



# GOVERNMENT POLYTECHNIC, KORAPUT

## DEPARTMENT OF MECHANICAL ENGINEERING

<b>Discipline:</b> ELECTRICAL ENGG	<b>Semester:</b> 3 <sup>RD</sup>	<b>Name of the Teaching Faculty:</b> <span style="float: right;">B. Sai Santosh.</span>
<b>Subject:</b> ELEMENT OF MECHANICAL ENGG	<b>No. of days/per week class allotted:</b>	<b>Semester From date:</b> 1/10/21 <b>To Date:</b> 08/01/22  <b>No. of Weeks:</b> 15

**COURSE OUTCOMES**

On completion of the course content the students will be able to:

1. Explain the principle of working of Boilers, Turbines and condensers.
2. State the different types of boilers and Turbines and their uses.
3. Explain the properties of steam.
4. State and explain thermodynamic laws.

Week	Class Day	Theory/Practical Topics
1 <sup>ST</sup>	1 <sup>ST</sup>	Introduction to thermodynamics, scope of thermodynamics, approach of thermodynamics
	2 <sup>ND</sup>	Thermodynamics system, properties, path, state, process
	3 <sup>RD</sup>	Thermodynamics equilibrium, point function, path function, reversible, irreversible process
	4 <sup>TH</sup>	Heat transfer & work transfer
2 <sup>ND</sup>	1 <sup>ST</sup>	First law of thermodynamics
	2 <sup>ND</sup>	Law's of perfect gas
	3 <sup>RD</sup>	Specific heat capacity, cp, cv
	4 <sup>TH</sup>	Relationship between cp & cv
3 <sup>RD</sup>	1 <sup>ST</sup>	Pure substance, formation of steam
	2 <sup>ND</sup>	T-v, T-s diagram of water
	3 <sup>RD</sup>	P-t, p-v diagram of water, dry steam, wet steam
	4 <sup>TH</sup>	Dryness fraction, mollier diagram
4 <sup>TH</sup>	1 <sup>ST</sup>	Numericals related pure substance
	2 <sup>ND</sup>	Numericals related pure substance
	3 <sup>RD</sup>	Boiler. Uses, classification
	4 <sup>TH</sup>	Types of boiler
5 <sup>TH</sup>	1 <sup>ST</sup>	Cochran boiler
	2 <sup>ND</sup> ✓	Babcock & willcox boiler
	3 <sup>RD</sup>	Boiler mountings
	4 <sup>TH</sup>	Boiler mountings
6 <sup>TH</sup>	1 <sup>ST</sup>	Boiler mountings
	2 <sup>ND</sup>	Boiler mountings
	3 <sup>RD</sup>	Boiler accessories
	4 <sup>TH</sup>	Boiler accessories
7 <sup>TH</sup>	1 <sup>ST</sup> ✓	Steam engine, classification
	2 <sup>ND</sup> ✓	Parts of steam engine
	3 <sup>RD</sup> ✓	Working principle of steam engine

8 <sup>TH</sup>	4 <sup>TH</sup>	Indicator diagram, expression for mean effective pressure
	1 <sup>ST</sup>	Indicator power, brake power
	2 <sup>ND</sup>	Indicated thermal efficiency, brake thermal efficiency, overall efficiency
9 <sup>TH</sup>	3 <sup>RD</sup>	Numericals
	4 <sup>TH</sup>	Numericals
	1 <sup>ST</sup>	Numericals
	2 <sup>ND</sup>	Numericals
10 <sup>TH</sup>	3 <sup>RD</sup>	Steam turbine & it's classification
	4 <sup>TH</sup>	Impulse turbine
	1 <sup>ST</sup>	Reaction turbine
	2 <sup>ND</sup>	Difference between impulse & reaction turbine
11 <sup>TH</sup>	3 <sup>RD</sup>	Condenser & it's classification
	4 <sup>TH</sup>	Jet condenser & types
	1 <sup>ST</sup>	Jet condenser & types
	2 <sup>ND</sup>	Surface condenser & types
12 <sup>TH</sup>	3 <sup>RD</sup>	Surface condenser & types
	4 <sup>TH</sup>	Ic engine , classification
	1 <sup>ST</sup>	Parts of ic engine, terminology related ic engine
	2 <sup>ND</sup>	4- stroke , 2- stroke diesel engine
13 <sup>TH</sup>	3 <sup>RD</sup>	4- stroke , 2-stroke petrol engine
	4 <sup>TH</sup>	Difference between 4-stroke, 2-stroke , petrol & diesel engine
	1 <sup>ST</sup>	Properties of fluid
	2 <sup>ND</sup>	Properties of fluid
14 <sup>TH</sup>	3 <sup>RD</sup>	Pressure measuring instruments
	4 <sup>TH</sup>	Pressure measuring instruments
	1 <sup>ST</sup>	Types of fluid flow,
	2 <sup>ND</sup>	Continuity equation,
15 <sup>TH</sup>	3 <sup>RD</sup>	Energy of fluids , Bernoulli's equation
	4 <sup>TH</sup>	Bernoulli's equation
	1 <sup>ST</sup>	Hydraulic intensifier
	2 <sup>ND</sup>	Hydraulic lift
	3 <sup>RD</sup>	Hydraulic accumulator
	4 <sup>TH</sup>	Hydraulic ram

#### LEARNING RESOURCES:

- 1 Thermal Engineering R. S. Khurmi S Chhand
- 2 Hydraulics & Hydraulic M/Cs A. R. Basu Dhanpat Rai & Co.
- 3 Thermal Engineering A. S. Sarad Satyaprakashan
- 4 Hydraulics & Hydraulic M/Cs R. K. Bansal Laxmi Publishers

B. Sai Santosh  
 Sign. Of Faculty  
 concerned  
 01/10/2021

*[Signature]*  
 01/10/2021  
 Signature. Of  
 HOD

Principal