M.E Semester: 3
Electrical Engineering
Subject Name: Energy Management and Audit

A. **Course Objective:**

- To present a problem oriented introductory knowledge of Energy management and energy audit.
- To understand basic concepts of Energy conservation.
- To understand Energy efficiency and cost benefit.
- To understand Conflict between energy consumption and optimization.

B. **Teaching / Examination Scheme**

SUBJECT		Teaching Scheme				Total Credit	Examination Scheme					Total Marks
		L	T	P	Total		THEORY		IE	CIA	PR. / VIVO	
CODE	NAME	Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
MEEPS-303	Energy Management and Audit	3	0	0	3	3	3	70	30	20	00	120

C. **Detailed Syllabus:**

SR No.	Topic	No. of Lectures	Weightage in % in Exam
Unit:1	**Essentials of Energy Management:** Introduction – Scope of Energy Management – Necessary Steps of Energy Management Programme – General Principles of Energy Management – Qualities and Functions of an Energy Manager – The Language of the Energy Manager. Method of investment appraisal – Rate of return method - Pay back method – Net present value method (NPV) - Internal rate of return method (IRR)– Capital budgeting. **Essentials of Energy Management:** Introduction – Scope of Energy Management –	12	25%

	Necessary Steps of Energy Management Programme – General Principles of Energy		
Unit: 2	**Energy Auditing:** Introduction – Objective of Energy Audit – Control of Energy – Uses of Energy – Energy Conservation Schemes – Energy Index – Cost Index – Pie Chart – Sankey Diagram – Load Profile – Types of Energy Audit – General Energy Audit – Sankey Questionnaire – Sample Questionnaire – Energy Audit Case Studies	09	20%
Unit: 3	**Energy Conservations:** Introduction – Indian Energy Conservation Act, 2001(EC Act) – The Electricity Act 2003 – Rules for Efficient Energy Conservation of Energy and Materials. Technologies for Energy Conservation – Design of EC – Energy Flow Networks – Critical Assessment of Energy Use – Formulation of Objectives and Constraints.	09	20%
Unit: 4	**Improvement of Energy Efficiency:** Thermal Plant: Waste Heat – Advantages of Recuperators – Air Preheaters and Economizers – Furnaces – Fans and Blowers – Compressors – Pumps – Energy Audits – Case studies, Tips for energy conservation in domestic and industrial Sectors	09	20%
Unit-5	**Electrical Energy Management:** Introduction – Power Factor Control – Tariff – Energy Efficient Motors – Case Study – Energy Efficient Lighting – Life cycle Cost Analysis (LCC analysis) – Equivalent Annual Worth(EAW) – Break Even Analysis.	06	15%

D. **Instructional Method & Pedagogy**

- At the start of course, the course delivery pattern , prerequisite of the subject will be discussed
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal weightage should be given to all topics while teaching and conduction of all examinations.
- Attendance is compulsory in lectures and laboratory, which may carries five marks in overall evaluation.
- One/Two internal exams may be conducted and total/average/best of the same may be converted to equivalent of 30 marks as a part of internal theory evaluation.
- Assignment based on course content will be given to the student for each unit/topic and will be evaluated at regular interval. It may carry an importance of ten marks in the overall internal evaluation.
- Surprise tests/Quizzes/Seminar/Tutorial may be conducted and having share of five marks in the overall internal evaluation.

E. **Students Learning Outcomes**

On successful completion of the course

- The student can acquire the basic knowledge of electric energy, electrical fundamentals, thus being prepared to pursue any area of engineering spectrum in depth as desired.
- The students will be able to effectively employ electrical systems and lead the exploration of new applications and techniques for energy saving.
- The students will be able work with energy management system and energy audit of whole system.

F. **Suggested Books:**

- 1. KV Sharma,P.Venkataseshaiah: Energy management and conservation IK International
- publishing house Pvt. Ltd.
- 2. Guide book for national certification examination for energy managers and energy auditors,
- Books1,2,3 &4-Bureau of Energy Efficiency, Ministry of power, Govt. of India
- 3. Turner W.C.: Energy management handbook

