

Method of Assessment

- Continuous Assessment – Quiz/Presentation/Assignment/Case study (20 Marks)
CA1: Quiz of 10 Marks (Units 1, 2, 3)
- Mid Sem Test – 20 marks on Units 1, 2, 3
- Continuous Assessment – Quiz/Presentation/Assignment/Case study (20 Marks)
CA2: Group Case Study of 10 Marks (Units 4, 5, 6)
- End Sem Exam – 60 marks (Unit 1, 2,3 ,4 5, 6)
- Grading System - Relative grading
- Total Lectures - 28 (14 Weeks) as per 2 Hrs/Week
- Each Unit carry 10 Marks

Detailing of Syllabus of EEE

Unit 1: (5 hrs duration)

- Scenario of conventional power in India and abroad
- Schematic diagram, components, their functions, working operation, advantages, applications and limitations of:
 - Steam power plant
 - Nuclear power plant
 - Gas turbine power plant
 - Hydro power plant
 - Thermionic power
- Environmental concern of all above plants

Unit 2: Renewable Power Generation (5 hrs duration)

- Status of renewable power in India and abroad
- Schematic diagram, components, their functions, working operation, advantages, applications and limitations of:
 - Solar power plant
 - Tidal power
 - Wind power – types
 - Fuel cell
 - Biomass power
 - OTEC
 - MHD

Unit 3: (4 hrs duration)

- Energy conservation – definition
- Scenario of energy conservation in India
- Energy Conservation Act - Definition
- Maximum energy efficiency - Definition

- Energy conservation/ saving in electric motors, refrigerators, AC, electric furnace, pumps, compressors, fans, blowers, lighting illumination (Tips of energy saving on above only)

Unit 4: Air Pollution (5 hrs duration)

- Air pollution – definition
- Causes or sources of air pollution
- Types of pollutants, primary and secondary
- Effect of air pollution on: human, environment and animals
- Indoor and outdoor air pollution
- Preventive/ control measures of air pollution
- Air quality standard – AQI values, effect on health
- Air quality measurements – Air sampling method, Particulate and gases measurement

Unit 5: Water Pollution (5 hrs duration)

- Point and nonpoint sources of water pollution
- Types of water pollution:
BOD/ COD – inorganic, organic, biologic
pH
Eutrophication
Suspended solids
NH₃ – N₂
Micro bacteria
Heavy metals
Pesticides
- Effects of water pollution
- Control of water pollution
- Soil pollution and thermal pollution – additional forms of water pollution
- Solid waste (types) and disposal methods (only list)
- Noise pollution – causes, effects, preventive measures and control

Unit 6: Environmental Laws and Sustainable Development (4 hrs duration)

- Clean Air Act/Clean Water Act
- Wild Life Protection Act 1972
- Forest Conservation Act 1980
- Environmental Protection Act 1986
- Disaster Management Act 2005 -Definition- Cycle
Types of disasters
Guidelines
- Watershed management- method and guidelines
- Rainwater Harvesting- method and guidelines

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DEPARTMENT OF MECHANICAL ENGINEERING

B. Tech. (All Branches) Sem- I

Subject: Energy and Environmental Engineering

L(2):T(0):P(0):C(4)

Contact Duration, 2 Hrs/week

LESSON PLAN

At the successful completion of the course, the student should be able to:

- CO-1. List the conventional and renewable sources of energy, energy conservation principles, environmental acts (Remember Level)
- CO-2. Explain the operation of conventional power plants and working principle of renewable power generation (Understand Level)
- CO-3. Compare merits and demerits of the conventional power generation and renewable power generation methods (Understand Level)
- CO-4. Demonstrate the sources, effects and control measures of air, water, noise and soil pollution (Understand Level)
- CO-5. Explain the methods of water conservation, rainwater harvesting, disaster management and solid waste disposal (Understand Level)

Lecture No.	Date	Contents	Teaching Aid	Course Outcome
1	08-08-17	Conventional power generation - National and International status	Chalk and Talk	CO-1
2	10-08-17	Steam power plant - Schematic arrangement, working, advantages and disadvantages	Chalk and Talk	CO-2
3	14-08-17	Gas Turbine Power plant - Schematic arrangement, working, advantages and disadvantages	Chalk and Talk	CO-2
4	22-08-17	Nuclear power generation - Schematic arrangement, working, advantages and disadvantages	Chalk and Talk	CO-2
5	24-08-17	Hydro-electric power generation - Schematic arrangement, working, advantages and disadvantages	Chalk and Talk	CO-2
6	29-08-17	Thermionic Generators, Site selection for power plants- consideration factors	Chalk and Talk	CO-2
7	31-08-17	Renewable power generation - National and International status	Chalk and Talk	CO-2
8	04-09-17	Solar power generation plant, Schematic arrangement, working, advantages and disadvantages, types, PV system	Chalk and Talk	CO-2
9	07-09-17	Wind power generation, Schematic arrangement, working, advantages and disadvantages	Chalk and Talk	CO-2
10	12-09-17	Biomass power generation, sources of Biomass, Biogas plant- working, Biomass conversion techniques, advantages and disadvantages	Chalk and Talk	CO-2

11	14-09-17	Tidal power plants, types of plants, Ocean thermal energy conversion (OTEC), open cycle and closed cycle - advantages, limitations	Chalk and Talk	CO-2
12	19-09-17	Fuel cell, types of fuel cells, construction and applications, advantages & limitations	Chalk and Talk	CO-2
13	21-09-17	MHD power generation, principle, Types of MHD, Advantages, Limitations	Chalk and Talk	CO-2
14	26-09-17	Energy conservation - principles and benefits, Maximum energy efficiency, Maximum cost effectiveness definitions	Chalk and Talk	CO-1
15	28-09-17	Methods of energy conservation in ventilation and air conditioners, compressors, pumps, fans and blowers, Energy conservation in electric furnaces, ovens and boilers., lighting techniques	Chalk and Talk	CO-1
16	03-10-17	Pollution (air) – primary and secondary pollutants, Classification of air pollutants, Particulate emission	Chalk and Talk	CO-4
17	10-10-17	Sources of air pollution, Effects of air pollution, Air quality standard, air quality measurement methods	Chalk and Talk	CO-4
15	12-10-17	Water pollution – Water resources, types of water pollution, sources of water pollution, Sources of industrial pollutants,	Chalk and Talk	CO-4
16	17-10-17	BOD, COD, Biological magnification, Eutrophication, Effects of water pollution, control of water pollution	Chalk and Talk	CO-4
17	24-10-17	Types of solid wastes, Methods of disposal of solid wastes, Soil pollution - causes and effects	Chalk and Talk	CO-5
18	26-10-17	Thermal pollution- causes and effects, Nuclear hazard	Chalk and Talk	CO-4
19	31-10-17	Noise pollution, causes, Sources & effects of noise pollution	Chalk and Talk	CO-4
20	02-11-17	Disaster management, watershed management,	Chalk and Talk	CO-5
21	07-11-17	Urban problems related to energy, rainwater harvesting	Chalk and Talk	CO-5
22	09-11-17	Water conservation methods	Chalk and Talk	CO-5
23	14-11-17	Environmental protection act, Air act, Wildlife protection act, Forest conservation act	Chalk and Talk	CO-1
24	16-11-17	Videos on Conventional Energy Generation	LCD projector	
25	21-11-17	Videos on Renewable Energy Generation	LCD projector	
26	23-11-17	Videos on Pollution control and Pollution of environment	LCD projector	
27	28-11-17	Videos on Pollution control and Pollution of environment	LCD projector	
28	30-11-17	Doubt clearing session	Chalk and Talk	

Following Lectures may not be conducted due to holiday or other academic, cocurricular and extra-curricular activities

Date	Day	Description
02-08-17	Wednesday	Induction Program
03-08-17	Thursday	Induction Program
17-08-17	Thursday	<i>Pateti</i>
04-10-17	Wednesday	Mid Sem Exam
05-10-17	Thursday	Mid Sem Exam
19-10-17	Thursday	<i>Deewali - Lakshmi Pujan</i>