

# GOVT. POLYTECHNIC, NAYAGARH

## 3<sup>rd</sup> SEMESTER MECHANICAL ENGINEERING (2022-23)

SUBJECT- THERMAL ENGINEERING-I

TOTAL PERIOD-60

NAME OF FACULTY: Prafulla Kumar Mallick, PTGF(Mech)

THEORY-4P/WEEK

Sl No.	week	Day	Topics to be covered
1.	1 <sup>st</sup>	1 <sup>st</sup> day	Thermodynamic Systems (closed, open, isolated)
		2 <sup>nd</sup> day	Thermodynamic properties of a system (pressure, volume, temperature, entropy, enthalpy, Internal energy and units of measurement).
		3 <sup>rd</sup> day	Intensive and extensive properties
		4 <sup>th</sup> day	Define thermodynamic processes, path, cycle , state, path function, point function & Thermodynamic Equilibrium.
Sl No.	week	Day	Topics to be covered
2	2 <sup>nd</sup>	1 <sup>st</sup> day	Work , heat and comparison between the two
		2 <sup>nd</sup> day	Mechanical Equivalent of Heat.
		3 <sup>rd</sup> day	Work transfer, Displacement work
		4 <sup>th</sup> day	State & explain Zeroth law of thermodynamics
Sl No.	week	Day	Topics to be covered
3	3 <sup>rd</sup>	1 <sup>st</sup> day	State & explain First law of thermodynamics
		2 <sup>nd</sup> day	Limitations of First law of thermodynamics
		3 <sup>rd</sup> day	Application of First law of Thermodynamics (steady flow energy equation and its application to turbine and compressor)
		4 <sup>th</sup> day	Second law of thermodynamics (Clausius & Kelvin Plank statements)
Sl No.	week	Day	Topics to be covered
4	4 <sup>th</sup>	1 <sup>st</sup> day	Application of second law in heat engine, heat pump, refrigerator & determination of efficiencies & C.O.P
		2 <sup>nd</sup> day	solve simple numerical)
		3 <sup>rd</sup> day	solve simple numerical)
		4 <sup>th</sup> day	Numerical on above
Sl No.	week	Day	Topics to be covered
5	5 <sup>th</sup>	1 <sup>st</sup> day	Laws of perfect gas:
		2 <sup>nd</sup> day	Boyle's law, Charle's law, Avogadro's law, Dalton's law of partial pressure, Gay lussac law, General gas equation, characteristic gas constant, Universal gas constant
		3 <sup>rd</sup> day	Explain specific heat of gas (Cp and Cv)
		4 <sup>th</sup> day	Relation between Cp & Cv.
Sl No.	week	Day	Topics to be covered



6	6 <sup>th</sup>	1 <sup>st</sup> day	Work done during a non- flow process
		2 <sup>nd</sup> day	Application of first law of thermodynamics to various non flow process (Isothermal, Isobaric, Isentropic and polytrophic process
		3 <sup>rd</sup> day	Solve simple problems on above.
		4 <sup>th</sup> day	Free expansion & throttling process.
<b>Sl No.</b>	<b>week</b>	<b>Day</b>	<b>Topics to be covered</b>
7	7 <sup>th</sup>	1 <sup>st</sup> day	Explain & classify I.C engine
		2 <sup>nd</sup> day	Terminology of I.C Engine such as bore, dead centers, stroke volume, piston speed & RPM.
		3 <sup>rd</sup> day	Explain the working principle of 2-stroke & 4- stroke engine C.I & S.I engine.
		4 <sup>th</sup> day	Differentiate between 2-stroke & 4- stroke engine C.I & S.I engine.
<b>Sl No.</b>	<b>week</b>	<b>Day</b>	<b>Topics to be covered</b>
8	8 <sup>th</sup>	1 <sup>st</sup> day	Gas Power Cycle
		2 <sup>nd</sup> day	Carnot cycle
		3 <sup>rd</sup> day	Otto cycle.
		4 <sup>th</sup> day	Diesel cycle
<b>Sl No.</b>	<b>week</b>	<b>Day</b>	<b>Topics to be covered</b>
9	9 <sup>th</sup>	1 <sup>st</sup> day	Dual cycle
		2 <sup>nd</sup> day	Solve simple numerical.
		3 <sup>rd</sup> day	Solve simple numerical.
		4 <sup>th</sup> day	Solve simple numerical.
<b>Sl No.</b>	<b>week</b>	<b>Day</b>	<b>Topics to be covered</b>
10	10 <sup>th</sup>	1 <sup>st</sup> day	Fuels and Combustion
		2 <sup>nd</sup> day	Define Fuel
		3 <sup>rd</sup> day	Types of fuel.
		4 <sup>th</sup> day	Application of different types of fuel
<b>Sl No.</b>	<b>week</b>	<b>Day</b>	<b>Topics to be covered</b>
11	11 <sup>th</sup>	1 <sup>st</sup> day	Heating values of fuel.
		2 <sup>nd</sup> day	Quality of I.C engine fuels Octane number
		3 <sup>rd</sup> day	Quality of I.C engine fuels Octane number
		4 <sup>th</sup> day	Numerical problems on above
<b>Sl No.</b>	<b>week</b>	<b>Day</b>	<b>Topics to be covered</b>

12	12 <sup>th</sup>	1 <sup>st</sup> day	Numerical problems on above
		2 <sup>nd</sup> day	Numerical problems on above
		3 <sup>rd</sup> day	Numerical problems on above
		4 <sup>th</sup> day	
Sl No.	week	Day	Topics to be covered
13	13 <sup>th</sup>	1 <sup>st</sup> day	Numerical problems on above
		2 <sup>nd</sup> day	Numerical problems on above
		3 <sup>rd</sup> day	Numerical problems on above
		4 <sup>th</sup> day	Numerical problems on above
Sl No.	week	Day	Topics to be covered
14	14 <sup>th</sup>	1 <sup>st</sup> day	Numerical problems on above
		2 <sup>nd</sup> day	Numerical problems on above
		3 <sup>rd</sup> day	Numerical problems on above
		4 <sup>th</sup> day	Numerical problems on above
Sl No.	week	Day	Topics to be covered
15	15 <sup>th</sup>	1 <sup>st</sup> day	Numericals problem solving
		2 <sup>nd</sup> day	Numericals problem solving
		3 <sup>rd</sup> day	Doubt clearance and Revision
		4 <sup>th</sup> day	Doubt clearance and Revision

*Pr* 15.9.2022

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