



SYNERGY SCHOOL OF ENGINEERING, DHENKANAL

Department:- Electrical Engineering	Semester:- 5th Sem	Name of the teaching faculty :- MANMOHAN PANDA
Subject:- ENERGY CONSERVATION AND AUDIT	No. of Days/week class Allotted :-3	No. of Weeks :-15 SESSION- 2026-2027 WINTER STARTING DATE - 01.07.2026 ENDING DATE - 05.11.2026
No. of week	No. of class	Topic to be Taught
	1 st	Introduction Class
1 st	2 nd	Energy Conservation Basics: Energy Scenario: Primary and Secondary Energy
	3 rd	Energy demand and supply, National scenario
	1 st	Energy conservation and Energy audit; concepts and difference
2 nd	2 nd	Indian Electricity Act 2001; relevant clauses of energy conservation
	3 rd	BEE and its Roles, MEDA and its Roles
	1 st	Star Labelling: Need and its benefits
3 rd	2 nd	Energy Conservation in Electrical Machines Need for energy conservation in induction motor and transformer
	3 rd	Energy conservation techniques in induction motor by: Improving Power quality
	1 st	Energy conservation techniques in induction motor by: Motor survey
4 th	2 nd	Energy conservation techniques in induction motor by: Matching motor with loading
	3 rd	Energy conservation techniques in induction motor by: Minimizing the idle and redundant running of motor
	1 st	Energy conservation techniques in induction motor by: Operating in star mode
5 th	2 nd	Energy conservation techniques in induction motor by: Rewinding of motor
	3 rd	Energy conservation techniques in induction motor by: Replacement by energy efficient motor
	1 st	Energy conservation techniques in induction motor by: Periodic maintenance
6 th	2 nd	Energy conservation techniques in Transformer by Loading sharing , Parallel operation, Isolating techniques
	3 rd	Replacement by energy efficient transformers. Periodic maintenance
	1 st	Energy Conservation Equipment: Soft starters, Automatic star delta convertor
7 th	2 nd	Energy Conservation Equipment: Variable Frequency Drives, Automatic p. f. controller (APFC), Intelligent p. f. controller (IPFC)
	3 rd	Energy efficient motor; significant features, advantages, applications and limitations
	1 st	Energy efficient transformers, amorphous transformers; epoxy Resin cast transformer / Dry type of transformer
8 th	2 nd	Energy conservation in Electrical Installation systems Aggregated Technical and commercial losses (ATC); Power system at state, regional, national and global level
	3 rd	Technical losses; causes and measures to reduce by. a) Controlling I^2R losses. b) Optimizing distribution voltage c) Balancing phase currents d) Compensating reactive power flow
	1 st	Commercial losses: pilferage, causes and remedies

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9th	2 nd	Energy conservation equipment: Maximum Demand Controller , KVAR Controller, Automatic Power Factor controller (APFC)
	3 rd	Energy Conservation in Lighting System a) Replacing Lamp sources. b) Using energy efficient luminaries. c) Using light controlled gears.
	1 st	Energy Conservation in Lighting System: d) Installation of separate transformer /servo stabilizer for lighting. e) Periodic survey and adequate maintenance programs.
10th	2 nd	Energy Conservation techniques in fans & Electronic regulators
	3 rd	Energy conservation through Cogeneration and Tariff : Co-generation and Tariff; concept, significance for energy conservation
	1 st	Co-generation , Types of Co-generation on basis of sequence of energy use (Topping cycle, Bottoming cycle)
11th	2 nd	Types of Co-generation basis of technology (Steam turbine Co-generation, Gas turbine Co-generation, Reciprocating engine Co-generation)
	3 rd	Factors governing the selection of Co-generation system Advantages of Co-generation
	1 st	Tariff: Types of tariff structure: Special tariffs; Time-off-day tariff, Peak-off-day tariff, Power factor tariff
12th	2 nd	Tariff: Types of tariff structure: Maximum Demand tariff, Load factor tariff
	3 rd	Application of tariff system to reduce energy bill
13th	1 st	Energy Audit of Electrical System Energy audit (definition as per Energy Conservation Act)
	2 nd	Energy audit instruments and their use
	3 rd	Questionnaire for energy audit projects
14th	1 st	Energy flow diagram (Sankey diagram)
	2 nd	Simple payback period, Energy Audit procedure (walk through audit and detailed audit)
	3 rd	Energy Audit report format
15th	1 st	Important Questions & Answers discussion for semester exam
	2 nd	Important Questions & Answers discussion for semester exam
	3 rd	Important Questions & Answers discussion for semester exam

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02.06.2026

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