GUJARAT TECHNOLOGICAL UNIVERSITY
DIPLOMA IN ELECTRICAL ENGINEERING
SEMESTER: V

Subject Name: **Energy Conservation Techniques**

Sr. No.	Course Content	Total Theory Hours
1.	**Elements of Energy Conservation And Management:** 1.1 Concept of energy conservation. 1.2 Conservation of electrical energy. 1.3 Energy conservation in different areas. 1.4 Energy management concept. 1.5 Elements of energy management. 1.6 Different approaches of energy management, Energy balance and organization for energy management.	06
2.	**Energy Conservation Approaches In Industry:** 2.1 Improvement in power factors in electrical system. 2.2 Improved illumination design by use of energy efficient light sources. 2.3 Use of energy efficient electric motors. 2.4 Reduction in heat loss in motor control centre (starters, main switches, fuse, cables etc) 2.5 Energy saving in the welding equipment. 2.6 Use of PAM motors for speed control in traction. 2.7 Energy saving in series parallel & star delta control of traction motor. 2.8 Use of electronic control in industrial drives. 2.9 Energy saver technology and equipments.	20
3.	**Technology Economic Evaluation of Energy Conservation Option:** 3.1 Calculation and costing of energy conservation project. 3.2 Depreciation cost, sinking fund method. 3.3 Cost evaluation by ROI and pay back method etc. 3.4 Case study.	06
4.	**Energy Conservation In Power Generation, Transmission And Distribution:** 4.1 Performance improvement of existing power plant. 4.2 Use of combined cycle power plants. 4.3 Use of co-generation plants, Use of small hydro power plants. 4.4 Improved power transmission lines & reduction in line losses. 4.5 Power quality-monitoring systems. 4.6 Energy conservation by demand side management different approaches.	06

5.	**Energy Audit:** 5.1 Energy audit-a concept. 5.2 Detailed energy audit. 5.3 Preliminary energy audit. 5.4 Detailed energy audit reporting & remedial measures. 5.5 Tools of electrical energy audit. 5.6 Diagnostic approaches.	04

Laboratory Experiences:

1. Energy conservation by energy efficient motors.
2. Energy conservation by power factor improvement.
3. Energy conservation by optimum loading of motor and proper control of motors.
4. Energy conservation by good illumination design.
5. Project cost evaluation case study no 1.
6. Demand side management Case study no 2.
7. Energy saving in starters Case study no 3.
8. Energy audit and techniques.
9. Energy conservation in power station by combined cycle method and co-generation.
10. Study of pole amplitude motor.
11. Energy conservation by improving load curves.
12. Energy conservation in the electric arc furnaces and welding

Note: Minimum 10 experiments should be performed.

References Books:

1. Renewable energy sources and conservation N. G. Bansal Kleemon & Meliss. Technology TMH Publication
2. Energy Technology Non conventional Renewable & conventional energy S.Rao – Parulkar, Khanna – publishers
3. Electric energy utilization and conservation S.C. Tripathi, T. M. H., Publisher
4. A text book of power plant engineering, A special appendix 1998 edition. Arora and S. Domkundwar Khanna Publication.