

# ELEMENTS OF MECHANICAL ENGINEERING

[illegible]

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| <b>UNIT -II</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>STEAM TURBINES, HYDRAULIC MACHINES</b>                              | <b>Classes: 09</b> |
| Properties of steam: Steam formation, types of steam enthalpy, specific volume, internal volume, internal energy and dryness fraction of steam, use of steam tables, calorimeters; Heat engine: Heat engine cycle and heat engine, working substances, classification of heat engines, description and thermal efficiency of carnot, Rankine, otto cycle, diesel cycles; Steam boilers: Introduction, cochran, lancashire, babcock, and Wilcox boiler, functioning of different mountings and accessories.                                                                                                                  |                                                                        |                    |
| <b>UNIT -III</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>INTERNAL COMBSUTION ENGINES, REFRIGERATION AND AIR-CONDITIONING</b> | <b>Classes: 09</b> |
| Internal combustion engines: Introduction, classification, engine details, four stroke, two stroke cycle, petrol engine, diesel engine, indicated power, brake power, efficiencies; Pumps: Types, operation of reciprocating, rotary, centrifugal pumps, priming.<br>Air compressors: Types, operation of reciprocating, rotary air compressors, significance of multi-staging; Refrigeration and air-conditioning: Refrigerant, vapor compression refrigeration system, vapor absorption refrigeration system, domestic refrigerator, window and split air conditioners.                                                   |                                                                        |                    |
| <b>UNIT-IV</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>MACHINE TOOLS AND AUTOMATION</b>                                    | <b>Classes: 09</b> |
| Machine tools and automation machine tools operation: Turning, facing , knurling, thread cutting, taper turning by swiveling the compound rest, drilling, boring, reaming, tapping, counter sinking, counter boring, plane milling, end milling, slot milling; Robotic and automation: Introduction, classification based on robot configuration, polar, cylindrical, cartesian, coordinate and spherical, application, advantages and disadvantages; Automation: Definition, types, fixed, programmable and flexible automation, NC/CNC machines, basic elements with simple block diagrams, advantages and disadvantages. |                                                                        |                    |
| <b>UNIT-V</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>ENGINEERING MATERIALS, JOINING PROCESS</b>                          | <b>Classes: 09</b> |
| Engineering materials and joining processes: Types, applications of ferrous metals, non-ferrous metals, alloys; Composites: Introduction, definition, classification and application (Automobile and Air Craft).                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                        |                    |
| <b>Text Books:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                        |                    |
| 1. V. K. Manglik, “Elements of Mechanical Engineering”, Prentice Hall, 1st Edition, 2013.<br>2. Mikell P. Groover, “Automation, Production Systems and CIM”, Prentice Hall, 4th Edition, 2015.                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                        |                    |
| <b>Reference Books:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                        |                    |
| 1. S. Trymbaka Murthy, “A Text Book of Elements of Mechanical Engineering”, University Press, 4th Edition, 2006.<br>2. K. P. Roy, S. K. Hajra Choudary, Nirjhar Roy, “Element of Mechanical Engineering”, Media Promoters & Publishers, 7th Edition, 2012.<br>3. Pravin Kumar, “Basic Mechanical Engineering”, Pearson, 1st Edition, 2013.                                                                                                                                                                                                                                                                                  |                                                                        |                    |
| <b>Web References:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                        |                    |
| 1. <a href="http://www.nptel.ac.in/courses/112107144/">http://www.nptel.ac.in/courses/112107144/</a><br>2. <a href="http://www.nptel.ac.in/courses/112101098/download/lecture37.pdf">http://www.nptel.ac.in/courses/112101098/download/lecture37.pdf</a>                                                                                                                                                                                                                                                                                                                                                                    |                                                                        |                    |