

Course code	Course Name	L-T-P-Credits	Year of Introduction
ME482	Energy Conservation and Management	3-0-0-3	2016
Prerequisite : Nil			
Course Objectives: :			
<ol style="list-style-type: none"> 1. To enable analysis of the energy data of industries, energy accounting and balancing 2. To know energy audit and methodologies for energy savings 3. To understand utilization of the available resources in optimal ways 			
Syllabus:			
Energy, Power, Past & Present scenario of World; National Energy consumption Data, Components of EB billing, Boilers, Furnaces and Thermic Fluid Heaters, Pumps, Fans, Blowers, Energy audit, Energy Economics			
Expected Outcomes:			
The students will be able to			
<ol style="list-style-type: none"> i. carryout energy accounting and balancing ii. suggest methodologies for energy savings 			
Text books:			
<ol style="list-style-type: none"> 1. Callaghn, P.W. Design and Management for Energy Conservation, Pergamon Press, Oxford,1981. 2. Witte. L.C., P.S. Schmidt, D.R. Brown, Industrial Energy Management and Utilisation, Hemisphere Publ, Washington, 1988. 			
References:			
<ol style="list-style-type: none"> 1. Dryden. I.G.C., The Efficient Use of Energy Butterworths, London, 1982 2. Energy Manager Training Manual (4 Volumes) available at www.energymanagertraining.com, a website of Bureau of Energy Efficiency (BEE), A statutory body under Ministry of Power, Government of India, 2004. 3. Murphy. W.R. and G. Mc KAY, Energy Managemen”, Butterworths, London 1987. 4. Turner. W.C., Energy Management Hand book, Wiley, New York, 1982. 			
Module	Contents	Hours	End Sem. Exam. Marks
I	Energy - Power – Past & Present scenario of World; National Energy consumption Data – Environmental aspects associated with energy utilization –Energy Auditing: Need, Types, Methodology and Barriers. Role of Energy Managers. Instruments for energy auditing	7	15%

II	Components of EB billing – HT and LT supply, Transformers, Cable Sizing, Concept of Capacitors, Power Factor Improvement, Harmonics, Electric Motors - Motor Efficiency Computation, Energy Efficient Motors, Illumination – Lux, Lumens, Types of lighting, Efficacy, LED Lighting and scope of Encon in Illumination.	7	15%
FIRST INTERNAL EXAMINATION			
III	Stoichiometry, Boilers, Furnaces and Thermic Fluid Heaters – Efficiency computation and encon measures. Steam: Distribution & Usage: Steam Traps, Condensate Recovery, Flash Steam Utilization, Insulators & Refractories	7	15%
IV	Energy efficiency in Pumps, Fans, Blowers, Compressed Air Systems, Refrigeration and Air Conditioning Systems – Cooling Towers – D.G. sets	7	15%
SECOND INTERNAL EXAMINATION			
V	Energy audit, need, types of energy audit. Energy management (audit) approach-understanding energy costs, Bench marking, energy performance, matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirements, fuel and energy substitution, energy audit instruments and metering	7	20%
VI	Energy Economics – Discount Rate, Payback Period, Internal Rate of Return, Net Present Value, Life Cycle Costing –ESCO concepts	7	20%
END SEMESTER EXAMINATION			

Question Paper Pattern

Maximum marks: 100

Time: 3 hrs

The question paper should consist of three parts

Part A

There should be 2 questions each from module I and II

Each question carries 10 marks

Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part B

There should be 2 questions each from module III and IV

Each question carries 10 marks

Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part C

There should be 3 questions each from module V and VI

Each question carries 10 marks

Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

Note: Each question can have a maximum of four sub questions, if needed.