GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC- Electrical Engineering

SEMESTER: V

Subject Name: **Electrical Power Utilization**

Subject Code: **X50901**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (E)**	**Mid Sem Exam (Theory) (M)**	**Practical (Internal)**
3	0	0	3	70	30	50

Sr. No	Course Content	Total Hrs.
1.	**Electrical Heating & Welding:** Advantages of electric heating, modes of transfer of heat, classification of electric heating methods, Resistances heating methods, requirements of heating elements, design of heating elements, methods of temperature control, problems, Induction heating: principle, types of induction furnaces, direct core type, vertical core type, indirect core type, core less type, advantages and disadvantages, eddy current heating, applications examples., Arc-furnace: principle, types, direct and indirect arc furnaces, power supply and control, condition for maximum output, examples., Dielectric heating: principles, advantages and disadvantages, applications, choice of frequency, examples., Electric welding: different types of resistance welding and electric arc welding, conservation approach to be considered. Energy efficient processes.	14
2.	**Electrolytic Process:** Principle, Faradays laws of electrolysis, current efficiency, energy efficiency etc., Rating of metals, production of chemicals, Electro-deposition, electroplating, power supply for electrolytic processes.	06
3.	**Illuminations:** Nature of light, definitions, laws of illumination, different types of lamps, tungsten lamp, discharge lamp, sodium vapour lamp, fluorescent lamp, design of lighting scheme, methods of lighting, calculations, examples., flood lighting, factory lighting and street lighting, examples., conservation approach to be considered.	08
4.	**ECONOMIC ASPECTS OF UTILISING ELECTRICAL ENERGY:** Fixed charges: interest and sinking-fund calculations. Energy costs: public supply, two part tariff, effect of power factor, other factors, measurements, and the grid tariff. Reduction of Energy costs: power factor improvement, improvement of load factor, off peak loads. Private Generating Plant: use of exhaust steam, waste heat stations, pit head generation, diesel plant,	14

	general comparison of private plant and public supply. Economic choice of Equipment: initial cost and efficiency, capitalization of losses, choice of voltage, cost of renewals.	

References Books:

1. Utilisation of Electric Energy – E Openshaw Taylor (University Press).
2. Electrical Power Utilization – J. B. Gupta. Dhanpat rai &sons
3. Electrical Power Utilization – B.L. Theraja. S chand & company.
4. A text book on Power System Engg. – Soni, Gupta, Bhatnagar, Dhanpat rai &sons