

## SEMESTER V

Course Code		Credits :3
<b>USARM 501</b>	<b>AIRFRAME SYSTEM</b>	
<p><b>Unit I -Hydraulic Power and Pneumatic/Vacuum Systems:</b>            System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators;            Pressure generation: electric, mechanical, pneumatic; Emergency pressure generation;            Pressure Control; Power distribution; Indication and warning systems;            Interface with other systems. Filters.</p> <p><b>Pneumatic/Vacuum Systems:</b>            System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply;            Pressure control; Distribution; Indications and warnings; Interfaces with other systems.</p>		<b>30 Lectures</b>
<p><b>Unit II–Ice and rain protection</b>            Pneumatic deicing systems, de-icer boots constructions, deicing system components, pneumatic deicing system maintenance, thermal anti icing system, ground deicing of aircraft, wind shield ice control system, rain elimination system</p>		<b>20 Lectures</b>
<p><b>Unit III–Oxygen System :</b>            Oxygen system: Purpose of the system; Safety portable &amp; fixed Oxygen systems; low pressure and high pressure oxygen system &amp; components; Installation and replacement of Oxygen lines. General familiarization with provision of emergency equipment on modern aircraft such as Emergency exits; Megaphone; Signaling Flares; FDR &amp; CVR; Fire Extinguishers.</p> <p><b>Lights: External:</b> navigation, anti-collision, landing, taxiing, ice; <b>Internal:</b> cabin, cockpit, cargo; Emergency.</p>		<b>20 Lectures</b>
<p><b>Reference Book :-</b>            A &amp; P Technician Airframe textbook (Jeppesen)</p>		

Course Code		Credits :3
<b>USARM 502</b>	<b>LANDING GEAR</b>	
<p><b>Unit I –General –</b>            Landing gear arrangement, shock strut, electrical and hydraulic landing gear extension and retraction, emergency extension system, nose wheel centering mechanism, nose wheel steering, shimmy dampers.</p>		<b>20 Lectures</b>
<p><b>Unit II – Brakes –</b>            Independent brake system, power operated brake system, power boosted brake system, power brake control valve, nose wheel brakes, single disc brakes, multi disc brakes, segmented rotor brakes, expander tube brake system, inspection and maintenance of brakes, bleeding of brake.</p>		<b>20 Lectures</b>

<p><b>Unit III – Wheels and tyres</b>  Split wheel, removable and fixed flange wheels, different parts of tyres, aircraft tyre maintenance, rethreading and recapping, tube inspections, mounting and demounting of wheels and tyres,  Antiskid system, landing gear retraction check, rigging and adjustment.</p>	<b>20 Lectures</b>
<p><b>Reference Book :-</b>  A &amp; P Technician Airframe textbook (Jeppesen)</p>	

Course Code		Credits :3
<b>USARM 503</b>	<b>GAS TURBINE ENGINE– II</b>	
<p><b>Unit I –</b>  <b>Power Augmentation Systems</b>  Operation and applications; Water injection, water methanol; Afterburner systems.  <b>Turboprop Engines</b>  Gas coupled/free turbine and gear coupled turbines; Reduction gears; Integrated engine and propeller controls; Overspeed safety devices.  <b>Turbo shaft engines</b>  Arrangements drive systems, reduction gearing, couplings, control systems.  <b>Auxiliary Power Units (APUs)</b>  Purpose, operation, protective systems.  <b>Power plant Installation</b>  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>		<b>30 Lectures</b>
<p><b>Unit II –Engine Indication Systems :</b>  Exhaust Gas Temperature/Interstage 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; Vibration measurement and indication; Torque; Power.</p>		<b>20 Lectures</b>
<p><b>Unit III – Starting and Ignition Systems :</b>  Operation of engine start systems and components;  Ignition systems and components; Maintenance safety requirements.  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>		<b>30 Lectures</b>
<p><b>Reference Book :</b></p> <ol style="list-style-type: none"> <li>1. Aircraft gas turbine engine by Treager</li> <li>2. Gas turbine engine by Otis</li> </ol>		

Course Code		Credits :3
<b>USARM 504</b>	<b>PISTON ENGINE- II</b>	
<b>Unit I -Lubrication Systems and Fuel system:</b> System operation/lay-out and components, Properties and specifications of different types of lubricants. System operation/lay-out and components, Properties and specifications of different types of fuel.		<b>20 Lectures</b>
<b>Unit II-Powerplant:</b> 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. <b>Engine Indication Systems</b> Engine speed; Cylinder head temperature; Coolant temperature; Oil pressure and temperature; Exhaust Gas Temperature; Fuel pressure and flow; Manifold pressure.		<b>20 Lectures</b>
<b>Unit III-Engine Monitoring and Ground Operation:</b> 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. Preservation and depreservation for the engine and accessories/ systems		<b>20 Lectures</b>
<b>Reference Book :-</b> 12A, 15A, AC powerplant Kroes and Wild		

Course Code		Credits :3
<b>USARM 505</b>	<b>FLIGHT CONTROLS AND SNAG RECTIFICATION</b>	
<b>Unit I:Flight Controls (ATA 27)</b> Primary controls: aileron, elevator, rudder, spoiler; Trim control; Active load control; High lift devices; Lift dump, speed brakes; System operation: manual, hydraulic, pneumatic, electrical, fly-by-wire; Artificial feel, Yaw damper, Mach trim, rudder limiter, gust locks systems; Balancing and rigging; Stall protection/warning system		<b>30 Lectures</b>
<b>Unit II:Fuel Systems (ATA 28)</b> System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling; Longitudinal balance fuel systems.		<b>30 Lectures</b>

**Unit III :Aircraft Structure Systems (Mechanical)Snag analysis and Rectification:**

The snags in the aircraft systems pertaining to syllabus covered in Semester 1 to Semester 5 for Aircraft structure systems: namely Hydraulics, Pneumatics, Ice &rain protection, Landing gear, Oxygen, Fire protection, Air conditioning & cabin pressurization. The snag analysis and rectification.

**Aircraft Structure Systems (Avionics)Snag analysis and Rectification:**

The snags in the aircraft systems pertaining to syllabus covered in semester 1 to 5 for aircraft structure systems namely Electrical, Instrument, Radio and Digital. The snag analysis and rectification.

**30 Lectures**

**Reference Book :**

Aviation Maintenance Technician handbook – FAA -9A, 15A, 12A

Course Code	<b>PRACTICALS</b>	Credits :1
<b>USARM 5P1</b>	<b>AIRFRAME SYSTEM</b>	40 marks
<ol style="list-style-type: none"> <li>1. Servicing of hydraulic reservoir</li> <li>2. Operation of Hydraulic shut off valve</li> <li>3. Charging of hydraulic accumulator</li> <li>4. Discharging of hydraulic accumulator</li> <li>5. Check for hydraulic leak</li> <li>6. Servicing of pneumatic system installed on aircraft</li> <li>7. Check for antiicing methods used on aircraft</li> <li>8. Study how Antiicing of windshield is done</li> <li>9. Check for various component and servicing of those components used for antiicing purpose on the aircraft.</li> <li>10. Servicing of oxygen cylinder</li> <li>11. Servicing of oxygen mask</li> <li>12. Carryout snag analysis and rectification of Hydraulic quantity low</li> <li>13. Carryout snag analysis and rectification for Low oxygen pressure</li> </ol>		<b>50 hours</b>

Course Code	<b>PRACTICALS</b>	Credits :1
<b>USARM 5P2</b>	<b>LANDING GEAR</b>	40 marks
<ol style="list-style-type: none"> <li>1. Locate and identify various parts of aircraft landing gear</li> <li>2. Carryout greasing of various parts of aircraft landing gear</li> <li>3. Swap landing gear wheel on aircraft</li> <li>4. Servicing of oleo pneumatic shock strut</li> <li>5. Identify the information given on tire</li> <li>6. Inspection of brake system</li> <li>7. check the operation of antiskid system installed on aircraft</li> <li>8. replace the tires on the aircraft wheel.</li> <li>9. Carryout analysis and rectification of Landing Gear warning light ON</li> </ol>		<b>40 hours</b>

Course Code	<b>PRACTICALS</b>	Credits :1
<b>USARM 5P3</b>	<b>GAS TURBINE ENGINE</b>	40 marks
<ol style="list-style-type: none"> <li>1. carry out preflight inspection.</li> <li>2. Carry out simulated start of aircraft engine (in presence of supervisor)</li> <li>3. Locate and trace the various components of aircraft fuel system installed on aircraft.</li> <li>4. Take necessary safety precautions after hot start and hung start</li> <li>5. Replenish engine oil</li> <li>6. Main fuel pump- Purpose, location and mounting method including safety</li> <li>7. Fuel control unit-Identification, location, with reference to axial &amp; circumferential and mounting</li> </ol>		<b>50 hours</b>

8. Over speed governor- function, mounting, locking method and signals	
<p>Carryout snag analysis of following :</p> <p>i) No start, No light up, No EGT rise.</p> <p>ii) Slow start.</p> <p>iii) Hung start.</p> <p>iv) Hung up at low speed – less than 30%.</p> <p>v) Hung up at 50% N2 – High EGT. (Hot start).</p> <p>vi) Stall.</p> <p>vii) Flame out or power loss.</p> <p>viii) Stall – Surge.</p> <p>ix) Parameter fluctuation.</p> <p>x) High Oil Consumption (HOC).</p> <p>xi) Oil from Drain Mast – no other leak.</p> <p>xii) Oil wetting in fan cowl &amp; Accessory Gear Box (AGB).</p>	

Course Code	<b>PRACTICALS</b>	Credits :1
<b>USARM 5P4</b>	<b>PISTON ENGINE</b>	40 marks
<p>Details about Overhaul and Maintenance of the engine – including dismantling, inspection, repair and assembly with table of limits of all important engine parts such as Crankcase. Accessories case assembly, Oil sump, Crank shaft assemblies, Connecting rods, Piston assemblies, Cylinder assemblies, Valve mechanism, Gear train, Lubrication system, Induction system, Cooling and exhaust system.</p>		<b>40 hours</b>

Course Code	<b>PRACTICALS</b>	Credits :1
<b>USARM 5P5</b>	<b>Snag analysis and Rectification</b>	40 marks
<p><b>Snag rectification of snag related to following topics</b></p> <p>1. Practicals on defect rectification of aircraft power supply system such as GPU not Getting connected to aircraft. Low battery voltage, ground relay chattering etc.</p> <p>6. Practicals on servicing of GPU, charging, cleaning, checking of electrolyte level and specific gravity.</p> <p>7. Checking the serviceability, inspection, removal and fitting of landing lights and taxiing lights etc.</p>		<b>60 hours</b>
<p>1. Study of radio altimeter and its test procedure</p> <p>2. Familiarization of ATC system components and its test procedure</p> <p>3. Study of ESDS requirements and precaution during ground handling</p> <p>4. Operational test of VHF com system on Local frequency contact precaution and procedure</p> <p>5. Operational test of VOR Nav. System</p> <p>6. Operational/Self test operation of ILS components</p>		
<p>1. Pitot –static system of aircraft.</p>		

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| <ol style="list-style-type: none"><li>2. Stall warning system on aircraft.</li><li>3. EGT System snags.</li><li>4. N1 &amp; N2 rpm related system snags.</li><li>5. Fuel flow system related snags.</li><li>6. EPR related system snags.</li><li>7. Auto pilot system related snags.</li><li>8. DR</li><li>9. Compass, RR compasses related snags.</li><li>10. Gyro related snags on aircraft.</li></ol> |  |
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