

**Curriculum for
Diploma Programme in
AIRCRAFT MAINTENANCE ENGINEERING
(AME)
CAMPUS**

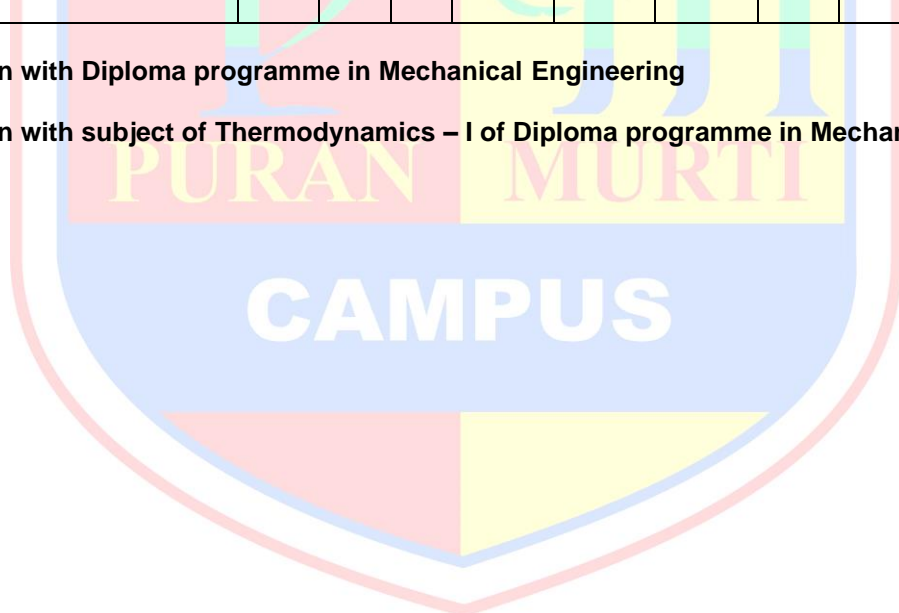


THIRD SEMESTER (AIRCRAFT MAINTENANCE ENGINEERING)

Sr. No.	Subject	STUDY SCHEME HOURS / WEEK			EVALUATION SCHEME						Total Marks
					Internal Assessment		External Assessment (Examination)				
		Th	Pr	Th	Pr	Th	Pr	Hrs.	Hrs.		
		Max. Marks	Max. Marks	Max. Marks	Hrs.	Max. Marks	Hrs.	Max. Marks	Hrs.		
		L	T	P							
3.1	*Strength of Materials	3	-	2	25	25	100	3	50	3	200
3.2	*Thermodynamics	3	-	2	25	25	100	3	50	3	200
3.3	Elements of Electrical and Electronics Engineering - I	4	-	4	25	25	100	3	50	3	200
3.4	Introduction to Aeronautics	4	-	-	25	-	100	3	-	-	125
3.5	Theory of Flight	5	-	-	25	-	100	3	-	-	125
3.6	*Computer Aided Drafting	-	-	4	-	50	-	-	50	3	100
	* SOFT SKILL -I	-	-	4	-	25	-	-	-	-	25
	Total	19	-	16	125	150	500	-	200	-	975

* Common with Diploma programme in Mechanical Engineering

+ Common with subject of Thermodynamics – I of Diploma programme in Mechanical Engineering



STRENGTH OF MATERIALS

L T P
3 - 2

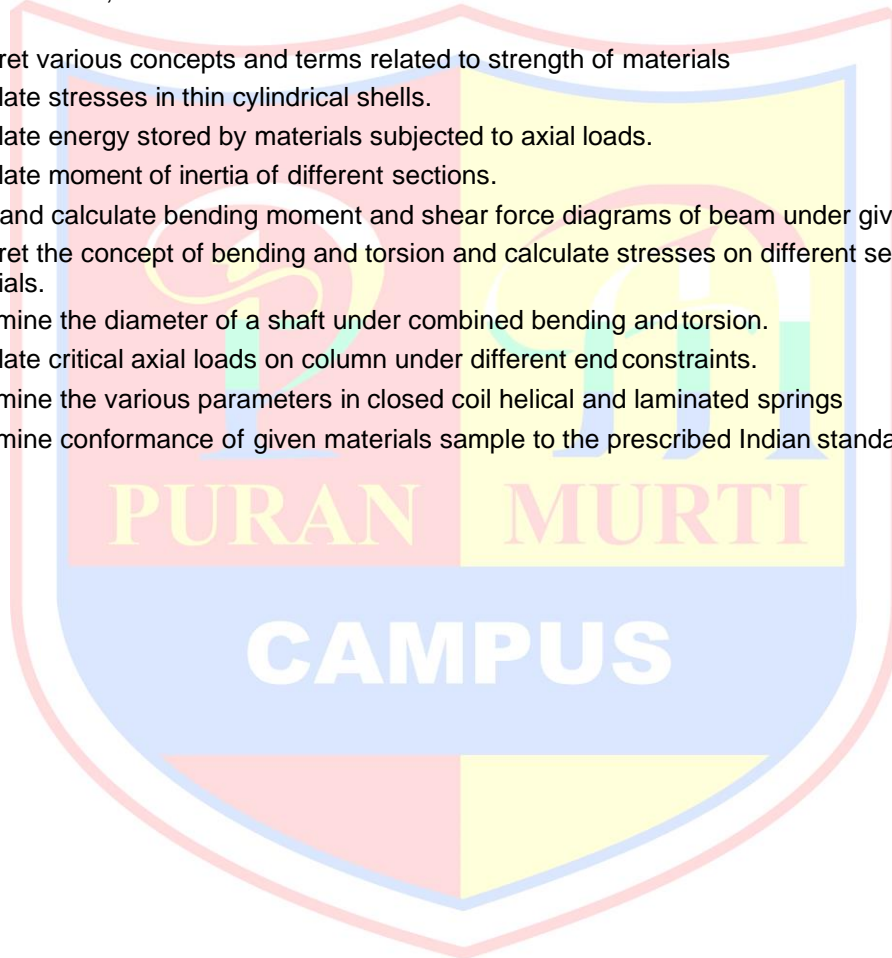
RATIONALE

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

(08 Periods)

Basic concept of load, stress and strain

Tensile, compressive and shear stresses

Linear strain, Lateral strain, Shear strain, Volumetric strain.

Concept of Elasticity, Elastic limit and limit of proportionality

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

(03 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

(08 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)

- a) Concept of Bending stresses
- b) Theory of simple bending, Derivation of Bending Equation
- c) Use of the equation $\frac{M}{I} = \frac{\sigma}{y} = \frac{E}{R}$
- d) Concept of moment of resistance
- e) Bending stress diagram
- f) Calculation of maximum bending stress in beams of rectangular, circular, and T section.

6 Columns

(05 Periods)

- a. Concept of column, modes of failure
- b. Types of columns, modes of failure of columns
- c. Buckling load, crushing load
- d. Slenderness ratio
- e. Effective length
- f. End restraints
- g. Factors effecting strength of a column
- h. Strength of column by Euler Formula without derivation
- i. Rankine Gourdan formula (without derivation)

7. Torsion

(06 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
- i. Concept of mean and maximum torque

8. Springs

(04 Periods)

Closed coil helical springs subjected to axial load and calculation of:

- Stress deformation
- Stiffness and angle of twist and strain energy
- Strain energy and proof resilience.

Determination of number of plates of laminated spring (semi elliptical type only)

LIST OF PRACTICALS

1. Tensile test on bars of Mild steel and Aluminium.
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

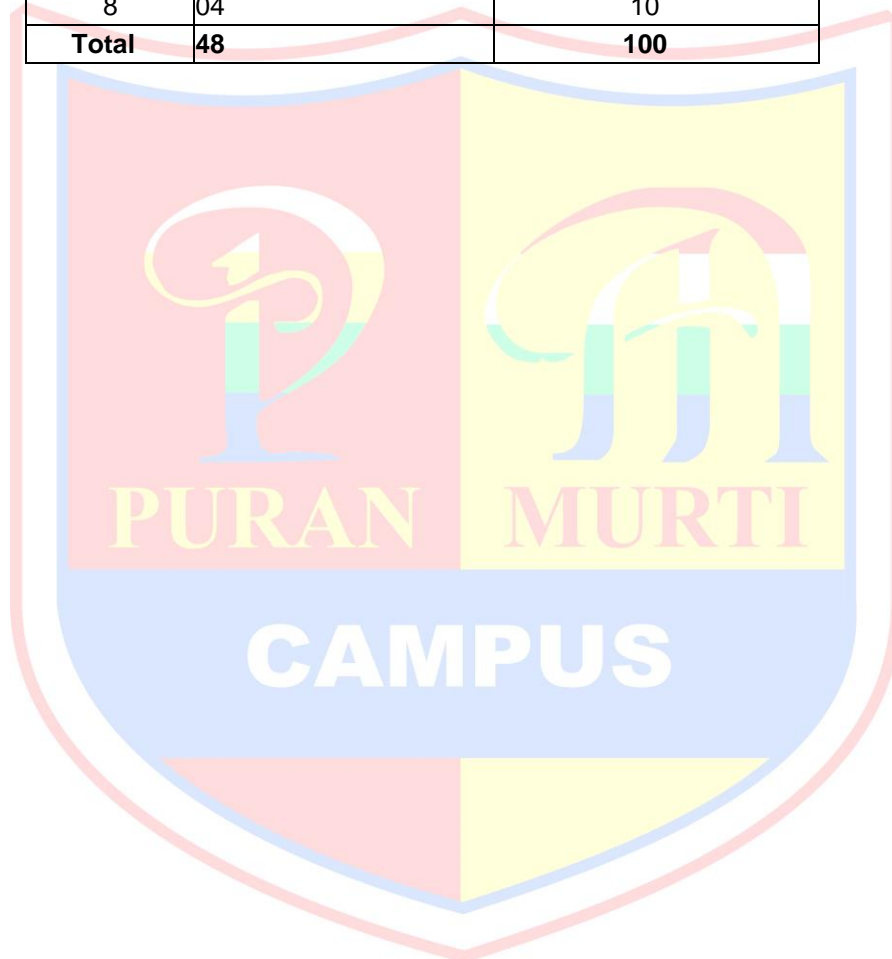
1. SOM by RS Khurmi; S.Chand & Co; New Delhi
2. Mechanics of Materials by Dr. Kirpal Singh; Standard Publishers Distribution, New Delhi.
3. SOM by Birinder Singh,; Katson Publishing House, New Delhi.
4. Elements of SOM by D.R. Malhotra and H.C.Gupta; Satya Prakashan, New Delhi.
5. E-books/e-tools/relevant 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	08	20
2	03	06
3	08	16
4	08	16
5	06	10
6	05	10
7	06	12
8	04	10
Total	48	100



THERMODYNAMICSL T P
3 - 2**RATIOANLE**

A diploma holder in this course is supposed to maintain steam generators, turbines, compressors and other power plant equipment. Therefore, it is essential to impart him basic concepts of thermodynamics, steam generators, steam turbines, and compressors and about IC engines.

LEARNING OUTCOMES

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

- Apply thermodynamic laws.
- Solve basic problems of gas equation using perfect gas laws.
- Determine enthalpy, specific heat capacity and P-V-T surface of an ideal and real gas.
- Determine various properties of Steam
- Explain the working, construction and applications of steam boilers and steam generators
- Explain the working, construction and application of air compressor.

DETAILED CONTENTS**1. Fundamental Concepts (04 Periods)**

Thermodynamic state and system, boundary, surrounding, universe, thermodynamic systems – closed, open, isolated, adiabatic, homogeneous and heterogeneous, macroscopic and microscopic, properties of system – intensive and extensive, thermodynamic equilibrium, quasi – static process, reversible and irreversible processes, Zeroth law of thermodynamics, definition of properties like pressure, volume, temperature, enthalpy and internal energy.

2. Laws of Perfect Gases (04 Periods)

Definition of gases, explanation of perfect gas laws – Boyle's law, Charle's law, Avagadro's law, Regnault's law, Universal gas constant, Characteristic gas constants and its derivation.

Specific heat at constant pressure, specific heat at constant volume of a gas, derivation of an expression for specific heats with characteristics, simple numerical problems on gas equation.

3. Thermodynamic Processes (06 Periods)

Types of thermodynamic processes – isochoric, isobaric, isothermal, adiabatic, isentropic, polytropic and throttling processes, equations representing the processes

Derivation of work done, change in internal energy, change in entropy, rate of heat transfer for the above processes

4. Laws of Thermodynamics (10 Periods)

Laws of conservation of energy, first law of thermodynamics (Joule's experiment) and its limitations, Application of first law of thermodynamics to Non-flow systems – Constant volume, Constant pressure, Adiabatic and polytropic processes, steady flow energy equation, Application of steady flow energy equation for turbines, pump, boilers, compressors, nozzles, and evaporators.

Heat source and sink, statements of second laws of thermodynamics: Kelvin Planck's statement, Clausius statement, equivalency of statements, Perpetual motion Machine of first kind, second kind, Carnot engine, Introduction of third law of thermodynamics, concept of irreversibility and concept of entropy.

5. Ideal and Real Gases (04 Periods)

Concept of ideal gas, enthalpy and specific heat capacities of an ideal gas, $P - V - T$ surface of an ideal gas, triple point, real gases, Vander-Wall's equation

6. Properties of Steam (04 Periods)

Formation of steam and related terms, thermodynamic properties of steam, steam tables, sensible heat, latent heat, internal energy of steam, entropy of water, entropy of steam, $T - S$ diagrams, Mollier diagram ($H - S$ Chart), Expansion of steam, Hyperbolic, reversible adiabatic and throttling processes, determination of quality of steam (dryness fraction),

7. Steam Generators (06 Periods)

Uses of steam, classification of boilers, function of various boiler mounting and accessories, comparison of fire tube and water tube boilers. Construction and working of Lancashire boiler, Nestler boiler, Babcock & Wilcox Boiler. Introduction to modern boilers.

8. Air Standard Cycles (05 Periods)

Meaning of air standard cycle – its use, condition of reversibility of a cycle
Description of Carnot cycle, Otto cycle, Diesel cycle, simple problems on efficiency for different cycles.

Comparison of Otto, Diesel cycles for same compression ratio, same peak pressure developed and same heat input.

Reasons for highest efficiency of Carnot cycle and all other cycles working between same temperature limits

9. Air Compressors (05 Periods)

Functions of air compressor – uses of compressed air, type of air compressors

Single stage reciprocating air compressor, its construction and working, representation of processes involved on $P - V$ diagram, calculation of work done.

Multistage compressors – advantages over single stage compressors, use of air cooler, condition of minimum work in two stage compressor (without proof), simple problems

Rotary compressors – types, working and construction of centrifugal compressor, axial flow compressor, vane type compressor

LIST OF PRACTICALS

1. Determination of temperature by
Thermocouple
Pyrometer
Infrared thermometer
2. Demonstration of mountings and accessories on a boiler.
3. Study the working of Lancashire boiler and Nestler boiler.
4. Study of working of high pressure boiler.
5. Study of boilers (Through industrial visit)
6. Determination of Dryness fraction of steam using calorimeter.
7. Demonstrate the working of air compressor.

INSTRUCTIONAL STRATEGY

1. Expose the students to real life problems.
2. Plan assignment so as to promote problem solving abilities.

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. Engineering Thermodynamics by PK Nag; Tata McGraw Hill, Delhi.
2. Basic Engineering Thermodynamics by Roy Chaudhary; Tata McGraw Hill, Delhi.
3. Engineering Thermodynamics by CP Arora; Tata McGraw Hill, Delhi.
4. A Treatise on Heat Engineering by VP Vasandani and DS Kumar; Metropolitan Book Company.
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	04	10
2	04	08
3	06	12
4	10	20
5	04	10
6	04	08
7	06	12
8	05	10
9	05	10
Total	48	100

ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING - I

L	T	P
4	-	4

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.

DETAILED CONTENTS**1. Application and Advantage of Electricity (03 hrs)**

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

2. Basic Electrical Quantities (05 hrs)

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 (06 hrs)

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 (07 hrs)

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 (08 hrs)

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 (12 hrs)

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 (06 hrs)

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

(06 hrs)

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. Batteries

(03 hrs)

Construction, charging and maintenance of lead and batteries, maintenance free batteries

10. Basic Electronics

(08 hrs)

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 thyristor, 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. Charging and testing of a lead – acid battery
4. Troubleshooting in domestic wiring system, including distribution board
5. Connection and reading of an electric energy meter
6. Use of ammeter, voltmeter, wattmeter, and multi-meter
7. Measurement of power and power factor in a given single phase ac circuit
8. Study of different types of fuses, MCBs and ELCBs
9. Study of zener diode as a constant voltage source and to draw its V-I characteristics
10. Study of earthing practices
11. To draw V-I characteristics of a (i) NPN transistor (ii) thyristor (SCR)
12. 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.

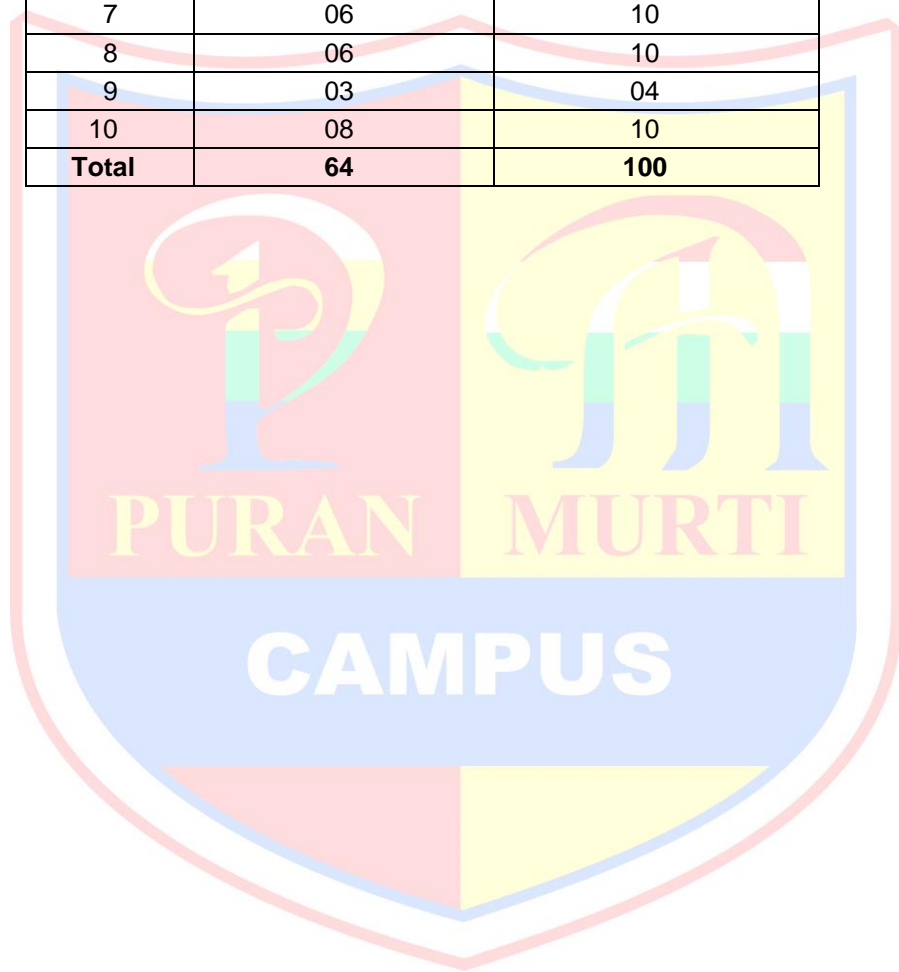
RECOMMENDED BOOKS

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

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	03	06
2	05	08
3	06	10
4	07	12
5	08	12
6	12	18
7	06	10
8	06	10
9	03	04
10	08	10
Total	64	100



INTRODUCTION TO AERONAUTICSL T P
4 - -**RATIONALE**

This course forms the first exposure to the discipline of Aircraft Maintenance Engineering. It starts with familiarization of airplanes and helicopters. The subject is built up slowly and steadily by introducing the terminology and basis of flight mechanics, airplane structures, power plant, systems etc. At the end of the subject, the student will be fully acquainted with the basics of Aeronautical engineering.

DETAILED CONTENTS**1. Introduction (7 hrs)**

Mankind's desire to fly, various efforts in Pre-Wright Brothers era, brief historical sketch, Wright flyer, earlier types of flying machines, development of aeronautics, progress in Aircraft design and applications, different types of heavier than air vehicles along with prominent features. Airplane, Helicopter, Hovercraft, V/STOL machines, modern developments

2. Airplane Aerodynamics (10 hrs)

Nomenclature used in Aerodynamics, different parts of airplane, Wing as lifting surface, Types of wing plan forms, Aerodynamic features like Aerofoil pressure distribution, Aerodynamic forces and moments, Lift and Drag. Drag polar, L/D ratio, high lift devices, Airplane performance like Thrust/Power available, climb and glide, maximum range and endurance, take off and landings, Illustrations through sketches/plots.

3. Airplane Stability and Control (7 hrs)

Airplane axis system, forces and moments about longitudinal, lateral and vertical axes, equilibrium of forces developed on wing and horizontal tail, centre of gravity, its importance in stability and control. Control surfaces, elevators, ailerons, and rudder

4. Airplane Propulsion (10 hrs)

Requirement of power, various means of producing power, Brief description of thermodynamics of engines, Piston engines, Jet engines. Engine airframe combinations of various types, their performance, detailed functioning of components of a Piston-Prop engine, use of propellers as means of producing forward thrust, functioning of Jet engine, turbo-prop, turbo-fan, turbo-shaft, Prop-fan, possible locations of power plant on airplane

5. Airplane Structure, Materials and Production (9 hrs)

Structural arrangement of earlier airplane, developments leading to all metal aircraft, Strength to weight ratio - choice of aircraft materials for different parts, detailed description of wing, tail and fuselage joints, stress-strain diagrams, plane and space, trusses, loads on airplane components, mechanical properties of materials.

6. Aircraft Instruments (6 hrs)

Flight instruments, air speed indicators, altimeters, rate of climb/descent meter, gyro based instruments, engine performance measuring instruments, basic instruments in avionics.

7. Aircraft Systems (8 hrs)

Elementary ideas about hydraulic and pneumatic systems, pressurization, temperature control and oxygen system, system integration, accessories, aircraft electrical system: generation and distribution of electricity on board the airplane, flight control system temperature / environment, aircraft fuel system, fire protection, ice and rain protection system.

8. Airplane Design, Types of Certification and Airworthiness (7 hrs)

Basic steps in airplane design, airplane specification, part/component wise specification, design and testing for certification, airworthiness requirements, air safety requirements and standards.

INSTRUCTIONAL STRATEGY

1. Use computer based learning aids for effective teaching-learning
2. Expose students to real life problems about aeronautics
3. Plan assignments so as to promote problem solving abilities and develop continued learning skills

RECOMMENDED BOOKS

1. Fundamentals of Flight by Y R S Shevell; Prentice Hall, Delhi
2. Aircraft Instruments by E H J Pallet; Himalayan Books, Delhi
3. Introduction to Flight by John Anderson Jr.; McGraw Hill, Delhi
4. Aircraft Electrical Systems by E H J Pallet; Himalayan Books, Delhi
5. Jet Engine Manual by E W Somerset Maugham,, BIP Publications, Delhi
6. Fundamentals of Flight by Dr. O. P. Sharma and Lalit Gupta, Himalayan Books, Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	07	10
2	10	16
3	07	10
4	10	16
5	09	14
6	06	10
7	08	14
8	07	10
Total	64	100

THEORY OF FLIGHT**L T P**
5 - -**RATIONALE**

This subject enables the aircraft maintenance engineer with the insight of pre and post requisites of flight. It will facilitate him in his work to meet the desired objectives of flights.

DETAILED CONTENTS**1. Aerodynamics (26 hrs)**

General principle of Aerodynamics and their application in Aircraft.
Different parts of Aircraft and their utility. Effect of engine power and aircraft weight on performance of aircraft.
Lift and means of producing lift.
Concepts of Air Resistance, Stream Lines, Stream Lining, Skin Friction and Boundary Layer.
Bernoulli's Theorem-Venturi tube.
Drags and their classification
Lift/drag Ratio considerations.
Forces acting on the aircraft during all phases of flight.

2. Physics of Atmosphere (I.S.A.) (6 hrs)

The atmosphere, Air Density, Pressure and Temperature change with Altitude and their effect on the performance of Aircraft. International Standard atmosphere (I.S.A.) and their applications.

3. Types of stability and control (6 hrs)**4. Air frame primary flying controls. (6 hrs)****5. Air frame secondary flying controls. (6 hrs)****6. Characteristics of subsonic, transonic and supersonic airflow used in aircraft flight. (6 hrs)****7. Characteristics of the aerofoils used for subsonic and transonic flights (6 hrs)****8. Various types of high lift and drag devices, their operation, vortex generators boundary layer fences etc., (6 hrs)****9. Knowledge of the following: (6 hrs)**

Sweepback, High incidence tail plane aerodynamic loading, Superstall, Load Factors, Aquaplaning, Fly over concept.

10. A brief knowledge of rotor craft (6 hrs)

INSTRUCTIONAL STRATEGY

The teachers should lay emphasis on basic concepts involved in the flight of an aircraft. Suitable charts and figures should be shown to the students so that they can grasp the basic concept very well.

RECOMMENDED BOOKS

1. Airframe & Power plant Mechanics (General Handbook EA-AC 65-9A) FAA
2. Aircraft Materials & Processes by Titterton; Pitman Publishing Corporation, USA
3. Mechanics of Flight by A C Karmode and D R Philpott, Pearson Publishing, Delhi
4. Standard Aircraft Handbook by Larry Reithmaier and Ron Sterkenburg; McGraw Hill Education, Delhi
5. Principles of Electronics by V K Mehta; S Chand & Company, New Delhi
6. Airframe and Powerplant Mechanics (AC 65-15A)-Airframe Hand Book FAA
7. Automatic Flight Controls-by E.H.J. Pallet and Shawn Coyle
8. Airframe and Powerplant Mechanics (EA-AC 65-9A)-General Hand Book

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	26	28
2	06	08
3	06	08
4	06	08
5	06	08
6	06	08
7	06	08
8	06	08
9	06	08
10	06	08
Total	80	100

COMPUTER AIDED DRAFTINGL T P
4 - -**RATIONALE**

A diploma holder is expected to prepare and interpret CAD Drawings. Hence this subject.

LEARNING OUTCOMES

On completion of this course, students will be able to :

- Know the advantages of using CAD in comparison with conventional method.
- Draw and interpret CAD drawings using drawing, editing and viewing in CAD software.
- Create easy and complex solids and assemblies using various tools in CAD software.
- Assemble various mechanisms using CAD software.

DETAILED CONTENTS**1. Introduction to Computer Aided Drafting (2D) commands of anyone software (Auto CAD, ProE, Solid works, Unigraphics etc.) (6 drawing sheets)**

Concept of AutoCAD, Tool bars in CAD software, coordinate system, snap, grid, and ortho mode (Absolute, Relative and Polar), setting of units and layout.

Drawing commands – point, line, arc, circle, ellipse,

Editing commands – scale, erase, copy, stretch, lengthen and explode.

Dimensioning and placing text in drawing area

Sectioning and hatching

Inquiry for different parameters of drawing entity

Create layers within a drawing

Specifying Geometrical Dimensioning & tolerancing (GD&T) parameters in drawing

2. Detail and assembly drawing of the following using Drafting Software (2D) (4 sheets)

Plummer Block

Wall Bracket

Stepped pulley, V-belt pulley

Flanged coupling

Machine tool Holder (Three views)

Screw jack, joints, crank shaft and piston.

3. Isometric Drawing by CAD using any part modeling Software (3D) (one sheet)

Drawings of following on computer:

- Cone
- Cylinder
- Cube
- Spring
- Isometric view of objects

4. Introduction to any part modeling software(ProE, Solid works,AutoCAD,Uni Graphic , Catia etc.)

Introduction to Sketcher: Sketch Entities, Sketch Tools, Blocks, Dimensioning

Part modeling (4 models)

Part Modeling Tools:-

Creating reference planes Creating Extrude features Creating Revolve

Creating Swept features Creating Loft features Creating Reference -
points, axis, coordinates

Creating curves Creating Fillet features Inserting Hole types Creating Chamfer

Creating Shell Creating Rib

Environment & Utilities - Working with views and manipulating views.

Create parts e.g. Piston, Pin, Bolts and Nuts, Fixture, Jig parts, Washer, Rings, Gaskets,
Machine parts etc.**Assembly and Simulation****(2 sheets)****Assembly Modeling Tools:-**

Introduction to Assembly Modeling & Approaches – Top down and Bottom up approach, Applying Standard Mates- Coincident, Parallel, Perpendicular, Tangent, Concentric, Lock, Distance, Angle. Assemble of any two Mechanism e.g. Crank slider mechanism, Piston and Cylinder assembly, Quick Return Mechanism (QRM), Machine vices, Crank Shaft, Bearing assembly, any other mechanism.

INSTRUCTIONAL STRATEGY

1. Teachers should show model or realia of the component/part whose drawing is to be made.
2. Emphasis should be given on cleanliness, dimensioning, & layout of sheet. Teachers should ensure use of IS codes related to drawing.

MEANS OF ASSESSMENT

- Drawings
- Assignments and quiz/class tests, mid-term and end-term written tests, model/prototype making
- Software installation, operation, and viva-voce

LIST OF RECOMMENDED BOOKS

1. Engineering Drawing with AutoCAD 2000 by T. Jeyapooran; Vikas Publishing House, Delhi.
2. AutoCAD for Engineering Drawing Made Easy by P. Nageswara Rao; Tata McGraw Hill, New Delhi.
3. AutoCAD 2000 for you by Umesh Shettigar and Abdul Khader; Janatha Publishers, Udipi.
4. Auto CAD 2000 by Ajit Singh, TMH, New Delhi.
5. Instruction Manual of the software used (AutoCAD, ProE, Solidwors, Unigraphic etc.)

6 e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTTR.

Websites for Reference:

<http://swayam.gov.in>

SOFT SKILLS – I

L	T
P	
-	- 4

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.

