



**SCHEME FOR
THIRD SEMESTER (AIRCRAFT MAINTENANCE ENGINEERING)**

Sr. No	Subject	STUDY SCHEME Hrs/week L T P			EVALUATION SCHEME						Total Marks
					Internal Assessment		External Assessment (Examination)				
					Theory	Practical	Written Paper		Practical		
					Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
					3.1*	Thermodynamics	4	-	2	25	
3.2	Introduction to Aeronautics	4	-	-	50	-	100	3	-	-	150
3.3	Elements of Electrical and Electronics Engineering - I	3	-	4	25	25	100	3	50	3	200
3.4*	Strength of Materials	4	-	2	25	25	100	3	50	3	200
3.5*	Computer Aided Drafting	-	-	3	-	50	-	-	50	3	100
3.6	Aircraft Rules, Regulations and CAR - I	4	-	-	50	-	100	3	-	-	150
3.7	Theory of Flight	5	-	-	50	-	100	3	-	-	150
Student Centred Activities#		-	-	5	-	25	-	-	-	-	25
Total		24	-	16	225	150	600	-	200	-	1175

* Common with diploma programme in Mechanical Engineering

Student Centred Activities will comprise of co-curricular activities like extension lectures, library studies, games, hobby clubs e.g. photography, painting, singing, seminars, declamation contests, educational field visits, N.C.C., NSS, Cultural Activities, Civil Defence/Disaster Management activities etc.



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SYLLABUS: Polytechnic (AME)

Department: Aircraft Maintenance Engineering-3rd Semester

Subject: Thermodynamics (Theory)

Subject Code:

DETAILED CONTENTS

Unit No.1 Fundamental Concepts

- Topic No.1: Thermodynamic state and system
- Topic No.2: Boundary, surrounding, universe
- Topic No.3: Thermodynamic systems – closed, open, isolated, adiabatic, homogeneous and heterogeneous
- Topic No.4: Macroscopic and microscopic
- Topic No.5: Properties of system – intensive and extensive
- Topic No.6: Thermodynamic equilibrium
- Topic No.7: Quasi – static process
- Topic No.8: Reversible and irreversible processes
- Topic No.9: Zeroth law of thermodynamics
- Topic No.10: Definition of properties like pressure, volume, temperature, enthalpy, internal energy.

Unit No.2. Laws of Perfect Gases

- Topic No.11: Definition of gases
- Topic No.12: Explanation of perfect gas laws – Boyle's law, Charles's law
- Topic No.13: Avogadro's law, Renault's law
- Topic No.14: Universal gas constant, characteristic gas constants, derivation
- Topic No.15: Specific heat at constant pressure
- Topic No.16: Specific heat at constant volume of gas
- Topic No.17: Derivation of an expression for specific heats with characteristics
- Topic No.18: Simple problems on gas equation

Unit No.3. Thermodynamic Processes on Gases

- Topic No.19: Types of thermodynamic processes – isochoric, isobaric, isothermal, hyperbolic
- Topic No.20: Isentropic, polytropic and throttling processes
- Topic No.21: Equations representing the processes
- Topic No.22: Derivation of work done, change in internal energy
- Topic No.23: Change in entropy, rate of heat transfer for the above processes

Unit No.4. Laws of Thermodynamics

- Topic No.24: Laws of conservation of energy
- Topic No.25: first law of thermodynamics (Joule's experiment)
- Topic No.26: Application of first law of thermodynamics to non-flow systems – Constant volume, constant pressure
- Topic No.27: Adiabatic and polytropic processes, steady flow energy equation
- Topic No.28: Application of steady flow energy to equation
- Topic No.29: Turbines, pump, boilers, compressors, nozzles, evaporators, limitations.
- Topic No.30: Heat source and heat sinks
- Topic No.31: Statement of second laws of thermodynamics: Kelvin Planck's statement
- Topic No.32: Classius statement, equivalence of statements
- Topic No.33: Perpetual motion Machine of first kind, second kind, Carnot engine
- Topic No.34: Introduction of third law of thermodynamics, concept of irreversibility, entropy.

Unit No.5. Ideal and Real Gases

- Topic No.35: Concept of ideal gas
- Topic No.36: Enthalpy and specific heat capacities of an ideal gas
- Topic No.37: P – V – T surface of an ideal gas
- Topic No.38: Triple point, real gases, Vander-Wall's equation

Unit No.6. Properties of Steam

- Topic No.39: Formation of steam and related terms
- Topic No.40: Thermodynamics properties of steam
- Topic No.41: Steam tables, internal latent heat
- Topic No.42: Internal energy of steam, entropy of water, entropy of steam



Topic No.43: T- S diagrams, Molliès diagram (H – S Chart)

Topic No.44: Expansion of steam, Hyperbolic

Topic No.45: Reversible adiabatic and throttling processes

Topic No.46: Quality of steam (dryness fraction)

Topic No.47: Finding dryness fraction using separating and throttling calorimeter, Rankine cycle

Unit No.7.Steam Generators

Topic No.48: Uses of steam, classification of boilers

Topic No.49: Comparison of fire tube and water tube boilers

Topic No.50: Construction features of Lancashire boiler

Topic No.51: Nestler boiler, Babcock & Wilcox Boiler

Topic No.52: Introduction to modern boilers

Unit No.8.Air Compressors

Topic No.53: Functions of air compressor – uses of compressed air

Topic No.54: Type of air compressors

Topic No.55: Single stage reciprocating air compressor

Topic No.56: Its construction and working

Topic No.57: Representation of processes involved on P – V diagram, calculation of work done

Topic No.58: Multistage compressors – advantages over single stage compressors

Topic No.59: Use of air cooler – condition of minimum work in two stage compressor (without proof) simple problems

Topic No.60: Rotary compressors – types

Topic No.61: Descriptive treatment of centrifugal compressor

Topic No.62: Axial flow compressor, vane type compressor

Unit No.9.Introduction to Heat Transfer

Topic No.63: Modes of heat transfer

Topic No.64: Fourier's law

Topic No.65: Steady state conduction

Topic No.66: Composite structures

Topic No.67: Natural and forced convection, thermal radiation

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
4	-	-	25	-	100	3	-	-	125

INSTRUCTIONAL STRATEGY

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

TEXT 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.



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SUGGESTED DISTRIBUTION OF MARKS

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





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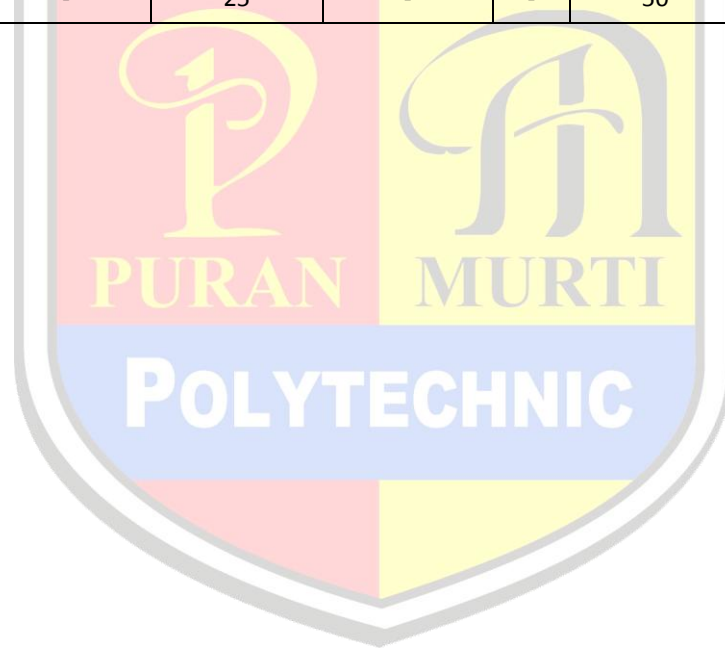
Subject: Thermodynamics (Practical)

Subject Code:

LIST OF PRACTICALS

1. Determination of temperature by
 - Thermocouple
 - Pyrometer
 - Infrared thermometer
2. Demonstration of mountings and accessories on a boiler.
3. Study of boilers (through industrial visit)
4. Study of air compressors.
5. Demonstration of heat transfer through conduction, convection and Radiation

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
-	-	2	-	25	-	-	50	3	75





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Subject: Introduction to Aeronautics (Theory)

Subject Code:

DETAILED CONTENTS

Unit No.1 Introduction

- Topic No.1: Mankind's desire to fly
- Topic No.2: Various efforts in Pre-Wright Brothers era
- Topic No.3: Brief historical sketch
- Topic No.4: Wright flyer, earlier types of flying machines
- Topic No.5: Development of aeronautics
- Topic No.6: Progress in Aircraft design and applications
- Topic No.7: Different types of heavier than air vehicles along with prominent features
- Topic No.8: Airplane, Helicopter, Hovercraft, V/STOL machines, modern developments

Unit No.2 Airplane Aerodynamics

- Topic No.9: Nomenclature used in Aerodynamics
- Topic No.10: Different parts of airplane
- Topic No.11: Wing as lifting surface
- Topic No.12: Types of wing plan forms
- Topic No.13: Aerodynamic features like Aerofoil pressure distribution
- Topic No.14: Aerodynamic forces and moments
- Topic No.15: Lift and Drag. Drag polar, L/D ratio, high lift devices
- Topic No.16: Airplane performance like Thrust/Power available
- Topic No.17: Climb and glide
- Topic No.18: Maximum range and endurance
- Topic No.19: Take off and landings
- Topic No.20: Illustrations through sketches/plots.

Unit No.3 Airplane Stability and Control

- Topic No.21: Airplane axis system
- Topic No.22: Forces and moments about longitudinal
- Topic No.23: Lateral and vertical axes
- Topic No.24: Equilibrium of forces developed on wing and horizontal tail
- Topic No.25: Centre of gravity
- Topic No.26: Its importance in stability and control
- Topic No.27: Control surfaces, elevators, ailerons, and rudder

Unit No.4 Airplane Propulsion

- Topic No.28: Requirement of power
- Topic No.29: various means of producing power
- Topic No.30: Brief description of thermodynamics of engines, Piston engines, Jet engines
- Topic No.31: Engine airframe combinations of various types
- Topic No.32: Their performance, detailed functioning of components of a Piston-Prop engine
- Topic No.33: Use of propellers as means of producing forward thrust
- Topic No.34: Functioning of Jet engine
- Topic No.35: Turbo-prop, turbo-fan, turbo-shaft, Prop-fan
- Topic No.36: Possible locations of power plant on airplane

Unit No.5 Airplane Structure, Materials and Production

- Topic No.37: Structural arrangement of earlier airplane
- Topic No.38: Developments leading to all metal aircraft
- Topic No.39: Strength to weight ratio - choice of aircraft materials for different parts
- Topic No.40: Detailed description of wing
- Topic No.41: Tail and fuselage joints
- Topic No.42: Stress-strain diagrams, plane and space
- Topic No.43: Trusses, loads on airplane components
- Topic No.44: Mechanical properties of materials.



Unit No.6 Aircraft Instruments

- Topic No.45: Flight instruments
- Topic No.46: Air speed indicators
- Topic No.47: Altimeters, rate of climb/descent meter
- Topic No.48: Gyro based instruments
- Topic No.49: Engine performance measuring instruments
- Topic No.50: Basic instruments in avionics.

Unit No. 7 Aircraft Systems

- Topic No.51: Elementary ideas about hydraulic and pneumatic systems Pressurization
- Topic No.52: Temperature control and oxygen system
- Topic No.53: System integration, accessories
- Topic No.54: Aircraft electrical system: generation and distribution of electricity on board the airplane
- Topic No.55: Flight control system temperature / environment
- Topic No.56: Aircraft fuel system, fire protection, ice and rain protection system.

Unit No. 8 Airplane Design, Types of Certification and Airworthiness

- Topic No.57: Basic steps in airplane design
- Topic No.58: Airplane specification
- Topic No.59: Part/component wise specification
- Topic No.60: Design and testing for certification
- Topic No.61: Airworthiness requirements
- Topic No.62: Air safety requirements and standards.

STUDY SCHEME	EVALUATION SCHEME								Total Marks
	Internal Assessment				External Assessment (Examination)				
	Hrs/week			Theory	Practical	Written Paper		Practical	
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
4	-	-	50	-	100	3	-	-	150

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

TEXT BOOKS:

1. Fundamentals of Flight by 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

REFERENCE BOOKS:

1. Aircraft Electrical Systems by E H J Pallet; Himalayan Books, Delhi
2. Jet Engine Manual by E W Somerset Maugham,, BIP Publications, Delhi
3. Fundamentals of Flight by Dr. O. P. Sharma and Lalit Gupta, Himalayan Books, Delhi



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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





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Subject: Elements of Electrical and Electronics Engineering- I (Theory)

Subject Code:

DETAILED CONTENTS

Unit No. 1. Application and Advantage of Electricity

- Topic No.1: Difference between ac and dc
- Topic No.2: Various applications of electricity
- Topic No.3: Advantages of electrical energy over other types of energy

Unit No. 2. Basic Electrical Quantities

- Topic No.4: Definition of voltage, current, power and energy with their units
- Topic No.5: Name of instruments used for measuring above quantities

Unit No. 3. AC Fundamentals

- Topic No.6: Electromagnetic induction-Faraday's Laws
- Topic No.7: Lenz's Law; Fleming's rules
- Topic No.8: Principles of a.c. Circuits
- Topic No.9: Alternating emf, Definition of cycle, frequency, amplitude and time period
- Topic No.10: Instantaneous, average, r.m.s and maximum value of sinusoidal wave; form factor and Peak Factor
- Topic No.11: Concept of phase and phase difference
- Topic No.12: Concept of resistance, inductance and capacitance in simple a.c. Circuit
- Topic No.13: Power factor and improvement of power factor by use of capacitors
- Topic No.14: Concept of three phase system; star and delta connections
- Topic No.15: Voltage and current relationship (no derivation)

Unit No. 4. Transformers

- Topic No.16: Working principle and construction of single phase transformer
- Topic No.17: Transformer ratio, emf equation, losses and efficiency
- Topic No.18: Cooling of transformers, isolation transformer
- Topic No.19: CVT, auto transformer (brief idea), applications

Unit No. 5 Distribution System

- Topic No.20: Difference between high and low voltage distribution system
- Topic No.21: Identification of three-phase wires, neutral wire and earth wire in a low voltage distribution system
- Topic No.22: Identification of voltages between phases and between one phase and neutral
- Topic No.23: Difference between three-phase and single-phase supply

Unit No. 6. Electric Motor

- Topic No.24: Description and applications of single-phase and three-phase motors
- Topic No.25: Connection and starting of three-phase induction motors by star-delta starter
- Topic No.26: Changing direction of rotation of a given 3 phase induction motor
- Topic No.27: Motors used for driving pumps, compressors, centrifuge, dyers etc
- Topic No.28: Totally enclosed submersible and flame proof motors

Unit No.7. Domestic Installation

- Topic No.29: Distinction between light-fan circuit and single phase power circuit, sub-circuits
- Topic No.30: Various accessories and parts of domestic electrical installation
- Topic No.31: Identification of wiring systems. Common safety measures and earthing

Unit No. 8. Electrical Safety

- Topic No.32: Electrical shock and precautions against shock
- Topic No.33: Treatment of electric shock
- Topic No.34: Concepts of fuses and their classification
- Topic No.35: Selection and application
- Topic No.36: Concept of earthing and various types of earthing
- Topic No.37: Applications of MCBs and ELCBs

Unit No. 9. Batteries

- Topic No.38: Construction, charging and maintenance of lead and batteries
- Topic No.39: Maintenance free batteries



Unit No. 10. Basic Electronics

- Topic No.40: Basic idea of semiconductors – P and N type
Topic No.41: Diodes, zener diodes and their applications
Topic No.42: Transistor – PNP and NPN
Topic No.43: Their characteristics and uses. Characteristics and applications of a thyristor
Topic No.44: Characteristics and applications of stepper motors and servo motors in process control.

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
3	-	-	25	-	100	3	-	-	125

INSTRUCTIONAL STRATEGY

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

TEXT 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

REFERENCE BOOKS:

1. Electrical Machines by SK Bhattacharya; Tata McGraw Hill, New Delhi
2. Basic electronics and Linear circuits by NN Bhargava and Kulshreshta, Tata Mc Graw Hill New Delhi.
3. Electronic principles by SK Sahdev, Dhanpat Rai and Sons, New Delhi.
4. Electronic Devices and circuits by Rama Raddy Narora Publishing House Pvt. Ltd. New Delhi.
5. 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	04	08
3	04	10
4	06	12
5	06	12
6	08	16
7	06	12
8	04	10
9	02	04
10	05	10
Total	48	100

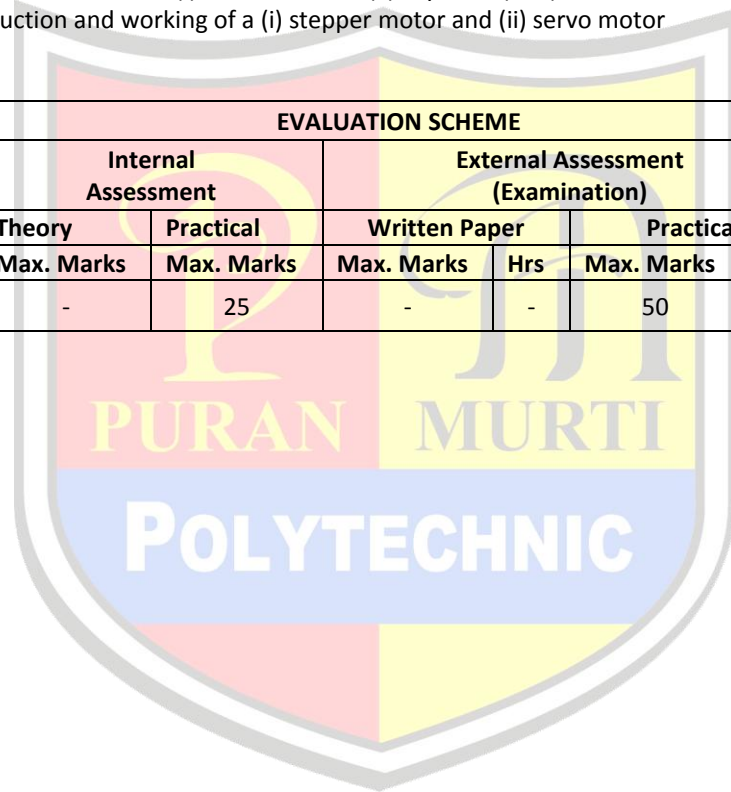


Subject: Elements of Electrical and Electronics Engineering- I (Practical)

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

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
-	-	4	-	25	-	-	50	3	75





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Subject: Strength of Materials (Theory)

Subject Code:

DETAILED CONTENTS

Unit No.1. Stresses and Strains

- Topic No.1: Concept of load, stresses and strain
- Topic No.2: Tensile compressive and shear stresses and strains
- Topic No.3: Concept of Elasticity, Elastic limit and limit of proportionality.
- Topic No.3.1: Hook's Law
- Topic No.3.2: Young Modulus of elasticity
- Topic No.3.4: Nominal stress
- Topic No.3.5: Stress strain diagram
- Topic No.3.6: Yield point, plastic stage
- Topic No.3.7: Ultimate strength and breaking stress
- Topic No.3.8: Percentage elongation
- Topic No.3.8: Proof stress and working stress
- Topic No.3.9: Factor of safety
- Topic No.3.10: Poisson's ratio
- Topic No.3.11: Shear modulus
- Topic No.4: Longitudinal and circumferential stresses in seamless thin walled cylindrical shells (derivation of these formulae not required)

Unit No. 2. Resilience

- Topic No.5: Resilience, proof resilience and modulus of resilience
- Topic No.6: Strain energy due to direct stresses
- Topic No.7: Stresses due to gradual, sudden and falling load.
- Topic No.8: Numerical problems

Unit No.3. Moment of Inertia

- Topic No.9: Concept of moment of Inertia and second moment of area
- Topic No.10: Radius of gyration, section modulus
- Topic No.11: Theorem of perpendicular axis and parallel axis (without derivation)
- Topic No.12: Second moment of area of common geometrical sections: Rectangle, Triangle, Circle (without derivation) Second moment of area for I, T, L, Z section
- Topic No.13: Simple numerical problems.

Unit No. 4. Bending Moment and Shearing Force

- Topic No.14: Concept of beam and type of loading
- Topic No.15: Concept of end supports-Roller, hinged and fixed
- Topic No.16: Concept of bending moment and shearing force
- Topic No.17: B.M. and S.F. Diagram for cantilever and simply supported beams with and without overhang subjected to concentrate and U.D.L.
- Topic No.18: Simple numerical problems

Unit No. 5. Bending stresses

- Topic No.19: Concept of Bending stresses
- Topic No.20: Theory of simple bending
- Topic No.21: Use of the equation $f/y = M/I = E/R$
- Topic No.22: Concept of moment of resistance
- Topic No.23: Bending stress diagram
- Topic No.24: Calculation of maximum bending stress in beams of rectangular, circular, and T section.
- Topic No.25: Permissible bending stress Section modulus for rectangular, circular and symmetrical I section.
- Topic No.26: Simple numerical problems



Unit No. 6. Columns

- Topic No.27: Concept of column, modes of failure
- Topic No.28: Types of columns
- Topic No.29: Buckling load, crushing load
- Topic No.30: Slenderness ratio
- Topic No.31: Factors effecting strength of a column
- Topic No.32: End restraints , Effective length
- Topic No.33: Strength of column by Euler Formula without derivation
- Topic No.34: Rankine Gourdan formula (without derivation)
- Topic No.35: Simple numerical problems

Unit No. 7. Torsion

- Topic No.36: Concept of torsion- difference between torque and torsion.
- Topic No.37: Use of torque equation for circular shaft
- Topic No.38: Comparison between solid and hollow shaft with regard to their strength and weight.
- Topic No.39: Power transmitted by shaft
- Topic No.40: Concept of mean and maximum torque
- Topic No.41: Simple numerical problems

Unit No. 8.Springs

- Topic No.42: Closed coil helical springs subjected to axial load and impact load
- Topic No.43: Stress deformation
- Topic No.44: Stiffness and angle of twist and strain energy
- Topic No.45: Proof resilience
- Topic No.46: Laminated spring (semi elliptical type only)
- Topic No.47: Determination of number of plates
- Topic No.48: Simple numerical problems

STUDY SCHEME		EVALUATION SCHEME							Total Marks
		Internal Assessment			External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
4	-	-	25	-	100	3	-	-	125

INSTRUCTIONAL STRATEGY

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

TEXT BOOKS:

- Strength of Materials by Birinder Singh; Katson Publishing House, New Delhi.
- Strength of Materials by RS Khurmi; S. Chand & Co, New Delhi
- Elements of Strength of Materials by D.R. Malhotra & H.C. Gupta; Satya Prakashan, New Delhi.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (hrs)	Marks Allotted (%)
1	08	12
2	06	10
3	06	10
3	10	16
4	08	12
5	08	12



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6	08	12
7	10	16
Total	64	100





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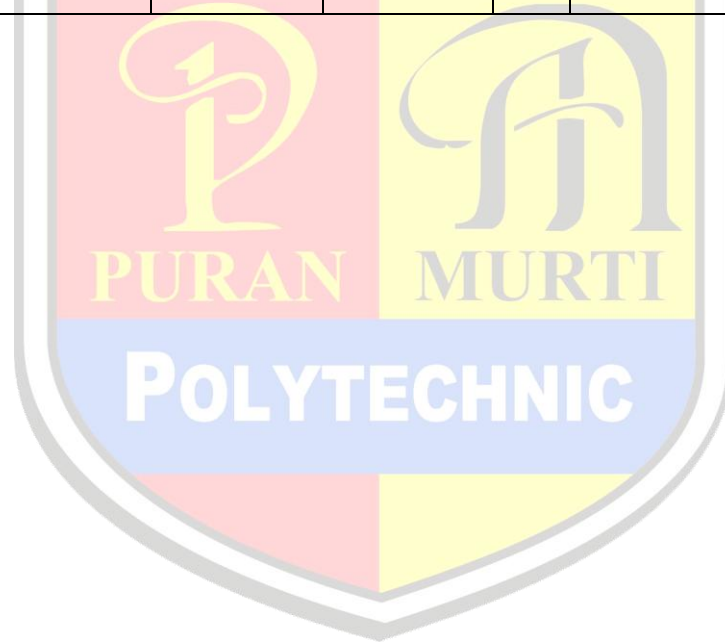
Subject: Strength Of Materials (Practical)

Subject Code:

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 on specimens of different metals for determining modulus of rigidity.
5. To determine the stiffness of a helical spring and to plot a graph between load and extension.
6. Hardness test on different metals.

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
-	-	2	-	25	-	-	50	3	75





PRACTICE WORK

1. Introduction to AutoCAD : Starting up, practice on – how to create a new drawing file, setting drawing limits & saving a file, drawing lines in different ways using absolute co-ordinates, user co-ordinates, WCS, UCS, drawing circles, drawing arcs, drawing ellipses. Drawing polygons, drawings splines. Drawing polylines, using window, zoom commands.
2. Practice on Edit commands such as erase, copy, mirror, array, offset, rotate, oops, undo, redo, scale, stretch, trim, break, extend, chamfer, fillet, O snap command
3. Practice on Text commands: editing text, text size, text styles, change properties commands.
4. Practice on Layer Commands: creating layer, freeze, layer on/off colour assigning, current layer, load line type, lock & unlock layer, move from one layer to other.
5. Practice on Hatching, Hatch pattern selection.
6. Practice on Dimensioning, linear dimensioning, angular dimensioning radius/.diameter dimensioning O-snap command, aligned dimensioning, editing of dimensioning, tolerances in dimensioning.
7. Practice on print/plot commands. Export/import commands.
8. Practice on making complete drawings of components by doing following exercises:
 - a) Detail and assembly drawing of the following using AUTOCAD (2D)(4 sheets)
 - Plummer Block
 - Wall Bracket
 - Stepped pulley, V-belt pulley
 - Flanged coupling
 - Machine tool Holder (Three views)
 - Screw jack or knuckle joint
 - b) Isometric Drawing by CAD using Auto CAD (one sheet)
Drawings of following on computer:
 - Cone
 - Cylinder
 - Isometric view of objects
9. Modelling (02 sheets)
3D modelling, Transformations, scaling, rotation, translation
10. Creating Chamfer and Fillet
Practice on surface modeling, create part file, practice on assembly of parts, creating assembly view, orthographic views, section view (Practice on different views, practice on data transfer)
11. Introduction to Other Softwares;

(Pro Engineer/CATIA / Inventor/Unigraphics/Solid Work: Salient features.

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
-	-	3	-	50	-	-	50	3	100

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.
3. Teachers should ensure use of IS codes related to drawing.



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REFERENCE 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, Udupi.
4. Auto CAD 2000 by Ajit Singh, TMH, New Delhi.





DETAILED CONTENTS

Unit No. 1. I. A. R.

Topic No.1: Knowledge of Aircraft Rules in relation to airworthiness and safety of an aircraft

Unit No.2. C.A.R, A/C, Advisory Circulars

Topic No.2: Knowledge of "Civil Airworthiness Requirements"

Topic No 3: "Aeronautical Information Circulars (Relating to Airworthness)"

Topic No.4:"Aeronautical Information Circulars (Relating to Airworthness)"

Unit No.3. Privileges of AME's

Topic No.5: Knowledge of Privileges and responsibility of the various categories of AME Licence and approved person

Topic No.6:Requirements and procedure for issue/ extension/endorsement/renewal of various categories of AME license/ approvals/authorization.

Unit No.4. Airworthiness and Confirmed Airworthiness

Topic No.7: Knowledge of various mandatory documents like Certificate of Registration

Topic No.8: Certificate of Airworthiness, Flight Manual

Topic No.9: Export Certificate of Airworthiness

Topic No.10: Types of certificates like requirements for Aging Aircraft, Requirements

Topic No.11: Procedures and conditions for issuance of special flight permits.

Unit No.5.Aircraft Maintenance

Topic No.12: Requirements for storage, quality control, checks, distribution

Topic No.13: Aircraft instruments, equipments and accessories

Topic No.14: General requirements for maintenance and certifications of aircraft, including Gliders

Topic No.15: Microlight, Aircraft, Hot Air balloons. Duplicate inspection of controls.

Unit No.6.Log Books

Topic No.16: Various log books required to be maintained for Aircraft

Topic No.17: Method of maintaining the log book

Topic No.18: Procedure for making entries in Log books

Topic No.19: Journey log books, Technical log book etc.

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
4	-	-	50	-	100	3	-	-	150

INSTRUCTIONAL STRATEGY

This being an important and elementary subject for Aircraft Maintenance Engineer, the teachers should lay emphasis on various basic procedures for Civil Aviation and Civil Airworthiness requirements, as given by DGCA from time to time. Some actual maintenance worksheets may be shown to the students.

TEXT BOOKS:

1. Aircraft Manual Published by DGCA, New Delhi
2. Civil Aviation Requirements (Section 2- Airworthiness) Published by DGCA, New Delhi
3. Aeronautical Information Circulars (relating to Airworthiness) Published by DGCA, New Delhi
4. Airworthiness Advisory Circulars Published by DGCA, New Delhi
5. Human Factor Guidelines DOC 9806 Published by DGCA, New Delhi

REFERENCE BOOKS:

1. Civil Aircraft Inspection Procedures (CAP 459-Part I, Basic) Published by DGCA, New Delhi
2. Civil Aircraft Inspection Procedure (CAP 459) Part II Aircraft Published by DGCA, New Delhi
3. Aircraft Maintenance and Repair by Kroes, Watkin and Delp



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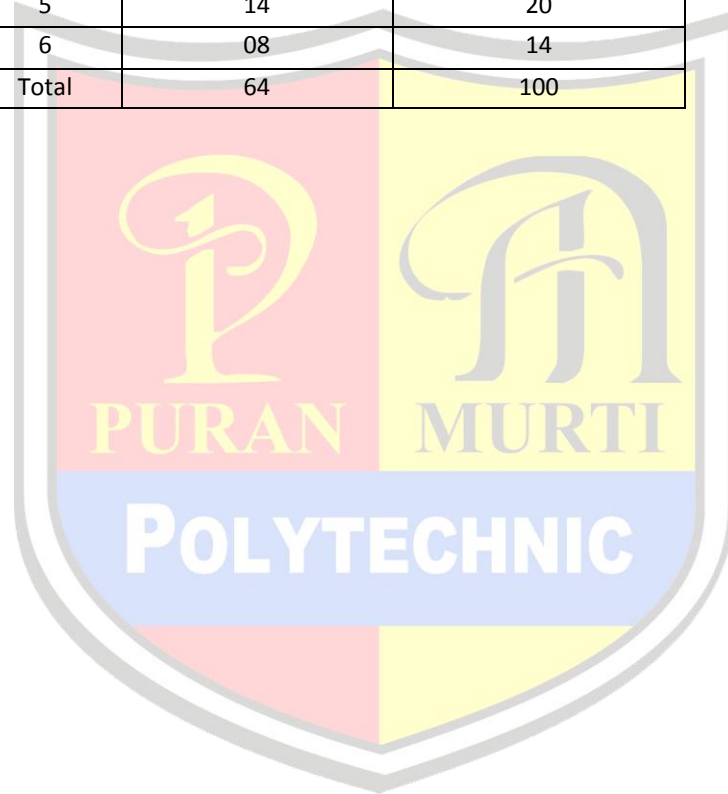
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4. Acceptable Methods, Techniques and Practices (FAA)-EA-AC 43.13-1 A&2A published by DGCA, New Delhi
5. Aircraft Construction Repair and Inspection by Joe Christy
6. Light Aircraft Maintenance by J.E. Heywood
7. Light Aircraft Inspection by J.E. Heywood.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	08	14
2	12	18
3	08	14
4	14	20
5	14	20
6	08	14
Total	64	100





DETAILED CONTENTS

Unit No. 1. Aerodynamics

- Topic No.1: General principle of Aerodynamics and their application in Aircraft.
- Topic No.2: Different parts of Aircraft and their utility. Effect of engine power and aircraft weight on performance of aircraft.
- Topic No.3: Lift and means of producing lift.
- Topic No.4: Concepts of Air Resistance, Stream Lines, Stream Lining, Skin Friction and Boundary Layer.
- Topic No.5: Bernoulli's Theorem-Venturi tube.
- Topic No.6: Drags and their classification
- Topic No.7: Lift/drag Ratio considerations.
- Topic No.8: Forces acting on the aircraft during all phases of flight.

Unit No. 2. Physics of Atmosphere (I.S.A.)

Topic No.9: The atmosphere, Air Density, Pressure and Temperature change with Altitude and their effect on the performance of Aircraft

Topic No.10: International Standard atmosphere (I.S.A.) and their applications.

Unit No. 3. Types of stability and control

Unit No.4 .Air frame primary flying controls.

Unit No. 5. Air frame secondary flying controls

Unit No. 6. Characteristics of subsonic, transonic and supersonic airflow used in aircraft flight

Unit No.7.Characteristics of the aerofoils used for subsonic and transonic flights

Unit No.8.Various types of high lift and drag devices, their operation, vortex generators boundary layer fences etc.,

Unit No. 9.Knowledge of the following:

Topic No.11: Sweepback, High incidence tail plane aerodynamic loading

Topic No.12: Superstall, Load Factors, Aquaplaning, Fly over concept.

Unit No.10.A brief knowledge of rotor craft

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment			External Assessment (Examination)			
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
5	-	-	50	-	100	3	-	-	150

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.

TEXT BOOKS:

1. Airframe & Powerplant 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



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SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (hrs)	Marks Allotted (%)
	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

