

ENERGY MANAGEMENT & AUDITING

Course Code	23HS1702	Year	IV	Semester	I
Course Category	Management	Branch	EEE	Course Type	Theory
Credits	2	L-T-P	2-0-0	Prerequisites	Power Systems, Electrical Measurements & Instrumentation, Utilization of Electrical Energy.
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Understand the fundamentals of energy auditing, management, efficient motors, lighting systems, demand side management, energy measuring instruments, and economic considerations (L2).
CO2	Apply energy audit and management practices to assess and improve energy efficiency (L3).
CO3	Analyze energy data and management strategies to enhance energy conservation (L4).
CO4	Apply energy efficiency, demand side management, measurement, and economic analysis methods to conduct energy audit (L3).
CO5	Analyze the demand side management, performance and economic impact of energy efficient system to minimize energy usage and cost (L4).

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	1										2	1
CO2	3					1					1	2	1
CO3		3									1	2	1
CO4	3				1						1	2	1
CO5		3									1	2	1

SYLLABUS		
Unit No.	Contents	Mapped CO
I	Basic Principles of Energy Audit Energy audit- definitions - concept - types of Energy audit - energy index - cost index - pie charts - Sankey diagrams and load profiles - Energy conservation	CO1 CO2 CO3

	schemes- Energy audit of industries- energy saving potential - energy audit of process industry, thermal power station - building energy audit - Conservation of Energy Building Codes (ECBC-2017).	
II	Energy Management Principles of energy management - organizing energy management program - initiating - planning - controlling - promoting - monitoring - reporting. Energy manager - qualities and functions - language - Questionnaire – check list for top management.	CO1 CO2 CO3
III	Energy Efficient Motors and Lighting Energy efficient motors - factors affecting efficiency - loss distribution - constructional details - characteristics – variable speed - RMS - voltage variation-voltage unbalance-over motoring-motor energy audit. lighting system design and practice - lighting control - lighting energy audit.	CO1 CO4 CO5
IV	Demand Side Management and Energy Instruments Introduction to DSM - concept of DSM - benefits of DSM - Different techniques of DSM – time of day pricing - multi-utility power exchange model - time of day models for planning. Load management - load priority technique - peak clipping - peak shifting - valley filling - strategic conservation– Energy Instruments- data loggers - thermocouples - pyrometers - lux meters - tongue testers.	CO1 CO4 CO5
V	Economic Aspects and Their Computation Economics Analysis depreciation Methods - time value of money - rate of return - present worth method - replacement analysis - life cycle costing analysis – Energy efficient motors. Calculation of simple payback method - net present value method – Applications of life cycle costing analysis - return on investment.	CO1 CO4 CO5

Learning Resources	
Text Books:	
1. W.R.Murphy & G.Mckay Butter worth, “Energy management”,Heinemann publications,1982. 2. W.CTurner , “Energy management hand book”, John wiley and sons - 1982.	
Reference Books:	
1. John.C.Andreas , “Energy efficient electric motors”, Marcel Dekker Inc Ltd,2 nd edition, 1995 2. Paul o’ Callaghan , “Energy management”, Mc-graw Hill Book company,1 st edition, 1998 3. Energy management and good lighting practice : fuel efficiency- booklet12-EEO	
E-Resources:	
1. https://nptel.ac.in/courses/112105221 2. https://nptel.ac.in/courses/109106161	