Department of Physics

UG V Semester

Paper-Vocational

ELECTRICAL TECHNOLOGY (MODULE -3)

Course Outcomes

CO. No.	Course Outcomes	Cognitive Level
CO 1	understand the principles, construction, working and maintenance of electrical motors and testing instruments.	U,Ap, C
CO 2	acquire professional skills for testing, installation, fault identification and **repairing** of electrical motors and instruments.	U,C,R
CO 3	learn the skill to prepare Ethernet cables for local area networks.	R, An
CO 4	develop **an** analytical approach while working on a job.	C, E
CO 5	develop a respectful attitude towards dignity of labour	U, R,C

Credit and Marking Scheme

	Credits	Marks		Total Marks
		Internal	External	
Theory	2	40	60	**100**
Practical	2	40	60	**100**
Total	**4**	**200**		

Content of the Course

Theory

No. of Lectures (in hours per week): 2.2 Hrs. per week

Total No. of Lectures: 30 Hrs. **Maximum Marks:** 60

Units	Topics	No. of Lectures
I	**1. Transformer, Soldering and Brazing** 1.1 Transformer, Construction and working principle of transformer 1.2 Types of transformers - step-up and step-down transformer, voltage and current transformer, auto-transformer circuit 1.3 Applications of different types of transformers. . 1.4 Safety measures, precautions from operational point of view **2. Soldering and Brazing:** 2.1 General characteristics of soldering and desoldering 2.2 Tools and procedures adopted for soldering and desoldering 2.3 Brazing joints processes and their characteristics. 2.4 Brief description of soldering, brazing tools and equipment, brazing materials, 2.5 Soldering defects and their remedies advantages and disadvantages of soldering and brazing. **3. DC Motors** 3.1 Types of motors - Series, Shunt, Compound and Universal - Construction, working principles, characteristics, winding details 3.2 Applications of different types of motors including fractional horse power 3.3 Starting and starters for DC motors and installation **4. Single Phase AC Motor** 4.1 Types of AC motors, Induction motor (Split, phase and repulsion start), Capacitor motor, Shaded pole motor, Universal motor- construction and working principle 4.2 Construction, working principle, special characteristics, winding details and applications of different 'types of fractional horse power motors 4.3 Starting and starters for different AC motors.	15
II	**Measuring Instrument and Mechanics** 1. **Electrical tools:**	15

	1.1 Types of testing equipment's-line tester, Continuity tester, analog voltmeter, digital voltmeter, ammeter, clamp meter, multimeter, battery tester cable, cable length tester, cable testers and locators, high voltage testers, meter testers **2. cathode ray oscilloscope:** 2.1 block diagram of CRT and basic circuit 2.2 Measurement of voltage, current, phase and frequency of a signal wave from 2.3 Types of oscilloscopes - Dual trace oscilloscope, sampling oscilloscope, analog storage oscilloscope and digital storage oscilloscope. 3.**Water Pump:** 3.1 Working principle, functional block diagram, operating procedure 3.2 Types: AC, DC, submersible pumps; role of microcontroller in control, monitoring. minimum failure and safe operation. 3.3 Recent development and routine: maintenance. 3.4 Common fault and their troubleshooting. 4. **Water treatment plant:** 4.1 Working principle, functional block diagram, operating procedure, 4.2 Common types - drinking water, wastewater, agricultural etc. 4.3 Role of' micro controller in control, monitoring, minimum failure and safe operation. 4.4 Recent development and routine maintenance, 4.5 Common faults and their troubleshooting **5. Washing machine:** 5.1 Working principle, functional block diagram, operating procedure. 5.2 Common types, 5.3 Role of microcontroller in control. monitoring and minimum failure safe operation, 5.4 Recent development Routine maintenance, 5.5 Common faults and their troubleshooting	

References

Test/Reference Books:

1. Gupta, R..G.•Electronic instruments and systems: Principles, maintenance and troubleshooting, Tata McGraw Hill, India, 2021.
2. Khandpur R. S., Modern. electronic equipment: Troubleshooting, repair and maintenance. Tata Mc Graw Hill, 1987.
3. Loveday, G. C., Electronic: fault diagnosis, A. H. Wheeler publishing

List of Practical

1. To study the construction of single-phase and three phase, transformer.
2. To study rewinding and cooling of transformer.
3. Constructing. testing and troubleshooting a simple circuit on Printed circuit Board (PCB) and develop skills o soldering and Desoldering.
4. Study and design of power supply.
5. Dismantling. study and reassembling of a D.C. motor.
6. Measurement of resistance of shunt field and armature of a D.C. motor and identification of terminals by multimeter.
7. Testing, fault finding, repair, overhauling. dismantling and reabsorbing of a A.C. and D.C. motor and starter.
8. Connecting, starting and reversing of an A.C. universal motor.
9. Installation of A.C. and D.C. motors.
10. Testing of instruments by using electrical tools.
11. Testing of instruments and measuring voltage and frequency of a wave by using CRO.
12. Study of networking tools and crimping.
13. To prepare ethernet networking cables by using RJ45 and RJ11 connectors.
14. Water pump, -Water purifier, -Washing machine:
    a. Identification of parts
    b. Fault detection from. the observed symptoms
    c. Replacement of the faulty part