**	**60**	**30**	**75**	**200**	**0**	**875**	**24**