

"PVC" NSSK GOVT POLYTECHNIC BILASPUR
PLANNED THEORY SYLLABUS COVERAGE

| Department: Mechanical Engg. | | | Subject: Thermal Engineering-I | | | |
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| Sem. & Branch: 3rd / Mech. Engg. | | | Duration: 3 Year | | | |
| Syllabus coverage | | Total periods:-56 | | | | |
| Sr. No | Period No | Topic | Details | Instruction Reference | Additional study | Remarks |
| 1 | 1-8 | Sources of Energy | Brief description of energy Sources: Classification of energy sources: Renewable, Non-Renewable; Solar Energy: Flat plate and concentrating collectors & its applications (Solar Water Heater, Photovoltaic Cell); Wind Energy; Tidal Energy; Ocean Thermal Energy; Geothermal Energy; Biogas, Biomass, Bio-diesel; Hydraulic Energy. | 1. Introduction to Renewable Energy-Vaughn Nelson, CRC Press 2. Thermal Engineering-R.S.Khurmi and J.K.Gupta, 18th Edition, S.Chand & Co,New Delhi | 1. Thermal Engineering- P.L. Ballaney, Khanna Publishers,2002 2. A Course in Thermal Engineering-S. Domkundwar & C.P.Kothandaraman,Dhanpat Rai 3. Thermal Engineering-R.K.Rajput, 8th Edition, Laxmi publications Pvt Ltd,NewDelhi | |
| 2 | 9-18 | Internal Combustion Engines | Assumptions made in air standard cycle analysis; Brief description along with derivation of efficiency of Carnot, Otto and Diesel cycles with P-V and T-S diagrams; Internal and external combustion engines; classification of I.C. engines; Function of each part and materials used for the component parts - Cylinder, crank case, crank pin, crank shaft, connectingrod, wrist pin, piston, cylinder heads, exhaust valve, inlet valve; Working of four-stroke and two-stroke petrol and diesel engines; Comparison of two stroke and four stroke engines; Comparison of C.I. and S.I. engines; Valve timing and port timing diagrams for four stroke and two stroke engines | | | |
| 3 | 19-30 | I.C. Engine Systems | Fuel system of Petrol engines; Principle of operation of simple carburetor; Fuel system of Diesel engines; Plunger type fuel injection pump, fuel feed pump and fuel injector (description with line diagram); Cooling system ; Air cooling, water cooling system with thermosiphon method of circulation and water cooling system with radiator and forced circulation (description with line diagram). Comparison of air cooling and water cooling system; Ignition systems-Battery coil ignition and magneto ignition (description and working). Comparison of two systems; Types of lubricating systems used in I.C. engines with line diagram; Objective of turbocharging and supercharging | | | |
| 4 | 31-40 | Performance of I.C. Engines | Brake power; Indicated power; Frictional power; Brake and Indicated mean effective pressures; Brake and Indicated thermal efficiencies; Mechanical efficiency; Relative efficiency; Performance test; Morse test; Heat balance sheet; Methods of determination of B.P., I.P. and F.P.; Simple numerical problems on performance of I.C. engines. | | | |
| 5 | 41-48 | Air Compressors | Functions of air compressor; Uses of compressed air;Types of air compressors; Single stage reciprocating air compressor - its construction and working (with line diagram); Multistage compressors-Advantages over single stage compressors; Description of Rotary compressors, Centrifugal compressor, axial flow type compressor and vane type compressors. | | | |

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| 6 | 49-56 | Refrigeration & Air-conditioning | Refrigeration; Refrigerant; COP; Air Refrigeration system: components, working & applications; Vapour Compression system: components, working & applications; Air-conditioning; Classification of Air-conditioning systems; Window Air Conditioner; Summer Air-Conditioning system, Winter Air-Conditioning system, Year-round Air Conditioning system, Central air conditioning system | | | |
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| Approved | Sign HOD/ IOC |
| 07/08/23. | <i>[Signature]</i> |