

Name of the Course : DIPLOMA IN MECHANICAL ENGINEERING (PRODUCTION)		
Subject: PRODUCTION MANAGEMENT (Same with Mechanical engg).		
Course code: MEP	Semester : Sixth	
Duration : 17 week	Maximum Marks : 100	
Teaching Scheme	Examination Scheme	
Theory : 3 hrs/week	Semester Exam: 70 Marks	
Tutorial: hrs/week	Teacher's Assessment (Assignment & Quiz): 10 Marks	
Practical : hrs/week	Internal Assessment: 20 Marks	
Credit: 3		
Aim :-		
	To study the techniques for improvement in productivity of the people and equipment. to plan the production schedule accordingly organize material supply for the manufacturing activities. To minimize the direct and indirect cost by optimizing the use of resources available. To learn accounting process, inventory control and process planning. Modern manufacturing system employ techniques such as JIT, TPM , FMS, 5'S', kaizen which should be known to the technician.	
Objective :-		
S No	The student will able to	
1	Understand importance of productivity and factors for improvement of productivity.	
2	Know different production systems and modern trends in manufacturing systems.	
3	Find the break even point for manufacturing a product.	
4	Prepare / modify layout of production system.	
5	Select suitable material handling devices and plant facilities.	
	Prepare process plan and specify toolings for it.	
	Prepare process chart for analysis of existing process.	
	Use pert & cpm techniques for scheduling and controlling the manufacturing activities.	
	Apply techniques of method study and work measurement for improvement of existing manufacturing methods.	
	Find the economic order quantity (eoq) for given situation.	
Pre-Requisite:-Nil		
	Contents	Hrs/week
Chapter	<i>Name of the Topic</i>	Hours
GROUP:A		
01	Production System Production - Definition , Types of production systems Productivity - Importance , Measurement of Productivity , Techniques of improving productivity Elements of cost- Fixed cost, Variable Cost. Break even analysis, Calculation of Break even point.	05
02	Plant location, Plant layout and Material Handling Plant Location - Importance of Site Selection, Factors affecting Site Selection, Government Policies, and relaxation for Backward Areas. Plant Layout - Objectives, types, design principles, characteristics of Plant Layout, Symptoms of Bad Plant Layout. Group technology , Cellular layout, Material handling – Need, Principles and Types of material handling	05

	devices – conveyors , Hoist & cranes , forklift truck, trolleys, Pipes, Automated Guided Vehicles (AGV's) Selection of Material Handling systems and Devices.	
GROUP:B		
03	Process Planning Planning of Processes from raw material to finished product, Factors affecting Process Planning, Deciding sequence of operations, Operation Sheet, Combined operations, Determination of Inspection Stages. Selection of Machine Techniques of assembly planning, Types of assembly. Plant Capacity, Machine Capacity, Plant Efficiency. Numerical not to be asked,	05
04	Production Planning and Control Routing, Sequencing [n job 2 machines], Scheduling, Dispatching, Meaning of Control, Progressive Control, Gantt chart. Concept of Line balancing,	03
GROUP:C		
05	Work Study Method Study- Objectives, Procedure, Selection of work. Recording Techniques - Process Charts – Outline process chart, Flow process chart, Two Hand process chart, Multiple activity chart, Flow diagram, String diagram, Travel chart. Micro motion study- Critical Examination, Principles of Motion Economy. Concept of ergonomics and workplace layout. Work Measurement - Objectives, procedure , Time Study, Time Study Equipments. Stop Watch Time Study, Standard Time, Work Sampling, Analytical Estimating, Predetermined Motion Time Study, Allowances, Calculation of Standard Time, Concept of Merit Rating.	08
06	Maintenance of machine Tools: Types of maintenance, repair cycle analysis, repair complexity, maintenance manual, maintenance records, housekeeping, Introduction to total production maintenance(TPM).	04
07	Quality Control: A) Quality: Definitions, meaning of quality of product and services, quality characteristics, quality of design, quality of conformance, quality of performance, concept of reliability, cost, quantity assurance, cost of rework and repair, quality and inspection, inspection stage. B) Total Quality Management(TQM): 1. Principles of total quantity management.	09

	<p>i) customer focus. ii) Commitment by top management. iii) Continuous improvement-PDCA, Quality Circles. iv) Employee empowerment(JIDOKA). -Quality Audit: Concept of audit practices, lead assessor certification. -Six sigma: Statistical meaning, methodology of system improvement, DMAIC cycle, yellow belt, green belt, black belt certification. C) ISO 9000 Series & other standards: Concept, ISO 9000 series quality standards, Qs 14000, Standards certification, other Quality systems.</p>	
08	<p>Modern Trends Just In Time manufacturing – Pull and push types of manufacturing systems, Waste reduction, 5’S’, inventory reduction, single piece production systems. Concept of continuous improvement (Kaizen) – DMIAC cycle, Brain storming. Poka Yoke. Concept of Rapid Prototyping Concept of Flexible manufacturing system</p>	06
	Total	45

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Kanishka Bedi	Production & Operations Management		Oxford University Press
L.C. Jhamb	Industrial Management		Everest
James C. Rigs	Production System, Planning, Analysis & Control		N.Y.Wiley & Sons
O.P. Khanna	Industrial Engineering and Management		Dhanpat Rai & Sons
ILO	Work Study		ILO Geneva
P. H. Joshi	Jigs & Fixtures		
P.C. Sharma	Production Engineering		
Kempster	Introduction to Jigs and Fixtures Design		
Baffna , Sarin	Modern Production and Operations Management		
Terry Wireman	Total productive maintenance		Industrial press inc.
Taiichi ohno	Toyota production system		Productivity Press

Reference books :- Nil

Suggested List of Assignments/Tutorial :-

- 1. Making a conceptual layout of an Engg. Industry conforming ISO 9000 series.**
- 2. Preparation of EOQ model.**
- 3. Preparation of a flow process and operation process chart.**
- 4. Preparation of a chart of Total Quality Management.**

End Semester Examination Scheme. Maximum Marks-70, Time Allotted-3 hrs

Group	unit	Objective Questions		Subjective Questions			
		No. of questions to be set	Total marks	No. of questions to be set	To answer	Marks per question	Total marks
A	01,02	4		2	5, taking at least one from each group	10	50
B	03,04	6	20	4			
C	05,06,07	10		4			

Suggested List of Laboratory Experiments :- Nil

Name of the Course : Diploma in Mechanical Engineering (Production)		
Subject Title: DESIGN OF MACHINE ELEMENTS (Same with Mechanical engg).		
Course code: MEP	Semester : Sixth	
Duration : 17 weeks	Maximum Marks : 150	
Teaching Scheme:	Examination Scheme:	
Theory : 4 hrs/week	Internal Assessment: 20 Marks	
Tutorial: hrs/week	Teacher's assessment (Assignment & Quiz): 10 Marks	
Practical : 2 hrs/week	End Semester Exam: 70 Marks	
Credit: 5	Practical: Internal Sessional continuous evaluation: 25 Marks	
	Practical: External Sessional Examination: 25 Marks	
Aim :-		
S.No		
1	To enable the student to design and draw simple machine components used in small and medium scale industries. Fundamental knowledge of Applied Mechanics, Strength of Materials, Engineering Materials and Theory of Machines is essential. To develop analytical abilities to give solutions to engineering design problems.	
Objective :-		
S No	The student will able to	
1	Analyze the various modes of failure of machine components under different load patterns.	
2	Design and prepare part and assembly drawings.	
3	Use design data books and different codes of design.	
4	Select standard components with their specifications from manufacturer's catalogue.	
5	Develop drawings on CAD software	
Pre-Requisite:-NIL		
Contents		Hrs/week
Chapter	<i>Name of the Topic</i>	Hours
GROUP:A		
01	Introduction to Design 1.1 Machine Design philosophy and Procedures 1.2 General Considerations in Machine Design 1.3 Fundamentals:- Types of loads, concepts of stress, Strain, Stress – Strain Diagram for Ductile and Brittle Materials, Types of Stresses such as Tension, Compression, Shear, Bearing pressure Intensity, Crushing, bending and torsion, Principle Stresses (Simple Numerical) 1.4 Creep strain and Creep Curve 1.5 Fatigue, S-N curve, Endurance Limit. 1.6 Factor of Safety and Factors governing selection of factor of Safety. 1.7 Stress Concentration – Causes & Remedies 1.8 Converting actual load or torque into design load or torque using design factors like velocity factor, factor of safety & service factor. 1.9 Properties of Engineering materials, Designation of materials as per IS and introduction to International standards & advantages of standardization, use of design data book, use of standards in design	10

	<p>and preferred numbers series. standardization, use of design data book, use of standards in design and preferred numbers series.</p> <p>Theories of Elastic Failures – Principal normal stress theory, Maximum shear stress theory & maximum distortion energy theory.</p> <p>Theories of Elastic Failures – Principal normal stress theory, Maximum shear stress theory & maximum distortion energy theory.</p>	
02	<p><i>Design of simple machine parts</i></p> <p>2.1 Cotter Joint, Knuckle Joint, 2.2 Design of Levers:- Hand/Foot Lever & Bell Crank Lever.</p>	08
GROUP:B		
03	<p><i>Design of Shafts, Keys and Couplings ,Spur Gears and Pulley.</i></p> <p>3.1 Types of Shafts, Shaft materials, Standard Sizes, Design of Shafts (Hollow and Solid) using strength and rigidity criteria, ASME code of design for line shafts supported between bearings with one or two pulleys in between or one overhung pulley</p> <p>3.2 Design of Sunk Keys, Effect of Keyways on strength of shaft.</p> <p>3.3 Design of Couplings – Protected type Flange Coupling,</p> <p>3.4 Spur gear design considerations. Lewis equation for static beam strength of spur gear teeth. Power transmission capacity of spur gears in bending.</p> <p>3.5 Design of C.I. Pulley.</p>	14
04	<p><i>Design of Fasteners</i></p> <p>4.1 Stresses in Screwed fasteners, bolts of Uniform Strength.</p> <p>4.2 Design of Bolted Joints subjected to eccentric loading.</p> <p>4.3 Design of parallel and transverse fillet welds, axially loaded symmetrical section, Merits and demerits of screwed and welded joints</p>	08
GROUP:C		
05	<p><i>Antifriction Bearings</i></p> <p>5.1 Classification of Bearings – Sliding contact & rolling contact.</p> <p>5.2 Terminology of Ball bearings – life load relationship, basic static load rating and basic dynamic load rating, limiting speed. Selection of ball bearings using manufacturer’s catalogue.</p>	08
06	<p><i>Ergonomics & Aesthetic consideration in design</i></p> <p>6.1 Ergonomics of Design – Man –Machine relationship. Design of Equipment for control, environment & safety.</p> <p>6.2 Aesthetic considerations regarding shape, size, color & surface finish.</p>	04
07	<p><i>Estimating & Costing</i></p> <p>7.1 Definition of estimating and costing, elements of costing, overhead</p> <p>7.2 Determination of weight of various parts such as simple bush, flanged pipe, Lathe centre, Rivets, Bolts & Nuts, Simple spanner, Simple crank & connecting Rod.</p> <p>7.3 Estimation of selling price of cast part such as C.I.pulley, Coupling, Wooden pattern of flange.</p>	08

	7.4 Estimation of fabricated job such as Simple chimney, Funnel, Cylindrical tank	
	Total	60

Assignments:

Skills to be developed:

Intellectual skills:

1. Understand the basic philosophy and fundamentals of Machine Design.
2. Apply and use the basic knowledge of earlier subjects like mechanical Engineering. materials, strength of materials and theory of machines.
3. Analyse and evaluate the loads, forces, stresses involved in components and subassemblies and decide the dimensions.
4. Understand the modes of failures of m/c components and decide the design criteria and equations.
5. Understand the concept of standardization and selecting standard components.
6. Understand the methods of computer aided design practices.

Motor skills:

1. Draw the components assembly as per the designed dimensions.
2. Modify drawings and design as per requirement.
3. Use the different design software.
4. Use different design data books and IS codes.

1. IS/ International Codes

- a) IS 4218: 1967 ISO Metric Threads
- b) IS 2693: 1964 Cast Iron Flexible Couplings
- c) IS 2292: 1963 Taper keys & Keyways
- d) IS 2293: 1963 Gib Head Keys & Keyways
- e) IS 2389: 1963 Bolts, Screws, Nuts & Lock Nuts
- f) IS 4694: 1968 Square threads
- g) IS 808: 1967 Structural Steel
- h) SKF Catalogue for Bearings

2. SOFTWARE

- 1) Think 3 CAD Software developed by acebrain.
- 2) E-Yantra Software, developed by FEAST.

Suggested List of Laboratory Experiments : - Nil

Suggested List of Assignments/Tutorial :

S.No List of Assignments:

- 1 Assignment on selection of materials for given applications [at least five applications should be covered] using design data book. List the mechanical properties of material selected.
- 2 Problems on design of simple machine parts like Cotter Joint, Knuckle Joint, Bell Crank Lever, C.I. Pulley (One example on each component) with free hand sketches.
- 3 Design Project No. 1 Observe the system where transmission of power takes place through shaft, Keys, coupling, pulley and belt drive. Get the required information regarding power transmitted (power output by motor or engine etc.). By selecting suitable materials, design the shaft, key and coupling. Also select suitable Ball Bearing from Manufacture's catalogue. Prepare design report and assembly drawing indicating overall dimensions, tolerances, and surface finish. Also prepare bill of materials.(Activity should be completed in a group of five to six students)
- 4 Design Project No. 2 Observe the System where transmission of power takes place through power Screws. (e.g. Lead screw of lathe, feed screws of machine tools, Clamping screws, Toggle Jack screw, etc.) Get the required information regarding effort, clamping force, etc., and selecting suitable materials design screw, nut and different simple components in assembly. Prepare design report and assembly drawing indicating overall dimensions, tolerances and surface finish. Also prepare bill of materials. (Activity should be completed in a group of five to six students)
- 5 Assignments on overhead cost calculation, selling price calculation,

6. Assignments on weight and cost calculation of different parts.

6 CAD Drawing for project No 1 or 2 should be prepared in practical and print out should be attached along with respective drawing sheets

7 Survey of Prime movers – Electric motors / I.C. Engines available in the market along with specifications suitable for your design project. Survey report should be prepared with the relevant catalogue.

End Semester Examination Scheme. Maximum Marks-70, Time Allotted-3 hrs							
Group	unit	Objective Questions		Subjective Questions			
		No. of questions to be set	Total marks	No. of questions to be set	To answer	Marks per question	Total marks
A	01,02,03	10		4	5, taking at least one from each group	10	50
B	04,05	9	25	3			
C	06,07	6		3			

List of Books:

Author	Title	Publication
V.B.Bhandari	Introduction to Machine Design	Tata Mc- Graw Hill
R.K.Jain	Machine Design	Khanna Publication
Pandya & Shah	Machine design	Dhanpat Rai & Son
Joseph Edward Shigley	Mechanical Engg. Design	Mc- Graw Hill
PSG Coimbtore	Design Data Book	PSG Coimbtore Mechanics
Abdulla Shariff	Hand Book of Properties of Engineering Materials & Design Data for Machine Elements	Dhanpat Rai & Sons
Hall, Holowenko, Laughlin	Theory and Problems of Machine Design	Mc- Graw Hill

Reference books :

Author	Title	Publication
Robert L.Mott,Jong Tang	Machine Elements in Mechanical Design	Pearson
Jack A. Collins, Henry R. Busby	Mechanical Design of Machine Elements and Machines	Willey Publications

EXAMINATION SCHEME FOR PRACTICAL SESSIONAL

Internal Examination: Examiner- Lecturer in Mechanical Engg.			
Submission of Five No. of Assignments in due time.	5 x 3 = 15		
VIVA VOCE	10		
TOTAL	25		
External Examination: Examiner- Lecturer in Mechanical Engg.			
Submission of Signed Note Book	5 x 2 = 10		
VIVA VOCE	15		
TOTAL	25		

MATERIAL HANDLING(ELECTIVE-II)

Name of the course: Mechanical Engineering(Production)				
Subject: MATERIAL HANDLING.(ELECTIVE-II).				
Course Code:ME(P)		Semester:Sixth.		
Duration:17 weeks		Maximum Marks: 100.		
Teaching Scheme		Examination Scheme		
Theory:3 hrs/week		End Semester Exam:35.		
Tutorial:hrs/week		Teacher's Assesment(Assignment & Quiz):5 Marks		
Practical:2hrs/week		Internal Assesment:10 Marks		
Credit:4		Practical Sessional internal continuous evaluation:25		
		Practical Sessional external examination:25		
Aim:-				
Sl. No.				
1.	To study the mechanism of E.O.T. crane.			
2.	To understand the Belt conveyor& screw conveyor.			
3.	To study Vibratory conveyor.			
4.	To study Bucket elevator.			
5.	To study Pneumatic & Hydraulic conveyor.			
6.	To study the mechanism of Automated Guided Vehicles.			
Objective:-				
Sl. No.	The students should be able to:			
1.	Know the mechanism of E.O.T. crane.			
2.	Know the Belt & screw conveyor.			
3.	Understand the bucket elevator.			
4.	Understand the Pneumatic & Hydraulic conveyor.			
5.	Understand the principle of AGV.			
Pre-Requisite: Elementary knowledge of Machining & Machine Tools & Manufacturing process.				
Contents			Hrs./week	
Chapter	Name of the Topic		Hours	Marks
GROUP-A				
1	1.0	TRODUCTION:-		
	1.1	portant Types of material handling Material – Unit Load & Bulk Load.	02	
2	2.0	ELECTRIC OVERHEAD TRAVELLING CRANE	06	
	2.1	asic conception pplication sential parts of E O T crane. ecification of E O T Crane. Design Parameters.		
3	3.0	BELT CONVEYOR	07	
	3.1	Essential Components orking Principle esignation, belt splicing ers – Types of idlers & Idler spacing ive Arrangement eed reduction mechanism ke up arrangement lt tension diagram		

		Maximum belt tension Power required for drive unit Capacity of belt conveyor.(No numerical)		
		GROUP-B		
4	4.0	SCREW CONVEYOR:-	04	
	4.1	Essential components Principle of operation Application Advantages & Disadvantages		
5	5.0	VIBRATORY CONVEYOR:-	06	
	5.1	Working principle Advantages Disadvantages Application Classification.		
6	6.0	BUCKET ELEVATOR	04	
	6.1	Working Principle Advantages Disadvantages Types of bucket elevators Centrifugal Discharge Type Bucket Elevators – Construction, Speed, Feed, Discharge, Suitability. Perfect Discharge Type Bucket Elevator – Construction, Speed, Feed, Discharge, Suitability. Continuous Discharge Type Bucket Elevator – Construction, Speed, Feed, Discharge, Suitability.(No Numerical).		
		GROUP-C		
7	7.0	PNEUMATIC CONVEYOR	05	
	7.1	Definition of Pneumatic Conveying Application Advantages Disadvantages Limitations Classifications.		
8	8.0	HYDRAULIC CONVEYOR:-	05	
	8.1	Principle of operation Application Advantages Disadvantages Conveying principle and its variants		
9	9.0	AUTOMATED GUIDED VEHICLE SYSTEMS (AGVS) & ROBOTIC Material handling.	06	

9.1	Definition Types of Vehicle Application of AGVS Vehicle Guidance – Imbedded Guide wire, paint strip, self guided vehicle (Only concept).		
Sub Total		45	
Internal Assesment Examination & Preperation of Semester Examination		6	
Total		51	

Name of Authors	Title of the Book	Name of the publishers
T.K.Ray	Mechanical Handling of Materials	Asian book pub. Co.
S.Ray	Material Handling	New Age International Pub. Ltd.
Spivakovosky And Dyachkov	Conveyors and Related Equipment.	Peace Publishers, Moscow.
Reference books: Nil		
Suggested list of laboratory experiments:- Nil		
Suggested list of Assignments/Tutorial:- 1.Draw schematic diagram of Belt Conveyor. 2. Draw schematic diagram of Bucket Elevator. 3. Draw Layout of AGV.		

**Practical:
Skills to be developed:**

Intellectual Skill :

1. Understand the different motions of E.O.T. crane.
2. Understand the working of belt conveyor.
3. Understand the motion of a particle on vibratory conveyor.
4. Know the working of Bucket elevator.

Motor Skills :

1. Conduct trial on vibratory conveyor.
2. Study of different motions of E.O.T. crane.
3. Conduct trial on Screw conveyor.
4. Study of Lump size of bulk material.

List of Practical:.

- 1.Determination of lump size of bulk material by screening through seaves
- 2.Determination of bulk weight of a granular material
- 3.Determination of static angle of repose of granular bulk material
- 4.Study of different motion of EOT crane with different load with a model/ EOT crane in crane in the work shop.
- 5.Study of different motion of a Jib crane.
- 6.Comparision of capacity of a flat belt conveyor and a belt conveyor with a 3 roller

throughing

7.Determination of capacity of a horizontal screw conveyor

8.Study of Motion of a Particle on a vibrating conveyor with a model

9.Determination of capacity of a push plate conveyor

10.Study of discharge pattern of a bucket elevator at different speed.

11.Programming for different motion of a model robot.

N.B. : At least five experiments/studies are to be performed by each student.

EXAMINATION SCHEME:END SEMESTER EXAMINATION:-

GROUP	MODULE/CHAPTER	OBJECTIVE QUESTIONS				SUBJECTIVE QUESTION			
		TO BE SEEN	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS	TO BE SEEN	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS
A	1,2,3	3	ANY 10	1	10	3	FIVE(AT LEAST TWO FROM EACH GROUP)	5	25
B	4,5,6	4				3			
C	7,8,9	3				3			

EXTERNAL Examination: Examiner- Lecturer in Mechanical Engg. / Jr.Lecturer/Demonstrator.				
Submission of Signed Lab Note Book (for five experiments/study)	5*2=10			
On spot experiment (one for each group consisting 15 students / explanation of study item)	10			
VIVA VOCE	5			
TOTAL	25			

EXAMINATION SCHEME FOR PRACTICAL SESSIONAL:-

Internal Examination: Examiner- Lecturer in Mechanical Engg./Jr. Lecturer/Demonstrator.

Five No. of Experiments / Study attended & respective lab note submitted in due time.	5*3=15		
VIVA VOCE	10		
TOTAL	25		

TOOL ENGINEERING

Name of the course: Mechanical Engineering(Production)				
Subject: TOOL ENGINEERING.				
Course Code:ME(P)		Semester:Sixth.		
Duration:17 weeks		Maximum Marks: 100.		
Teaching Scheme		Examination Scheme		
Theory:4 hrs/week		End Semester Exam:70		
Tutorial:hrs/week		Teacher's Assesment(Assignment & Quiz):10 Marks		
Practical:hrs/week		Internal Assesment:20 Marks		
Credit:4		Practical Sessional internal continuous evaluation:Nil		
		Practical Sessional external examination: Nil		
Aim:-				
Sl. No.				
1.	To study the Materials of cutting tool.			
2.	To understand the Design of cutting tool.			
3.	To study Tool geometry.			
4.	To study various clamping methods.			
5.	To study forming & drawing dies.			
Objective:-				
Sl. No.	The students should be able to:			
1.	Know the cutting tool materials.			
2.	Know the design of cutting tool.			
3.	Understand the tool geometry.			
4.	Understand the clamping methods.			
Pre-Requisite: Elementary knowledge of Machining & Machine Tools & Manufacturing process.				
Contents			Hrs./week	
TOOL ENGINEERING.				
Chapter	Name of the Topic		Hours	Marks
GROUP-A				
1	1.0	TOOLING MATERIAL:	06	
	1.1	Ferrous Tooling materials – Water hardening steel, oil-Hardened steel, cold worked steel, Air hardening, Cold work steels, high carbon high chromium, cold work steel, hot –work tool steels, high speed tool steels. Non ferrous tooling materials – sintered carbides, cast non-ferrous alloys, non-metallic tooling materials, oxide cutting material, diamonds.		
2	2.0	HEAT TREATMENT OF TOOLING MATERIAL:	06	
	2.1	Purpose of heat treatment, various types – normalising annealing, spherodising, stress-relieving, hardening, carburising, nitriding, cyaniding, critical temperature, critical cooling rate, tempering, case hardening, microstructural changes, heat-treatment furnaces-type Muffle type, semi muffle type, liquid bath.		
GROUP-B				

3	3.0	TOOL DESIGN CONSIDERATIONS:-	08	
	3.1	Basic Metal cutting process, requirements of cutting tool, mechanism of chip formation, forces on cutting tool, power required, machinability of various materials, selection of cutting speed and feed, use of tables and monographs, chatter and vibration, cutting fluids.		
4	4.0	TOOL GEOMETRY:	08	
	4.1	Tool Geometry Lathe tool angles and nomenclature. Solid bits, brazed tips, indexable inserts, boring tool and angles, Milling cutters, profile sharpened- form relieved cutters, face milling cutters and their geometry, Twist drills and their geometry, reamers and their geometry, taps and their geometry.		
5	5.0	LOCATING AND CLAMPING ELEMENTS :	06	
	5.1	Basic principles of location, locating methods for flat and circular surfaces – pin or button location, rest pads and plates nest or cavity location. Basic principle of clamping types of clamps-strap clamps, cam clamps, screw clamps, latch clamps, wedge clamps, toggle clamps, rack and pinion clamping, hydraulic and pneumatic		
		GROUP-C		
6	6.0	JIGS AND FIXTURES	08	
	6.1	Drill jig – Definition types, box and tumble jigs, template jigs, plate jigs, vice jigs, drill bushing. Fixture – Definition, Economics of using fixture, types of fixture, Vise Fixtures, Milling fixtures, boring fixture, broaching fixture. Lathe fixture – chucks, face plate fixtures, magnetic and vacuum chucks, Grinding fixture.		
7	7.0	SHEET METAL BLANKING AND PIERCING DIES :	06	
	7.1	Fundamental of die cutting operation, power press types, mechanical, hydraulic, die and punch operations, die clearance, angular clearance, stripping, cutting forces, punch and die mountings, shear angle, types of die construction, inverted dies, progressive dies, compound dies.		
8	8.0	SHEET METALS BENDING FORMING AND DRAWING DIES :	06	
	8.1	Bending dies, types and purchase, spring back, bending pressure, forming dies, deep drawing dies- determination of blank sizes.		
	8.2	SHARPENING OF CUTTING TOOLS: Universal tool and cutter grinder, Grinding of single point tools, grinding of drills, grinding of core drills and reamers, grinding of milling cutters, grinding of thread	06	

Name of the Course : DIPLOMA IN MECHANICAL ENGINEERING(PRODUCTION) (INDUSTRIAL PROJECT)

	cutting tools, grinding of gear cutting tools, grinding of broaches.		
Sub Total		60	
Internal Assesment Examination & Preperation of Semester Examination		08	
Total		68	

Name of Authors	Title of the Book	Name of the publishers
C.Donaldson	Tool design	TMH
Metal cutting –Theory & Practice.	A.Bhattacharya	New central book Agency.
Jigs & Fixtures	Joshi	TMH.
Reference books: Nil		
Suggested list of laboratory experiments:- Nil		
Suggested list of Assignments/Tutorial:- 1.Draw schematic diagram of USM. 2. Draw graphically effect of various factors on MRR in AJM. 3. Draw Layout of Wire cut EDM machine.		

EXAMINATION SCHEME:END SEMESTER EXAMINATION.

GROUP	MODULE/CHAPTER	OBJECTIVE QUESTIONS				SUBJECTIVE QUESTION			
		TO BE SET	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS	TO BE SET	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS
A	1,2	5	ANY 20	1	20	3	FIVE(AT LEAST TWO FROM EACH GROUP)	10	50
B	3,4,5	8				3			
C	6,7,8,9	7				3			

Course code: MEP		Semester: Sixth.	
Duration: 17 weeks		Maximum Marks : 100	
Teaching Scheme		Examination Scheme:	
Theory : hrs/week		Practical: Internal Sessional continuous evaluation: 50 Marks	
Tutorial: hrs/week		Practical: External Sessional examination: 50 Marks	
Practical : 6 hrs/week			
Credit: 3			
Aim :-			
S. No.			
1	To solve the problems involving drawings, designs, manufacturing, installation, testing and maintenance of machines. In order to cultivate the systematic methodology for problem solving using acquired technical knowledge & skills, and to enhance the generic skills & professional skills.		
Objective :-			
	The Students should be able to:		
	<ol style="list-style-type: none"> 1. Identify, analyze & define the problem. 2. Generate alternative solutions to the problem identified. 3. Compare & select feasible solutions from alternatives generated. 4. Design, develop, manufacture & operate equipment/program. 5. Acquire higher-level technical knowledge by studying recent development in mechanical engineering field. 6. Compare machines/devices/apparatus for performance practices. 7. Work effectively in a team. 		
Pre-Requisite: Nil			
Contents:			
Part A-Project			
<p>A batch of maximum 4 students will select a problem and then plan, organize & execute the project work of solving the problem in a specified duration. Student is expected to apply the knowledge & skills acquired. Batch may select any one problem/project work from following categories.</p> <p>a) Fabrication of small machine / devices/ test rigs/ material handling devices/ jig & fixtures/ demonstration models, etc. Report involving aspects of drawing, process sheets, costing, Installation, commissioning & testing should be prepared and submitted.</p> <p>b) Design & fabrication of mechanisms, machines, Devices, etc. Report involving aspects of designing & fabricating should be prepared & submitted</p> <p>c) Development of computer program for designing and /or drawing of machine components, Simulation of movement & operation, 3D modeling, pick & place robots etc.</p> <p>d) Industry sponsored projects- project related with solving the problems identified by industry should be selected. One person / engineer from industry is expected to work as co- guide along with guide from institution.</p> <p>e) Literature survey based projects: Project related with collection tabulation, classification, analysis & presentation of the information. Topic selected must be related with latest technological developments in mechanical or mechatronics field, and should not be a part of diploma curriculum. Report should be of min 60 pages.</p> <p>f) Investigative projects- Project related with investigations of causes for change in performance or structure of machine or component under different constraints through experimentation and data analysis.</p> <p>g) Maintenance based projects: The institute may have some machine/ equipment/ system which are lying idle due to lack of maintenance. Students may select the specific machines/equipment/system. Overhaul it, repair it and bring it to working condition. The systematic procedure for maintenance to be followed and the report of the activity are submitted.</p> <p>h) Industrial engineering based project: Project based on work study, method study, methods improvement, leading to productivity improvement, data collection, data analysis and data interpretation be undertaken.</p> <p>i) Low cost automation projects: Project based on hydraulic/pneumatic circuits resulting into low cost automated equipment useful in the identified areas.</p> <p>j) Innovative/ Creative projects – Projects related with design, develop & implementation of new concept for some identified useful activity using PLC, robotics, non-conventional energy sources, CIM , mechatronics, etc.</p> <p>k) Environmental management systems projects: Projects related with pollution control, Solid waste management, liquid waste management, Industrial hygiene, etc, Working model or case study should be undertaken.</p>			

- l) Market research/ survey based projects: Projected related with identification of extent of demand, sales forecasting, Comparative study of marketing strategies, Comparative study of channels of distribution, Impact of variables on sales volume, etc. The project involves extensive survey & market research activities information to be collected through various mechanisms/tools & report is prepared.
- m) Project based on use of appropriate technology particularly benefiting rural society or economically weaker section.
- n) Project can be selected other than the area specified above. Project should provide viable and feasible solution to the problem identified. Report should be of min 50 pages.

Part B- Seminar

Every student will prepare & deliver the seminar. Evaluation of seminar will be carried out by panel of at least three teaching staff from mechanical/ production /automobile department.

1. Selection of topic for the seminar should be finalized in consultation with teacher guide allotted for the batch to which student belongs.
2. Seminar report should be of min.10 & max. 20 pages & it should be certified by guide teacher and head of the department
3. for presentation of seminar, following guide lines are expected to be followed:-
 - a) Time for presentation of seminar: 7 to 10 minutes /student.
 - b) Time for question/answer : 2 to 3 minutes /student
 - c) use of audio visual aids or power point presentation is desirable.
4. Topic of the seminar should not be from diploma curriculum.
5. Seminar can be on project selected by batch.

Skills To Be Developed:

Intellectual Skills

1. Design the related machine components & mechanism.
2. Convert innovative or creative idea into reality.
3. Understand & interpret drawings & mechanisms
4. Select the viable, feasible & optimum alternative from different alternatives.

Motors skills

1. Use of skills learnt in workshop practical.
2. Assemble parts or components to form machine or mechanisms.
3. Classify & analyze the information collected.
4. Implement the solution of problem effectively.

- Notes:** 1) Project group size: Maximum 4 students
 2) Project report will be of minimum 40 pages unless otherwise specified.
 3) Project diary should be maintained by each student.

Text Books

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Karl Smith	Project management & team work		Tata- Mc Graw Hill
Clifford gray & Erik Lasson	Project management		Tata- Mc Graw Hill

EXAMINATION SCHEME FOR PRACTICAL SESSIONAL

Internal Examination: Examiner- Lecturer in Mechanical Engg.			
On Project Work & submission of project within schedule time.	30		
Seminar on Project Work	10		
Viva-voce	10		
TOTAL	50		
External Examination: Examiner- Lecturer in Mechanical Engg.			
On Project Work	20		
Viva-voce	30		
TOTAL	50		

Name of the Course : Mechanical Engineering(Production)		
Subject Title: Professional Practices-IV		
Course code: MEP	Semester : Fifth	
Duration :	Maximum Marks : 50	
Teaching Scheme	Examination Scheme	
Theory : hrs/week	Mid Semester Exam: Marks	
Tutorial: hrs/week	Assignment & Quiz: Marks	
Practical : 4 hrs/week	End Semester Exam: Marks	
Credit: 2	Practical: Internal Sessional continuous evaluation:25 Marks	
	Practical: External Sessional Examination:25 Marks	
Aim :-		
S.No		
1	To develop general confidence, ability to communicate and attitude, in addition to basic technological concepts through Industrial visits, expert lectures, seminars on technical topics and group discussion.	
Objective :-		
S No	The student will able to	
1	Acquire information from different sources.	
2	Prepare notes for given topic.	
3	Present given topic in a seminar.	
4	Interact with peers to share thoughts.	
5	Prepare a report on industrial visit, expert lecture	
Pre-Requisite:-Nil		
Contents		Hrs/week
Chapter	Name of the Topic	
01	Group Discussion : (Two topics) The students shall discuss in group of six to eight students and write a brief report on the same as a part of term work. The topic for group discussions may be selected by the faculty members. Some of the suggested topics are i) Solar Vehicles / Electric Vehicles. ii) Auto Vehicles – Comparison. iii) Two stroke versus four stroke engines iv) Recycling of plastics and other waste material v) Attributes of product design vi) Creativity and innovativeness vii) Energy conservation in institutes viii) Value engineering ix) Revolution in communication technology x) Pneumatic tools and equipments xi) Wear mechanisms	10

02	Study of Open Source Softwares: 1] LibreOffice Unit:1 Installation Of LibreOffice and Introduction to LibreOffice Writer Unit:2 Introduction to LibreOffice Calc Unit:3 Introduction to LibreOffice Impress Unit: 4 Introduction to LibreOffice Base Unit: 5 Introduction to LibreOffice Math Unit: 6 Introduction to LibreOffice Draw 2] LaTeX: Unit:1 Introduction and Installation Of LaTeX and Compilation Unit:2 Letter Writing, Report Writing in LaTeX Unit:3 Maths, Equations, Tables and Figures in LaTeX documentation Unit:4 References and Beamer LaTeX documentation 3] Scilab Unit:1 Introduction and Installation Of Scilab and Vector Operations Unit:2 Matrix Operations and Scripts and functions Unit:3 Conditional Branching and Iterations and Plotting in Scilab Unit: 4 ODES and Polynomials in Scilab Unit: 5 SBHS and Introduction to X-Cos in Scilab	50
02		
	Total	

Recommended Text Books:

It is alright to go ahead with teaching from the prescribed books as per the existing syllabus. Text books can be referred from the link given below.

Text Books link for LibreOffice:

- <http://www.taming-libreoffice.com/category/books>

Recommended Text Books:

LaTeX: A Document Preparation System by Leslie Lamport

The LaTeX Companion by Mittelbach and Goossens

More information about LaTeX can be found on moudgalya.org

Introduction to MATLAB & ITS Open Source Equivalent SCILAB and hands on demonstration:

1. Introduction and Installation Of MATLAB & SCILAB and Vector Operations
2. Matrix Operations and Scripts and functions
3. Conditional Branching and Iterations and Plotting in Scilab
4. SBHS and Introduction to X-Cos in Scilab
5. **Matlab programming by Singh (PHI)**

Internal Practical Sessional Examination	
Topic	

Performance on Group Discussion	05
Practice on Open Source Software	15
Viva - voce	5
Total:	25
External Practical Sessional Examination	
Examiner: Lecturer	
On spot assignment on Open Source Software	10
Viva - voce	15
Total:	25

Name of the Course: Diploma in Mechanical Engineering(Production).			
Subject: General Viva-Voce			
Course Code:	MEP	Semester:	Sixth
Duration:	N.A	Maximum Marks:	100
Teaching Scheme :	N.A	Examination Scheme :	viva-voce
Theory:	Nil	Continuous Internal Examination :	Nil
Tutorial:	Nil	End Semester Exam.:	Nil
Practical:	Nil	End Semester Examination (viva-voce):	100 Marks
Credit: 2			
Aim :			
The object of conducting Grand viva-voce is to assess out going students on their general understanding of all subjects (Theory, practical, laboratory etc.) taught and also on expected technical sense / ability developed being an engineer during this periods.			
Examination Scheme (at semester end): Grand Viva-voce			Total Marks :
100			
<ul style="list-style-type: none"> End Semester Examination (viva-voce): - 100 marks. Examiner –Internal Lecturers headed by HOD			