

B SC (Honours) AM SEMESTER –IV TEACHING & EXAMINATION SCHEME

SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME				TOTAL
			L	T	P			THEORY		PRACT		
								CIE	ESE	CIE	ESE	
1	AM0431	Aircraft system 1	4	0	4	6	8	60	40	60	40	200
2	AM0432/A M0435	Gas Turbine Engine(Mech.)?Gas Turbine Engine(Avio.)	4	0	4	6	8	60	40	60	40	200
3	AM0433/A M0436	Avionics(Mech.)/Avionics(Avio.)	4	0	4	6	8	60	40	60	40	200
4	AM0434	Piston Engine and propeller	5	1	0	6	6	60	40	00	00	100
TOTAL			17	1	12	24	30	240	160	180	120	700

Program: B SC (Honours) AM				Subject Code: AM0431			Semester: IV	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
4	0	4	6	60	60	40	40	200

Course Objectives :

1. Study about Aircraft Weight and Balance & Aircraft Handling & Storage.
2. Study about Air Conditioning and Cabin Pressurization (ATA 21).
3. Study about equipment and furnishings (ATA 25).
4. Study about flight controls (ATA 27), fuel Systems (ATA 28), hydraulic Power (ATA 29).
5. Study about Ice and Rain Protection (ATA 30), Landing Gear (ATA 32).
6. Inspection of lightning strikes.

Course Outcomes :

CO 1: Use of fire extinguisher on types of fire. [BT-3]

CO 2: Choose fueling grade for particular aircraft. [BT-4]

CO 3: Measure the control cable tension by tensiometer. [BT-5]

CO 4: Examine the aircraft mechanical, hydraulic, pneumatic and light system CO 5: Explain primary and secondary control surfaces. [BT-2]

CO 6: Setup the equipment for weighing an aircraft. [BT-6]

Unit 1	<p>Aircraft Electrical Power System (ATA 24) Batteries Installation and Operation; DC power generation; AC power generation; Emergency power generation; Voltage regulation; Power distribution; Inverters, transformers, rectifiers; Circuit protection; External/Ground power;</p> <p>Aircraft Lights System (ATA 33) External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency Lights.</p>	15 Hrs.
Unit 2	<p>Instrument System (ATA 34) Direct reading pressure and temperature gauges; Temperature indicating systems; Fuel quantity indicating systems; Gyroscopic principles; Artificial horizons; Attitude director, direction indicator, horizontal situation indicator, turn and slip indicators, turn coordinator; Directional gyros; Ground Proximity Warning Systems; Compass systems: direct reading, remote reading; Flight Data Recording systems; Stall warning systems and angle of attack indicating systems; Vibration measurement and indication; Glass cockpit.</p> <p>Oxygen System (ATA 35) System lay-out: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings;</p>	15 Hrs.
Unit 3	<p>Fire Protection (ATA 26) (a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests. (b) Portable fire extinguisher.</p> <p>Water/Waste (ATA 38) Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing; Corrosion aspects.</p>	10 Hrs.
Unit 4	<p>Integrated Modular Avionics (ATA42) Functions that may be typically integrated in the Integrated Modular Avionic (IMA) modules are, among others: Bleed Management, Air Pressure Control, Air Ventilation and Control, Avionics and Cockpit Ventilation Control, Temperature Control, Air Traffic Communication,</p> <p>Avionics Communication Router, Electrical Load Management, Circuit Breaker Monitoring, Electrical System BITE, Fuel Management, Braking Control, Steering Control, Landing Gear Extension and Retraction, Tyre Pressure Indication, Oleo Pressure Indication, Brake Temperature Monitoring, etc.; Core System; Network Fundamentals of automatic flight control including working principles and current terminology;</p> <p>Flight Director System; Command signal processing; Modes of operation: roll, pitch and yaw channels; Yaw dampers; Auto-throttle systems; Automatic Landing Systems: principles and categories, modes of operation, Approach, glideslope, land, go-around, system monitors and failure conditions. FBW-Fly by Wire Components</p> <p>Door and Door Warning Type of Doors. Sensors, Escape Slides, Door warning systems, Inspections techniques</p>	20 Hrs.

Reference Books:

Aviation Electronics by Keith W Bose

Aircraft Instruments-by E.H.J.Pallett

Aircraft Instruments-by C.A.Williams

Avionics Systems operation & Maintenance by James W Wasson Principles of Servo mechanism-by A Typers & R.B.Miles

Aircraft Electricity and electronics-by Bent McKinley and also by Eismin/Bent McKinley

Civil Aircraft Inspection Procedure(CAP 459) -Part II Aircraft

The Mechanism of Inertial Position and Heading Indication by Winston Merkey John Hovorka

List of Practicals:

- 1** Reading and interpretation of electrical schematic and wiring diagrams and Identification of components of electrical power supply system.
- 2** Replacement of switches and circuit breakers and system check
- 3** Installation and operation check of Batteries in aircraft
- 4** Generator power check / voltage adjustment.
- 5** Internal lighting, replace bulb and filament.
- 6** Operational check of GPWS
- 7** Operational checkup of stall warning system and angle of attack indicating system
- 8** Operational check of temperature indicating system
- 9** Gyroscopic Instrument component replacements and functional tests.
- 10** Inspection and operation check of fuel quantity indication
- 11** Functional check of RR compass
- 12** Removal and Installation of Crew O2 system component
- 13** Identification of FDR system components
- 14** Check operation of fire / smoke detection and warning system.
- 15** Identification of components of door warning system and its operation check

Program: B Sc (Honours) AM				Subject Code: AM0432			Semester: IV	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
4	0	4	6	60	60	40	40	200

Course Objectives:

1. Introduction about gas turbine.
2. Study about engine performance.
3. Study about compressor, combustion section, turbine section.
4. Study of bearing & seals.
5. Study about Lubricants & Fuels.
6. Study of fuel system & air system.

Course Outcomes :

CO 1: Explain how thrust can be improve in Aircraft. [BT-2]

CO 2: Calculate the total thrust acting on an aircraft. [BT-3]

CO 3: Assembling of various components of starting and ignition system of a jet engine. [BT-6]

CO 4: Illustrate how power plant installed and basic thing related with engine storage and preservation. [BT-4]

CO 5: Define basic components of jet engine according to their use and its function. [BT-1]

CO 6: Describe Constructional features and principles of operation of combustion section. [BT-2]

Unit 1	Fundamentals Potential energy, kinetic energy, Newton's laws of motion, Brayton cycle; The	15 Hrs.
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	<p>relation ship between force, work, power, energy, velocity, acceleration; Constructional arrangement and operation of turbojet, turbofan, turbo shaft, turboprop.</p> <p>Engine Performance Gross thrust, net thrust, choked nozzle thrust, thrust distribution, resultant thrust, thrust horsepower, equivalent shaft horsepower, specific fuel consumption; Engine efficiencies; By-pass ratio and engine pressure ratio; Pressure, temperature and velocity of the gas flow; Engine ratings, static thrust, influence of speed, altitude and hot climate, flat rating, limitations.</p> <p>Inlet Compressor inlet ducts; Effects of various inlet configurations; Ice protection.</p> <p>Compressors Axial and centrifugal types; Constructional features and operating principles and applications; Fan balancing; Operation: Causes and effects of compressor stall and surge; Methods of air flow control: bleed valves, variable inlet guide vanes, variable stator vanes, rotating stator blades; Compressor ratio.</p> <p>Combustion Section Constructional features and principles of operation.</p> <p>Turbine Section Operation and characteristics of different turbine blade types; Blade to disk attachment; Nozzle guide vanes; Causes and effects of turbine blade stress and creep. Exhaust Constructional features and principles of operation; Convergent, divergent and variable area nozzles; Engine noise reduction; Thrust reversers.</p>	
Unit 2	<p>Bearings and Seals Constructional features and principles of operation and handling .</p> <p>Lubricants and Fuels Properties and specifications; Fuel additives; Safety precautions</p> <p>Lubrication Systems System operation/lay-out and components.</p> <p>Fuel Systems Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.</p> <p>Air Systems Operation of engine air distribution and anti-ice control systems, including internal cooling, sealing and external air services.</p>	15 Hrs.
Unit 3	<p>Starting and Ignition Systems Operation of engine start systems and components; Ignition systems and components; Maintenance safety requirements.</p> <p>Engine Indication Systems Exhaust Gas Temperature/ Inter-stage Turbine Temperature; Engine Thrust Indication: Engine Pressure Ratio, engine turbine discharge pressure or jet pipe pressure systems; Oil pressure and temperature; Fuel pressure and flow; Engine speed, Propeller Speed; Vibration measurement and indication; Torque; Power.</p> <p>Power Augmentation Systems Operation and applications; Water injection, water methanol; Afterburner Systems.</p> <p>Turbo-prop Engines Gas coupled/free turbine and gear coupled turbines; Reduction gears; Integrated engine and propeller controls; Over-speed safety devices.</p> <p>Turbo-shaft engines Arrangements, drive systems, reduction gearing, couplings, control systems.</p>	15 Hrs.
Unit 4	<p>Auxiliary Power Units (APUs) Purpose, operation, protective systems.</p>	15 Hrs.

	<p>Power plant Installation Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.</p> <p>Fire Protection Systems Operation of detection and extinguishing systems.</p> <p>Engine Monitoring and Ground Operation Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Trend (including oil analysis, vibration and boroscope) monitoring; Inspection of engine and components to criteria, tolerances and data specified by engine manufacturer; Compressor washing/cleaning; Foreign Object Damage.</p> <p>Engine Storage and Preservation Preservation and depreservation for the engine and accessories/ systems.</p>	
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Reference Books:
Aircraft Gas Turbine Technology by IRWINE TREAGER
The Jet Engine' by ROLLS ROYCE
Power plant Section Text book- (EA-ITP-P)
Aviation Maintenance Technician Series by Dale Crane
Jet Aircraft power Systems' by JACK V. CASAMASSA and RALPH D.BENT
Gas Turbine Engines' by Turbomeca, Bordes, France.
Hydraulic Servo Systems' by M.GUILLON
Introduction to Flight by JOHN ANDERSON:
Civil Aircraft Inspection Procedure (CAP459) Part- II Aircraft
Aircraft Power Plants by M.J.KROES, T.W.Wild, R.D.Bent and J.L.McKINLEY;

- List of Practical :**
- 1 Identify engine types, modules and subassemblies and components of turbine engines .
 - 2 Identify various parts of thrust management and bypass system of turbine engine.
 - 3 Identification and inspection of compressors stages.
 - 4 Engine compressor surge and stall management components and control.
 - 5 Identification various components of combustion systems and methods of cooling's.
 - 6 Identification of exhaust system and methods of noise reduction
 - 7 Identification and inspection of components of thrust reversal system.
Identify normal & electronic fuel control, monitoring and indication
 - 8 system
 - 9 Familiarization with methods of engine starting and ignition systems.
 - 10 Operation check of Engine indicating systems.
 - 11 Familiarization of APU starting and shutdown procedure
 - 12 Familiarization with power plant removal & installation
 - 13 Visual Inspection of engines
 - 14 Typical engine control rigging.
 - 15 Familiarization with engines and airframe interface.

- 16 Testing of engine fire monitoring and extinguishing operation
Identify engine types, modules and subassemblies and components of turbine engines .
- 17 engines .

Subject: Gas Turbine Engine(Avionics)								
Program: B Sc (Honours) AM				Subject Code: AM0435			Semester: IV	
Teaching Scheme				Examination Evaluation Scheme				Total
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	
4	0	4	6	60	60	40	40	200

Unit 1	<p>Fundamentals Potential energy, kinetic energy, Newton's laws of motion, Brayton cycle; The relation ship between force, work, power, energy, velocity, acceleration; Constructional arrangement and operation of turbojet, turbofan, turbo shaft, turboprop.</p> <p>Engine Performance thrust distribution, resultant thrust, thrust horsepower, Pressure, temperature and velocity of the gas flow; Engine ratings, static thrust, influence of speed, altitude and hot climate, flat rating, limitations.</p> <p>Inlet Compressor inlet ducts;</p> <p>Compressors Axial and centrifugal types; Constructional features and operating</p> <p>Combustion Section Constructional features and principles of operation.</p> <p>Turbine Section Exhaust Constructional features and principles of operation</p>	15 Hrs.
Unit 2	<p>Fuel Systems Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.</p> <p>Air Systems Operation of engine air distribution and anti-ice control systems,</p>	15 Hrs.
Unit 3	<p>Starting and Ignition Systems Operation of engine start systems and components; Ignition systems and components; Maintenance safety requirements.</p>	15 Hrs.

Engine Indication Systems

Exhaust Gas Temperature/ Inter-stage Turbine Temperature; Engine Thrust Indication: Engine Pressure Ratio, engine turbine discharge pressure or jet pipe pressure systems; Oil pressure and temperature; Fuel pressure and flow; Engine speed, Propeller Speed;

Reference Books:

Aircraft Gas Turbine Technology by IRWINE TREAGER
The Jet Engine' by ROLLS ROYCE
Power plant Section Text book- (EA-ITP-P)
Aviation Maintenance Technician Series by Dale Crane
Jet Aircraft power Systems' by JACK V. CASAMASSA and RALPH D.BENT
Gas Turbine Engines' by Turbomeca, Bordes, France.
Hydraulic Servo Systems' by M.GUILLON
Introduction to Flight by JOHN ANDERSON:
Civil Aircraft Inspection Procedure (CAP459) Part- II Aircraft
Aircraft Power Plants by M.J.KROES, T.W.Wild, R.D.Bent and J.L.McKINLEY;

List of Practical :

- 1 Identify engine types, modules and subassemblies and components of turbine engines .
- 2 Identify various parts of thrust management and bypass system of turbine engine.
- 3 Identification and inspection of compressors stages.
- 4 Engine compressor surge and stall management components and control.
- 5 Identification various components of combustion systems and methods of cooling's.
- 6 Identification of exhaust system and methods of noise reduction
- 7 Identification and inspection of components of thrust reversal system.
Identify normal & electronic fuel control, monitoring and indication
- 8 system
- 9 Familiarization with methods of engine starting and ignition systems.
- 10 Operation check of Engine indicating systems.
- 11 Familiarization of APU starting and shutdown procedure
- 12 Familiarization with power plant removal & installation
- 13 Visual Inspection of engines
- 14 Typical engine control rigging.
- 15 Familiarization with engines and airframe interface.
- 16 Testing of engine fire monitoring and extinguishing operation
Identify engine types, modules and subassemblies and components of turbine
- 17 engines .

Program: B Sc (Honours) AM				Subject Code: AM0433			Semester: IV	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
4	0	4	6	40	40	60	60	200

Course Objectives :

1. Study about Communication system in aircraft. (ATA 23).
2. Study about Navigation system in aircraft (ATA 34).
3. Study about Auto-flight (ATA 22).
4. Information Systems (ATA46)
5. Operation, function and use of avionic general test equipment.

Course Outcomes :

CO 1: Categorize different types of communication systems used in aircraft. [BT-4]

CO 2: Demonstrate the various types of navigation systems used in aircraft. [BT-3]

CO 3: Classify the various components of auto-flight system. [BT-4]

CO 5: Classify the various components of onboard maintenance system. [BT-4]

CO 6: Describe aircraft information system. [BT-2]

Course Content:

Unit 1	Communication (ATA 23) Fundamentals of radio wave propagation, antennas, transmission lines, communication, receiver and transmitter; Emergency Locator Transmitters; Cockpit Voice Recorder;	15 Hrs.
Unit 2	Navigation (ATA 34) Flight Management Systems; Air Traffic Control transponder, secondary surveillance radar; Traffic Alert and Collision Avoidance System(TCAS); Weather avoidance radar; Radio altimeter; IRS-Inertial reference system; TCAS-Traffic Collision Avoidance system;	15 Hrs.
Unit 3	Auto-flight (ATA 22) Fundamentals of automatic flight control including working principles and current terminology; On board Maintenance Systems (ATA 45) Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).	15 Hrs.
Unit 4	Information Systems (ATA46) The units and components which furnish a means of storing, updating and retrieving digital information traditionally provided on paper, microfilm or microfiche. Includes units that are dedicated to the information storage and retrieval function such as the electronic library mass storage and controller. Does not include units or components installed for other uses and shared with other systems, such as flight deck printer or general use display; Typical examples include Air Traffic and Information Management Systems and Network Server Systems; Aircraft General Information System; Flight Deck Information System; Maintenance Information System; Passenger Cabin Information System; Miscellaneous Information System.	15 Hrs.

Reference Books:

Micro Electronics Aircraft System- by E.H.J.Pallett

Avionics Systems operation & Maintenance by James W Wasson

Aircraft Electricity and electronics-by Bent McKinley and also by Eismin/Bent McKinley

Civil Aircraft Inspection Procedure(CAP 459) -Part II Aircraft Integrated

List of Practical

- 1 VHF / HF Communications LRU replacement and Communication Check.
- 2 Use of various test equipment for avionics system maintenance.
- 3 VHF Navigation LRU replacement and system tests.
- 4 Inspection / testing of ELT
- 5 CVR switching and recording
- 6 Antenna replacement and system testing
- 7 Radio Standing Wave ratio Measurement Tests.
- 8 Function Testing of ATC / TCAS system components.
- 9 Operation test of Weather Radar system.
- 10 Intercommunication / Passenger Address Component function testing.
- 11 ILS / VOR Systems function testing using appropriate test equipment e.g. Nav

401/402.

- 12 Radio Altimeter system test utilizing appropriate (555) test set.
- 13 DME / VOR Functional Testing utilizing appropriate test set.
- 14 ADF component functions and tests.
- 15 Functional check of inertial navigation system
- 16 Operational testing of Flight Director System's and auto pilot system.
- 17 Locate Autothrottle systems components and bite test.
- 18 Perform BITE on Central Maintenance system.

Subject : Avionics (Avio.)								
Program: B Sc (Honours) AM				Subject Code:AM0436			Semester: IV	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
4	0	4	6	40	40	60	60	200

Course Content:

Unit 1	Communication (ATA 23) Fundamentals of radio wave propagation, antennas, transmission lines, communication, receiver and transmitter; Working principles of following systems: Very High Frequency (VHF) communication; High Frequency (HF) communication; Audio; Emergency Locator Transmitters; Cockpit Voice Recorder; ARIN communication and reporting;	15 Hrs.
Unit 2	Navigation (ATA 34) Very High Frequency omnidirectional range (VOR); Automatic Direction Finding (ADF) Instrument Landing System (ILS); Microwave Landing System (MLS); Distance Measuring Equipment (DME); Very Low Frequency and hyperbolic navigation (VLF/Omega); Doppler navigation; Area navigation, RNAV systems; Flight Management Systems; Global Positioning System (GPS), Global Navigation Satellite Systems (GNSS); Inertial Navigation System; Air Traffic Control transponder, secondary surveillance radar; Traffic Alert and Collision Avoidance System (TCAS); Weather avoidance radar; Radio altimeter; IRS-Inertial reference system; TCAS-Traffic Collision Avoidance system; Weather avoidance radar; Radio altimeter; IRS-Inertial reference system; TCAS-Traffic Collision Avoidance system;	15 Hrs.
Unit 3	Auto-flight (ATA 22) Fundamentals of automatic flight control including working principles and current terminology; Flight Director System; Command signal processing; Modes of operation: roll, pitch and yaw channels; Yaw dampers; Auto-throttle systems; Automatic Landing Systems: principles	15 Hrs.

	<p>and categories, modes of operation, Approach, glideslope, land, go-around, system monitors and failure conditions. FBW-Fly by Wire</p> <p>On board Maintenance Systems (ATA 45)</p> <p>Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring). Software management control: Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes</p>	
Unit 4	<p>Information Systems (ATA46)</p> <p>The units and components which furnish a means of storing, updating and retrieving digital information traditionally provided on paper, microfilm or microfiche. Includes units that are dedicated to the information storage and retrieval function such as the electronic library mass storage and controller. Does not include units or components installed for other uses and shared with other systems, such as flight deck printer or general use display; Typical examples include Air Traffic and Information Management Systems and Network Server Systems; Aircraft General Information System; Flight Deck Information System; Maintenance Information System; Passenger Cabin Information System; Miscellaneous Information System.</p> <p>Avionic General Test Equipment</p> <p>Operation, function and use of avionic general test equipment. Cabin System; Information system.</p>	15 Hrs.
<p>Reference Books:</p> <p>Micro Electronics Aircraft System- by E.H.J.Pallett</p> <p>Avionics Systems operation & Maintenance by James W Wasson</p> <p>Aircraft Electricity and electronics-by Bent McKinley and also by Eismin/Bent McKinley</p> <p>Civil Aircraft Inspection Procedure(CAP 459) -Part II Aircraft Integrated</p>		

Program: B Sc (Honours) AM				Subject Code: AM0434			Semester: IV	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
5	01	00	06	40	00	60	00	100

Course Objectives:

1. Study about engine performance, construction, fuel system & electronics engine control.
2. Study about ignition system & cooling system.
3. Study about supercharging & turbocharging.
4. Study about Lubricants and fuels lubrication systems.
5. Study about engine indication systems.
6. Study about power plant installation.
7. Study about engine monitoring and ground operation system.
8. Study about engine storage and preservation.

Course Outcome :

CO 1: Define basic terminology of Propeller and Piston Engine [BT-1]

CO 2: Differentiate between different types of Propeller and Piston Engines. [BT-2]

CO 3: Experimental demonstration for propeller Pitch Control [BT-3]

CO4: Formulate for balancing the propeller. [BT-6]

CO 5: Explain different methods for Propeller Ice Protection [BT-2]

CO 6: Summarized various methods for Propeller Storage and Preservation [BT-2]

Unit 1	<p>Fundamentals Mechanical, thermal and volumetric efficiencies operating principles — 2 stroke, 4 stroke, Otto and Diesel, Piston displacement and compression ratio; Engine configuration and firing order.</p> <p>Engine Performance Power calculation and measurement; Factors affecting engine power; Mixtures/leaning, pre-ignition.</p> <p>Engine Construction Crank case, crank shaft, cam shafts, sumps; Accessory gearbox; Cylinder and piston assemblies Connecting rods, inlet and exhaust manifolds; Valve mechanisms; Propeller reduction gearboxes.</p> <p>Engine Fuel Systems Carburetors Types, construction and principles of operation; Icing and heating</p> <p>Electronic engine control Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components</p>	15 Hrs.
Unit 2	<p>Starting and Ignition Systems Starting systems, pre-heat systems; Magneto types, construction and principles of operation; Ignition harnesses, spark plugs; Low and high tension systems.</p> <p>Induction, Exhaust and Cooling Systems Construction and operation of: induction systems including alternate air systems; Exhaust systems, engine cooling systems — air and liquid.</p> <p>Supercharging/Turbocharging Construction and operation of supercharging/ turbocharging systems; System terminology; Control systems; System protection.</p> <p>Lubricants and Fuels Properties and specifications; Fuel additives; Safety precautions</p> <p>Lubrication Systems System operation/lay-out and components.</p>	15 Hrs.
Unit 3	<p>Engine Indication Systems Engine speed; Cylinder head temperature; Coolant temperature; Oil pressure and temperature; Exhaust Gas Temperature; Fuel pressure and flow; Manifold pressure.</p> <p>Power plant Installation Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.</p> <p>Engine Monitoring and Ground Operation Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Inspection of engine and components: criteria, tolerances, and data specified by engine manufacturer.</p> <p>Engine Storage and Preservation Preservation and de-preservation for the engine and accessories/ systems.</p>	15 Hrs.

<p>Unit 4</p>	<p>Aircraft Propeller Fundamentals; Blade element theory; High/low blade angle, reverse angle, angle of attack, rotational speed; Propeller slip; Aerodynamic, centrifugal, and thrust forces, Torque, Relative airflow on blade angle of attack; Vibration and resonance.</p> <p>Propeller Construction : Construction methods and materials used in wooden, composite and metal propellers; Blade station, blade face, blade shank, blade back and hub assembly; fixed pitch, controllable pitch, constant speed propeller; Propeller/spinner installation.</p> <p>Propeller Pitch Control Speed control and pitch change methods, mechanical and electrical/electronic; Feathering and reverse pitch; Over speed protection.</p> <p>Propeller Synchronising Synchronising and synchrophasing equipment.</p> <p>Propeller Ice Protection Fluid and electrical de-icing equipment.</p> <p>Propeller Maintenance Static and dynamic balancing; Blade tracking; Assessment of blade damage, erosion, corrosion, impact damage, delamination; Propeller treatment/repair schemes; Propeller engine running.</p> <p>Propeller Storage and Preservation Propeller preservation and de-preservation.</p>	<p>15 Hrs.</p>
<p>Reference Books:</p> <p>Airframe and Power plant Mechanics (EA-AC 65- 12A) -Power Plant Hand FAA</p> <p>Power Plant-By Bent and McKinley</p> <p>Civil Aircraft Inspection Procedure (CAP 459) Part II Aircraft</p> <p>Aircraft Propeller and Controls-by Frank Delph</p> <p>Power plant Section Text book- (EA-ITP-P)</p> <p>Aircraft Piston Engines-By Herschel Smith</p> <p>Aviation Maintenance Technician Series by Dale Crane</p>		
<p>List of Practical:</p> <ol style="list-style-type: none"> 1 Familiarise with constructions and functions of piston engines 2 Identification and inspection of various subassemblies of piston engines 3 Identification and inspection of cylinder and piston assemblies. 4 Inspection of accessory gear box valve mechanism. 5 Identification and inspection of various components of piston engines. 6 Identification and inspection of engine fuel system and function of carburetor. 7 Identification and inspection of engine fuel injection system and electronic fuel control. 		

- 8** Function check of magneto.
- 9** Various methods of engine starting and ignition systems and Engine indicating systems
- 10** Identification and inspection of components and function of lubrication system.
- 11** Engine control system and rigging
- 12** Familiarization with engines and airframe interface.
- 13** Testing of engine fire warning and extinguishing operation
- 14** Preparation for engine/ propeller storage and preservation.
- 15** Familiarise with propeller construction
- 16** Methods of propeller pitch control and its effect on engine power. Feathering and reverse pitch control. Propeller synchrophasing system
- 17** Check Propeller track.
- 18** Engine monitoring and ground operation
- 19** Spark plug cleaning and testing