G P Kangra	Department: -MECHANICAL ENGG. Subject- SOM				
	Course -DIPLOMA		Duration -3 Years		
SYLLABUS COVERAGE	Total Periods-64		Theory -64		
Sr No	Period Nos	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
1	1-14	Stresses and Strains	1.1 Concept of load, stresses and strain 1.2 Tensile compressive and shear stresses and strains 1.3 Concept of Elasticity, Elastic limit and limit of proportionality. 1.3.1 Hook's Law 1.3.2 Young Modulus of elasticity 1.3.3 Nominal stress 1.3.4 Yield point, plastic stage 1.3.5 Strain hardening 1.3.6 Ultimate strength and breaking stress 1.3.7 Percentage elongation 1.3.8 Proof stress and working stress 1.3.9 Factor of safety 1.3.10 Shear modulus 1.3.11 Strain energy due to direct stresses 1.3.12 Proof resilience and modulus of resilience 1.3.13 Stresses due to gradual, sudden and falling load 1.4 Longitudinal and circumferential stresses in seamless thin walled cylindrical shells (derivation of these formulae not required).	Strength of Materials by RS Khurmi; S Chand . Strength of Materials by Sadhu Singh, Strength of Materials by Birinder Singh; Katson Publishing		
2	15-24	Moment of Inertia	2.1. Concept of moment of inertia and second moment of area 2.2. Radius of gyration 2.3. Second moment of area of common geometrical sections: Rectangle, Triangle, Circle (without derivation), Second moment of area for L, T and I section 2.4. Section modulus	---do-----		
3	25-37	Beams and Bending Stress	3.1. Bending and shearing force 3.1.1. Concept of beam, form of loading 3.1.2. Concept of end supports Roller, hinged and fixed 3.1.3. Concept of bending moment and shearing force 3.1.4. B.M. and S.F. Diagram for cantilever and simply supported beams with and without overhang subjected to concentrated and U.D.L. 3.2. Bending stresses 3.2.1 Concept of Bending stresses 3.2.2 Bending Equation	---do-----		

3.2.4 Use of the equation $f/y = M/I = E/R$
3.2.5 Concept of moment of resistance
3.2.6 Bending stress diagram
3.2.7 Calculation of maximum bending stress in beams of rectangular, circular, I and T section.
3.2.8 Permissible bending stress Section modulus for rectangular, circular and symmetrical I section.

4	38-47	Columns	4.1. Concept of column, modes of failure 4.2. Types of columns 4.3. Buckling load, crushing load 4.4. Slenderness ratio 4.5. Factors effecting strength of a column 4.6. End restraints 4.7. Effective length 4.8. Strength of column by Euler Formula 4.9. Rankine Gourdan formula 4.10 Combined direct and bending stresses 4.10.1 Simple cases of short columns of uniform section subjected to eccentric loading with stress diagram	---do-----
5	48-57	Torsion	5.1. Concept of torsion- difference between torque and torsion, Torsion equation. 5.2. Use of torque equation for circular shaft 5.3. Comparison between solid and hollow shaft with regard to their strength and weight. 5.4. Power transmitted by shaft 5.5. Concept of mean and maximum torque	---do-----
6	58-64	Springs	6.1. Closed coil helical springs subjected to axial load and impact load 6.2. Stress deformation 6.3. Stiffness and angle of twist and strain energy 6.4. Proof resilience 6.5. Laminated Spring (Semi elliptical type only) 6.5.1 Determination of number of plates 6.5.2 Maximum bending stress and deflection	---do-----

Approved
Date 08/01/2020   HOD Sign.
for Averus

PLANNED SYLLABUS COVERAGE (Theory)

Department: Mech. Engg. Subject:- THERMAL ENGINEERING-I

Course: Diploma .   **Duration: Three years.**

angra

SYLLABUS COVERAGE

Total Periods:64   **Theory: 64**

Sr No	Period No's	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
1	1-6	**1. Basic Concepts and Gas Laws**	1.1 Gas laws: Boyle's law, Charle's law, Avogadro's Law and Gay Lussacs Law 1.2 Characteristics equation, Gas constant, Universal gas constant. 1.3 Thermodynamics, property (system open and closed), surroundings, Heat and work, specific heats and their relationship,	Engineering Thermodynamics by P.K. Nag, Tata McGraw Hill, Delhi Basic Engineering Thermodynamic by Roy Choudhury; Tata McGraw Hill, Delhi.		
2	7-20	**2. Laws of Thermodynamics**	2.1 Explanation of the Zeroth law of thermodynamics. 2.2 Explanation of First Law of Thermodynamics. 2.3 Concept of enthalpy, internal energy, specific heat, work and heat. 2.4 Clausius and Kelvin Plank statements of second law of thermodynamics. 2.5 Concept of Entropy 2.6 Constant Volume, Constant pressure, Isothermal, adiabatic and polytrophic processes, Throttling and free Expansion, work done under these processes.			
3	21-30	**3. Formation of Steam and its Properties**	3.1 Steam Formation 3.2 Wet steam; dry steam and saturated steam; dryness fraction with simple numericals 3.3 Super-heated steam; degree of super heat. 3.4 Latent heat of vaporization 3.5 Enthalpy of steam 3.6 Entropy; entropy increase during evaporation. 3.7 Temperature Entropy diagram 3.8 Mollier Diagram (H-S diagram) with simple numerical			
		4. Steam				

4	31-38	**Generator**	4.1 Uses of steam 4.2 Classification of boilers 4.3 Boiler mounting and accessories 4.4 Comparison of fire tube and water tube boilers. 4.5 Constructional features of Nestler boiler, Babcock and Wilcox boiler. 4.6 Modern boilers-: Benson boiler, La-mont boiler		
5	49-48	**5. Nozzles and Steam Turbines**	5.1 Energy equation as applied to a nozzle 5.2 Description of various types of turbines 5.3 Methods of reducing rotor speed in impulse turbines 5.4 Governing of steam turbines		
6	49-56	**6. Non-Conventional Sources of Energy**	6.1 Need of non-conventional energy sources 6.2 Solar Energy 6.3 Sun and solar radiation 6.4 Solar constant 6.5 Solar collectors-flat plate collectors and focusing collectors 6.6 Solar heating-solar cooker, solar power generation and Solar cooling 6.7 Photo voltaic cells 6.8 Industrial and agricultural application of a solar energy 6.9 Economic consideration for use of solar energy. 6.10 Other Non-Conventional Energy Sources: 6.11 Wind Power 6.12 Geothermal energy	Engineering Thermodynamics by P.K. Nag, Tata McGraw Hill, Delhi Basic Engineering Thermodynamic by Roy Choudhury; Tata McGraw Hill, Delhi.	
7	57-64	**7. Elements of Heat Transfer**	7.1 Conduction 7.2 Convection 7.3 Radiation 7.4 Stefan Boltzman's law Simple problems of heat transfer on conduction and radiation only.		

Approved		HOD Sign.
Date	08/01/2020	*Jw cWeron*

PLANNED SYLLABUS COVERAGE (THEORY)

Department: MECHANICAL ENGG.   **Subject:** MANUFACTURING TECHNOLOGY–II

P

Kangra

Course : DIPLOMA   **Duration** THREE YEARS

SYLLABUS COVERAGE

Total Periods: 64   **Theory : 64**

Sr No	Period No.	Topic	Details	Instruction Reference	Additional Study Recommended	Remark
1	1-10	Gas Welding	Principle of operation Oxyacetylene flame Types of flame Welding Techniques Filler rods and fluxes for gas welding Gas welding equipment and accessories Acetylene gas generator	SK Choudhary and Hazra,	BS Raghuwanshi	
2	11-18	Electric arc Welding	Introduction to arc welding with procedures, equipment and applications. Types of arc Types of electrode used Specifications of electrodes			
3	19-22	Resistance Welding	Spot welding Seam welding Projection welding Percussion welding			
4	23-30	Jigs and Fixtures	Importance and use of Jigs and fixtures. Principles of Location Locating Devices Purpose of Clamping elements 35 Types of clamps Types of drilling jigs Types of milling and welding fixtures			
5	31-37	Metal Forming Processes	General Idea of following processes: Die stamping Drawing Spinning Rolling Extruding Forging Tube drawing Powder Metallurgy			

SYLLABUS COVERAGE		Total Periods----64---------- Theory ----64--------			
Sr No	Period No	Topic	Details	Instruction Reference	Additiona Study Recomme
6	38-45	**Grinding**	Purpose of grinding Types of grinding machines and their working- Cylindrical, surface, centre less, tool and cutter grinder, Jig Grinder. Various elements of grinding wheel - abrasive, grade, structure, bond. Codification of grinding wheel Selection of grinding wheel Dressing, truing, balancing and mounting of wheel. Wheel and work speeds and feeds. Defects and remedies in grinding.		
7	46-53	Metal Finishing Processes	Purpose of finishing surfaces Surface roughness- Definition and units. Honing Process: its applications Super finishing process; its applications. Use of super finishing attachment on Centre lathe Polishing Buffing		
8	54-64	Modern Machining Methods: - Principle, process details, advantages limitations and applications of the following processes	Electro discharge machining Wire Cut EDM Electric chemical machining Chemical machining Ultrasonic machining Laser Beam machining. Plasma arc machining Additive Manufacturing		

APPROVED	SIGN HOD
DATE 08/01/2020	for charao

Department: Mechanical Engg. Subject-TOM

Course-Diploma   Duration – 3 years

Total Periods- .64 Theory - 64

Period Nos	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
1- 9	Simple Mechanisms	1.1 Introduction to link, kinematic pair, lower and higher pair, Kinematic chain, mechanism, Inversions. 1.2 Different types of mechanisms(with examples) 1.3 Mechanical advantage of a linkage 1.4 Cams and followers : Terminology and classification	*Theory of Machines by R.S. Khurmi and J.K. Gupta, S. Chand and company Ltd.* *Theory of Machine by S.S. Rattan, Tata McGraw Hill*		
10 - 20	Friction	2.1 Frictional torque in screws, both for square and V threads 2.2 Screw jack (Simple numerical only) · 2.3 Frictional clutches (concept only) 2.4 Friction in journal bearing 2.5 Different types of bearings and their applications			
21 - 33	Power Transmission	3.1 Power transmission through screw and efficiency Flat belt and V belt drives :-(Ratio of tensions; Power transmitted, centrifugal tension, Condition for maximum power) 3.3 Chain drive, different			

			types of chains and their applications	
			Gear and its nomenclature, types of gears and their applications; simple and compound gear trains; power transmitted by simple and compound gear trains.	
			(with simple numerical)	*Theory of Machines by R.S. Khurmi and J.K. Gupta, S. Chand and company Ltd.*
4	34-42	Flywheel	4.1 Principle and applications of flywheel.	
			4.2 Turning moment diagram of flywheel for different engines	
			4.3 Fluctuation of speed and fluctuation of energy	*Theory of Machine by S.S. Rattan, Tata McGraw Hill*
			(with simple numerical)	
5	43-50	Governor	5.1 Principle of governor	
			5.2 Construction and working of Watt, Porter and Hartnel Governor.	
			(with simple numerical)	
6	51-58	Balancing	6.1 Concept of balancing 6.2 Introduction to balancing of rotating masses (with simple numerical) 6.3 Concept of gyroscope.	
	59-64	Vibrations	7.1 Vibrations, its type and damping, causes of vibrations in machines, their harmful effects and remedies	

Department: -MECHANICAL ENGG.   Subject- H&P

Course -DIPLOMA			Duration -3 Years		
Total Periods-64			Theory -64		
Period Nos	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
1-9	Introduction	Fluid, types of fluid; properties of fluid viz mass density, weight density (specific weight), specific volume, capillarity, specific gravity, viscosity, compressibility, surface tension, kinematic viscosity and dynamic viscosity and their units.	Fluid Mechanics by R.K BANSAL & Hydraulics & Pneumatics by Harpreet Singh		
2 10-18	Pressure and its Measurement	Concept of pressure (Atmospheric Pressure, gauge pressure, absolute pressure) Pressure measuring devices: piezometer tube manometers - simple U-tube, differential single column, inverted U-tube, micro manometer including simple problems. Bourdon pressure gauge, Diaphragm pressure gauge, dead weight pressure gauge , Concept of static pressure, Dalton's Law of partial pressure, Pascal's law, intensity of pressure and pressure head, Total pressure on a plane surface and centre of pressure..			
3 19-27	Flow of Fluids	Types of fluid flow – steady and unsteady, uniform and non-uniform, laminar and turbulent; rate of flow and their units; continuity equation of flow; potential energy of a flowing fluid; total head; Bernoulli's theorem (statement and proof) and its applications. Discharge measurement with the help of venturi-meter, orifice meter, pitot-tube, limitations of Bernoulli's theorem, simple problems on measurement of flow.	---do-----		
4 28-36	Flow through Pipes	Definition of pipe flow, wetted perimeter, hydraulic mean depth, hydraulic gradient; loss of head due to friction; Chezy's equation and Darcy's equation of head loss (without proof), Reynolds's number and its effect on pipe friction. Loss of head in pipes due to sudden enlargement, sudden contraction, obstruction on flow path, change of direction and pipe fittings (without proof) including simple problems.	---do-----		
5 37-43	Hydraulic Machines	Description, operation and application of hydraulic machines – hydraulic ram, hydraulic jack, hydraulic brake,	---do-----		

			hydraulic accumulator, hydraulic door closer, hydraulic press, selection of specification of above machines for different applications.	
6	44-52	Hydro-Power, Water Turbines and Pumps	Advantages of hydropower, basic elements, dams, head works. Concept of a turbine, types of turbines –impulse and reaction type (concept only), difference between them. Construction and working of pelton wheel, Francis turbine, Propeller and Kaplan turbines. Unit speed, unit power, unit discharge, specific speed of turbines, selection of turbines based on specific speed, Concept of hydraulic pump, single acting reciprocating pump (construction and operation only), vane, screw and gear pumps. Construction, working and operation of centrifugal pump. Performance, efficiencies and specifications of a centrifugal pump. Trouble shooting and problems in centrifugal pumps and remedial measures, pitting, cavitation, priming.	---do-----
7	53-58	Hydraulic Systems	Basic components of hydraulic system, their symbols and function of each component in a hydraulic circuit. Industrial application of Hydraulic systems	---do-----
8	59-64	Pneumatic Systems	Basic components – function of each component ,Air cylinder – types, function, single acting, double acting, rotating, non-rotating, piston type, diaphragm type, tandem cylinder, double ended cylinder, duplex cylinder with symbols Industrial application of Pneumatic systems	---do-----

Approved		HOD Sign.
Date	08/01/2020	_(signature)_