

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING AND TECHNOLOGY (DIPLOMA PROGRAMMES)									
Programme		Diploma Engineering			Branch/Spec.		Electrical Engineering		
Semester		V			Version		1.0.0.0		
Effective from Academic Year			2020-21		Effective for the batch Admitted in			July2018	
Subject code		1EE2501	Subject Name		Energy Management & Audit				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	4	0	1	0	5	Theory	40	60	100
Hours	4	0	2	0	6	Practical	30	20	50

Course Learning Outcomes:
<ul style="list-style-type: none"> • The theory and practical course content and relevant skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry oriented COs associated with the above mentioned competency. <ul style="list-style-type: none"> ➤ Interpret energy conservation scenario in India. ➤ Implement energy conservation techniques in electrical machines. ➤ Evaluate the techno economic feasibility of the energy conservation technique adopted. ➤ Use Co-generation and relevant tariff for reducing losses in facilities. ➤ Carry out energy audit of an Industry or Organization. ➤ Select appropriate energy conservation method to reduce the wastage of energy.

Theory syllabus				
UNIT	Unit Content	Unit Learning Outcomes	Marks	Hrs
Unit – I Energy Conservation and Management	1a. Concept of Energy conservation, Sector wise Energy consumption, demand supply gap, Benefits of energy conservation 1b. Energy conservation Principle and concept, energy efficiency 1c. Mandatory provisions of EC act 1d. Energy management concept and objectives 1e. Initializing Planning, Leading, Controlling, Promoting, Monitoring and Reporting. energy management programmes	1.1 Aware with general energy problem in India 1.2 Identify the scope for energy conservation 1.3 Energy conservation act 2001 and with its Mandatory provisions and features 1.4 Understands the concept of energy management and its objectives 1.5 Describe the initialization and organizing energy management program	10	10

<p>Unit – II Energy Conservation Approaches In Industries/Organization</p>	<p>2a. Energy conservation approach by energy efficient motors 2b. Benefits of Power factor improvement and its techniques 2c. Effects of harmonics on – Motors, and remedies leading to energy conservation. Energy conservation by VSD 2d. Methods and techniques of energy conservation in ventilation and air conditioners compressors pumps, fans and blowers Area Sealing, Insulating the Heating / cooling fluid pipes , automatic door closing- Air curtain, Thermostat / Control 2e. Energy conservation in electric furnaces, ovens and boilers 2f. Lighting techniques – Natural , CFL, LED lighting sources and fittings</p>	<p>2.1 Identify energy conservation opportunities in various electrical systems in industries 2.2 Understands the energy saving opportunities in electric motors 2.3 Conservation of energy achieved by improving power factor and harmonics 2.4 Aware with benefits of the listed methods and techniques aiding to conserve energy in lighting systems, heating and Cooling systems, Variable speed drive (VSD) ? 2.5 State the energy conservation strategies in furnaces, ovens and boilers 2.6 State the energy conservation strategies in electric lighting</p>	<p>16</p>	<p>16</p>
<p>Unit – III Economic Evaluation of Energy Conservation</p>	<p>3a. New equipment technology, staffing, training 3b. Different costing of energy conservation project. 3c. Straight line Method, Depreciation cost, sinking fund method to calculate Depreciation 3d. Cost evaluation by Return of Investment(ROI) and pay back method etc. 3e. Risk analysis 3f. Case study.</p>	<p>3.1 Aware with circumstances that need capital investments for energy conservation 3.2 Calculate the cost of energy conservation project 3.3 Calculate the depreciation cost using different methods 3.4 Calculate the payback period for a given energy conservation equipment 3.5 Evaluate a energy conservation project based on risk analysis</p>	<p>14</p>	<p>14</p>
<p>Unit - IV Energy Conservation in</p>	<p>4a. Performance improvement of existing power plant: co-generation</p>	<p>4.1 Aware with different scope of energy conservation in Generation 4.2 Understands Demand side</p>	<p>10</p>	<p>10</p>

Power Generation, Transmission and Distribution sector	, combined cycle, small hydro 4b. Demand side management 4c. Load response programmes 4d. Types of tariff and restructuring of electric tariff. 4e. Technical measures to optimize T and D losses	4.3 management and its significance in energy conservation. Aware with Energy conservation measures to optimize Transmission and distribution losses		
Unit – V Energy Audit	5a. Benefits of Energy audit 5b. Elements of Energy Audit 5c. Preliminary and Detailed energy audit. 5d. Methodology of preliminary energy audit and Detailed energy audit Energy audit report. 5e. Tools for Energy Audit- Power Analyser, Combustion analyzer, fuel efficiency monitor, thermometer-contact, infrared, pitot tube and manometer, water flow meter, leak detector, tachometer and lux meter	5.1 Understands concept of energy audit and its benefits 5.2 Aware with different types of energy audits 5.3 Describe the methodology for preliminary & detailed energy audit 5.4 Enlist the Measurements and measuring instruments used in energy audit	10	10

List of Practical	
1	Identify the energy management skills and strategies in the energy management system
2	List the various energy conservation methods useful in a particular industry
3	Select appropriate energy conservation method for the critical area identified
4	Find out the payback period for a given energy conservation equipment
5	Determine depreciation cost of a given energy conservation project/equipment
6	Co-generation and combined cycle power plant
7	List the various energy conservation methods useful in power generation, transmission and distribution
8	Identify various measuring instruments used for energy audit
9	Prepare a technical report on ECBC
10	Prepare a energy audit report

List of Instruments/Equipments/ Trainer Board	
1	Power Analyzer
2	Earth Tester
3	Tri-vector meter
4	Multimeter
5	Tong Tester
6	Power Factor meter

List of Text Books			
1	Energy Management	Singh, Sanjeev	S.K. Katariya & Sons
2	Principles of Power System	Mehta, V.K.	S. Chand & Co.

List of Reference Books			
1	Energy conservation & Management	Dr. Subhash L. Gadhave, Pramod Mane	Technical publication

Link of Learning Resources	
1	www.bee.com
2	www.nptel.iitm.ac.in