



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

Sr. No	Subject	STUDY SCHEME			EVALUATION SCHEME						Total Marks
					Internal Assessment		External Assessment (Examination)				
					Theory	Practical	Written Paper		Practical		
					Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
Hrs/week		L	T	P							
4.1	Aircraft Material and Material Science - I				4	-	2	25	25	100	3
4.2	General Airframe and Aero Modeling	6	-	2	25	25	100	3	50	3	200
4.3	Elements of Electrical and Electronics Engineering - II	4	-	2	25	25	100	3	50	3	200
4.4	Aircraft Instruments	4	-	2	25	25	100	3	50	3	200
4.5	Aircraft Reciprocating Engine	4	-	2	25	25	100	3	50	3	200
4.6	Aircraft Rules, Regulations and CAR – II	4	-	-	50	-	100	3	-	-	150
Student Centred Activities #		-	-	4	-	25	-	-	-	-	25
<b>Total</b>		<b>26</b>	<b>-</b>	<b>14</b>	<b>175</b>	<b>150</b>	<b>600</b>	<b>-</b>	<b>250</b>	<b>-</b>	<b>1175</b>

# 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.

**Industrial Training** - After examination of 4<sup>th</sup> Semester, the students shall go for training in a relevant industry/field organization for a minimum period of one month and shall prepare a diary. It shall be evaluated during 5<sup>th</sup> semester by his/her teacher for 50 marks. The students shall also prepare a report at the end of training and shall present it in a seminar, which will be evaluated for another 50 marks. This evaluation will be done by HOD and lecturer incharge – training in the presence of one representative from training organization.



**PM**  
**POLYTECHNIC**

A Unit of Puran Murti Educational Society  
Approved by AICTE, Ministry of HRD, Govt. of India,  
Affiliated to State Board of Technical Education, Panchkula, Haryana

## SYLLABUS: Polytechnic (AME)

**Department: Aircraft Maintenance Engineering-5th Semester**

**Subject: Aircraft Materials and Material Science-I (Theory)**

**Subject Code:**

### DETAILED CONTENTS

#### **Unit No.1 Introduction to Aircraft Materials (Non Metals)**

- Topic No.1: Types of Wood-soft, Cross section, Grains defects
- Topic No.2: Specification requirements and use of spruce, Walnut, Mahogany, Birch and Ash.
- Topic No.3: Plywood, its construction and use.
- Topic No.4: Types of glues for aircraft use. Precautions to be observed storage life.
- Topic No.5: Fabric types, specifications, requirements.
- Topic No.6: Reinforcing tapes, edgings, threads and their specification requirement.
- Topic No.7: Different types of dopes and thinner acetate and nitrocellulose, tautening and non-tautening and their storage life, specification requirements of dopes.

#### **Unit No.2**

- Topic No.8: Plastics resin plastics
- Topic No.9: Thermo-plastics, thermosetting plastics
- Topic No.10: Acrylic and Cellulose their use.

#### **Unit No.3**

- Topic No.11: Rubber and synthetic rubber natural
- Topic No.12: Synthetic Buna's Buna-N
- Topic No.13: Neopren Butyl and thickol and their uses and shelf life and service life.

#### **Unit No. 4**

- Topic No.14: Aircraft adhesives
- Topic No.15: Sealants, paints, primers
- Topic No.16: Varnishes and enamels

#### **Unit No.5 Metal and Alloys**

##### **A Ferrous & Non Ferrous Metals:**

- Topic No.17: Introduction to manufacturing
- Topic No.18: Properties and uses of Pigiron
- Topic No.19: Wrought iron and Cast iron
- Topic No.20: Difference between iron and steels
- Topic No.21: Types of steels
- Topic No.22: SAE and British systems of their classification
- Topic No.23: Low, medium and high carbon steels
- Topic No.24: Their properties and uses
- Topic No.25: Introduction to various methods of heat treatment - Hardening, Tempering, Annealing
- Topic No.26: Normalizing, Carburising, Refining processes and temperatures
- Topic No.27: Temperature colour guides
- Topic No.28: Case hardening - Different processes
- Topic No.29: Identification of ferrous metals on practical tests

##### **B Non Ferrous Metals**

- Topic No.30: Alloy Steels: Kinds, composition, properties
- Topic No.31: Effect of constituents on their properties
- Topic No.32: Definition of light alloys and heavy alloys and their application in air crafts
- Topic No.33: Magnesium Alloys, Titanium alloys, Inconnel alloys and their uses.
- Topic No.34: Identification of non ferrous metals on practical tests.
- Topic No.35: Heat treatment processes for light alloys - Age hardening

##### **C**

- Topic No.36: Wrought aluminum alloys indicating their properties -Specifications Duralumin-alclad
- Topic No.37: Its use – identification of those materials in various heat treated states and forms.



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

The teacher should engage the students in discussion about various topics, so that the students understand the relevant significance and applications.

### REFERENCE BOOKS:

1. Aircraft Materials and Processes by George F Titterton; Pitman Publishing Corporation
2. An Introduction to Material Science and Engineering by William D. Callister; John Wiley and Sons.
3. Material Science by Raghvan V.; Prentice Hall India.
4. Principles of Material Science and Engineering by William F. Smith; McGraw-Hill Publications.
5. Engineering Physical Metallurgy by Lakhtin Y; Mir Publisher.

### SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	24	36
2	10	16
3	12	18
4	18	30
<b>Tot1al</b>	<b>64</b>	<b>100</b>



**PM**  
**POLYTECHNIC**

A Unit of Puran Murti Educational Society  
Approved by AICTE, Ministry of HRD, Govt. of India,  
Affiliated to State Board of Technical Education, Panchkula, Haryana

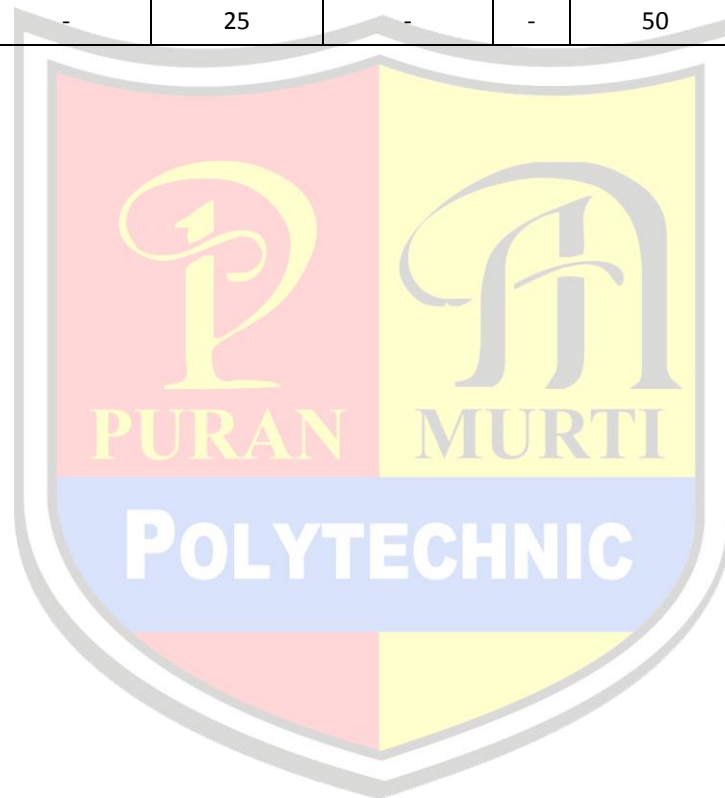
**Subject: Aircraft Materials and Material Science-I (Practical)**

**Subject Code:**

**LIST OF PRACTICALS**

1. Specimen preparation
2. Normalizing of steel specimen and study its microstructure
3. Annealing of steel specimen and study its microstructure
4. Pickling of steel specimen
5. Polishing of steel specimen

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





**Subject: General Air Frame and Aero Modeling (Theory)**

**Subject Code:**

### DETAILED CONTENTS

#### Unit No.1

- Topic No.1: Understanding of aircraft types, roles, structural layout
- Topic No.2: Classification of Aircraft and different parts
- Topic No.3: Including Windows, Doors and Emergency exits

#### Unit No. 2 Loads taken up by Aircraft

#### Unit No.3

- Topic No.4: General constructions: Composite constructions
- Topic No.5: Metal construction, Monocoque and Semi-monocoque
- Topic No.6: Stressed construction

#### Unit No.4 Knowledge of fail-safe and safe-life concept.

#### Unit No.5 Construction of fuselage

- Topic No.7: Steel Tubular Structure
- Topic No.8: Light Metal construction
- Topic No.9: Fabric, Plywood and Metal coverage

#### Unit No.6 Construction of Wing and types of wings.

#### Unit No.7 Aircraft components construction and utility.

#### Unit No.8 Undercarriage types, Fixed and retractable Tyres, Tubes, Brake system and shock absorbers.

#### Unit No.9 Primary control system, Secondary and Auxiliary control system, Cable testing and rigging of controls.

#### Unit No.10 Fuel tanks - different types, testing and repair of fuel tanks. Use of sealants

#### Unit No.11

- Topic No.10: Knowledge of minor defects
- Topic No.11: Their reporting, investigation and method of rectification and repair of minor defects rigging of aircraft
- Topic No.12: Periodical inspection necessary to check the serviceability of the aircraft
- Topic No.13: Preparation of a brief report with the help of sketches if necessary in case of damage to the aircraft
- Topic No.14: Symmetry check, balancing of control surface, duplicates inspection.

#### Unit No.12 Minor structural repairs of metal and composite aircraft.

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	
6	-	-	25	-	100	3	-	-	125

#### INSTRUCTIONAL STRATEGY

Resources given on website of NASA may be used to demonstrate working of all control surfaces; visit to flying schools/units to actually understand concept of LG, brakes, weighing. Jacking up Emphasis should be discussion on each topic with students.

#### REFERENCE BOOKS:

1. Mechanics of Flight by A.C. Kermode; Pearson Education, Delhi.
2. Fundamentals of Flight by R S Shevell; Prentice Hall India
3. Introduction to Flight by John Anderson Jr.; McGraw Hill
4. Fundamentals of Flight; by Dr. O.P. Sharma and Lalit Gupta



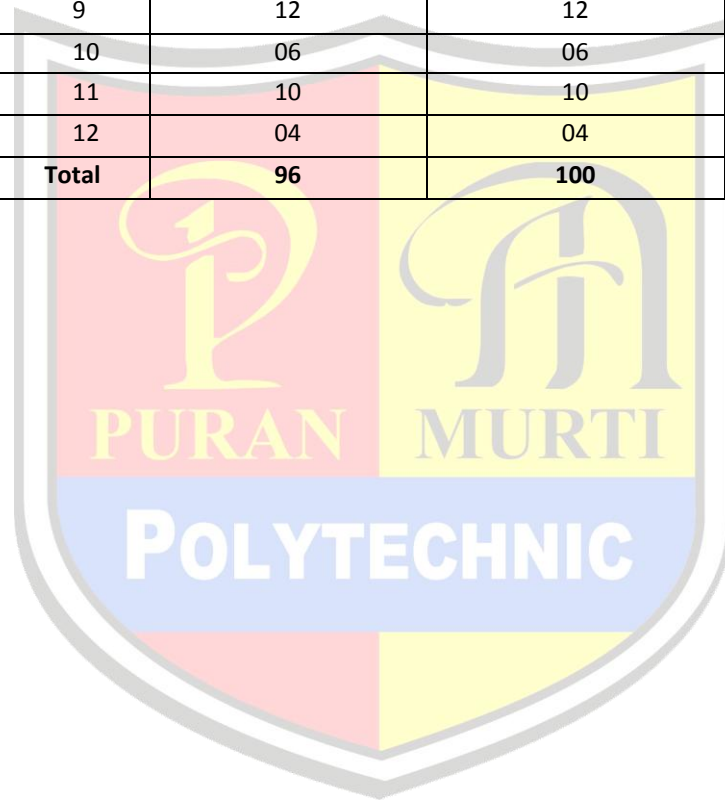
# PM

**POLYTECHNIC**

A Unit of Puran Murti Educational Society  
Approved by AICTE, Ministry of HRD, Govt. of India,  
Affiliated to State Board of Technical Education, Panchkula, Haryana

## SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	08	08
2	04	04
3	10	12
4	04	06
5	10	10
6	08	08
7	10	10
8	10	10
9	12	12
10	06	06
11	10	10
12	04	04
<b>Total</b>	<b>96</b>	<b>100</b>







# PM

## POLYTECHNIC

A Unit of Puran Murti Educational Society  
Approved by AICTE, Ministry of HRD, Govt. of India,  
Affiliated to State Board of Technical Education, Panchkula, Haryana

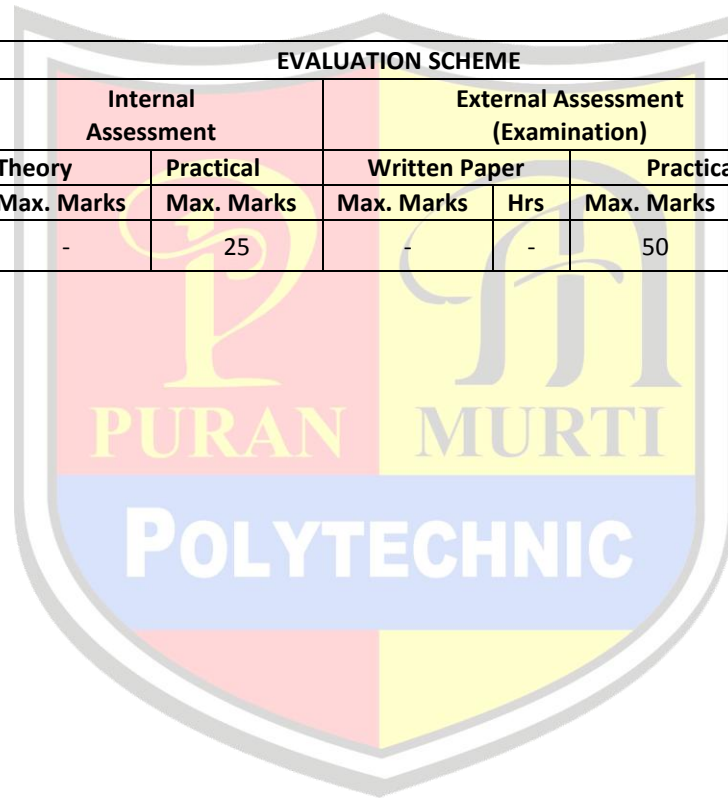
**Subject: General Air Frame and Aero Modeling (Practical)**

**Subject Code:**

### LIST OF PRACTICALS

1. Aircraft tire, tube and wheel assembly.
2. Servicing of aircraft brake system.
3. Brake bleeding.
4. Shock strut charging.
5. Landing gear retraction check.
6. Fabric covering, sewing and patching.
7. Dopping.
8. Rigging of aircraft controls.
9. Aircraft leveling and weighing.
10. Construction of full flying radio controlled models

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





**PM**  
**POLYTECHNIC**

A Unit of Puran Murti Educational Society  
Approved by AICTE, Ministry of HRD, Govt. of India,  
Affiliated to State Board of Technical Education, Panchkula, Haryana

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

**Subject Code:**

### DETAILED CONTENTS

#### **Unit No.1 Basic Terminology and their concepts**

Topic No.1: Current, EMF, potential difference (Voltage), resistance, resistivity, their units, conductors & insulators.

Topic No.1: Effect of temperature on the resistance of conductors, semiconductors (C, Si, Ge) and insulators physical explanation, temperature coefficient of resistance.

Topic No.1: Electrical power, energy and their units (SI).

Topic No.1: Relationship between electrical, mechanical and thermal SI units of work, power and energy.

#### **Unit No.2 D.C. Circuits**

Topic No.5: Kirchhoff's laws.

Topic No.6: Simple numerical problems based on Kirchhoff's laws

Topic No.7: Introduction to Thevenin and Superposition theorem

Topic No.8: Operation of photo cells, Construction, Material and operation of thermo-couples

#### **Unit No.3 Introduction to Semiconductor Devices**

Topic No.9: Introduction, semiconductor and their applications

Topic No.10: Different semiconductor materials used in manufacturing various semiconductor (Si & Ge)

Topic No.11: Material used for electronic components like resistor, capacitor, diode, transistors, thyristors and inductors.

#### **Unit No.4 Capacitors**

Topic No.12: Concept of capacitor, capacity of parallel plate capacitor, and effect of physical parameters.

Topic No.13: Energy stored in a capacitor, dielectric and its influence on capacitance of a capacitor, dielectric constant dielectric breakdown and dielectric strength. Dielectric loss.

Topic No.14: Series and parallel combination of capacitors.

Topic No.15: Variable capacitors.

Topic No.16: Charging and discharging of capacitors.

Topic No.17: Simple problems on capacitors.

#### **Unit No.5 Electromagnetism**

Topic No.18: Theory of magnetism, Magnetic material, Magnetism and demagnetism, Electromagnetic waves.

Topic No.19: Concept of magnetic flux, flux density, magnetic field intensity, permeability and their units.

Topic No.20: Magnetic circuits, concept of reluctance and mmf and simple problems.

Topic No.21: Analogy between electric and magnetic circuits.

Topic No.22: B-H curve and magnetic hysteresis (No mathematical derivation).

Topic No.23: Elementary ideas about hysteresis loss.

#### **Unit No.6 Electromagnetic Induction**

Topic No.24: Faraday's laws of electromagnetic induction. Lenz's law, simple problem. Dynamically induced emf.

Topic No.25: Self induced emf, inductance, its role in electrical circuits. Simple problems.

Topic No.26: Mutually induced emf, mutual inductance, its role in electrical circuits. Simple problems.

Topic No.27: Energy stored in magnetic circuit.

Topic No.28: Rise and decay of current in inductors.

Topic No.29: Force on a current carrying conductor placed in a magnetic field and its applications.

Topic No.30: Elementary idea about eddy current loss.

#### **Unit No.7 A.C. Circuits**

Topic No.31: Recapitulation of terminology, instantaneous value, maximum (peak) value, cycle, frequency, alternate current and voltage. Difference between AC and DC, Static electricity and conduction.

Topic No.32: Equation of an alternating voltage and current and wave shape varying sinusoidally.

Topic No.33: Average and RMS value of alternating voltage and current. Importance of RMS value. Simple problems.

Topic No.34: Concept of phase, phase difference and phasor representation of alternating voltage and current.

Topic No.35: A.C. through pure resistance, inductance, capacitance, phasor diagram and power absorbed.

Topic No.36: R-L series circuit, idea of impedance and calculations.

Topic No.37: Apparent power, reactive power and active power, power factor, its importance and simple problems.

Topic No.38: R-C series circuit, simple problems.

Topic No.39: Solution of simple parallel A-C circuits by

a) Phasor diagram method,

(b) Admittance method.





Topic No.40: Solution of AC circuits series/parallel by j method. (simple problems).

Topic No.41: Resonance (Series and parallel) and practical application, simple problems.

### Unit No.8 Polyphase System

Topic No.42: Introduction to polyphase system. Advantage of three phase system over single phase system.

Topic No.43 :Star and Delta connections. Relationship between phase and line value of currents and voltage. Power in polyphase circuits. Simple problems of balanced circuits only.

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

Teacher should lay emphasis on fundamentals related to electrical and electronics. They should also discuss with the students the significance and application of various topics in aircraft maintenance engineering.

### TEXT BOOKS:

1. Basic Electrical Engineering by V.N. Mittle; Tata McGraw Hill Edition, New Delhi, 1990.
2. Applied Electronics by R.S. Sedha; S. Chand & Co., 2006.
3. Basic Electrical, Electronics and Computer Engineering by Muthusubramanian R, Salivahanan S and Muraleedharan K A; Tata McGraw Hill, Second Edition, (2006).

### REFERENCE BOOKS:

1. Basics of Electrical Engineering by Nagsarkar T K and Sukhija M S; Oxford press (2005).
2. Principles of Electronics by Mehta V K; S.Chand & Company Ltd, (1994).
3. Electric Circuits by Mahmood Nahvi and Joseph A. Edminister; 'Schaum' Outline Series, McGraw Hill, (2002).
4. Basic Electrical Engineering by Premkumar N; Anuradha Publishers, (2003).

### SUGGESTED DISTRIBUTION OF MARKS

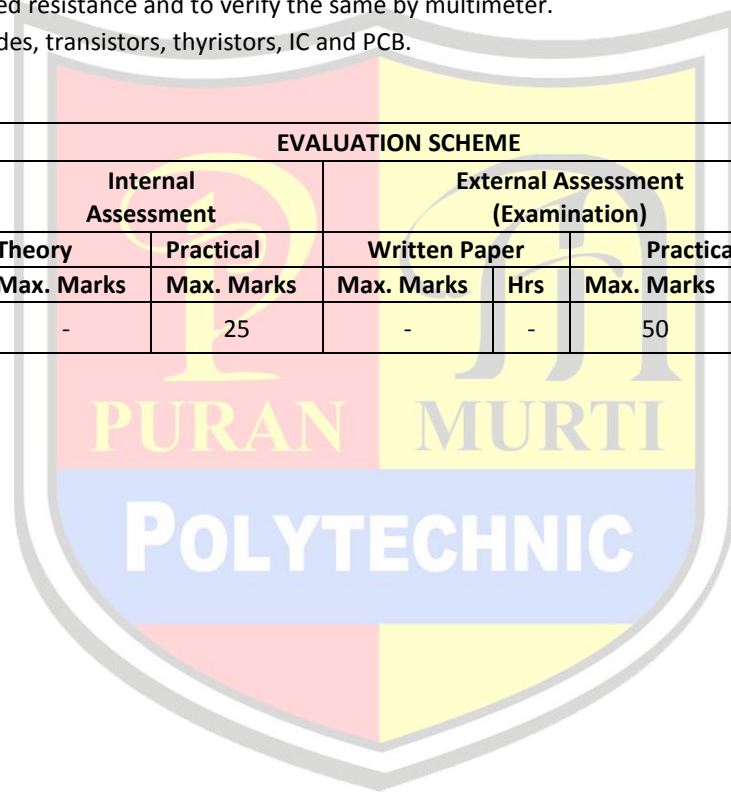
Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	10
2	08	12
3	08	12
4	10	16
5	08	12
6	08	12
7	10	16
8	06	10
<b>Tot1al</b>	<b>64</b>	<b>100</b>



**LIST OF PRACTICALS**

1. To show the variation of resistance of a lamp with temperature by plotting a V-I curve for 60W and 100W filament lamps.
2. To verify the Kirchoff's laws.
3. To observe the B-H curve for a Ferro-magnetic core on CRO.
4. To find the relationship between voltage and current for R-L series circuit for variable resistances & variable inductance.
5. To determine the variation in the values of inductance of a coil for different positions of the movable iron core.
6. To measure the power factor in a single phase AC circuit by using voltmeter, ammeter & wattmeter.
7. To charge and discharge a capacitor and to show the graph on C.R.O.
8. Verification of voltage and current relations in Star and delta connected systems.
9. To study the phenomenon of electromagnetic induction.
10. To measure the total on equivalent resistance to verify the same by calculation method.
11. To study the colour coded resistance and to verify the same by multimeter.
12. To study and sketch diodes, transistors, thyristors, IC and PCB.

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





### DETAILED CONTENTS

**Unit No.1 General Introduction to Aircraft instrument, various instruments and classification.**

**Unit No.2**

- Topic No.1: Altimeter, Principle
- Topic No.2: Constructional details
- Topic No.3: Types of setting
- Topic No.4: Position error leak test and periodical inspection.

**Unit No. 3**

- Topic No.5: Airspeed indicator
- Topic No.6: Pitot and Static Tube Construction and Principle
- Topic No.7: Position Error
- Topic No.8: Construction and periodical inspection, lead test

**Unit No. 4**

- Topic No.9: Vertical speed indicator
- Topic No.10: Constructional features checks and Installation procedure
- Topic No.11: Periodical inspection

**Unit No. 5 Pressure gauge**

- Topic No.12: Principle of operation
- Topic No.13: Types of gauges
- Topic No.14: Periodical inspection

**Unit No. 6**

- Topic No.15: Temperature Gauge
- Topic No.16: Principle of thermocouple and different types of thermometer used in Aviation.
- Topic No.17: Cylinder Head Temperature Gauge
- Topic No.18: Maintenance and Periodical inspection.

**Unit No. 7**

- Topic No.19: R. P. M. Indicator
- Topic No.20: Mechanical construction details types of indicator maintenance and periodical inspection

**Unit No. 8**

- Topic No.21: Gyro Instruments
- Topic No.22: Principle of Gyro Wheel and different types of gyres
- Topic No.23: Constructional details of each i.e. Turn & Bank
- Topic No.24: Artificial Horizon and Directional gyro
- Topic No.25: Maintenance and periodical inspection
- Topic No.26: Suction gauge etc

**Unit No.9 Electrically operated instruments.**

**Unit No.10 Fuel flow gauge and content gauges**

**Unit No.11 Main fold Pressure Gauge**

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

The teacher should give due emphasis on the basics, significance and application of various topics included in the subject. They should discuss and demonstrate various aircraft instruments in the class.



# PM

## POLYTECHNIC

A Unit of Puran Murti Educational Society  
Approved by AICTE, Ministry of HRD, Govt. of India,  
Affiliated to State Board of Technical Education, Panchkula, Haryana

### TEXT BOOKS:

1. Introduction to Avionics Systems by R P G Collinson; Kulwar Academic Publishers, 2003
2. Aircraft Electrical System by E H J Pallett; Pitman Publishers, 1976.
3. Avionics Systems by Middleton, D.H., Ed.; Longman Scientific and Technical Longman Group UK Ltd., England, 1989.

### REFERENCE BOOKS:

1. Digital Avionic Systems by Spitzer C.R.; Prentice Hall, Englewood Cliffs, N.J., USA, 1987.
2. Navigation by R.B. Underdown and Tony Palmer; Black Well Publishing 2001.
3. Aircraft Instruments by E.H.J. Pallet.

### SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	04	06
2	04	06
3	06	10
4	04	06
5	06	10
6	06	08
7	04	06
8	06	10
9	06	10
10	04	06
11	04	06
12	06	10
13	04	06
<b>Total</b>	<b>64</b>	<b>100</b>



**PM**  
**POLYTECHNIC**

A Unit of Puran Murti Educational Society  
Approved by AICTE, Ministry of HRD, Govt. of India,  
Affiliated to State Board of Technical Education, Panchkula, Haryana

**Subject: Aircraft Instruments (Practical)**

**Subject Code:**

**LIST OF PRACTICALS**

1. Leak testing of pitot and static system.
2. Identification of various parts of instruments.
3. Calibration and testing of fuel quantity gauges.
4. Periodical maintenance of gyro instruments

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





### DETAILED CONTENTS

#### Unit No. 1

- Topic No.1: Piston Engines
- Topic No.2: Two and four stroke engine
- Topic No.3: Efficiency, factors affecting engine performance
- Topic No.4: Knowledge of the function and construction of various parts and accessories of the engine including induction
- Topic No.5: Exhaust and cooling system Engine mounting
- Topic No.6: Engine fire detection and protection systems.

#### Unit No.2 Propellers

- Topic No.7: Theory of Propellers
- Topic No.8: Knowledge and functioning of parts
- Topic No.9: Variable pitch and feathering propellers and associated control system components.

#### Unit No.3 Engine Fuel and Oil System

- Topic No.10: Construction, features of carburetors
- Topic No.11: Engine fuel and oil systems
- Topic No.12: Characteristics of aviation fuel and oil
- Topic No.13: Common sources of contamination
- Topic No.14: Methods of checking contamination

#### Unit No.4 Ignition and Starting Systems

- Topic No.15: Magnetos and ignition system components
- Topic No.16: Various types of engine starters.

#### Unit No.5 Engine Power Augmentation System

- Topic No.17: Principle of operation
- Topic No.18: Superchargers-constructional features and principles of operation
- Topic No.19: Function of various types of superchargers and its related component.

#### Unit No.6 Engine Instrumentation

- Topic No.20: Various types of instruments
- Topic No.21: Manifold pressure gauge, oil pressure gauge
- Topic No.22: Electrical and mechanical tachometers
- Topic No.23: Fuel flow indicator
- Topic No.24: Electrical resistance thermometers, thermocouple thermometer indicators
- Topic No.25: Fuel indicating contents and pressure gauge
- Topic No.26: Identification of the causes of faults in typical engine system

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. Teachers should take the students to industry and explain the details of power plant systems and their components. While imparting instructions, focus should be on conceptual understanding. Training slides of "Carrier Fundamentals of Aircraft power plant" to be shown to students.

#### REFERENCE BOOKS:

1. Aviation Maintenance Management by Harry A. Kinnison, Tariq Siddiqui
2. Jet Engine Manual by E Mangham and A Peace; Himalayan Books
3. Jet Engines; Rolls Royce Ltd. 1992
4. Civil Aircraft Inspection Procedures (CAP 459); Himalayan Books





**PM**  
**POLYTECHNIC**

A Unit of Puran Murti Educational Society  
Approved by AICTE, Ministry of HRD, Govt. of India,  
Affiliated to State Board of Technical Education, Panchkula, Haryana

## SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (hrs)	Marks Allotted (%)
1.	12	18
2.	10	16
3.	12	18
4.	12	18
5.	12	18
6.	06	12
<b>Total</b>	<b>64</b>	<b>100</b>





**PM**  
**POLYTECHNIC**

A Unit of Puran Murti Educational Society  
Approved by AICTE, Ministry of HRD, Govt. of India,  
Affiliated to State Board of Technical Education, Panchkula, Haryana

**Subject: Aircraft Reciprocating Engine (Practical)**

**Subject Code:**

**LIST OF PRACTICALS**

1. Top overhaul of a piston engine.
2. Procedure of preservation (Long term and Short term).
3. Pre-oiling method for a piston engine.
4. Run out check of crank shaft.
5. Removal and installation procedure for piston engine.
6. Rigging procedure for engine controls.

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





**DETAILED CONTENTS**

**Unit No.1 Requirement for flight testing of aircraft.**

**Unit No.2 Storage of Aeronautical Parts**

Topic No.1: Bonded and Quarantine stores

Topic No.2: Storage of various aeronautical products including rubber goods

Topic No.3: Various fluids

**Unit No.3 Operational Requirements of Aircraft**

Topic No.4: Knowledge of various terms such as Certificate of Flight Release

Topic No.5: Certificate of Maintenance, Approved Certificates.

**Unit No.4 Installation and maintenance requirement of Air burning, commercial/navigation and radio equipments systems**

**Unit No.5 Registrations, markings, weight and balance control, load and trim sheets**

**Unit No.6 Minimum equipments, instruments required for various types of operation**

**Unit No.7 Modification, Concession, Airworthiness Directive, Service Bulletins.**

**Unit No.8 Approval of organization.**

**Unit No.9 Registration markings.**

**Unit No.10 Documents required to be carried on board.**

**Unit No.11 Issue of Type approval.**

**Unit No.12 Issue of C of A.**

**Unit No.13 Defects recording, Monitoring, reporting and investigation.**

**Unit No.14 Requirements of A/c fuels, refuelling of A/c and calibration of a/c fuel tanks (4 hrs)**

**Unit No.15 Human Performance**

- General - The need to take human factors into account. Incidents attributable to human factors/human error. Murphy's Law.
- Human Performance and Limitations - Vision, Hearing, Information processing, Attention and perception, Memory, Claustrophobia and physical access.
- Social Psychology - Responsibility : Individual and group, Motivation and demotivation, Peer pressure, Culture issues, Team working, Management, supervision and leadership.
- Factors Affecting Performance - Fitness/health; Stress : domestic and work related; Time pressure and deadlines; Workload : Overload and under load; Sleep and fatigue, shift work; Alcohol, medication, drug abuse.
- Physical Environment - Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.
- Tasks - Physical work; Repetitive tasks; Visual inspection; Complex system.
- Communication - Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information.
- Human Error - Error models and theories; types of error in maintenance tasks; Implications of errors (i.e. accidents), Avoiding and managing errors.
- Hazards in the workplace - Recognizing and avoiding hazards; Dealing with emergencies

STUDY SCHEME	EVALUATION SCHEME								Total Marks
	Internal Assessment			External Assessment (Examination)					
	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 a 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. 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
4. Acceptable Methods, Techniques and practices (FAA)-EA-AC 43.13-1 A&2A

### REFERENCE BOOK:

1. Aircraft Construction Repair and Inspection by Joe Christy
2. Light Aircraft Maintenance by J.E. Heywood
3. Light Aircraft Inspection by J.E. Heywood
4. Aircraft repair Manual by Larry Reithmaier
5. Aviation Maintenance Technician Hand book by FAA

### SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	02	04
2	02	04
3	06	08
4	06	08
5	04	06
6	04	06
7	04	06
8	04	04
9	04	04
10	04	06
11	04	06
12	04	04
13	04	06
14	04	06
15	08	22
<b>Total</b>	<b>64</b>	<b>100</b>



**PM**  
**POLYTECHNIC**

A Unit of Puran Murti Educational Society  
Approved by AICTE, Ministry of HRD, Govt. of India,  
Affiliated to State Board of Technical Education, Panchkula, Haryana

## INDUSTRIAL TRAINING

Industrial training provides an opportunity to students to experience the environment and culture of industrial production units and commercial activities undertaken in field organizations. It prepares student for their future role as diploma engineers in the world of work and enables them to integrate theory with practice.

For this purpose, students at the end of fourth semester need to be sent for industrial training for a minimum of 4 weeks duration to be organized during the semester break starting after IV Semester examinations. The concerned HODs along with other teachers will guide and help students in arranging appropriate training places relevant to their specific branch. It is suggested that a training schedule may be drawn for each student before starting of the training in consultation with the training providers. Students should also be briefed in advance about the organizational setup, product range, manufacturing process, important machines and materials used in the training organization.

Equally important with the guidance is supervision of students training in the industry/organization by the teachers. A teacher may guide a group of 4-5 students. A minimum of one visit per week by the teacher is recommended. Students should be encouraged to write daily report in their diary to enable them to write final report and its presentation later on.

An internal assessment of 50 and external assessment of 50 marks have been provided in the study and evaluation scheme of V Semester. Evaluation of professional industrial training report through viva-voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well as understanding of application of knowledge and skills learnt in real life situations. The formative and summative evaluation may comprise of weightage to performance in testing, general behaviour, quality of report and presentation during viva-voce examination. It is recommended that such evaluations may be carried out by a team comprising of concerned HOD, teachers and representative from industry. The components of evaluation will include the following.

- |                                      |     |
|--------------------------------------|-----|
| a) Punctuality and regularity        | 15% |
| b) Initiative in learning new things | 15% |
| c) Relationship with workers         | 15% |
| d) Industrial training report        | 55% |

