

Course title: Energy conservation and management				
Course code: ENR 111		No. of credits: 2	L-T-P: 22-06-04	Learning hours: 32
Pre-requisite course code and title (if any): NA				
Department: Sustainable Engineering				
Course coordinator: Dr. Sapan Thapar			Course instructor(s): Dr Sapan Thapar	
Contact details: sapan.thapar@terisas.ac.in				
Course type: Core			Course offered in: Semester 2	
Course description				
Energy Management has been identified as a key instrument to reduce greenhouse gas emissions, besides increasing the cost competitiveness of the entity/ facility while enhancing the energy security of the nation. Policy makers and technology providers have been working towards the cause of energy efficiency and its overall management. This course is designed to educate students on the various dimensions of energy management across the entire value chain.				
Course objectives				
<ul style="list-style-type: none"> ▪ To impart knowledge in the domain of energy conservation ▪ To bring out Energy Conservation Potential and Business opportunities across different user segments under innovative business models ▪ To inculcate knowledge and skills about assessing the energy efficiency of an entity/ establishment 				
Course contents				
Module	Topic	L	T	P
1	Introduction to Energy Conservation Overview - Global & Indian Energy Scenario Energy Sources, Supply & Demand Overview of Electrical and Thermal Energy Imperative for Energy Conservation	4		
2	Policy & Regulations for Energy Conservation Institutional Structure Overview – Global EE Programmes India - Energy Conservation Policies & Legislations including BEE’ activities	4		
3	Energy Conservation Opportunities – Electrical Buildings & Lighting Systems Motors, Pumps, Transformers Power Transmission & Distribution System	3		
4	Energy Conservation Opportunities – Thermal Boilers, Furnaces & Waste Heat Recovery Systems Cogeneration Systems HVAC, Cooling Towers & DG Systems	3		
5	Energy Data Analysis IT Tools and Applications Smart Energy Systems Industrial Use Cases	4		
6	Business Approaches Market Opportunities Overview on EE Financing ESCO Business Models Case studies	4	6	
7	Site Visit			

	Power Distribution Utility/ Industry/ Building			4
		22	6	4
Evaluation criteria				
<ul style="list-style-type: none"> ▪ Assignments: 20% ▪ Minor Test 1 (Written): 20% ▪ Minor Test 2 (Written): 20% ▪ Major Exam (Written): 40% 				
Learning outcomes				
<ul style="list-style-type: none"> ▪ Obtain knowledge about energy conservation policy, regulations and business practices ▪ Analyse energy systems from a supply and demand perspective ▪ Recognize opportunities for enabling rational use of energy ▪ Apply knowledge of Energy Conservation Opportunities in a range of contexts ▪ Develop innovative energy efficiency solutions and demand management strategies 				
Pedagogical approach				
A combination of class-room interactions, group discussions, tutorials, assignments and site visits				
Materials				
Text Books				
LC Witte, PS Schmidt and DR Brown: Industrial Energy Management and Utilization (Hemisphere Publishing Corporation, Washington, 1998)				
Reference Books				
WC Turner and Steve Doty: Energy Management Handbook , Seventh Edition, (Fairmont Press Inc., 2007)				
Sumper Andreas and Baggini Angelo: Electrical Energy Efficiency: Technologies and Applications (John Wiley 2012)				
Frank Kreith: Handbook on Energy Efficiency and Renewable Energy (CRC Press, 2007)				
George Polimeros: Energy Cogeneration Handbook (Industrial Press, Inc., New York, 1981)				
Websites				
National Productivity Council (http://www.npcindia.gov.in)				
Bureau of Energy Efficiency (https://www.beeindia.gov.in)				
Petroleum Conservation Research Association (http://www.pcra.org)				
Additional information (if any): N.A.				
Student responsibilities				
Attendance, feedback, discipline: as per university rules.				

Course reviewers

1. Mr RP Gokul, Head (Energy Efficiency Division), ICF International
2. Mr Amit Kumar, Sr. Director, TERI