

MOHAMMED SATHAK A J COLLEGE OF ENGINEERING

Siruseri IT Park, OMR, Chennai - 603103

LESSON PLAN							
Department of Mechanical Engineering							
Name of the Subject	ENERGY CONSERVATION AND MANAGEMENT			Name of the handling Faculty	Mr.Mohan S R & Mr.V.Vigneshwaran		
Subject Code	OME 551			Year / Sem	III/V		
Acad Year	2022-23			Batch	2020-24		
Course Objective							
Understand and analyse the energy data of industries							
Conduct energy audit and suggest methodologies for energy savings and Utilise the available resources in optimal ways							
Carryout energy accounting and balancing							
Course Outcome							
CO1-Understand and analyse the energy data of industries							
CO2-Can suggest methodologies for energy savings							
CO3-Can carryout energy accounting and balancing							
CO4-Utilise the available resources in optimal ways							
CO5-Understanding of Energy Economics							
Lesson Plan							
Sl. No.	Topic(s)	T / R*	Periods Required	Mode of Teaching (BB / PPT / NPTEL / MOOC / etc)	Blooms Level (L1-L6)	CO	PO
		Book					
UNIT I - INTRODUCTION							
1	Energy - Power – Past & Present scenario of World	T1	1	PPT/BB	L1	CO1	PO1, PO2
2	National Energy consumption Data – Environmental aspects associated with energy utilization	T1	1	PPT/BB	L2	CO1	PO1, PO2
3	Energy Auditing: Need, Types	T1	1	PPT/BB	L1	CO1	PO1,PO11
4	Methodology and Barriers	R2	3	PPT/BB	L1	CO1	PO1,PO2
5	Role of Energy Managers	R2	2	PPT/BB	L2	CO1	PO10,PO11
6	Instruments for energy auditing	R2	1	PPT/BB	L2	CO1	PO2,PO3
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any Seminar *							
Evaluation method							
*Answers are evaluated based on Direct interaction during Seminar							
UNIT –II ELECTRICAL SYSTEMS							
7	Components of EB billing – HT and LT supply	R2	1	PPT/BB	L2	CO2	PO1, PO5
8	Transformers, Cable Sizing, Concept of Capacitors,	R2	1	PPT/BB	L2	CO2	PO1,PO2
9	Power Factor Improvement, Harmonics	R2	1	PPT/BB	L2	CO2	PO1
10	Electric Motors - Motor Efficiency Computation	R2	2	BB	L4	CO2	PO3
11	Energy Efficient Motors, Illumination – Lux, Lumens	R2	2	PPT/BB	L2	CO2	PO1
12	Types of lighting, Efficacy	R2	1	PPT/BB	L3	CO2	PO1

13	LED Lighting and scope of Encon in Illumination	R2	1	PPT/BB	L2	CO2	PO1,PO2
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any							
*Tutorials							
Evaluation method							
*Answers are evaluated based on Assignments and Direct interaction during Tutorials							
UNIT III- THERMAL SYSTEMS							
14	Stoichiometry, Boilers	R2	1	PPT/BB	L2	CO3	PO1,PO2
15	Furnaces and Thermic Fluid Heaters	R2	1	PPT/BB	L2	CO3	PO2,PO3
16	Efficiency computation and encon measures.	R2	2	BB	L4	CO3	PO1,PO2
17	Steam: Distribution &U sage: Steam Traps	R2	2	PPT/BB	L3	CO3	PO1,PO2
18	Condensate Recovery, Flash Steam Utilization	R2	2	PPT/BB	L2	CO3	PO1,PO7
19	Insulators & Refractories	R2	1	PPT/BB	L2	CO3	PO1
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any							
*Assignment							
Evaluation method							
*Answers are evaluated based on Assignments Presentation							
UNIT IV- ENERGY CONSERVATION IN MAJOR UTILITIES							
20	Pumps, Fans	R1	1	PPT/BB	L2	CO4	PO1,PO2
21	Blowers, Compressed Air Systems	R1	2	PPT/BB	L3	CO4	PO1,PO2
22	Refrigeration and Air Conditioning Systems	R1	2	PPT/BB	L3	CO4	PO4,PO7
23	Cooling Towers	R1	2	PPT/BB	L2	CO4	PO4,PO7
24	D.G. sets	R1	2	PPT/BB	L2	CO4	PO1,PO2
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any							
*Tutorials							
Evaluation method							
*Answers are evaluated based on Assignments and Direct interaction during Tutorials							
UNIT-V ECONOMICS							
25	Energy Economics	R3	2	PPT/BB	L2	CO5	PO2
26	Discount Rate, Payback Period	R3	1	PPT/BB	L2	CO5	PO2
27	Internal Rate of Return	R3	1	PPT/BB	L3	CO5	PO2
28	Net Present Value	R3	2	PPT/BB	L2	CO5	PO2
29	Life Cycle Costing	R3	2	PPT/BB	L2	CO5	PO12
30	ESCO concept	R3	1	PPT/BB	L2	CO5	PO2
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any							
*Seminar							
Evaluation method							
*Answers are evaluated based on Direct interaction during Seminar							
Content Beyond the Syllabus Planned							
1	Energy Management Programme						
2	Waste Heat Recovery Systems						
Text Books							
1	Energy Manager Training Manual (4 Volumes) administered by Bureau of Energy Efficiency (BEE), a statutory body under Ministry of Power, Government of India, 2004						
Reference Books							
1	Witte. L.C., P.S. Schmidt, D.R. Brown, “Industrial Energy Management and Utilisation” Hemisphere Publ, Washington, 1988.						

2	Turner. W.C., “Energy Management Hand book”, Wiley, New York, 1982													
3	Murphy. W.R. and G. Mc KAY, “Energy Management”, Butterworths, London 1987.													
Website / URL References														
1	https://nptel.ac.in/courses/112105221													
Blooms Level														
Level 1 (L1) : Remembering			Lower Order Thinking	Fixed Hour Exams	Level 4 (L4) : Analysing				Higher Order Thinking	Projects / Mini Projects				
Level 2 (L2) : Understanding					Level 5 (L5) : Evaluating									
Level 3 (L3) : Applying					Level 6 (L6) : Creating									
Mapping syllabus with Bloom’s Taxonomy LOT and HOT														
Unit No	Unit Name				L1	L2	L3	L4	L5	L6	LOT	HOT	Total	
Unit 1	INTRODUCTION				3	3					6	0	6	
Unit 2	ELECTRICAL SYSTEMS					5	1	1			6	1	7	
Unit 3	THERMAL SYSTEMS					4	1	1			5	1	6	
Unit 4	ENERGY CONSERVATION IN MAJOR UTILITIES					3	2				5	0	5	
Unit 5	ECONOMICS					5	1				6	0	6	
Total					3	20	5	2	0	0	28	2	30	
Total Percentage					10	66.6667	16.6667	6.66667	0	0	93.3333	6.66667	100	
CO PO Mapping														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2									1			
CO2	3	1	1		1									2
CO3	3	2	1				1						1	
CO4	2	2		1			1						1	
CO5		3										1		
Avg	3	2	1	1	1		1					1		
Justification for CO-PO mapping														
CO1	PO1: Applying allied engineering fundamentals, in Computer Science and Engineering PO2: Identification of Engineering complex problems agreed moderatly PO11: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work agreed lowerely													
CO2	PO1: Applying allied engineering fundamentals, in Computer Science and Engineering PO2: Identification of Engineering complex problems agreed moderatly PO3: Design solutions for complex engineering problems and design system components or processes agreed lowerely PO5: Select and apply appropriate techniques, resources, and modern engineering tools agreed lowerely													
CO3	PO1: Applying allied engineering fundamentals, in Computer Science and Engineering PO2: Identification of Engineering complex problems agreed moderatly PO3: Design solutions for complex engineering problems and design system components or processes agreed lowerely PO7: Understanding of impact of engineering solutions in societal aspect agreed lowerely													
CO4	PO1: Basic engineering knowledge of maths / science agreed moderatly PO2: Identification of Engineering complex problems agreed moderatly PO4: Problem analysis and interpretation of datas agreed lowerely PO7: Understanding of impact of engineering solutions in societal aspect agreed lowerely													
CO5	PO2: Identification of Engineering complex problems agreed moderatly PO12: Recognise and preparation of things for life long learning agreed lowerely													
3		High level			2		Moderate level			1		Low level		
Name & Sign of Faculty Incharge : Mr.Mohan S R & Mr.V.Vigneshwaran														
Name & Sign of Subject Expert : Dr. S Prasath														
Head of the Department : Dr. S Prasath														