




**PURAN MURTI**  
**CAMPUS**

A Unit of Puran Murti Educational Society

Approved by AICTE

Affiliated to Haryana State Board of Technical Education, Panchkula



**Curriculum for  
Diploma Programme in  
AUTOMOBILE ENGINEERING**

**CAMPUS**

### THIRD SEMESTER: (AUTOMOBILE ENGINEERING)

Sr. No.	SUBJECTS	STUDY SCHEME		Credits	MARKS IN EVALUATION SCHEME								Total Marks of Internal & External
		HOURS / WEEK	Pr		INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT					
					Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot	
3.1	*Strength of Materials	4	2	5	25	25	50	100	3	50	3	150	200
3.2	Basic of Thermodynamics, Hydraulics and Pneumatics	4	2	5	25	25	50	100	3	50	3	150	200
3.3	*Basic of Electrical and Electronics Engineering	3	2	4	25	25	50	100	3	50	3	150	200
3.4	*Workshop Technology-I	4	-	4	25	-	25	100	3	-	-	100	125
3.5	Mechanical Workshop Practice -I	-	6	3	-	100	100	-	-	100	3	100	200
3.6	Automobile Workshop Practice	-	4	2	-	50	50	-	-	50	3	50	100
Soft Skills- I		-	4	-	-	25	25	-	-	-	-	-	25
Total		15	20	23	100	250	350	400	-	300	-	700	1050

\* Common with Diploma Programme in Mechanical Engineering



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# **THIRD SEMESTER**

## STRENGTH OF MATERIALS

L T P  
4 - 2

### RATIONALE

Diploma holders in this course are required to analyze reasons for failure of different components and select the required material for different applications. For this purpose, it is essential to teach them concepts, principles, applications and practices covering stress, strain, bending moment, shearing force, shafts, columns and springs. It is expected that efforts will be made to provide appropriate learning experiences in the use of basic principles in the solution of applied problems to develop the required competencies.

### LEARNING OUTCOMES

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

- Interpret various concepts and terms related to strength of materials
- Calculate stresses in thin cylindrical shells.
- Calculate energy stored by materials subjected to axial loads.
- Calculate moment of inertia of different sections.
- Draw and calculate bending moment and shear force diagrams of beam under given loading
- Interpret the concept of bending and torsion and calculate stresses on different section of materials.
- Determine the diameter of a shaft under combined bending and torsion.
- Calculate critical axial loads on column under different end constraints.
- Determine the various parameters in closed coil helical and laminated springs
- Determine conformance of given materials sample to the prescribed Indian standards.

### DETAILED CONTENTS

#### 1. Stresses and Strains (12 Periods)

- 1.1 Basic concept of load, stress and strain
- 1.2 Tensile, compressive and shear stresses
- 1.3 Linear strain, Lateral strain, Shear strain, Volumetric strain.
- 1.4 Concept of Elasticity, Elastic limit and limit of proportionality
- 1.5 Hook's Law and Elastic Constants
  - 1.6. Stress-strain curve for ductile and brittle materials
- 1.7 Nominal stress
- 1.8 Yield point, plastic stage
- 1.9 Ultimate stress and breaking stress
- 1.10 Percentage elongation
- 1.11 Proof stress and working stress
  - 1.12. Factor of safety



1.13 Poisson's Ratio

1.14 Thermal stress and strain

1.15 Longitudinal and circumferential stresses in seamless thin walled cylindrical shells.

1.6 Introduction to Principal stresses

## 2. Resilience

(04 Periods)

Strain Energy, Resilience, proof resilience and modulus of resilience

Strain energy due to direct stresses and Shear Stress

Stresses due to gradual, sudden and falling load.

## 3. Moment of Inertia

(08 Periods)

Concept of moment of inertia and second moment of area

Radius of gyration

Theorem of perpendicular axis and parallel axis (with derivation)

Second moment of area of common geometrical sections : Rectangle, Triangle, Circle (without derivation);

Second moment of area for L,T and I section

Section modulus

## 4. Bending Moment and Shearing Force

(10 Periods)

Concept of various types of beams and form of loading

Concept of end supports-Roller, hinged and fixed

Concept of bending moment and shearing force

B.M. and S.F. Diagram for cantilever and simply supported beams with and without overhang subjected to concentrate and U.D.L.

## 5. Bending stresses

(06 Periods)

5.1 Concept of Bending stresses

5.2 Theory of simple bending, Derivation of Bending Equation

5.3 Use of the equation  $M = \frac{EI}{R} = \frac{E}{R} \int y^2 dA$

5.4 Concept of moment of resistance

5.5 Bending stress diagram

5.6 Section modulus for rectangular, circular and symmetrical I section.

5.7 Calculation of maximum bending stress in beams of rectangular, circular, and T section.

## 6 Columns

(08 Periods)

- Concept of column, modes of failure
- Types of columns, modes of failure of columns
- Buckling load, crushing load
- Slenderness ratio
- Effective length
- End restraints
- Factors effecting strength of a column
- Strength of column by Euler Formula without derivation
- Rankine Gourdun formula ( without derivation)



## 7. Torsion

(08 Periods)

- a. Concept of torsion, difference between torque and torsion.
- b. Derivation of Torsion Equation, use of torsion equation for circular shaft, (solid and hollow)
- c. Comparison between solid and hollow shaft with regard to their strength and weight.
- d. Power transmitted by shaft
- e. Concept of mean and maximum torque

## 8. Springs

(8 Periods)

- a. Closed coil helical springs subjected to axial load and calculation of:
  - i. Stress deformation
  - ii. Stiffness and angle of twist and strain energy
  - iii. Strain energy and proof resilience.
- b. Determination of number of plates of laminated spring (semi elliptical type only)

### LIST OF PRACTICALS

1. Tensile test on bars of Mild steel and Aluminum.
2. Bending tests on a steel bar or a wooden beam.
3. Impact test on metals
  - a) Izod test
  - b) Charpy test
4. Torsion test of solid specimen of circular section of different metals for determining modulus of rigidity.
5. To plot a graph between load and extension and to determine the stiffness of a helical spring.
6. Hardness test on different metals.

Note: All the tests need to be done as per prescribed Indian Standards.

### INSTRUCTIONAL STRATEGY

1. Expose the students to real life problems.
2. Plan assignments so as to promote problem solving abilities and develop continued learning skills.

### 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. SOM by RS Khurmi; S.Chand & Co; New Delhi
2. Mechanics of Materials by Dr. Kirpal Singh; Standard Publishers Distribution, New Delhi.
3. SOM by Birinder Singh,; Katson Publishing House, New Delhi.
4. Elements of SOM by D.R. Malhotra and H.C.Gupta; Satya Prakashan, 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 (Periods)	Marks Allotted (%)
1	12	20
2	04	06
3	08	12
4	10	16
5	06	10
6	08	12
7	08	12
8	08	12
<b>Total</b>	<b>64</b>	<b>100</b>





### 3.2 BASICS OF THERMODYNAMICS, HYDRAULICS AND PNEUMATICS

L T P

4 - 2

#### RATIONALE

A diploma holder has to assist in activities of installation, operation and maintenance of thermal & hydraulic devices, compressors and air-conditioning equipment. This subject has been included to impart basic knowledge of hydraulics, pneumatics and thermal engineering to the students.

#### LEARNING OUTCOMES:

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

- Explain various thermodynamic processes
- Describe the air standard cycles
- Measure temperature of hot surfaces
- Apply Pascal's law to general engineering devices
- Verify Bernoulli's theorem
- Measure pressure of the fluids
- Explain working of hydraulic devices and machines
- Describe concepts of pneumatics
- Use pneumatic tools







## DETAILED CONTENTS

### A. Thermodynamics

#### 1. Introduction

(04 Periods)

Energy, work and heat

Thermodynamic state and system, boundary, surrounding, universe

Types of thermodynamic systems: closed, open, isolated, adiabatic

Thermodynamic properties: pressure, volume, temperature, enthalpy, internal energy, entropy

#### 2. Gas Laws

(04 Periods)

Definition of gas,

Boyle's law, Charle's law, Joule's law, Avagadro's law, Regnault's law,

Ideal and real gas,

Characteristics equation, gas constant, universal gas constant.

Specific heat at constant pressure, specific heat at constant volume of gas,

Vander-Wall's equation

#### 3. Laws of Thermodynamic

(06 Periods)

Zeroth, first and second law of thermodynamics (concept only).

Applications of first law of thermodynamics

Steady flow energy equation,

Various thermodynamic processes - constant volume, constant pressure, isothermal, hyperbolic, adiabatic, polytropic, throttling and free expansion processes; P-V & T-S diagrams.

#### 4. Air Standard Cycles (without derivation)

(05 Periods)

Definition of heat engine cycle, net work done in a cycle and air standard efficiency of cycle,

Description of Carnot cycle, Otto cycle, Diesel cycle and Dual combustion cycle

### B. Hydraulics

#### 5. Introduction

(04 Periods)

Fluids and non-fluids, Liquid, gas and vapour

Properties of fluids: Mass density, specific weight, specific volume, specific gravity, viscosity, compressibility, vapour pressure, surface tension, capillarity

#### 6. Fluid statics

(04 Periods)

Concept of pressure, static pressure and pressure head

Types of pressure: Atmospheric pressure, gauge pressure, vacuum, absolute pressure

Measurement of pressure: Single tube manometer, U - tube manometer, Differential manometer, bourdon gauge

Pascal's law and its applications

#### 7. Flow of Fluids

(04 Periods)



Types of fluid flow: steady and unsteady, uniform and non - uniform, laminar and turbulent

Rate of flow and its units

Continuity equation of flow

Bernoulli's theorem (without proof) and its applications

Simple problems

## **8. Hydraulic Devices**

**(08 Periods)**

Principle of working,

Layout of hydraulic system,

Various components of hydraulic system and function of each component,

Types of hydraulic pumps – reciprocating pump, centrifugal pump, gear type pump, screw pump, vane type pump and their working

Description, operation and application of hydraulic machines – hydraulic ram, hydraulic jack, hydraulic brake, hydraulic accumulator, hydraulic press.

## **C. PNEUMATICS**

### **9. Introduction**

**(05 Periods)**

Basic concept of pneumatics.

Layout of pneumatic system.

Various components of pneumatic system and their functions.

Construction and working of reciprocating and rotary air compressor.

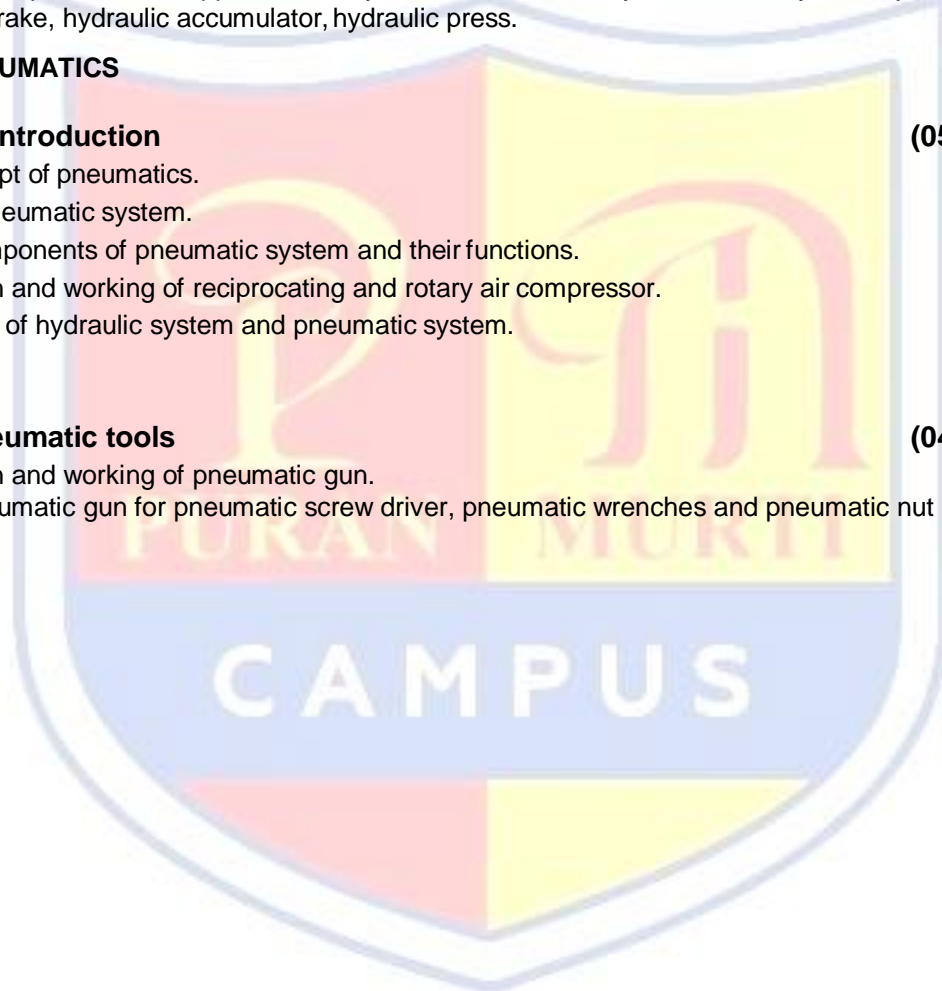
Comparison of hydraulic system and pneumatic system.

### **10. Pneumatic tools**

**(04 Periods)**

Construction and working of pneumatic gun.

Uses of pneumatic gun for pneumatic screw driver, pneumatic wrenches and pneumatic nut runner.





## LIST OF PRACTICALS

1. Measurement of temperature by thermocouple, pyrometer and infrared thermometer.
2. Measurement of pressure head by piezometer tube and manometer.
3. Verification of Bernoulli's theorem.
4. To study the hydraulic circuit of an automobile brake and hydraulic ram.
5. Use of hydraulic press in removal and fitting of bearing, bushes and cylinder liner.
6. Dismantling and assembling of gear pump.
7. Study of reciprocating air compressor.
8. Inflating and deflating of tyres, checking of air pressure in tyres.
9. Study of a pneumatic circuit.
10. Practice on pneumatic tools like pneumatic screw driver & pneumatic wrench.

Note: Safety precautions must be explained to the students before performing each practical.

## 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, assembly and disassembly exercises and viva-voce

## RECOMMENDED BOOKS

1. Hydraulics and Hydraulic Machines by RS Khurmi; S. Chand & Co. Ltd., New Delhi.
2. Hydraulics and Fluid Mechanics by Jagdish Lal; Metropolitan Book Company Ltd., Delhi.
3. Fluid Mechanic, Hydraulics and Hydraulic Machines by K.K. Arora; Standard Publishers Distributors, Delhi.
4. Engineering Thermodynamics by PK Nag; Tata McGraw Hill, Delhi
5. Basic Engineering Thermodynamics by Roy Chaudhary; Tata McGraw Hill, Delhi
6. Basic Thermodynamics by PB Joshi and US Tumne; Pune Vidyarthi Grah Prakashan
7. Engineering Thermodynamics by CP Arora; Tata McGraw Hill, Delhi
8. Hydraulic and Pneumatic Control by K Shammuga Sundaram, S. Chand & Co. Ltd., New Delhi.
9. Pneumatic Controls by Festo Didactic; Bangaluru
10. 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 (Periods)	Marks Allotted (%)
1	06	08
2	06	10
3	08	14
4	06	10



5	06	08
6	06	08
7	06	08
8	10	16
9	06	10
10	04	08
<b>Total</b>	<b>64</b>	<b>100</b>

## **BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING**

L T P  
3 - 2

### **RATIONALE**

The objective of this subject is to impart fundamental knowledge and skills regarding basic electrical and electronics engineering, which diploma holders will come across in their professional life. This course will provide the students to understand the basic concepts and principles of d.c. and a.c. fundamentals, electromagnetic induction, batteries, transformers, motors, distribution system, domestic installation, electrical safety etc. The students will also learn basic electronics including diodes and transistors and their applications.

### **LEARNING OUTCOMES**

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

- Measure basic electrical quantities.
- Measure and improve power factor in a given circuit.
- Explain the construction, working principle, performance and applications of transformers.
- Identify different wires of distribution system.
- Select and operate single phase and three phase motors.
- Follow electrical safety measures.
- Describe the characteristics and applications of diodes, transistors and thyristor.



## DETAILED CONTENTS

### 1. Application and Advantage of Electricity (03 periods)

Difference between ac and dc, various applications of electricity, advantages of electrical energy over other types of energy

### 2. Basic Electrical Quantities (04 periods)

Definition of voltage, current, power and energy with their units, name of instruments used for measuring above quantities, connection of these instruments in an electric circuit

### 3. AC Fundamentals (08 periods)

Electromagnetic induction-Faraday's Laws, Lenz's Law; Fleming's rules, Principles of a.c. Circuits; Alternating emf, Definition of cycle, frequency, amplitude and time

Period. Instantaneous, average, r.m.s and maximum value of sinusoidal wave; form factor and Peak Factor. Concept of phase and phase difference. Concept of resistance, inductance and capacitance in simple a.c. circuit. Power factor and improvement of power factor by use of capacitors. Concept of three phase system; star and delta connections; voltage and current relationship (no derivation)

### 4. Transformers (06 periods)

Working principle and construction of single phase transformer, transformer ratio, emf equation, losses and efficiency, cooling of transformers, isolation transformer, CVT, auto transformer (brief idea), applications.

### 5. Distribution System (06 periods)

Difference between high and low voltage distribution system, identification of three-phase wires, neutral wire and earth wire in a low voltage distribution system. Identification of voltages between phases and between one phase and neutral. Difference between three-phase and single-phase supply

### 6. Electric Motor (08 periods)

Description and applications of single-phase and three-phase motors. Connection and starting of three-phase induction motors by star-delta starter. Changing direction of rotation of a given 3 phase induction motor. Motors used for driving pumps, compressors, centrifuge, dyers etc. Totally enclosed submersible and flame proof motors

### 7. Domestic Installation (04 periods)

Distinction between light-fan circuit and single phase power circuit, sub-circuits, various accessories and parts of domestic electrical installation. Identification of wiring systems. Common safety measures and earthing

### 8. Electrical Safety (04 periods)

Electrical shock and precautions against shock, treatment of electric shock, concept of fuses and their



classification, selection and application, concept of earthing and various types of earthing, applications of MCBs and ELCBs

## 9. Basic Electronics

(05 periods)

Basic idea of semiconductors – P and N type; diodes, zener diodes and their applications, transistor – PNP and NPN, their characteristics and uses. Characteristics and applications of a thruster, characteristics and applications of stepper motors and servo motors in process control.





## LIST OF PRACTICALS

1. Connection of a three-phase motor and starter with fuses and reversing of direction of rotation
2. Connection of a single-phase induction motor with supply and reversing of its direction of rotation
3. Troubleshooting in domestic wiring system, including distribution board
4. Connection and reading of an electric energy meter
5. Use of ammeter, voltmeter, wattmeter, and multi-meter
6. Measurement of power and power factor in a given single phase ac circuit
7. Study of different types of fuses, MCBs and ELCBs
8. Study of zener diode as a constant voltage source and to draw its V-I characteristics
9. Study of earthing practices
10. To draw V-I characteristics of a (i) NPN transistor (ii) thyristor (SCR)
11. Study of construction and working of a (i) stepper motor and (ii) servo motor

## INSTRUCTIONAL STRATEGY

The teacher should give emphasis on understanding of concept and various terms used in the subject. Practical exercises will reinforce various concepts.

## 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, assembly and disassembly exercises and viva-voce

## RECOMMENDED BOOKS

1. Basic Electrical Engineering by PS Dhogal; Tata McGraw Hill Publishers, New Delhi
2. A Text Book of Electrical Technology, Vol. I and II by BL Thareja; S Chand and Co., New Delhi
3. Basic Electricity by BR Sharma; Satya Prakashan, New Delhi
4. Basic Electrical Engineering by JB Gupta, S Kataria and Sons, Delhi
5. Experiments in Basic Electrical Engineering by SK Bhattacharya and KM Rastogi, New Age International Publishers Ltd., New Delhi
6. Basic Electronics by VK Mehta; S Chand and Co., New Delhi
7. Electrical Machines by SK Bhattacharya; Tata McGraw Hill, New Delhi
8. Basic electronics and Linear circuits by NN Bhargava and Kulshreshta, Tata Mc Graw Hill New Delhi.
9. Electronic principles by SK Sahdev, Dhanpat Rai and Sons, New Delhi.
10. Electronic Devices and circuits by Rama Raddy Narora Publishing House Pvt. Ltd. New Delhi.
11. Principles of electrical and electronics Engineering by VK Mehta; S Chand and Co. New Delhi
12. E-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

## Websites for Reference:

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### SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	03	06
2	04	08
3	08	16
4	06	12
5	06	12
6	08	16
7	04	10
8	04	10
9	05	10
<b>Total</b>	<b>48</b>	<b>100</b>





• **WORKSHOP TECHNOLOGY-I**

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4 - -

**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 manufacturing processes is required to be imparted. Hence the subject of workshop technology.

**LEARNING OUTCOMES**

After undergoing the subject, students will be able to:

- Fabricate welding joints using gas welding, arc welding, TIG and MIG welding techniques.
- Select suitable (most appropriate) process, electrodes, various parameters of process for a given job.
- Explain respective principle of operations of modern welding processes.
- Inspect various welding joints, castings, forgings.
- Prepare pattern for given job.
- Select material and type of patterns, cores.
- Prepare sand moulds manually and on machine.
- Select type of moulding sand, adhesives, compact, strength and parameters of sand for given job.
- Cast a mould.
- Identify a suitable furnace, alloying elements
- Carry out deburring of castings.
- Test the properties of moulding sand (permeability, Strength, refractoriness, adhesiveness, cohesiveness).
- Explain the principle of forging, rolling, extrusion and drawing process.

## DETAILED CONTENTS

### 1. Welding

(20 periods)

#### Welding Process

Principle of welding, Classification of welding processes, Advantages and limitations of welding, Industrial applications of welding, Welding positions and techniques, symbols. Safety precautions in welding.

#### Gas Welding

Principle of operation, Types of gas welding flames and their applications, Gas welding equipment - Gas welding torch, Oxygen cylinder, acetylene cylinder, cutting torch, Blow pipe, Pressure regulators, Filler rods and fluxes and personal safety equipment for welding.

#### Arc Welding

Principle of operation, Arc welding machines and equipment. A.C. and D.C. arc welding, Effect of polarity, current regulation and voltage regulation, Electrodes: Classification, B.I.S. specification and selection, Flux for arc

welding. Requirements of pre heating, post heating of electrodes and work piece. Welding defects and their testing methods.

#### Other Welding Processes

Resistance welding: Principle, advantages, limitations, working and applications of spot welding, seam welding, projection welding and percussion welding, Atomic hydrogen welding, Shielded metal arc welding, submerged arc welding, Welding distortion, welding defects, methods of controlling welding defects and inspection of welded joints.

#### Modern Welding Methods

Methods, Principle of operation, advantages, disadvantages and applications of, Tungsten inert gas (TIG) welding, Metal inert gas (MIG) welding, Thermit welding, Electro slag welding, Electron beam welding, Ultrasonic welding, Laser beam welding, Robotic welding

### 2. Foundry Techniques

(24 periods)

#### 2.1. Pattern Making

Types of pattern, Pattern material, Pattern allowances, Pattern codes as per B.I.S., Introduction to cores, core boxes and core materials, Core making procedure, Core prints, positioning of cores

#### 2.2.. Moulding and Casting

##### Moulding Sand

Properties of moulding sand, their impact and control of properties viz. permeability, refractoriness, adhesiveness, cohesiveness, strength, flow ability, collapsibility, Various types of moulding sand, Testing of moulding sand. Safety precautions in foundry.

##### Mould Making

Types of moulds, Step involved in making a mould, Molding boxes, hand tools used for mould making, Molding processes: Bench molding, floor molding, pit molding and machine molding, Molding machines squeeze machine, jolt squeeze machine and sand slinger.

#### 2.2.3 Casting Processes

Charging a furnace, melting and pouring both ferrous and non ferrous metals, cleaning of castings, Principle, working and applications of Die casting: hot chamber and cold chamber, Centrifugal casting

#### 2.2.4. Gating and Riser System

Elements of gating system, Pouring basin, sprue, runner, gates, Types of risers, location of risers, Directional solidification Melting Furnaces

Construction and working of Pit furnace, Cupola furnace, Crucible furnace – tilting type, Electric furnace

Casting Defects



Different types of casting defects, Testing of defects: radiography, magnetic particle inspection and ultrasonic inspection.

### 3 Metal Forming Processes

(14 periods)

Press Working - Types of presses, type of dies, selection of press die, die material. Press Operations- Shearing, piercing, trimming, punching, notching, shaving, gearing, embossing, stamping

Forging - Open die forging, closed die forging, Press forging, upset forging, swaging, up setters, roll forging, Cold and hot forging

Rolling - Elementary theory of rolling, Types of rolling mills, Thread rolling, roll passes, Rolling defects and remedies

Extrusion and Drawing - Type of extrusion- Hot and Cold, Direct and indirect. Pipe drawing, tube drawing, wire drawing

### 4. Plastic Processing

(06 periods)

Industrial use of plastics, and applications- Advantages and limitations of use of plastics.

Injection moulding-principle, working of injection moulding machine.

Compression moulding-principle, and working of compression moulding machine.

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

#### MEANS OF ASSESSMENT

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

#### LIST OF RECOMMENDED BOOKS

1. Workshop Technology by BS Raghuvanshi : Dhanpat Rai and Sons Delhi
2. Elements of Workshop Technology by SK Choudhry and Hajra : Asia Publishing House
3. Welding Engineering by RL Aggarwal and T Manghnani; Khanna Publishers, Delhi
4. A Text Book of Production Engineering by PC Sharma; S Chand and Company Ltd. Delhi
5. Foundry Technology by KP Sinha and DB Goel; Roorkee Publishing House, Roorkee.
6. A Text Book of Manufacturing Science and Technology by A Manna, Prentice Hall of India, Delhi.
7. 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 (Periods)	Marks Allotted (%)
1	20	35
2	24	35
3	14	20



4	06	10
<b>Total</b>	<b>64</b>	<b>100</b>



## MECHANICAL WORKSHOP PRACTICE -1

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- - 6

### 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 need to be developed. Hence the subject of workshop practices.

### LIST OF PRACTICALS

General introduction to hand tools used in foundry, welding and pattern making and foundry shop.

#### Welding Shop

Job 1. Preparing gas welding joint in vertical/Horizontal position joining M.S. Plates Job 2. Exercise on gas cutting of mild steel plate with oxy-acetylene gas torch.

Job 3. Exercise on preparation of T Joint by arc welding Job 4.

Exercise on spot welding/seam welding

Job 5. Exercise on MIG and TIG welding

Job 6 Exercise on arc welding pipe joint MS.

#### Pattern making

Job 1. Preparation of solid/single piece pattern.

Job 2. Preparation of two piece/split pattern

Job 3. Preparation of a pattern on wooden lathe

Job 4. Preparation of a self cored pattern

Job 5. Preparation of a core box.

#### Foundry Shop

Job 1. Preparation of mould with solid pattern on floor.

Job 2. Preparation of floor mould of split pattern in cope and drag of moulding box.

Job 3 Moulding and casting of a solid pattern of aluminum

Job 4. Preparing a mould of step pulley and also preparing core for the same.

Job 5. A visit to cast iron foundry should be arranged to have first hand knowledge of cast iron melting pouring and casting.

Job 6. Testing of moisture contents and strength of moulding sand.

### INSTRUCTIONAL STRATEGY

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

- Quiz and viva-voce
- Actual jobs

## AUTOMOBILE WORKSHOP PRACTICE

L T P  
- - 4

### RATIONALE

For an automobile technician, it is necessary to develop the skills of handling and use of tools for servicing, repair and maintenance of the vehicle. The automobile workshop practice imparts basic knowledge of tools and vehicles as a base for the learner to be able to accomplish complex jobs. Some hands on practice will also enhance the skill.

### LEARNING OUTCOMES

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

- Follow safety procedures in automobile workshop.
- Identify and use general and special tools of autoshop.
- Remove and refit simple outside components.
- Wash the vehicles.

### DETAILED CONTENTS

1. General safety procedures to be followed in automobile workshop; and familiarization to safety equipment and their uses.
2. Identification and sketching of general tools of automobile workshop and practice to use them
3. Identification and sketching of special purpose tools and gauges of automobile workshop.
4. Removal and fitting of wheels and tyres of a two wheeler and repairing of punctures of tube.
5. Removal and fitting of wheels and tyres of car/jeep, tyre pressure measurement, repair of punctures of tubeless tyres.
6. Washing, greasing, wiping and polishing of a vehicle.
7. Removal, greasing and refitting of wheel bearing.
8. Replacement of clutch and brake wires of a two wheeler.
9. Removal and refitting of radiator and water hoses.
10. Removal and refitting of front and rear bumpers of a car/jeep.
11. Removal and refitting of battery.

### 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, assembly and disassembly exercises and viva-voce

### RECOMMENDED BOOKS

1. Car maintenance and repair by Arthur W. Judge
2. Automobile Engineering vol. 1 by Kirpal Singh



## SOFT SKILLS – I

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### 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:

- Identify components of effective verbal communication
- Prepare a report
- Learn the techniques of enhancing memory
- Set goals for overall personality development
- Understand the concept of quality and its implementation in an organization.





## DETAILED CONTENTS

- Soft Skills - Concept and Importance
- Communication Skills- Improving verbal communication
- Report Writing
- Method to enhance memory and concentration
- Component of overall personality- Dressing sense/etiquettes/body language etc.

In addition, the students must participate in the following activities to be organized in the institute.

- Sports
- NCC/NSS
- Camp – Blood donation
- Cultural Event

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







**PURAN MURTI**  
**CAMPUS**

A Unit of Puran Murti Educational Society

Approved by AICTE

Affiliated to Haryana State Board of Technical Education, Panchkula

