Curriculum for

Diploma Programme in

MECHANICAL ENGINEERING

FIFTH SEMESTER

FIFTH SEMESTER(MECHANICAL ENGINEERING)

Sr. No.	SUBJECTS	STUDY SCHEME Hours/Week		Credits	MARKS IN EVALUATION SCHEME								Total Marks of Internal & External
					INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT					
		Th	Pr		Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
Industrial Training		-	-	5	-	100	100	-	-	100	-	100	200
5.1	*Theory of Machines	3	2	4	25	25	50	100	3	50	3	150	200
5.2	*Refrigeration and Air-conditioning	3	2	4	25	25	50	100	3	50	3	150	200
5.3	*Machine Design	4	-	4	25	-	25	100	3	-	3	100	125
5.4	*CNC Machines and Automation	3	4	5	25	25	50	100	3	50	3	150	200
5.5	*Workshop Technology-III	3	-	3	25	-	25	100	3	-	-	100	125
5.6	*Workshop Practice –III	-	9	4	-	100	100	-	-	100	3	100	200
*Soft Skills-III		-	2	-	-	25	25	-	-	-	-	-	25
Total		16	19	29	125	300	425	500	-	350	-	850	1275

* Common with other Diploma programmes

5.1 THEORY OF MACHINES

L T P
3 - 2

RATIONALE

A diploma holder in this course is required to assist in the design and development of prototype and other components. For this, it is essential that he is made conversant with the principles related to design of components and machine and application of these principles for designing. The aim of the subject is to develop knowledge and skills about various aspects related to design of machine components.

LEARNING OUTCOMES

After undergoing this course, the students will be able to:

- Explain working of different types of mechanisms and draw their inversion.
- Solve problems on power transmission.
- Determine ratio of driving tension for flat and V-belt drive.
- Identify various types of gears and their applications.
- Construct turning moment diagram of flywheel for different types of engine.
- Explain working of different types of governors.
- Identify different types of cams and followers and construct displacement diagram
- Calculate balancing of rotating mass and its position.
- Identify different type of vibrations, their causes, harmful effect and remedies.

DETAILED CONTENTS

1. Simple Mechanisms (06 Hours)

1.1 Kinematics of Machines: - Definition of Kinematics, Dynamics, Statics, Kinetics, Kinematic link, Kinematic Pair and its types, constrained motion and its types, Kinematic chain and its types, Mechanism, inversion, machine and structure.

1.2 Inversions of Kinematic Chain: Inversion of four bar chain, coupled wheels of Locomotive & Pantograph. Inversion of Single Slider Crank chain- Rotary I.C. Engines mechanism, Crank and Slotted lever quick return mechanism. Inversion of Double Slider Crank Chain- Scotch Yoke Mechanism & Oldham's Coupling.

2. Power Transmission (12 Hours)

2.1 Introduction to Belt and Rope drives
2.2 Types of belt drives .
2.3 Concept of velocity ratio, slip and creep; crowning of pulleys (simple numericals)
2.4 Flat and V belt drive: Ratio of driving tensions, power transmitted, centrifugal tension, and condition for maximum horse power (simple numericals)
2.5 Different types of chains and their terminology
2.6 Gear Drive - Simple, compound, reverted and epicyclic gear trains(simple numericals)
2.7 Relative advantages and disadvantages of various drives

3. Flywheel (06 Hours)

3.1 Principle and applications of flywheel
3.2 Turning - moment diagram of flywheel for different engines
3.3 Fluctuation of speed and fluctuation of energy - Concept only
3.4 Coefficient of fluctuation of speed and coefficient of fluctuation of energy
Simple numericals on above topics

4. Governor (06 Hours)

4.1 Function of a governor, comparison of flywheel and governor.
4.2 Simple description and working of Watt, Porter and Hartnel governor (simple numerical based on watt and porter governor)
4.3 Terminology used in governors: Height, equilibrium speed, Hunting, isochronisms, stability, sensitiveness of a governor.

5. Cams (06 Hours)

5.1 Definition and function of cam. Description of different types of cams and followers with simple line diagram.
5.2 Terminology of cam profile.
5.3 Displacement diagram for uniform velocity, S.H.M. and uniform acceleration and deceleration.

6. Balancing (06 Hours)

6.1 Need of balancing, concept of static and dynamic balancing.
6.2 Introduction to balancing of rotating masses in the same plane and different Planes (simple numericals)

7. Vibrations (06 Hours)

7.1 Causes of vibrations in machines, their harmful effects and remedies.
7.2 Types-longitudinal, transverse and torsional vibrations.
7.3 Damping of vibrations

LIST OF PRACTICALS

1. To study inversion of Four Bar Mechanism, Single Slider Crank Chain Mechanism and Double Slider Crank Chain Mechanism with the help of working models.
2. To study various kinds of belts drives and gear trains with the help of working models.
3. To find the moment of inertia of a flywheel.
4. To Study the different types of centrifugal governors & to plot graph between R.P.M & Displacement.
5. To construct cam profile for uniform velocity, SHM and uniform acceleration and retardation on drawing sheet.
6. To perform the experiment of Balancing of rotating parts and find the unbalanced couple and forces.

INSTRUCTIONAL STRATEGY

1. Use teaching aids for classroom teaching
2. Give assignments for solving numerical problems
3. Arrange industry visits to augment explaining use of various machine components like belt, rope, chain, gear drives, action due to unbalanced masses, brake clutch, governors, fly wheels, cams and gear drives
4. Video films may be used to explain the working of mechanisms and machine components like clutch, governors, brake etc.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests, model/prototype making
- Actual laboratory and practical work, model/prototype making, and viva-voce

RECOMMENDED BOOKS

1. Theory of Machines by D.R. Malhotra; Satya Prakashan, New Delhi.
2. Theory of Machines by V.P Singh; DhanpatRai and sons, New Delhi.
3. Theory of Machines by JagdishLal; Metropolitan Publishers, New Delhi.
4. Theory of Machine by B.S Ubhi; S.K. Kataria and Sons, New Delhi.
5. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:
http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS Topic No.	Time Allotted (Hours)	Marks Allotted (%)
1	06	12
2	12	24
3	06	14
4	06	12
5	06	14
6	06	12
7	06	12
Total	48	100

5.2. REFRIGERATION AND AIR CONDITIONING

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3 - 2

RATIONALE

The diploma holders in Mechanical Engineering are responsible for supervising and maintenance of RAC system. For this purpose, the knowledge and skill covering basic principles of refrigeration and air conditioning is required to be imparted to the students. Moreover, RAC industry is expanding and employment opportunities in this field are good.

LEARNING OUTCOMES

After undergoing this subject, the students will be able to:

- Explain the working and construction features of refrigeration and air conditioning systems
- Draw and interpret various refrigeration cycles.
- Make basic calculation of psychometric properties and processes.
- Calculate heating and cooling load requirements of a room.
- Explain latest developments in the field of refrigeration and air conditioning.
- Calculate the properties of air by using psychometric chart.
- Detect faults in an air-conditioner/refrigerator.
- Carry out charging of air conditioner.

DETAILED CONTENTS

REFRIGERATION

1. Fundamentals of Refrigeration (04 Hours)

Introduction to refrigeration, and air conditioning, meaning of refrigerating effect, units of refrigeration, COP, difference between COP and efficiency, methods of refrigeration, Natural system and artificial system.

2. Vapour Compression System 12 Hours)

Introduction, principle, function, parts and necessity of vapour compression system, T- □ and p– H charts, dry, wet and superheated compression. Effect of sub cooling, super heating,. actual vapour compression system. Introduction to air refrigeration system, advantage and disadvantage of air refrigeration over vapour compression system.

3. Refrigerants (04 Hours)

Functions, classification of refrigerants, properties of R - 717, R – 22, R–134 (a), CO2, R – 12, R – 502, Properties of ideal refrigerant, selection of refrigerant

4. Vapour Absorption System (04 Hours)

Introduction, principle and working of simple absorption system and domestic electrolux refrigeration systems. Solar power refrigeration system, advantages and disadvantages of solar power refrigeration system over vapour compression system.,

5. Refrigeration Equipment (08 Hours)

5.1 Compressors- Function, various types of compressors
5.2 Condensers - Function, various types of condensers
5.3 Evaporators- Function, types of evaporators
5.4 Expansion Valves - Function, various types such as capillary tube, thermostatic expansion valve, low side and high side float valves, application of various expansion valves
5.5. Safety Devices-Thermostat, overload protector, LP, HP cut out switch.

AIR CONDITIONING

6. Psychrometry (06 Hours)

Definition, importance, specific humidity, relative humidity, degree of saturation, DBT, WBT, DPT, sensible heat, latent heat, Total enthalpy of air.

7. Applied Psychrometry and Heat Load Estimation. (08 Hours)

Psychrometric chart, various lines, psychrometric process, by pass factor, room sensible heat factor, effective room sensible heat factor, grand sensible heat factor, ADP, room DPT.
Heating and humidification, cooling and dehumidification, window air-conditioning, split type air-conditioning, car air-conditioning, central air-conditioning.

8. Latest development in refrigeration and air conditioning:- (02 Hours)

Inverter technology, auto-defrosting, blast cooling, star rating.

LIST OF PRACTICALS

1. Identify various tools of refrigeration kit.
2. Practice in cutting, bending, flaring, swaging and brazing of tubes.
3. Study of thermostatic switch, LP/HP cut out overload protector filters, strainers and filter driers.
4. Identify various parts of a refrigerator and window air conditioner.
5. To find COP of Refrigeration system
6. To measure air flow using anemometer.
7. Charging of a refrigerator/ air conditioner.
8. To detect faults in a refrigerator/ air conditioner
9. Visit to an ice plant or cold storage plant. or central air conditioning plant

INSTRUCTIONAL STRATEGY

1. Teaches should take the students to industry and explain the details of refrigeration and air-conditioning systems and their components.
2. While imparting instructions, focus should be on conceptual understanding.
3. Training slides of “Carrier Fundamentals of Refrigeration Air Conditioning” to be shown to students.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests, model/prototype making
- Actual laboratory and practical work, model/prototype making, and viva-voce

RECOMMENDED BOOKS

1. Refrigeration and Air Conditioning by Domkundwar; Dhanpat Rai and Sons, Delhi.
2. Refrigeration and Air Conditioning by CP Arora; Tata McGraw Hill, New Delhi.
3. Refrigeration and Air Conditioning by R.S Khurmi and J.K. Gupta; S Chand and Company Limited, New Delhi.
4. Refrigeration and Air Conditioning by Dr. Harjeev Khanna; Dhanpat Rai and Sons, Delhi.
5. Refrigeration and Air Conditioning by Dr. R.K Rajput; S.K. Kataria and Sons, Ludhiana.
6. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hours)	Marks Allotted (%)
1	04	08
2	12	24
3	04	10
4	04	10
5	08	16
6	06	12
7	08	16
8	02	04

Total	**48**	**100**

5.3 MACHINE DESIGN

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4 - -

RATIONALE

A diploma holder in this course is required to assist in the Design and Development of Prototype and other components. For this, it is essential that he is made conversant with the principles related to design of components and machine and application of these principles for designing. The aim of the subject is to develop knowledge and skills about various aspects related to design of machine components.

LEARNING OUTCOMES

At the end of this course, students will be able to:

- Explain the terms related to design.
- Use codes and standards for designing a component.
- Select material for designing a component.
- Interpret the various causes of design failures.
- Design shaft on the basis of strength and rigidity.
- Design various machine elements (key, joint, flange coupling and screwed joints)

DETAILED CONTENTS

1. Introduction (08 Hours)

1.1 Design – Definition, Type of design, necessity of design
1.1.1 Comparison of designed and undesigned work
1.1.2 Design procedure
1.1.3 Characteristics of a good designer
1.2 Design terminology: stress, strain, factor of safety, factors affecting factor of safety, stress concentration, methods to reduce stress concentration, fatigue,endurance limit.
1.2.1 General design consideration
1.2.2. Codes and Standards (BIS standards)
1.3 Engineering materials and their mechanical properties :
1.3.2 Properties of engineering materials: elasticity, plasticity, malleability, ductility, toughness, hardness and resilience. Fatigue, creep, tenacity and S trength etc.
1.3.3 Selection of materials, criteria of material selection

2. Design Failure (04 Hours)

2.1 Various design failures-maximum stress theory, maximum strain theory
2.2 Classification of loads
2.3 Design under tensile, compressive and torsional loads.

3. Design of Shaft (10 Hours)

3.1 Type of shaft, shaft materials, Type of loading on shaft, standard sizes of shaft available
3.2 Shaft subjected to torsion only, determination of shaft diameter (hollow and solid shaft) on the basis of :
- Strength criterion
- Rigidity criterion

3.3 Determination of shaft diameter (hollow and solid shaft) subjected to bending
3.4 Determination of shaft diameter (hollow and solid shaft) subjected to combined torsion and bending .

4. Design of Key (06 Hours)

4.1 Types of key, materials of key, functions of key
4.2 Failure of key (by Shearing and Crushing).
4.3 Design of key (Determination of key dimension)
4.4 Effect of keyway on shaft strength. (Figures and problems).
5. Design of Joints (20 **Hours**)
Types of joints - Temporary and permanent joints, utility of various joints

5.1 Temporary Joint:

5.1.1 Knuckle Joints – Different parts of the joint, material used for the joint, type of knuckle Joint, design of the knuckle joint. (Figures and problems).
5.1.2 Cotter Joint – Different parts of the spigot and socket joints, Design of spigot and socket joint.
5.2 Permanent Joint:
5.2.1 Welded Joint - Welding symbols. Type of welded joint, strength of parallel and transverse fillet welds.
5.2.2 Strength of combined parallel and transverse weld.
5.2.3 Riveted Joints. : Rivet materials, Rivet heads, leak proofing of riveted joint – caulking and fullering.
5.2.4 Different modes of rivet joint failure.
5.2.5 Design of riveted joint – Lap and butt, single and multi riveted joint.

6. Design of Flange Coupling **(08 Hours)**

Necessity of a coupling, advantages of a coupling, types of couplings, design of muff coupling, design of flange coupling. (both protected type and unprotected type).

7. Design of Screwed Joints **(08 Hours)**

5.1 Introduction, Advantages and Disadvantages of screw joints, location of screw joints.
5.2 Important terms used in screw threads, designation of screw threads
5.3 Initial stresses due to screw up forces, stresses due to combined forces
5.4 Design of power screws (Press, screw jack, screw clamp)

Note : a) Use of design data book during the examination is allowed.
b) The paper setter should normally provide all the relevant data for the machine design in the question paper.

INSTRUCTIONAL STRATEGY

1. Use moulds of various parts/components.
2. Presentation should be arranged for various topics.

MEANS OF ASSESSMENT

 Design and drawing

RECOMMENDED BOOKS

1. Machine Design by R.S. Khurmi and JK Gupta, Eurasia Publishing House (Pvt.) Limited, New Delhi.
2. Machine Design by V.B.Bhandari, Tata McGraw Hill, New Delhi.
3. Engineering Design by George Dieter; Tata McGraw Hill Publishers, New Delhi.
4. Mechanical Engineering Design by Joseph Edward Shigley; McGraw Hill, Delhi.
5. Machine Design by Sharma and Agrawal; Katson Publishing House, Ludhiana.
6. Design Data Handbook by D.P. Mandali, SK Kataria and Sons, Delhi.
7. Machine Design by A.P.Verma; SK Kataria and Sons, Delhi
8. Machine Design by AR Gupta and BK Gupta ; Satya Parkashan, New Delhi.
9. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

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SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hours)	Marks Allotted (%)
1	08	12
2	04	06
3	10	16
4	06	10
5	20	32
6	08	12
7	08	12
Total	64	100

5.4 CNC MACHINES AND AUTOMATION

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3 - 4

RATIONALE

Diploma holders are required to supervise and handle specialized machines and equipment like CNC machines. For this purpose, knowledge and skills about NC machines, part programming in NC machines and tooling for CNC machines are required to be imparted for enabling them to perform above functions. This subject aims at development of knowledge and skills about CNC machines, tools, equipment and use of high tech machines for increased productivity and quality.

LEARNING OUTCOMES

After undergoing this course, the students will be able to :

- Explain the construction and tooling of CNC machine.
- Prepare simple part programme.
- Operate a CNC lathe.
- Operate a CNC milling machine.
- Diagnose common problems in CNC machines.
- Explain the trends in the field of automation.
- Use Advanced programming structures.

DETAILED CONTENTS

1. Introduction 08 Hours)

Introduction to NC, Basic Components of NC, binary coding, MCU, , input devices, advantages /disadvantages of NC machines over conventional machines, CNC & DNC, their types, their advantages, disadvantages and applications, selection of parts to be machined on CNC machines, Problems with conventional NC, Rules for Axis identification, New developments in NC, PLC Control and its purpose.

2. Construction and Tooling (08 Hours)

Design features, special mechanical design features, specification Chart of CNC machines, types of slideways, balls, rollers, motor- servo/stepper , axis drive and leadscrew, recirculating ball screw and nut assembly, swarf removal, safety and guarding devices,
Various cutting tools for CNC machines, overview of tool holder, different pallet systems
and automatic tool changer system, tool change cycle, management of a tool room.

3. System Devices (06 Hours)

Control System , Feedback control classification(open loop, closed loop), Actuators, Transducers and Sensors, characteristics of sensors, Tachometer, LVDT, optointerrupters, potentiometers for linear and angular position, encoder and decoder, axis drives, other classifications of CNC machines-Feedback, motion , positioning.

4. Part Programming (12 Hours)

Part programming and basic procedure of part programming, NC words, Blocks, part programming formats, simple programming for rational components (Point to point, Straight line, curved surface), tool off sets, cutter radius compensation and wear compensation.
Advanced structures: Advantages of using advanced structures, part programming using canned cycles, subroutines and do loops, mirror image

5. Problems in CNC Machines (06 Hours)

Common problems in mechanical, electrical, pneumatic, electronic and PC components of NC machines, diagnostic study of common problems and remedies, use of on-line faultfinding diagnosis tools in CNC machines, methods of using discussion forums, environmental problems.

6. Automation and NC system (08 Hours)

Automation, suitability of production system to automation , types, emerging trends in automation, automatic assembly, manufacture of printed circuit boards, manufacture of integrated Circuits, Overview of FMS, AGV, ASRS, Group technology, CAD/CAM and CIM, Automated Identification system , concept of AI, Robotics, nomenclature of joints,
motion.

LIST OF PRACTICALS

1 Study the constructional details of CNC lathe.

2. Study the constructional details of CNC milling machine.

3. Study the constructional details and working of:
- Automatic tool changer and tool setter
- Multiple pallets
- Swarf removal
- Safety devices

4. Develop a part programme for following lathe operations and make the job on CNC lathe and CNC turning center.(for finish pass only) – (At least two)

Calculating coordinate points for a cylindrical job by considering sign convention
for lathe
- Plain turning and facing operations
- Taper turning operations
- Operation along contour using circular interpolation.

5. Develop a part programme for the following milling operations and make the job on CNC milling (for finish pass only)- At least two
- Plain milling
- Slot milling
- Contouring
- Pocket milling

Calculate coordinate points for a zig zag job by considering sign convention for milling
6. Develop a part program by using canned cycle on CNC lathe for turning , facing

7. Preparation of work instruction for machine operator

8. Preparation of preventive maintenance schedule for CNC machine.

9. Demonstration through industrial visit for awareness of actual working of FMS in production.

10. Use of software for turning operations on CNC turning center.

11. Use of software for milling operations on machine centres.

INSTRUCTIONAL STRATEGY

This is highly practice-based course. Efforts should be made to develop programming skills amongst the students. During practice work, it should be ensured that students get opportunity to individually perform practical tasks.

MEANS OF ASSESSMENT

 Assignments and quiz/class tests, mid-term and end-term written tests, model/prototype making
 Actual laboratory and practical work, and viva-voce

RECOMMENDED BOOKS

1. CNC Machines – Programming and Applications by M Adithan and BS Pabla; New Age

International (P) Ltd., Delhi.
2. CNC Machine and Automation by JS Narang, Dhanpat Rai &Co, New Delhi.
3. Computer Aided Manufacturing by Rao, Kundra and Tiwari; Tata McGraw Hill, New Delhi.
4. CNC Machine by Bharaj; Satya Puble-books ications, New Delhi.
5. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hours)	Marks Allotted (%)
1	08	20
2	08	16
3	06	16
4	12	24
5	06	12
6	08	12
Total	48	100

5.5 WORKSHOP TECHNOLOGY - III

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RATIONALE

Diploma holders are responsible for supervising production processes to achieve production targets and for optimal utilization of resources. For this purpose, knowledge about various machining processes and modern machining methods is required to be imparted. Hence the subject of workshop technology.

LEARNING OUTCOMES

After undergoing the subject, students will be able to:

- Perform boring, internal threading on lathe machine.
- Perform milling machine operations on vertical and horizontal milling machine.
- Operate tool and cutter grinder
- Operate cylindrical grinder, surface grinder, internal grinder.
- Use Milling machine accessories and attachments.
- Explain gear hobbing, gear shaping, gear shaving and gear finishing processes.
- Explain the working and use of modern machining practices.
- Explain the working principle of metallic coating processes.
- Explain the working principle of metal finishing processes.

DETAILED CONTENTS

1. Milling (12 Hours)

1.1 Specification and working principle of milling machine
1.2 Classification, brief description and applications of milling machines
1.3 Details of column and knee type milling machine
1.4 Milling machine accessories and attachment – Arbors, adaptors, collets, vices, circular table, indexing head and tail stock, vertical milling attachment, rotary table.
1.5 Milling methods - up milling and down milling
1.6 Identification of different milling cutters and work mandrels
1.7 Work holding devices
1.8 Milling operations – face milling, angular milling, form milling, straddle milling and gang milling.
1.9 Cutting speed and feed, simple numerical problems.
1.10 Thread milling

2. Gear Manufacturing and Finishing Processes (06 Hours)

2.1 Gear hobbing
2.2 Gear shaping
2.3 Gear finishing processes

3 Grinding (10 Hours)

3.1 Purpose of grinding
3.2 Various elements of grinding wheel – Abrasive, Grade, structure, Bond
3.3 Common wheel shapes and types of wheel – built up wheels, mounted wheels and diamond wheels. Specification of grinding wheels as per BIS.
3.4 Truing, dressing, balancing and mounting of wheel.
3.5 Grinding methods – Surface grinding, cylindrical grinding and centreless grinding.
3.6 Grinding machine – Cylindrical grinder, surface grinder, internal grinder, centreless grinder, tool and cutter grinder.
3.7 Selection of grinding wheel
3.8 Thread grinding.

4. Modern Machining Processes (08 Hours)

4.1 Mechanical Process - Ultrasonic machining (USM): Introduction, principle, process, advantages and limitations, applications
4.2 Electro Chemical Processes - Electro Chemical Machining (ECM) – Fundamental principle, process, applications
4.3 Electrical Discharge Machining (EDM) - Introduction, basic EDM circuit, Principle, metal removing rate, dielectric fluid, applications
4.4 Laser Beam Machining (LBM) – Introduction, machining process and applications
4.5 Plasma Arc Machining (PAM) and welding – Introduction, principle process and applications

5. Metallic Coating Processes (04 Hours)

5.1 Metal spraying – Wire process, powder coating process, applications
5.2 Electro plating, anodizing and galvanizing
5.3 Organic Coatings- oil base paint, rubber base coating

6. Metal Finishing Processes (08 Hours)

6.1 Purpose of finishing surfaces.
6.2 Surface roughness-Definition and units
6.3 Honing Process, its applications
6.4 Description of hones.
6.5 Brief idea of honing machines.
6.6 Lapping process, its applications.
6.7 Description of lapping compounds and tools.
6.8 Brief idea of lapping machines.
6.9 Polishing
6.10 Buffing.
6.11 Burnishing

INSTRUCTIONAL STRATEGY

3. Teachers should lay special emphasis in making the students conversant with concepts and principles of manufacturing processes.
4. Focus should be on preparing jobs using various machines in the workshop.
5. Foreman Instructor should conduct classes of each workshop explaining use of tools, jobs to be made and safety precautions related to each workshop prior to students being exposed to actual practicals.

MEANS OF ASSESSMENT

 Assignments and quiz/class tests, mid-term and end-term written tests, model/prototype Making

RECOMMENDED BOOKS

1. Workshop Technology by B.S. Raghuwanshi; Dhanpat Rai and Sons, Delhi
2. Elements of Workshop Technology by S.K. Choudhry and Hajra, Asia Publishing House.
3 A Textbook of Production Engineering by PC Sharma; S.Chand and Company Ltd. Delhi.
4 e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:
http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hours)	Marks Allotted (%)
1	12	25
2	06	12
3	10	20
4	08	18
5	04	10
6	08	15
Total	48	100

5.6 WORKSHOP PRACTICE - III

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- - 9

RATIONALE

Diploma holders are responsible for supervising production processes to achieve production targets and for optimal utilization of resources. For this purpose, skills in operating various machines are required to be developed. Hence the subject of workshop practice.

PRACTICAL EXERCISES

Advanced Turning Shop

1. Exercise of boring with the help of boring bar
2. Exercises on internal turning on lathe machine
3. Exercises on internal threading on lathe machine
4. Exercises on external turning with greater finishing/accuracy on lathe machine
5. Resharpening of single point cutting tool with given geometry

Machine Shop

1. Produce a rectangular block by facing on a slotting machine
2. Produce a rectangular slot on one face with a slotting cutter
3. Produce a rectangular block using a milling machine with a side and face cutter
4. Prepare a slot on one face using milling machine
5. Job on grinding machine using a surface grinder
6. Prepare a job on cylindrical grinding machine.
7. Exercise on milling machine with the help of a form cutter
8. Exercise on milling machine to produce a spur gear
9. Grinding a drill-bit on tool and cutter grinder
10. Exercise on dressing a grinding wheel

MEANS OF ASSESSMENT

- Workshop jobs
- Report writing, presentation and viva-voce

INSTRUCTIONAL STRATEGY

1. Teachers should lay special emphasis in making the students conversant with concepts, principles, procedures and practices related to various manufacturing processes.

2. Focus should be laid in preparing jobs using various machines/equipment in the workshop.

3. Use of audio-visual aids/video films should be made to show specialized operations.

4. Foreman Instructor should conduct classes of each Workshop explaining use of tools, jobs to be made and safety precautions related to each workshop prior to students being exposed to actual practical's.

SOFT SKILLS – III

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- - 2

RATIONALE

The present day world requires professionals who are not only well qualified and competent but also possess good communication skills. The diploma students not only need to possess subject related knowledge but also soft skills to get good jobs or to rise steadily at their work place. The objective of this subject is to prepare students for employability in job market.

LEARNING OUTCOMES

After undergoing this course, the students will be able to:
 Develop communication skills.
 Learn how to speak without fear and get rid of hesitation
 Use effective presentation techniques
 Understand entrepreneurial traits
 Exhibit attitudinal changes

DETAILED CONTENTS

 Communication Skills – Handling fear and phobia

 Resume Writing

 Applying for job through email/job portal

 Interview preparation : Mock Interview, Group Discussions and Extempore

 Presentation Techniques

 Developing attitude towards safety. Disaster management. In addition, the students must participate in the following activities to be organized in the institute
 Sports

 NCC/NSS

 Camp – Entrepreneurial awareness

 Cultural Event
Note : Extension Lectures by experts may be organized. There will be no examination for this subject.