

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN ELECTRICAL ENGINEERING

SEMESTER: V

Subject Name: **Electrical Installation and Maintenance**

Sr. No.	Course Content	Total Theory Hours
1.	Commissioning and Testing: 1.1 Standard procedure for commissioning of various static/ rotating electrical machines/equipment and power installation. 1.2 Oil sampling, testing & filtering. 1.3 Polarization index, Drying out procedure of transformer, winding etc. 1.4 Measurement of Insulation Resistance (I.R.). 1.5 Check before commissioning such as Mechanical & Electrical checks as per I.S. 1.6 Safety rules and regulations to be observed. 1.7 Technical reports to be prepared. 1.8 Different types of electrical and mechanical tests. 1.9 Insulation resistance test. 1.10 Classification of insulating materials	12
2.	Installation: 2.1 Standard procedure for installation of various electrical machines 2.2 Inspection on arrival and before installation. 2.3 Foundation preparation for installation. 2.4. Tools / instruments required for installation 2.5. Safety precautions to be observed 2.6. Installation procedure for electrical machine/ equipment. 2.7 Preparation of technical report & specification sheet.	6
3.	Maintenance of Electrical Machine/Equipment: 3.1 Basic need of maintenance. 3.2 Meaning, Importance and advantages of preventive maintenance of preventive maintenance. 3.3 Maintenance schedules of different types of electrical machines (Rotating and static) and equipment, transmission line, circuit breakers and cables 3.4 Break down maintenance and its record keeping. 3.5 Safety rules applicable for preventive maintenance and breakdown maintenance.	8

4.	Installation & Maintenance of Domestic Appliances: 4.1 Common faults in domestic appliances. 4.2 Installation procedure for domestic appliances 4.3 Maintenance procedure for domestic appliances. 4.4 Tools/equipments required for maintenance of domestic appliances. 4.5 Safety rules observed during maintenance of domestic appliances.	8
5.	Trouble Shooting: 5.1 Definition of trouble shooting. 5.2 Causes of faults and types of faults. 5.3 Common faults in domestic appliances and electrical machine/ equipment. 5.4 Common faults in electrical installation and cable. 5.5 Location of faults in above machines and equipments 5.5 Trouble shooting charts for above electrical equipment and machines. 5.6 Tools and equipment used in trouble shooting and repairs. 5.7 Servicing procedure for electrical equipment and list of the servicing materials 5.8 Testing of equipment after repairs and servicing	8
6.	Earthing: 6.1 Necessity of earthing. 6.2 System earthing. 6.3 Equipment earthing. 6.4 Methods of earthing 6.5 Earth electrodes, Earth bus & Earth wire. 6.6 Measurement of earth resistance. 6.7 Values of earthing resistance of different equipment/ installation. 6.8 Reduction of earth resistance. 6.9 Earthing procedure of the following, - Installations in building - Domestic fitting & appliances - Industrial premises. - Substation & Generating station. - Overhead power lines.	8
7.	Electrical Accidents and Safety: 7.1 Types and causes of electrical accidents. 7.2 Factors affecting severity of electric shock. 7.3 Preventive measures against electrical accident. 7.4 General and specific safety rules to avoid electrical accident as per I.E. acts. 7.5 Importance of "permit to work" in power station. 7.6 Safety tools and devices with their applications like Slogan, Board, Notice, Fire extinguisher.	6

Laboratory Experiences:

1. Prepare test report of an electrical machine after commissioning.
2. Prepare complete layout of wiring for installation of given machine with specifications.
3. Measure earth resistance of installation in building/domestic fitting & appliances etc.
4. Measure Insulation Resistance of a winding/ cables/ wiring installation and write the procedure.
5. Perform various tests applied to an insulating oil.
6. Prepare plate/ pipe earthings as per I.S. and measure the earth resistance.
7. Trouble shooting of an induction motor.
8. Dismantle and trouble shoot of ceiling fan.
9. Use of following
 - (a) Bearing puller tools
 - (b) Filler gauge
 - (c) Different types of spanners
 - (d) Cork screw driver
10. Use of following instruments
 - (a) Megger
 - (b) Clip on meter
 - (c) Earth tester
 - (d) Phase sequence indicator
 - (e) Growler
11. Read and interpret I.E. rules pertaining to safety.

Reference Books:

1. Installation, Commissioning and Maintenance Sunil S. Rao - Khanna Publisher
2. Operation and Maintenance of electrical B.S. Rao, equipment Vol. 1 - 2, Asia Publication Bombay.
3. Electrical Maintenance and Repair By J.I. Watts
4. Electrical Installation and fault location Mc Millans London.
Work Book.
5. Electrical Installation estimating and costing S.L. Uppal Khanna Publication.
6. A Course in Electrical Installation Estimating & Costing by J.B.Gupta- Katson
7. Relevant IS

- (1) Transformer Installation —> I.S. 1886, 1967
- (2) Induction motor —> I.S. 900, 1965
- (3) Electrical wiring —> I.S. 2274 : 1963
- (4) Switch gear —> I.S. 3072 : 1975