G P Kangra	Department: -MECHANICAL ENGG. Subject- AUTOMOBILE ENGG.					
SYLLABUS COVERAGE	Course -DIPLOMA			Duration -3 Years		
	Total Periods-64			Theory -64		
Sr No	Period Nos	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
1	1-6	Introduction	Components of an automobile, Classification of automobiles, Layout of chassis ,Types of drives- front wheel, rear wheel, four wheel, left hand, right hand ,Introduction to electric vehicle.	Automobile Engineering by R.K Rajput,		
2	7-22	Transmission System	Clutch Function, Constructional details of single plate and multi plate friction clutches, Centrifugal and semi centrifugal clutch, Gear Box: Function, Working of slide mesh, constant mesh and synchro mesh gear box, Torque converter and overdrive, Propeller shaft and rear axle Function, Universal joint, Differential, Rear axle drives and different types of rear axles, Wheels and Tyres - Types of wheels- disc wheels and wire wheel, Types of tyres used in Indian vehicles, Causes of tyre wear, Toe in, Toe out, Camber, Caster, Kingpin inclination, Tube less tyres.	Automobile Engineering by Kripal Singh		
3	23-29	Steering System	Function and principle ,Ackerman and Davis steering gears, Types of steering gears- worm and nut, worm and wheel, Rack and pinion type, Introduction to power steering.	---do-----		
4	30-37	Braking System	Constructional detail and working of mechanical, hydraulic and vacuum brake, Concept of brake adjustment & Bleeding of brakes, Introduction to ABS, EBD and hill assist braking system, Introduction to Traction control.	---do-----		
5	38-41	Suspension System	Function, Types, Working of coil spring, leaf spring ,Shock absorber.	---do-----		

6	42-49	**Battery**	Constructional details of lead and cell battery, Specific gravity of electrolyte, Effect of temperatures, charging and discharging on specific gravity, Capacity and efficiency of battery, Battery charging, Maintenance of batteries, Checking of batteries for Voltage and specific gravity.	---do-----		
7.	50-56	**Dynamo and Alternator**	Dynamo, Function and details, Regulators-voltage, current and compensated type, Cut out-Construction, working and their adjustment, Alternator, Construction and working, Charging of battery from alternator.	---do-----		
8	57-59	**Introduction to special purpose vehicles**	Tractors, Forklift, Cranes & Recovery vehicles	---do-----		
9	60-64	**Lighting System and Accessories**	Introduction to Lighting system of automobile, Windscreen Wiper, Horn, Speedometer, HVAC system	---do-----		

Approved	HOD Sign. Aswathy
Date	08/03/2021

PLANNED SYLLABUS COVERAGE (Theory)

G P Kangra	Department: Mech. Engg. Subject:- PRODUCTION PLANNING AND CONTROL					
	Course: Diploma . Duration: Three years.					
SYLLABUS COVERAGE	Total Periods:64 Theory: 64					
Sr No	Period No's	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
1	1-5	Production Planning and Control	1.1 Types of production. - Job, batch and mass production. 1.2 Concept of planning, scheduling, routing, dispatching and follow up. 1.3 Break even analysis and Gantt chart.	*Industrial Engineering and Management by O.P. Khanna; DhanpatRai and Sons, New Delhi* *Industrial Engineering and Management by T.R. Banga and SC Sharma; Khanna Publishers, Delhi.*		
2	6-14	Plant Location and Layout	2.1 Definition 2.2 Factors affecting the site selection of plant. 2.3 Factors affecting plant layout. 2.4 Types of layout - Process, product, combination and fixed position, layout patterns 2.5 Techniques of making layout - Flow diagram, templates, distance volume matrix, travel chart.			
3	15-25	Work Study	3.1 Definition, advantages and procedure of Work study. 3.2 Difference between production and Productivity, measures to Improve productivity. 3.3 Method study - Definition, Objectives and Procedure. 3.4 Symbols, Flow process chart, Flow diagram, Machine chart, Two hand chart. 3.5 Principles of motion economy, Therblig symbols, Simo chart. 3.6 Work Measurement - Time study, definition, principle and method of time study.			

			3.7 Stop watch study - Number of readings, calculation of basic time, rating techniques, normal time, allowance, standard time, simple numerical problems.			
4	26-33	**Inventory Control**	4.1 Material purchasing, store keeping, functions and duties of store department. 4.2 Definition of inventory, Types of inventory 4.3 ABC analysis 4.4 Procurement cost, carrying charges, lead-time, reorder point, Economic ordering quantity, simple numerical problems 4.5 Codification and standardization. 4.6 Concept of JIT	*Industrial Engineering and Management by O.P. Khanna, DhanpatRai and Sons, New Delhi* *Industrial Engineering and Management by T.R. Banga and SC Sharma; Khanna Publishers, Delhi.*		
5	34-40	**Inspection and Quality Control**	5.1 Inspection needs, types of inspection, stages of inspection. 5.2 Statistical quality control. 5.3 Process capability. 5.4 Control charts for variables - X and R chart, control chart for fraction defectives (P chart), control chart for number of defects (C chart). 5.5 Concept of ISO 9000, ISO 14000 and TQM. 5.6 QC tools.			
6	41-48	**Material Handling**	6.1 Principles of material handling 6.2 Hoisting equipment - Fork lift truck, cranes 6.3 Conveying equipment - Package conveyor, gravity roller conveyors, screw conveyors, flight or scraper conveyors, bucket conveyors, bucket elevators, belt conveyors, and pneumatic conveyors. 6.4 Work station design			

7	49-58	**Repair and maintenance**	7.1 Objectives and importance of maintenance 7.2 Different types of maintenance 7.3 Nature of maintenance problem 7.4 Range of maintenance activities 7.5 Procedure of preventive maintenance 7.6 Schedules of preventive maintenance 7.7 Advantages of preventive maintenance	*Industrial Engineering and Management by O.P. Khanna; DhanpatRai and Sons, New Delhi Industrial Engineering and Management by T.R. Banga and SC Sharma; Khanna Publishers, Delhi.*		
8	59-64	**Cost estimation and control**	8.1 Functions of cost estimation 8.2 Estimation procedure 8.3 Elements of cost, ladder of costs 8.4 Depreciation-concept and methods of calculating depreciation 8.5 Overhead expanses 8.6 Cost control-capital cost control (planning and scheduling) operatingcost control.			

Approved	HOD Sign.
Date 08/03/2021	

G P Kangra	Department: -MECHANICAL ENGG. Subject- Refrigeration and Air Conditioning				
	Course -DIPLOMA		Duration -3 Years		
SYLLABUS COVERAGE	Total Periods-52		Theory -52		

Sr No	Period Nos	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
1	1- 6	Principles of Refrigeration	Meaning, Refrigeration Methods Units of Refrigeration, Reversed Carnet cycle, Heat pump, Coefficient of Performance ,Rating of refrigeration machines	Refrigeration & air conditioning by Domkundwar, Dhanpat Rai & Sons,		
2	7 - 14	Refrigeration Systems	Air refrigeration cycle- applications and its limitations, Vapour Compression Cycle, Effect of sub cooling and super heating, Departure of Actual vapour compression cycle from theoretical cycle, Effect of varying condensing and suction temperature on coefficient of performance. Simple mathematical calculation with pressure-enthalpy charts. Vapour Absorption cycle Actual vapour absorption cycle and application.	---do---		
3	15-18	Refrigerants	Important properties of a refrigerant Properties and applications of commonly used refrigerants such as R11, R12, R22, NH3 and Water. Newer Refrigerants.	----do---		
4	19-26	Refrigeration System, Components and Controls	Function, types, specification and constructional details of components such as compressor, condenser, throttling device, evaporator, oil separator, accumulator, header. Various controls- Solenoid Valve, thermostat, low pressure/high pressure cut out, oil safety switch.	----do---		
5	26- 34	Psychometry	Various terms-Dry and wet bulb temperatures, Saturation, Dew point, adiabatic saturation, temperature, Relative humidity, absolute humidity, humidity ratio. Psychometric chart and its uses. Psychometric processes- Sensible heating and sensible cooling, humidification and dehumidification, cooling and dehumidification, heating	----do---		

			and humidification, and their representation on psychometric chart. Simple Problems.			
6	35- 40	**Air-conditioning**	Introduction, Metabolism in human body. Human comfort Applications of air-conditioning.	----do---		
7	41- 45	**Heat Loads**	Various types of loads Sensible and latent heat load, Load calculations.	----do---		
8	46- 50	**Air-conditioning System**	Description of room air conditioner Central air-conditioning system Round the year air conditioning system; Air distribution systems: concept of filter, damper, fan, blower, air register and diffuser.	----do---		
9	51- 52	**Miscellaneous Topics**	Evaporative cooling - Principle, Desert air cooler.	----do---		

Approved	HOD Sign.
Date 02/03/2021	

Govt. Polytechnic Kangra (H.P.)
Lecture Planning (Theory)

Branch: Mechanical Engineering
Subject: Computer Numerical Control Machine and Automation
Teacher: Arvind Katoch

Semester: SIXTH
Session: Jan-may-2020

Sr. No.	No. of Lectures	Chapter/ Unit Description	Detail of Contents	Reference Resources	Remarks
1	7	Introduction to CNC machines and automation	Basic concepts of NC, CNC & DNC, advantages &disadvantage of CNC Machines, (Emendation of demanded Topics)	R1 ,R2,R3	Pedagogical Tools:- Black board ; PPT
			Application of CNC Machines,difference between conventional & CNC Machines, Profitable applications of CNC Machines. Introduction to CAM.(Emendation of demanded Topics)	R1 ,R2,R3	Pedagogical Tools:- Black board ; PPT
2	13	Construction of CNC machines	Application of CNC Machines,difference between conventional & CNC Machines,Profitable applications of CNC Machines. Introduction to CAM.Machine control unit, NC control, (Emendation of demanded Topics)	R1 ,R2,R3	Pedagogical Tools:- Black board ; PPT
			PLC Contro and its advantages & disadvantages, Application and limitations of PLC machines, Axis designate of CNC machines, (Emendation of demanded Topics)	R1 ,R2,R3	Pedagogical Tools:- Black board ; PPT
			special constructional requirement of CNC machines, slide ways,bolt screw & nut assembly, Lubrication & cooling of CNC machines, (Emendation of demanded Topics)	R1 ,R2,R3	Pedagogical Tools:- Black board ; PPT
			Spindle & spindle motors, axis drives motor,Swarf removal & safety provision of CNC machines, (Emendation of demanded Topics)	R1 ,R2,R3	Pedagogical Tools:- Black board ; PPT
			Feedback mechanism in CNC machines,Swarf removal & safety provision of CNC machines, Feedback mechanism in CNC machines. (Emendation of demanded Topics)	R1 ,R2,R3	Pedagogical Tools:- Black board ; PPT
3	7	Tooling of CNC machines	Introduction, various cutting tools for CNC machines, Work holdingdevices, automatic tool changer (Emendation of demanded Topics)	R1 ,R2,R3	Pedagogical Tools:- Black board ; PPT
4	9	Control System	Open & close loop control system, fundamental problem in control: Accuracy,resolution, repeatability, instability, response & damping, type of position control: • Point to point ,Straight line , continuous.	R1 ,R2,R3	Pedagogical Tools:- Black board ; PPT
5	9	PART Programming	Part programming and basic concepts of part programming,NC words, (Emendation of demanded Topics)	R1 ,R2,R3	Pedagogical Tools:- Black board ; PPT
			part programming formats,(Emendation of demanded Topics)simple programming for rational components, part programming using conned cycles,	R1 ,R2,R3	Pedagogical Tools:- Black board ; PPT
			subroutines and do loops, tool off secutter radius compensation and wear compensation. (Emendation of demanded Topics)	R1 ,R2,R3	Pedagogical Tools:- Black board ; PPT

6	4	Common problems in CNC machines	Common problems in mechanical, electrical, pneumatic, electronic and PC components of NC machines. (Emendation of demanded Topics)	R1 ,R2,R3	Pedagogical Tools:- Black board ; PPT
			diagnostic study of common problems and remedies, use of on-time fault finding diagnosis tools in CNC machines.(Emendation of demanded Topics)	R1 ,R2,R3	Pedagogical Tools:- Black board ; PPT
7	5	Industrial Automation	Meaning of automation, need of automation, different types of automation, (Emendation of demanded Topics)	R1 ,R2,R3	Pedagogical Tools:- Black board ; PPT
			Advantages/disadvantages of automation, (Emendation of demanded Topics)	R1 ,R2,R3	Pedagogical Tools:- Black board ; PPT
			Components of automated system, concept of FMS. (Emendation of demanded Topics)	R1 ,R2,R3	Pedagogical Tools:- Black board ; PPT

Recommaded Books:

1. *CNC Machines - Programming and Applications by M Adithan and BS Pabla; New Age International (P) Ltd., Delhi*
2. *Computer Aided Manufacturing by Rao, Kundra and Tiwari, Tata Mc GrawHill,New Delhi.*
3. *CNC Machine by Bharaj; Satya Publications, New Delhi.*

Subject Teacher

H.O.D (Mech.)