BHARAT INSTITUTE OF AERONAUTICS

SYLLABUS

B. Sc AME

AIRCRAFT SYSTEMS, MAINTENANCE PROCEDURES AND AVIATION REGULATIONS

Course Structure and Syllabi for B.Sc. (Aircraft Maintenance Engineering)

Semester	Subject	Credits
I	AV11071- Maintenance Practices –I	4
	AV11073- Basic Aerodynamics	3
	AV11075- Aviation Legislation-I	4
	AV11077- Mathematics	3
	AV11079- Introduction to Computers	3
	AV15081- Work shop Practices	2
	AV13083- Engineering Drawing	2
	Total	**21**
II	AV11072- Electrical fundamentals –I	3
	AV11074- Materials and Hardware – I	4
	AV11076- Aviation Legislation-II	4
	PH11078- Physics	3
	HS11080- English Language Communication Skills	3
	AV19082- Welding	2
	CS19084 – Computer	1
	Total	**20**
III	AV21071-Electrical fundamentals-II	4
	AV21073-Materials and Hardware – II	4
	HS21075-Human Factors	4
	BM21077- Quality & Safety Management System	3
	AV21079- Approval of Maintenance Organizations (CAMO & CAR 145)	3
	EE21081- Electrical	2
	AV29083- NDT and Heat Treatment	1
		21
IV	EC21072-Electronic Fundamentals	4
	AV21074-Maintenance Practices –II	4
	AV21076- Aircraft Structure, Aerodynamics and Systems -I	4
	AV21078- Aircraft Stores	3
	AV21080 -Ground Handling, Safety and Support Services	3
	AV29082-Maintenance Practices	2
	AV29084- Basic Composite	1
	Total	**21**

V	AV31071-Digital Techniques Electronic Instrument Systems	4
	AV31073- Aircraft Structure, Aerodynamics and Systems -II	4
	AV33075- Piston Engine –I	3
	AV33077- Gas Turbine Engine –I	3
	AV31079- Aircraft Maintenance (Planning & Logistics)	3
	AV39081- Aircraft Structure and Systems	2
	AV39083- Basic Electronics	1
	AV39085- Aircraft Instruments	1
	AV39087- Piston Engine-I	1
	AV39089- Gas Turbine Engine –I	1
	Total	**23**

VI	AV33072- Piston Engine –II	4
	AV33074-Gas Turbine Engine-II	4
	AV33076-Propeller	4
	AV39078- Avionic Systems	1
	AV39080- Piston Engine-II	2
	AV39082- Gas Turbine Engine-II	1
	AV39084 - Propeller	1
	AV37086- Project Work / 3 Months internship in live maintenance environment in aviation industry	7
	Total	**24**

SUMMARY OF SEMESTER WISE CREDITS

Semester	I	II	III	IV	V	VI	Total
Credit	21	20	21	21	23	24	130

Subject Code: AV11071	**B.Sc. AME** -1		**Course Title** : **Maintenance Practices –I**	
Contact Hours: 60	**Lecture**- 4	**Tutorial**-0	**Practicle**-0	**Credit**-4
Objective				
Units	**Content**			
1	**SAFETY PRECAUTIONS-AIRCRAFT AND WORKSHOP:** Aspects of safe working practices including precautions to be taken when working with electricity, gases especially oxygen, oils and chemicals. Also, instruction in the remedial action to be taken in the event of a fire or another accident with one or more of these hazards including knowledge on extinguishing agents.			
2	**WORKSHOP PRACTICES:** Care of tools, control of tools, use of workshop materials; Dimensions, allowances and tolerances, standards of workmanship; Calibration of tools and equipment, calibration standards.			
3	**TOOLS:** Common hand tool types; Common power tool types; Operation and use of precision measuring tools; Lubrication equipment and methods. Operation, function and use of electrical general test equipment;			
4	**AVIONIC GENERAL TEST EQUIPMENT:** Operation, function and use of avionic general test equipment			
5	**FITS AND CLEARANCES:** Drill sizes for bolt holes, classes of fits; Common system of fits and clearances; Schedule of fits and clearances for aircraft and engines; Limits for bow, twist and wear; Standard methods for checking shafts, bearings and other parts.			
6	**WELDING, BRAZING, SOLDERING AND BONDING:** (a) Soldering methods; inspection of soldered joints. (b) Welding and brazing methods; Inspection of welded and brazed joints; Bonding methods and inspection of bonded joints.			

Subject Code: AV11073	**B.Sc. AME** -2	**Course Title** : **Basic Aerodynamics**	
Contact Hours: 45	**Lecture**- 3 **Tutorial**-0 **Practical**-0 **Credit**-3		
Objective			
Units	**Content**		**Contact Hours**
1	**Mechanics :** Force, and the first law of motion, Mass, Momentum, Forces in equilibrium, Forces not in equilibrium, Inertia forces, Weight, The acceleration due to gravity, Mass weight and g, Units, Motion on curved paths, Centripetal force and centripetal acceleration, Centrifugal force, Work, power and energy, Energy and momentum, Fluid pressure, Density, Pressure and density variation in a stationary fluid, The behavior of gases (Gas Laws),		
2	**Air and airflow – subsonic speeds:** Introduction – significance of the speed of sound : Invisibility of the atmosphere, Density of the air, Pressure of the atmosphere, Decrease of pressure and density with altitude, Temperature changes in the atmosphere, Effect of temperature and pressure on density, Viscosity, Winds and up-and-down currents, Air speed and ground speed, Chemical composition of the atmosphere, The international standard atmosphere, Bernoulli's equation, Static Pressure, Dynamic Pressure , Stagnation Pressure, Indicated Air Speed (IAS), Calibrated Air Speed (CAS), Equivalent Air Speed (EAS), True Air Speed (TAS), The venturi tube, Air resistance or drag, Streamlines and form drag, Effect of Streamlining, Skin friction and boundary layer, Control of boundary layer, Transition Point, Coefficient of Drag & Lift, Absolute pressure, fineness ratio laminar and turbulent flow, free stream flow, relative airflow, upwash and downwash, vortices, The terms: camber, chord, mean aerodynamic chord, profile (parasite) drag, induced drag, centre of pressure, angle of attack, wash in and wash out, , wing shape and aspect ratio; Thrust, Weight, Aerodynamic Resultant; Generation of Lift and Drag: Angle of Attack, Lift coefficient, Drag coefficient, polar curve, stall; Aerofoil contamination including ice, snow, frost.		
3	**Aerofoils – subsonic speeds:** Lifting surfaces, Lift and drag , Airflow and pressure over aerofoil ,		

	Chord line and angle of attack , Line of zero lift , Pressure distribution , Centre of pressure , Total resultant force on an aerofoil , Movement of centre of pressure Lift, drag and pitching moment of an aerofoil, Aerofoil characteristics, Lift curve , Stalling of aerofoil , drag curve , The lift/drag ratio curve, The centre of pressure and moment coefficient, Aerodynamic centre , The ideal aerofoil, Camber, Laminar flow aerofoil, The geometric features that have most effect on the qualities of an aerofoil section, Aspect ratio, How aspect ratio affects the lift curve, Induced drag, wing-tip vortices, Taper and shape of wing tips, Variable camber, Flaps and slots, Effect of flaps and slots on maximum lift coefficient and stalling angle, Effect of slot on airflow over an aerofoil at large angle of attack, Icing,	
4	**Level flight:** Introduction, The four forces, Conditions of equilibrium, Difficulties in balancing the four forces, Arranging the forces, The tail plane and other horizontal control surfaces, 'Tail-less' and 'tail-first' aeroplanes, Loads on tail plane, Effects of downwash, Level flight at different air speeds, Relation between air speed and angle of attack, Effect of : height , weight, on level flight.	
5	**Gliding and landing:** Gliding, Gliding angle, How the angle of attack affects the gliding angle, Effect of wind on angle of glide relative to the earth, Effect of weight on gliding, Endurance on the glide, Disadvantages of flat gliding angle, Landing, Stalling speed, Wing loading, Short and vertical landing and take-off, The gyroplane, The helicopter, Other short and vertical take-off aircraft,	
6	**Performance :** Taking-off, Climbing, Forces acting on an aero plane during a climb, Power curves – propeller propulsion, Maximum and minimum speeds of horizontal flight, Effect of changes of engine power, Effect of altitude on power curves, Ceiling, service ceiling, absolute ceiling, Effect of weight on performance,	
7	**Manoeuvres:** Introduction, The longitudinal axis, rolling, The normal axis, yawing, The lateral axis, side slipping or skidding, pitching, Accelerations, The load factor, Turning or Banking, Forces acting on an aeroplane during a turn, Loads during a turn, Correct and incorrect angles of bank, Other problems	
8	**Stability and control:** Meaning of stability and control, Inherent stability, Neutral stability, Dynamic stability, Stick free and Stick fixed conditions, Longitudinal stability, Factors affect longitudinal Stability, Longitudinal dihedral, Lateral stability, Factors affect Lateral Stability, Effect of low-slung fuselage and engine pods on lateral stability, Dihedral angle, Directional stability, Factors affect Directional Stability, spiral instability, Control of an aeroplane i.e. Longitudinal control, Roll control, Directional control,	
9	**Flight at transonic speeds:** Introduction, Shock waves, Effects of shock waves – the shock stall, buffet boundary, Shock drag, Mach	

	Number, Critical Mach Number, Drag rise in the transonic region, Subsonic – transonic – supersonic regions, Shock–wave patterns, Sonic bangs, Vortex generators and other devices to delay separation	
10	**Flight at supersonic speeds:** Introduction, Boundary layer and supersonic flow, Renold number,	

Subject Code: AV11075	**B.Sc. AME** -3	**Course Title** : **Aviation Legislation - I**	
Contact Hours: 60	**Lecture**- 4 **Tutorial**-0	**Practical**-0	**Credit**-4
Objective			
Units	**Content**		
1	**REGULATORY FRAME WORK**: Role of regulatory framework, Role of DGCA, Role of International Civil Aviation Organization; The Aircraft Acts and Rules made there under Role of the DGCA; Rules related to Airworthiness (49 – 62) , rules related to registration and marking of aircraft, Rules related to Radio Telegraph apparatus , Rules related to log Books of Aircraft Maintenance Engineer, Rules related to Air transport Services and Aerial work, Schedule I, VIA , VIB, and XI of A/C Rules 1937, Brief description of CAR Section 1 to Section 11, Relationship between CAR-21, CAR-M, CAR-145, CAR-66, CAR 147The Aircraft Rules (Applicable to Aircraft Maintenance and Release) Aeronautical Information Circulars (Applicable to Aircraft Maintenance and Release) CAR Sections 1 and 2	
2	**DEFINITION AND INTERPRETATION**: Part-I Preliminary(Aircraft Manual, India)	
3	**CAR – 66 (LICENCING OF AIRCRAFT MAINTENANCE ENGINEERS):** Introduction, Salient Features of the CAR-66, CAR66 General, Section A: Technical Requirements, Subpart A: Scope, License Categories, A/C Groups, Application, Eligibility, Privileges, Basic Knowledge requirements, Basic Experience requirements, Demonstration of skills, Continued validity of AME license, Endorsement wity Aircraft ratings, Limitations, Evidence of qualification, Conversion of license, Subpart B: General Subpart C: General, Requirements, and Extension to scope of Authorization, Privileges, Validity of Certificate of Authorization,	

	Suspension, Cancelation and return of Certificate of Authorization, Appendices to CAR 66,	
4	**APPROVED Maintenance Organizations (CAR 145):** SECTION A – TECHNICAL REQUIREMENTS, RELATED AMC AND GM.... COMPETENT AUTHORITY: CAR-145 Definitions, Applicability and Effectivity. Scope, Application for an organization certificate , Terms of approval and scope of work, Facility requirements, Personnel requirements, Certifying and support staff, Airworthiness review staff, Equipment and tools, Maintenance data, Production planning, Performance of maintenance, Certification of maintenance, Record-keeping, Occurrence reporting, Maintenance procedures, Maintenance organization exposition (MOE). Privileges of the organization, Changes to the organization, Continued validity, Findings and observations: Access, Immediate reaction to a safety problem, Management system, Internal safety reporting scheme, Contracting and subcontracting, Appendices,	
5	**CONTINUING AIRWORTHINESS REQUIREMENTS:** SECTION A - Technical Requirements SUBPART A – General, SUBPART B – Accountability (Responsibility), SUBPART C - Continuing Airworthiness, SUBPART D- Maintenance Standards, SUBPART E – Components, SUBPART F - Maintenance Organization, SUBPART G - Continuing Airworthiness Management Organization, SUBPART H - Certificate of Release to Service – CRS , SUBPART I - Airworthiness Review Certificate - ARC	
6	CONTINUING AIRWORTHINESS MANAGEMENT ORGANISATION (CAR-CAMO): Scope, Competent Authority, Application for an organization certificate, Means of compliance, Terms of approval and privileges of the organization, Changes to the organization, Continued validity, Access, Findings, , Immediate	

	reaction to a safety problem , Occurrence reporting , Internal safety reporting scheme, Contracting and subcontracting, Facilities , Continuing airworthiness management exposition (CAME), Personnel requirements, Airworthiness review staff qualifications, Continuing airworthiness management, Airworthiness review, Continuing airworthiness management data,	
7	**COMBINED AIRWORTHINESS ORGANISATION (CAR-CAO):** SECTION A – ORGANISATION REQUIREMENTS: Scope, Application, Means of compliance, Terms of approval, combined airworthiness exposition, Facilities, Personnel requirements, Certifying staff, Components, equipment and tools, Maintenance data and work orders, Maintenance standards, Aircraft certificate of release to service, Continuing airworthiness management, Continuing airworthiness management data, Record-keeping, Privileges of the organization, Quality system and organizational review, Changes to the organization, Continued validity, Findings,	

Subject Code: AV11077	**B.Sc. AME** -4	**Course Title** : Mathematics	
Contact Hours: 45	**Lecture**- 3 Tutorial-0 Practical-0		**Credit-**3
Objective			
Units	**Content**		
1	**Arithmetic:** Arithmetical terms and signs, methods of multiplication and division, fractions and decimals, factors and multiples, weights, measures and conversion factors, ratio and proportion, averages and percentages, areas and volumes, squares, cubes, square and cube roots.		
2	**Algebra:** (a) Evaluating simple algebraic expressions, (b) addition, subtraction, multiplication and division, (c) use of brackets, simple algebraic fractions; (d)Linear equations and their solutions; Indices and powers, negative and fractional indices; Binary and other applicable numbering systems; Simultaneous equations and second-degree equations with one unknown; Logarithms.		
3	**Geometry:** (d) Simple geometrical constructions (e) Graphical representation; (f) nature and uses of graphs, (g) graphs of equations/functions (h) Simple trigonometry; trigonometrical relationships, (i) use of tables and rectangular and polar co-ordinates		

Subject Code: AV11079	**B.Sc. AME** -5	Course Title : **Introduction to Computers**	
Contact Hours: 75	**Lecture**- 3 **Tutorial**-0	**Practical**- 2	**Credit**-4
Objective			
Units	**Content**		
1	**Basics of Computer:** (j) Computer versus human brain, Historical Evaluation of computer, Computer Generations and their comparison; Digital, Analog and Hybrid computer. (k) Classification of computers based on memory size like Microcomputers, Minicomputers, Super minicomputers, Maxi or super computers, personal computers and their advantages over each other. (l) Characteristics of computer in terms of speed, accuracy, and reliability, memory, integrity, versatility. Capabilities / limitations of computer Potential dangers of computers.		
2	**Computer Architecture:** Anatomy of computer, Input devices, CPU (ALU, IAS, CU), Output devices, Storage Devices-Storage Hierarchy etc. Types of Memory: Classification based on recording method like RAM, ROM, PROM, EPROM,EE-PROMs and difference between them.Memory construction- Magnetic ferrite core memory, Semiconductor memory, CD ROM, Words and addresses. Processors, types, Pentium, Pentium Pro,		
3	**Boolean Algebra:** **a)** Number system, Decimal system, Binary number system and conversion from decimal to Binary and vice- versa. Binary addition, Subtraction, Complement of a number and subtraction by this method, Binary multiplication , Division , Shifting of a number , fractional number and conversion of fractional decimal to Binary number, Octal number system and conversion of Decimal to Octal number. **b)** Concept of words, Bytes and Bits, Binary Code Decimal (BCD), BCD numbers ASC II code, EBCDIC Code, Visual Display Codes. **c)** Logic gates like OR, XOR, AND, NOT, NOR, NAND gates. Mathematical operation with the aid of gates- half Adder , Full Adder and Truth tables ,		
4	**Office Automation:** ➢ MS Word ➢ MS Excel ➢ Power Point		
5	**HTML and JAVA Script**		
6	**VR (Virtual Reality):** AI, Intra Green Computing, Intro Grid Computing		
7	Cyber Security, Cyber Bullying		

8	**Internet Services:** Components of the Internet, Telnet, FTP, E-Mail discussion groups, Use net News, How to Access the World Wide Web, Web Browsers etc. Hardware and Software requirements of networking, Computer Virus: Definition, Types and classification, detection & protection, Network Security methodology	

Subject Code: AV15081	**B.Sc. AME** -6		Course Title : **Workshop Practices**	
Contact Hours: 60	**Lecture-** 0	**Tutorial**-0	**Practical**-4	**Credit**-2
Objective				
UNITS	**Content**			**Contact Hours**
1	Demonstration of all types of hand tools, power tools, and precision tools.			
2	Torque practice using torque wrenches.			
3	Measure dimensions using vernier caliper, Micrometer, Telescoping, Go Not Go, Feeler and Radius gauge.			
4	Make a perfect square of mild steel of a given size and finish the job by buffing process.			
5	Make a "V" fitting of given size of mild steel.			
6	Make a "T" fitting of given size of mild steel.			
7	Make a "U" fitting of given size of mild steel.			
8	Exercise of making internal / external threads using taps and dies.			
9	Exercise on turning (facing), step turning, taper turning and knurling on mild steel and aluminum bar.			
10	Make a bolt and nut of given size using lathe.			
11	Exercise of milling and Surface grinding.			
12	Fabricate a tray of given size using Tin/Aluminum sheet.			
13	Fabricate a wing rib of given size using Tin/Aluminum sheet.			
14	Internal and external threading using lathe.			

Course Structure and Syllabi for B.Sc. (Aircraft Maintenance Engineering)

Subject Code: AV13083	B.Sc. AME -7	Course Title : **Engineering Drawing**	
Contact Hours: 60	**Lecture**- 0 **Tutorial**-0	**Practical**-4	**Credit**-2
Objective			
UNITS	**Content**		**Contact Hours**
1	**Introduction to Drawing Instruments:** Drawing board, T-Square, set squares, Compass, Scales, Projector, French Curves, drawing papers, drawing pencils, sand paper, Eraser, drawing pin, drafting machine.		
2	**Sheet and sheet layout:** Title block, folding marks, scaling, types of drawing		
3	**Line, lettering and dimensions:** Types of lines; out line, magic line, dimension line, extension or projection line, construction line, holding or section line, leader line, border line, short and long break lines, hidden dotted line, centre line		
4	**Geometrical construction:** Bisecting line, draw a perpendicular, parallel lines, divide a line, divide a circle, Bisect an angle, trisect an angle, find the center of an arc, construct a equilateral triangle, construct a square, construct a polygon, regular polygon inscribed in a circle, draw a regular figure, draw a tangent, construct an ellipse by other method, construct an ellipse by arc of circle method; concentric circle method, loop of thread method, oblong method		
5	**Construction of parabola and hyperbola:** Rectangular method; Parallelogram method and tangent method,		
6	**Projections:** Introduction, principle of projection, method of projection; Orthographic projection, isometric projection, oblique projection, perspective projection. **Orthographic projection:** Introduction, steps, planes of projection, four quadrants, first angle of projection, third angle of projection, difference between first and third angle of projection, reference line, symbols, engineering drawing views; top or bottom view, front view, left and right hand view,		
7	**Orthographic projection practice**		
8	Projections of points, projection of planes, projection of solids,		
9	Projection of line, section of solids.		
10	**Isometric projection:** Introduction, isometric axis, lines and planes, isometric Scale, isometric drawing or view, isometric graph.		
11	**Isometric projection practice:**		
12	Symbols, tolerances, specification 100 of Air Transport Association (ATA), Wiring and Schematic diagrams.		
13	Microfilm and Microfiche presentation.		

Subject Code: AV11072	**B.Sc. AME** -8	Course Title : **Electrical Fundamentals-I**	
Contact Hours: 45	**Lecture**- 3 **Tutorial**-0	**Practical**-0	**Credit**-3
Objective			
UNITS	**Content**		
1	**Electron theory:** Structure and distribution of electrical charges within: atoms, molecules, ions, compounds; Molecular structure of conductors, semiconductors and insulators		
2	**Static electricity and conduction:** Static electricity and distribution of electrostatic charges; Electrostatic laws of attraction and repulsion; Units of charge, Coulomb's Law; Conduction of electricity in solids, liquids, gases and a vacuum.		
3	**Electrical terminology:** The following terms, their units and factors affecting them: potential difference, electromotive force, voltage, current, resistance, conductance, charge, conventional current flow, electron flow.		
4	**Generation of electricity:** Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.		
5	**DC sources of electricity :** Construction and basic chemical action of: primary cells, secondary cells, lead acid cells, nickel cadmium cells, other alkaline cells; Cells connected in series and parallel; Internal resistance and its effect on a battery; Construction, materials and operation of thermocouples; Operation of photo-cells.		
6	**DC Circuits :** Ohms Law, Kirchhoff's Voltage and Current Laws; Calculations using the above laws to find resistance, voltage and current; Significance of the internal resistance of a supply.		
7	**Resistance / Resistor:** (a) Resistance and affecting factors; Specific resistance; Resistor colour code, values and tolerances, preferred values, wattage ratings; Resistors in series and parallel; Calculation of total resistance using series, parallel and series parallel combinations; Operation and use of potentiometers and rheostats; Operation of Wheatstone Bridge. (b) Positive and negative temperature coefficient conductance; Fixed resistors, stability, tolerance and limitations, methods of construction; Variable resistors, thermistors, voltage dependent resistors; Construction of potentiometers and rheostats; Construction of Wheatstone Bridge;		
8	**Capacitance / Capacitor:** Operation and function of a capacitor; Factors affecting capacitance area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating; Capacitor types, construction and function; Capacitor colour coding; Calculations of capacitance and voltage in series and parallel circuits; Exponential charge and discharge of a capacitor, time constants; Testing of capacitors		

9	**Magnetism:** (a) Theory of magnetism; Properties of a magnet Action of a magnet suspended in the Earth's magnetic field; Magnetization and demagnetization; Magnetic shielding; Various types of magnetic material; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor. (b) Magneto motive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.	
10	**Inductance/Inductor:** Faraday's Law; Action of inducing a voltage in a conductor moving in a magnetic field; Induction principles; Effects of the following on the magnitude of an induced voltage: magnetic field strength, rate of change of flux, number of conductor turns; Mutual induction; The effect the rate of change of primary current and mutual inductance has on induced voltage; Factors affecting mutual inductance: number of turns in coil, physical size of coil, permeability of coil, position of coils with respect to each other; Lenz's Law and polarity determining rules; Back emf, self-induction; Saturation point; Principle uses of inductors;	

Subject Code: AV11074	**B.Sc. AME** -9		**Course Title** : **Materials and Hardware - I**	
Contact Hours: 60	**Lecture-** 4	**Tutorial**-0	**Practical** -0	**Credit**-4
Objective				
UNITS	**Content**			
1	**FERROUS:** (a) Characteristics, properties and identification of common alloy steels used in aircraft; Heat treatment and application of alloy steels; (b) Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.			
2	**NON-FERROUS:** (a) Characteristics, properties and identification of common non-ferrous materials used in aircraft; Heat treatment and application of non-ferrous materials; (b) Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.			
3	**AIRCRAFT MATERIALS - COMPOSITE AND NON- METALLIC , COMPOSITE AND NON-METALLIC OTHER THAN WOOD AND FABRIC:** (a) Characteristics, properties and identification of common composite and nonmetallic materials, other than wood, used in aircraft; Sealant and bonding agents. (b) The detection of defects/deterioration in composite and non-metallic material. Repair of composite and non-metallic material.			
4	**WOODEN STRUCTURES:** Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in aero planes; Preservation and maintenance of wooden structure; Types of defects in wood material and wooden structures; The detection of defects in wooden structure; Repair of wooden structure.			
5	**FABRIC COVERING:** Characteristics, properties and types of fabrics used in aero planes; Inspections methods for fabric; Types of defects in fabric; Repair of fabric covering.			
6	**CORROSION:** (a) Chemical fundamentals; Formation by, galvanic action process, microbiological, stress; (b) Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.			

Subject Code: AV11076	**B.Sc. AME** -10	**Course Title** : **Aviation Legislation - II**	
Contact Hours: 60	**Lecture-** 4 **Tutorial**-0	**Practical**-0	**Credit**-4
Objective			
UNITS	**Content**		
1	**APPROVAL OF COCKPIT CHECK LIST, MEL, CDL:** Minimum Equipment List (MEL)		
2	**DEFECT RECORDING, MONITORING, INVESTIGATION AND REPORTING:** Defect recording, reporting, investigation, rectification and analysis		
3	Approval of Organization engaged in - Storage, Distribution and Supply of Aircraft Fuel, Lubricants, Special Products. Acceptance of Foreign Approved Maintenance Organization (FAMO), Acceptance of Foreign Approved Organization (FAO) - Aircraft Type Rating, Approved Maintenance Training Organization (Type Training), Approved Basic Maintenance Training Organization,		
4	**AIRWORTHINESS AND CONTINUED AIRWORTHINESS:** Registration/De-registration of Aircraft, Issue/validation and suspension of Certificate of Airworthiness Special Flight Permits, Airworthiness requirements for Gliders, Design, Manufacture, Registration and Operation of Micro light Aircraft. Requirements for manufacture, registration and airworthiness control of hot air balloons, Age of Aircraft to be imported for Scheduled / Non-Scheduled including Charter, General Aviation and other Operations, Issue/ Renewal and Suspension of Special Certificate of Airworthiness.		
5	**REQUIREMENTS OF AIRCRAFT FUEL, REFUELLING OF AIRCRAFT AND CALIBRATION OF AIRCRAFT FUELS:** Aircraft fuelling procedures , Aviation fuel at airport - Storage, handling and quality control		
6	**AIRCRAFT INSTRUMENT, EQUIPMENT AND ACCESSORIES:** Aircraft equipment and instruments for flying training organisations and aerial work operations Flight Data Recorders, Combination Recorders, Datalink Recorders, Airborne Image Recorders, Airborne Image Recording System and Aircraft Data Recording System Cockpit voice recorders and Cockpit Audio Recording System Ground Proximity Warning Systems (GPWS) Installation of Airborne Collision Avoidance System		
7	**MANDATORY MODIFICATIONS AND INSPECTIONS:** Mandatory Modifications/ Inspection		
8	**OPERATIONAL REQUIREMENT FOR AIRCRAFT:** Manufacture, Registration and Operation of Powered Hang Gliders Airworthiness and Maintenance Requirements for Cat II and Cat IIIA operations.		

9	**AIRBORNE COMMUNICATION, NAVIGATION AND RADAR:** Installation of Communication, Navigation and Radar equipment, Installation of Mode A/C and Mode S Transponders	
10	**AIRCRAFT CERTIFICATION:** (a) General Certification rules: such as FAA & EACS 23/25/27/29; Type Certification; Supplemental Type Certification; CAR-21 Design/Production Organization Approvals. Aircraft Modifications and repairs approval and certification Permit to fly requirements (b) Documents : Certificate of Airworthiness; Certificate of Registration; Noise Certificate; Weight Schedule; Radio Station License and Approval.	
11	**APPLICABLE NATIONAL AND INTERNATIONAL REQUIREMENTS:** (a) Maintenance Program, Maintenance checks and inspections; Master Minimum Equipment Lists, Minimum Equipment List, Dispatch Deviation Lists; Airworthiness Directives; Service Bulletins, manufacturers service information; Modifications and repairs; Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc.; (b) Continuing airworthiness; Test flights; ETOPS /EDTO , maintenance and dispatch requirements; RVSM, maintenance and dispatch requirements RNP, MNPS Operations All Weather Operations, Category 2/3 operations and minimum equipment requirements.	
12	**SAFETY MANAGEMENT SYSTEM:** State Safety Program , Basic Safety Concepts Hazards & performance Safety Assurance	
13	**FUEL TANK SAFETY:** Safety Risks SMS Operation SMS Safety Special Federal Aviation Regulations (SFARs) from 14 CFR SFAR 88 of the FAA and of JAA TGL 47 Concept of CDCCL, Airworthiness Limitations Items (ALI)	

Subject Code: PH11078	**B.Sc. AME** -11	**Course Title** : **Physics**	
Contact Hours: 45	**Lecture-** 3 **Tutorial**-0	**Practical**-0	**Credit**-3
Objective			
UNITS	**Content**		
1	**Matter:** Nature of matter: the chemical elements, structure of atoms, molecules, Chemical compounds, States: solid, liquid and gaseous		
2	**Mechanics** **Statics:** Forces, moments and couples, representation as vectors; Centre of gravity; Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid, fluid and gas; Pressure and buoyancy in liquids (barometers). **Kinetics:** Linear movement: uniform motion in a straight line, motion under constant acceleration (Motion under gravity); Rotational movement: uniform circular motion (centrifugal/centripetal forces); Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio, mechanical advantage and efficiency		
3	**Dynamics:** (a)Mass: Force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency; Momentum, conservation of momentum; Impulse; Gyroscopic principles; Friction: nature and effects, coefficient of friction (rolling resistance). (b)Specific gravity and density; (c)Viscosity, fluid resistance, effects of streamlining; Effects of compressibility on fluids; Static, dynamic and total pressure: Bernoulli's Theorem, ventury,		
4	**Thermodynamics:** (a) Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin; Heat definition; (b) Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics; Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas; Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps; Latent heats of fusion and evaporation, thermal energy, heat of combustion.		
5	**Optics (Light):** Nature of light; speed of light; Laws of reflection and refraction: reflection at plane surfaces, reflection by spherical mirrors refraction, lenses, Fiber optics		

6	**Wave Motion and Sound:** Wave motion: mechanical waves, sinusoidal wave motion, interference phenomena, standing waves; Sound: speed of sound, production of sound, intensity, pitch and quality, Doppler effect, Special Theory of Relativity: Constancy of speed of light. Postulates of Special Theory of Relativity. Length contraction. Time dilation. Relativistic addition of Velocities. "	

Subject Code: HS11080	**B.Sc. AME** -12	**Course Title : English Language Communication Skills**		
Contact Hours: 45	**Lecture**- 3	**Tutorial**-0	**Practical**-0	**Credit**-3
Objective				
UNITS	**Content**			
1	**INTRODUCTION:** Theory of Communication, Types and modes of Communication			
2	**LANGUAGE OF COMMUNICATION:** Verbal and Non-verbal (Spoken and Written), Personal, Social and Business Barriers and Strategies Intra-personal, Inter personal and Group communication			
3	**SPEAKING SKILLS:** Monologue, Dialogue, Group Discussion, Effective Communication/ Miscommunication, Interview, Public Speech			
4	**READING AND UNDERSTANDING:** Close Reading, Comprehension, Summary Paraphrasing, Analysis and Interpretation, Translation (from Indian language to English and vice-versa), Literary/Knowledge Texts			
5	**WRITING SKILLS:** Documenting, Report Writing, Making notes, Letter writing			

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Subject Code: **AV19082**	**B.Sc. AME** -13	**Course Title** : **Welding**	
Contact Hours: 60	**Lecture**- 0 **Tutorial**-0 **Practical**-4 **Credit**-2		
Objective			
UNITS	**Content**		**Contact Hours**
1	Demonstration of Oxy-Acetylene, Electric Arc, TIG and Spot-welding apparatus.		
2	Exercise on making a lap joint using Gas welding technique.		
3	Exercise on making a butt joint (single bevel) using arc welding technique.		
4	Exercise on making a butt joint (double bevel) using arc welding technique.		
5	Exercise on making a lap joint using arc welding technique.		
6	Exercise on making a T joint using arc welding technique.		
7	Exercise on making a T joint using arc welding technique.		
8	Exercise on making a butt joint using TIG welding technique		
9	Exercise on making a lap joint using Spot welding technique		
10	Exercise on making a tube joint using brazing technique.		
11	Exercise on making a lap joint using a solder.		
12	Exercise on making a joint using bonding technique.		

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Subject Code: CS19084	**B.Sc. AME** -14	**Course Title** : **Computer**	
Contact Hours: 30	**Lecture**- 0	**Tutorial**-0	**Practical-**2	**Credit**-1
Objective			
UNITS	**Content**		
1	Familiarization of computer and associated parts in detail.		
2	Performing operations in MS word		
3	Create various designs of word documents using MS-Word		
4	Familiarization to various operating systems like Windows – 98, 2000 etc.		
5	Perform several mathematical functions, create data charts and pivot table using MS- Excel		
6	Create various types of slide documents and presenting slide shows using MS- Power Point.		
7	Familiarization with Internet concepts like browsing web pages, creating E- mail account, searching data etc.		
8	Familiarization with HTML and JAVA Script.		

Subject Code: AV21071	**B.Sc. AME** -15	**Course Title** : **Electrical Fundamentals-II**	
Contact Hours: 60	**Lecture**- 4	**Tutorial**-0 **Practical**-0	**Credit**-4
Objective			
UNITS	**Content**		
1	**POWER:** Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and energy		
2	**MOTOR/GENERATOR THEORY:** Basic motor and generator theory; Construction and purpose of components in DC generator; Operation of, and factors affecting output and direction of current flow in DC generators; Operation of, and factors affecting output power, torque, speed and direction of rotation of DC motors; Series wound, shunt wound and compound motors; Starter Generator construction.		
3	**AC THEORY:** Sinusoidal waveform: phase, period, frequency, cycle; Instantaneous, average, root mean square, peak, peak to peak current values and calculations of these values, in relation to voltage, current and power Triangular/Square waves; Single/3 phase principles.		
4	**RESISTIVE (R), CAPACITIVE (C) AND INDUCTIVE (L) CIRCUITS :** Phase relationship of voltage and current in L, C and R circuits, parallel, series and series parallel; Power dissipation in L, C and R circuits; Impedance, phase angle, power factor and current calculations; True power, apparent power and reactive power calculations.		
5	**TRANSFORMERS :** Transformer construction principles and operation; Transformer losses and methods for overcoming them; Transformer action under load and no-load conditions; Power transfer, efficiency, polarity markings; Calculation of line and phase voltages and currents; Calculation of power in a three phase system; Primary and Secondary current, voltage, turns ratio, power, efficiency; Auto transformers		
6	**FILTERS:** Operation, application and uses of the following filters: low pass, high pass, band pass, band stop.		
7	**AC GENERATORS:** Rotation of loop in a magnetic field and waveform produced; Operation and construction of revolving armature and revolving field type AC generators; Single phase, two phase and three phase alternators; Three phase star and delta connections advantages and uses; Permanent Magnet Generators.		
8	**AC MOTORS:** Construction, principles of operation and characteristics of: AC synchronous and induction motors both single and poly phase; Methods of speed control and direction of rotation; Methods of producing a rotating field: capacitor, inductor, shaded or split pole.		

Subject Code: AV21073	**B.Sc. AME** -16	**Course Title** : **Materials and Hardware – II**		
Contact Hours: 60	**Lecture**- 4	**Tutorial**-0	**Practical**-0	**Credit**-4
Objective				
UNITS	**Content**			
1	**FASTENERS: (SCREW THREADS)** Screw nomenclature; Thread forms, dimensions and tolerances for standard threads used in aircraft; Measuring screw threads;			
2	**BOLTS, STUDS AND SCREWS:** Bolt types: specification, identification and marking of aircraft bolts, international standards; Nuts: self locking, anchor, standard types; Machine screws: aircraft specifications; Studs: types and uses, insertion and removal; Self tapping screws, dowels.			
3	**LOCKING DEVICES:** Tab and spring washers, locking plates, split pins, Pal nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.			
4	**AIRCRAFT RIVETS:** Types of solid and blind rivets: specifications and identification, heat treatment. Pipes and Unions (a) Identification of, and types of rigid and flexible pipes and their connectors used in aircraft; (b) Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.			
5	**SPRINGS:** Types of springs, materials, characteristics and applications			
6	**BEARINGS:** Purpose of bearings, loads, material, construction; Types of bearings and their application.			
7	**TRANSMISSIONS:** Gear types and their application; Gear ratios, reduction and multiplication gear systems, driven and driving gears, idler gears, mesh patterns; Belts and pulleys, chains and sprockets.			
8	**CONTROL CABLES:** Types of cables; End fittings, turnbuckles and compensation devices; Pulleys and cable system components; Bowden cables; Aircraft flexible control systems.			
9	**ELECTRICAL CABLES AND CONNECTORS:** Cable types, construction and characteristics; High tension and co-axial cables; Crimping; Connector types, pins, plugs, sockets, insulators, current and voltage rating, coupling, identification codes.			

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Subject Code: HS21075	**B.Sc. AME** -17	**Course Title** : **Human Factors**	
Contact Hours: 60	**Lecture**- 4	**Tutorial**-0	**Practical**-0	**Credit**-4
Objective			
UNITS	**Content**		
1	**GENERAL:** The need to take human factors into account; Incidents attributable to human factors/human error; 'Murphy's' law		
2	**HUMAN PERFORMANCE AND LIMITATIONS:** Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.		
3	**SOCIAL PSYCHOLOGY:** Responsibility: individual and group; Motivation and de motivation; Peer pressure; 'Culture' issues; Team working; Management, supervision and leadership		
4	**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.		
5	**PHYSICAL ENVIRONMENT:** Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.		
6	**TASKS:** Physical work; Repetitive tasks; Visual inspection; Complex systems.		
7	**COMMUNICATION:** Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information.		
8	**HUMAN ERROR:** Error models and theories; Types of error in maintenance tasks; Implications of errors (i.e accidents), Avoiding and managing errors.		
9	**HAZARDS IN THE WORKPLACE:** Recognizing and avoiding hazards; Dealing with emergencies.		

Course Structure and Syllabi for B.Sc. (Aircraft Maintenance Engineering)

Subject Code: BM21077	**B.Sc. AME** -18	**Course Title** : **Quality and Safety Management System**	
Contact Hours: 45	**Lecture**- 3	**Tutorial**-0	**Practical**-0	**Credit**-3
Objective			
UNITS	**Content**		
1	**QUALITY MANAGEMENT:** Introduction Why quality management? A Historical Evolution of Quality Approaches Understanding some basic concepts: Concept of quality Concept of a process and its networking Stakeholders and their expectations Quality control and quality assurance Standardization		
2	**BUILDING BLOCKS OF TQM:** Introduction Total Quality Management Cornerstones Total Quality Management Beliefs What Stumbling Blocks Should the TQM Manager Know About? Why Has TQM Become So Popular? Key Success Factors - What We Need To Make TQM Work. The PDCA Cycle		
3	**AUDIT:** Introduction, Quality system audit, Types of audit Audit planning & preparation, Audit execution, Audit report.		
4	**SAFETY MANAGEMENT:** Safety Management fundamentals Safety Culture Safety Performance Management Safety Management System Safety Analysis.		

Subject Code: AV21079	**B.Sc. AME** -19	**Course Title** : **Approval of Maintenance Organizations (CAR 145 & CAR M)**	
Contact Hours: 45	**Lecture**- 3	**Tutorial**-0 **Practical**-0	**Credit**-3
Objective			
UNITS	**Content**		
1	**Approval of Maintenance Organizations (CAR 145):** **SECTION A –** TECHNICAL REQUIREMENTS, RELATED AMC AND GM.... CAR-145 Definitions, Applicability and Effectivity. Scope, Application for an organization certificate , Terms of approval and scope of work, Facility requirements, Personnel requirements, Certifying and support staff, Airworthiness review staff, Equipment and tools, Maintenance data, Production planning, Performance of maintenance, Certification of maintenance, Record-keeping, Occurrence reporting, Maintenance procedures, Maintenance organization exposition (MOE). Privileges of the organization, Changes to the organization, Continued validity, Findings and observations: Access, Immediate reaction to a safety problem, Management system, Internal safety reporting scheme, Contracting and subcontracting, Appendices,	
2	**Approval of Maintenance Organizations (CAR M):** SECTION A - Technical Requirements SUBPART A – General, SUBPART B – Accountability (Responsibility), SUBPART C - Continuing Airworthiness, SUBPART D- Maintenance Standards,	

	SUBPART E – Components, SUBPART F - Maintenance Organization, SUBPART G - Continuing Airworthiness Management Organization, SUBPART H - Certificate of Release to Service – CRS , SUBPART I - Airworthiness Review Certificate - ARC	

Subject Code: **EE21081**	**B.Sc. AME** -20	**Course Title** : **Electrical**		
Contact Hours: 60	**Lecture**- 0	**Tutorial**-0	**Practical**-4	**Credit**-2
Objective				
UNITS	**Content**			**Contact Hours**
1	Generation of electricity by light , heat, chemical action, magnetism, and motion			
2	Simple experiments with static electricity and the coulomb's law			
3	Measuring (a) Resistances, (b) AC and DC Voltages, (c) DC Current, and (d) checking electrical fuses and connection			
4	Use of a range of test meters to measure volts, amps and resistance			
5	Resistor colour codes - Calculation of resistance value using colour codes			
6	Potentiometer , rheostat and wheat stone bridges and determine unknown resistance			
7	Use a Multi meter for measuring Resistances, checking electrical fuses Identify various types of resistance			
8	Identify various types of capacitances			
9	Production of electricity by inductance methods			
10	Construct series LCR circuit and determine its (a) Resonant Frequency, (b) Quality Factor			
11	Construct parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor Q			
12	Use of transformer in power distribution and measurements			
13	Make filters circuit to study function of low pass, high pass, band pass and band stop.			
14	Measure amount of power dissipated by various resistors; calculation of power			
15	Using at least two crimping systems, select appropriate cable crimping tools and crimp cables to prepare cable ends or plug / socket terminals			
16	Identify cables and cables values by reference to the maintenance manuals. Identify a range of electrical component symbols			
17	Inspection of electrical cable looms / bundles and cable trucking			
18	Prepare, and install a simple loom, using at least two binding methods			

19	Exercise on connecting cells in series and parallel.	
20	Practice Battery charging and discharging (Lead acid & Ni. Cad.).	
21	Construct a thermocouple and prove thermocouple principle	
22	Continuity and insulation tests of circuits using megger.	
23	Continuity check and transformer testing at no load and full load condition.	
24	Testing of resistors , capacitors	
25	Battery capacity test (Lead acid).	

Subject Code: AV29083	**B.Sc. AME** -21	**Course Title** : **NDT and Heat Treatment**	
Contact Hours: 30	**Lecture**- 0	**Tutorial**-0	**Practical**-2 **Credit**-1
Objective			
UNITS	**Content**		**Contact Hours**
1	Identification of ferrous materials through spark, color code, magnetic and chemical test methods.		
2	Heat treatment such as annealing, hardening, quenching, tempering and normalizing practice.		
3	Hardness testing of ferrous materials by Brinell and Rockwell methods		
4	Testing a piece of metal to detect flaws by Fluorescent particle Inspection		
5	Testing a piece of metal to detect flaws by Magnetic particle inspection		
6	Testing a piece of metal to detect flaws by Dye penetrant method		
7	Carry out internal inspection of combustion chamber using Borescope		

Subject Code: EC21072	**B.Sc. AME** -22	**Course Title** : **Electronic Fundamentals**	
Contact Hours: 60	**Lecture**- 4 **Tutorial**-0 **Practical**-0 **Credit**-4		
Objective			
UNITS	**Content**		
1	**SEMICONDUCTORS:** Materials, electron configuration, electrical properties; P and N type materials: effects of impurities on conduction, majority and minority characters; PN junction in a semiconductor, development of a potential across a PN junction in unbiased, forward biased and reverse biased conditions;		
2	**DIODES:** Diode symbols; Diode characteristics and properties; Diodes in series and parallel; Main characteristics and use of silicon controlled rectifiers (thyristors), light emitting diode, Schottky diode, photo conductive diode, varistor, rectifier diodes; Zener diode, Functional testing of diodes. Operation and function of diodes in the following circuits: clippers, clampers, full and half wave rectifiers, bridge rectifiers, voltage doublers and triples;		
3	**TRANSISTORS:** **(a)** Transistor symbols; Component description and orientation; Transistor characteristics and properties. (b)Construction and operation of PNP and NPN transistors; Base, collector and emitter configurations; Testing of transistors. Basic appreciation of other transistor types and their uses. Application of transistors: classes of amplifier (A, B, C); Simple circuits including: bias, decoupling, feedback and stabilization; Multistage circuit principles: cascades, push-pull, oscillators, multi-vibrators, flip-flop circuits		
4	**INTEGRATED CIRCUITS:** Description and operation of logic circuits and linear circuits/operational amplifiers. Description and operation of logic circuits and linear circuits; Introduction to operation and function of an operational amplifier used as: integrator, differentiator, voltage follower, comparator; Operation and amplifier stages connecting methods: resistive capacitive, inductive (transformer), inductive resistive (IR), direct; Advantages and disadvantages of positive and negative feedback.		
5	**PRINTED CIRCUIT BOARDS:** Description and use of printed circuit boards		
6	**SERVOMECHANISMS:** (a) Understanding of the following terms: Open and closed loop systems, feedback, follow up, analogue transducers; Principles of operation and use of the following synchro system components/features: resolvers, differential, control and torque, transformers, inductance and capacitance transmitters. (b) Understanding of the following terms: Open and closed loop, follow up, servomechanism, analogue, transducer, null, damping, feedback, dead band; Construction operation and use of the following synchro system components: resolvers, differential,		

	control and torque, E and I transformers, inductance transmitters, capacitance transmitters, synchronous transmitters; Servo mechanism defects, reversal of synchro leads, hunting.	

Subject Code: AV21074	**B.Sc. AME** -23	**Course Title** : Maintenance Practices - II	
Contact Hours: 60	**Lecture**- 4	**Tutorial**-0 **Practical**-0	**Credit**-4
Objective			
UNITS	**Content**		
1	**ELECTRICAL WIRING INTERCONNECTION SYSTEM (EWIS)** Continuity, insulation and bonding techniques and testing; Use of crimp tools: hand and hydraulic operated; Testing of crimp joints; Connector pin removal and insertion; Co-axial cables: testing and installation precautions; Identification of wire types, their inspection criteria and damage tolerance. Wiring protection techniques: Cable looming and loom support, cable clamps, protective sleeving techniques including heat shrink wrapping, shielding. EWIS installations, inspection, repair, maintenance and cleanliness standards.	
2	**RIVETING:** Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.	
3	**PIPES AND HOSES:** Bending and belling/flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.	
4	**SPRINGS:** Inspection and testing of springs.	
5	**BEARINGS:** Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.	
6	**TRANSMISSIONS:** Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets; Inspection of screw jacks, lever devices, push-pull rod systems.	
7	**CONTROL CABLES:** Swaging of end fittings; Inspection and testing of control cables; Bowden cables; aircraft flexible control systems.	
8	**MATERIAL HANDLING (SHEET METAL):** Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.	
9	**COMPOSITE AND NON-METALLIC:** Bonding practices; Environmental conditions Inspection methods	
10	**AIRCRAFT WEIGHT AND BALANCE:**	

	(a) Centre of Gravity/Balance limits calculation: use of relevant documents; (b) Preparation of aircraft for weighing; Aircraft weighing;	
11	**AIRCRAFT HANDLING AND STORAGE:** Aircraft taxiing/towing and associated safety precautions; Aircraft jacking, chocking, securing and associated safety precautions; Aircraft storage methods; Re-fuelling/de-fuelling procedures; De-icing/anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies. Effects of environmental conditions on aircraft handling and operation.	
12	**DISASSEMBLY, INSPECTION, REPAIR AND ASSEMBLY TECHNIQUES:** (a) Types of defects and visual inspection techniques. Corrosion removal, assessment and re-protection. (b) General repair methods, Structural Repair Manual; Ageing, fatigue and corrosion control program; (c) Non destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and Borescope methods. (d) Disassembly and re-assembly techniques. (e) Trouble shooting techniques	
13	**MAINTENANCE PROCEDURES:** Maintenance planning; Modification procedures; Stores procedures; Certification/release procedures; Interface with aircraft operation; Maintenance Inspection/Quality Control/Quality Assurance; Additional maintenance procedures. Control of life limited components	

Subject Code: AV21076	**B.Sc. AME** -24	**Course Title : Aircraft Structure, Aerodynamics and Systems-I**	
Contact Hours: 60	**Lecture**- 4	**Tutorial**-0 **Practical**-0	**Credit**-4
Objective			
UNITS	**Content**		
1	**AERO PLANE AERODYNAMICS AND FLIGHT CONTROLS:** Operation and effect of: roll control: ailerons and spoilers; pitch control: elevators, stabilators, variable incidence stabilizers and canards; yaw control, rudder limiters; Control using elevons, Ruddervators; High lift devices, slots, slats, flaps, flaperons; Drag inducing devices, spoilers, lift dumpers, speed brakes; Effects of wing fences, saw tooth leading edges; Boundary layer control using, vortex generators, stall wedges or leading edge devices; Operation and effect of trim tabs, balance and anti balance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels;		
2	**HIGH SPEED FLIGHT:** Speed of sound, subsonic flight, transonic flight, supersonic flight, Mach number, critical Mach number, compressibility buffet, shock wave, Aerodynamic heating, area rule; Factors affecting airflow in engine intakes of high speed aircraft; Effects of sweepback on critical Mach number.		
3	ROTARY WING AERODYNAMICS FLIGHT CONTROL SYSTEMS: Terminology; Effects of gyroscopic precession; Torque reaction and directional control; Dissymmetry of lift, Blade tip stall; Translating tendency and its correction; Coriolis effect and compensation; Vortex ring state, power settling, over pitching; Auto-rotation; Ground effect. Cyclic control; Collective control; Swash plate; Yaw control: Anti-Torque Control, Tail rotor, bleed air; Main Rotor Head: Design and Operation features; Blade Dampers: Function and construction; Rotor Blades: Main and tail rotor blade construction and attachment; Trim control, fixed and adjustable stabilizers; System operation: manual, hydraulic, electrical and flyby-wire; Artificial feel; Balancing and Rigging.		
4	**BLADE TRACKING AND VIBRATION ANALYSIS:** Rotor alignment; Main and tail rotor tracking; Static and dynamic balancing; Vibration types, vibration reduction methods; Ground resonance.		
5	**TRANSMISSIONS:** Gear boxes, main and tail rotors; Clutches, free wheel units and rotor brake. Tail rotor drive shafts, flexible couplings, bearings, vibration dampers and bearing hangers		
6	**AIRFRAME STRUCTURES — GENERAL CONCEPTS** (a) Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage tolerance concepts; Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Drains and ventilation provisions;		

	System installation provisions; Lightning strike protection provision. Aircraft bonding (b) Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning, anti-corrosive protection, wing, empennage and engine attachments; Structure assembly techniques: riveting, bolting, bonding Methods of surface protection, such as chromating, Anodizing, painting; Surface cleaning. Airframe symmetry: methods of alignment and symmetry checks.	
7	**AIRFRAME STRUCTURES — AEROPLANES** **Fuselage (ATA 52/53/56)** Construction and pressurization sealing; Wing, stabilizer, pylon and undercarriage attachments; Seat installation and cargo loading system; Doors and emergency exits: construction, mechanisms, operation and safety devices; Windows and windscreen construction and mechanisms. **Wings (ATA 57)** Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments. **Stabilizers (ATA 55)** Construction; Control surface attachment. **Flight Control Surfaces (ATA 55/57)** Construction and attachment; Balancing — mass and aerodynamic. **Nacelles/Pylons (ATA 54)** Construction; Firewalls; Engine mounts.	
8	**FLIGHT CONTROLS (ATA 27):** 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.	
9	**LANDING GEAR (ATA 32):** Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and auto braking; Tyres; Steering. Air-ground sensing	
10	**HYDRAULIC POWER (ATA 29):** System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical, pneumatic; Emergency pressure generation; Filters Pressure Control; Power distribution; Indication and warning systems; Interface with other systems.	
11	**LIGHTS (ATA 33)** External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.	

Subject Code: **AV21078**	**B.Sc. AME** -25	**Course Title** : **Aircraft Stores**		
Contact Hours: 45	**Lecture**- 3	**Tutorial**-0	**Practical**-0	**Credit**-3
Objective				
UNITS	**Content**			
1	**MATERIALS FLOW SYSTEMS:** Introduction Materials Management and its Functions Materials Management or Management of Flow of Materials 1.4Materials Logistics Management (MLM) Interfaces of Materials Management Materials Flow Process			
2	**STRATEGIC ROLE OF MATERIALS MANAGEMENT** Introduction ,Objectives and Advantages of Materials Management in an Organization Why Integrated Materials Management? Advantages of Materials Management Scope of Materials Management ,Roles of Materials Management in an Organization Functional Role of Materials Management			
3	**LINKAGE WITH OTHER FUNCTIONAL AREAS OF MANAGEMENT** Introduction ,TQM in Materials Management Focused Human Resources Management: Key to Materials Management Effectiveness Environmental Issues in Logistics ,Information and Materials Management Materials Management Cost, Productivity, and Performance Analysis			
4	**ISSUES AND OVERVIEW** Introduction ,Economics and Purchasing Objectives of Industrial Purchasing , Authority and Responsibility of Purchasing Why Source Selection, Stages in Source Selection, Important Aspects in Source Selection Analysis of Sources of Supply , Types of Evaluation Techniques The Approved List of Suppliers, A Comprehensive System for Vendor Performance Evaluation Developing Sources of Supply , Socio-economic Factors in Source Selection			
5	**DOMESTIC vs. INTERNATIONAL PURCHASE** Introduction ,Decision on Manufacture or Purchase Make or Buy: A Policy Decision, "Make or Buy" Decision Making Procedure , Need for International Purchase, Procedure for International Purchase			

	Problems in International Purchase, Selection of Foreign Suppliers Direct and Indirect Buying, Main Documents in International Purchase Consideration of Cultural Aspects in International Purchasing, Negotiating with Foreign Suppliers	
6	**VENDOR NETWORK** Introduction , Selection of Suppliers: A Key Issue , Overview of Decisions and Problem Definition in Supply Chain Network ,Purchasing Performance and Supplier Development , Supplier Development Models: A Review of Literature , Influencing Factors of Supplier Development Supplier Networking , Importance of Business Networks ,Problems and Risks in Vendor Networking	
7	**BUYERS-SELLERS RELATIONSHIP** Obligations to the Company , Ethical Obligations , The Problem of Gifts ,The Effects of Example Supplier Relations ,Obligations to Suppliers ,Confidential Information ,Sharp Practice Combating Unethical Practices ,Policies for Relationships, Internal Relationships, Vendor Relationships Policy on Supply Source ,Reciprocal Purchasing Policy , Important Issues in Relationships Cordial Relations between Buyers and Sellers , Control in Practicing Reciprocity , Backdoor Selling, Improvement in Relationships , Importance of Public Relations, Training in Relationship Skills Development , Negotiation in Purchasing , Details of Negotiation ,Elements of Negotiation Objectives of Negotiation , The Negotiation Process , Competitive Bidding and Negotiation, Negotiating Guidelines and Rules	
8	**INVENTORY SYSTEMS AND MODELLING** Introduction ,Inventory Modeling ,Deterministic Inventory Models , Economic Order Quantity (EOQ) Model with no Shortages ,Economic Order Quantity (EOQ) Model with Shortages Economic Production Lot Size Model (EPLS) ,Economic Order Quantity (EOQ) Model with Price Breaks Probabilistic Inventory Models ,Single Period Discreet Probabilistic Demand Model Single Period Continuous Probabilistic Demand Model ,Multi-period Probabilistic Inventory Models	
9	**PROCESS INVENTORY** Introduction , Meaning of Process Inventory , Inventory Types: A Review , Factors Influencing WIP Inventories , Methods of controlling WIP Inventories	
10	**SPARE PARTS MANAGEMENT** Introduction, Spare Parts Management: Connotation , Types of Spare Parts , Life Cycle of Spare Parts	

	Myths about Spare Parts Management Program , Spare Parts Management and Other Systems Benefits of Spare Parts Management , Cost Control for Spare Parts-Role of Maintenance Organizing for Effective Spare Parts Management Unique Problems of Spare Parts Management	
11	**CODIFICATION AND STANDARDISATION OF THE MATERIALS** Introduction , Codification, Codification Systems , Advantages of Codification , Standardization, Advantages of Standardization , International Standardization , Classification , Simplification Advantages of Simplification	
12	**LOCATION AND STRUCTURE OF WAREHOUSE** Introduction , Warehouse Location , Warehouse Layout, Warehouse Safety , Warehouse Functions, Warehouse Structure	
13	**INCOMING MATERIAL RECEIPTS** Introduction , The Receiving Procedure, The Receiving System , Incoming Materials: Inspection and Control , Costing of the Incoming Materials	
14	**RETRIEVAL AND TRANSACTION PROCESSING SYSTEM** Introduction, Store Record System , The Storage System , Physical Control of Stores , Automated Storage/Retrieval , Methods of Storing Various Items , Preservation of Materials , Cost Aspects and Productivity of Storage System , Problems and Developments , Issue System, Stores Equipments and Material Handling Equipments	
15	**SECURITY AND LOSS PREVENTION** Introduction , Types of Losses Due to Warehousing Systems , Type of Losses Due to Shrinkages/Pilferages , Type of Losses Due to Fire , Stock Verification in Warehouses	
16	**MATERIALS INFORMATION SYSTEM** Introduction , Advantages of Materials Information System , Functions of Materials Information System, System Approach to Materials Management	
17	**CONTROL OF MATERIAL MANAGEMENT AND PERFORMANCE APPRAISAL** Introduction, Why Control is Needed in Materials Management? Different Types of Control Needed in Materials Management Approaches to Materials Management, Need for Performance Appraisal in Materials Management, Approaches for Performance Appraisal in Materials Management, Matrices of Performance Appraisal system, Inventory Turnover Ratio ,Safety Stock Balanced Score Card Approach for Performance Appraisal SCOR Framework for Performance Appraisal, **Safety policy and objectives**: i) Management commitment ii) Safety accountability and responsibilities iii) Appointment of key safety personnel	

	iv) Co-ordination of emergency response planning v) SMS documentation **Safety risk management:** i) Hazard identification ii) Safety risk assessment and mitigation **Safety assurance** i) Safety performance monitoring and measurement ii) The Management of change iii) Continuous improvement of the SMS **Safety promotion** i) Training and education ii) Safety communication	

Subject Code: AV21080	**B.Sc. AME** -26	**Course Title** : **Ground Handling , Safety and Support Services**	
Contact Hours: 45	**Lecture**- 3	**Tutorial**-0 **Practical**-0	**Credit**-3
Objective			
UNITS	**Content**		**Contact Hours**
1	**INTRODUCTION:** Types of jacks, Jacking procedure, towing procedure in general, Light aircraft towing procedure, Heavy aircraft towing procedure, night towing procedure; Marshaling.		
2	**PARKING AND MOORING:** Tie down equipment, tie down the aircraft, Park, secure and cover the aircraft.		
3	**PURPOSE OF AIRCRAFT LEVELING AND WEIGHING, LEVELING METHODS:** Introduction, Sprit level, Plumb Bob, Engineers transit. Weighing equipments,		
4	**PURPOSE, DESCRIPTION AND OPERATING PROCEDURE OF VARIOUS GROUND EQUIPMENTS USED FOR AIRCRAFT SERVICING:** Chocks, Jacks, towing apparatus, picketing Material, ladders, platforms, trestles, lifting cranes, hoist, over head gantry, compressors, oil canes, slings etc. Charging trolleys: High pressure cylinder trolleys; Oxygen charging trolleys, Re-fuelling appliances, Oil rigs , Fire extinguishing equipments, Battery cart GPU, Lubrication equipments as well as spray cleaning guns.		
5	**AIRCRAFT CLEANING:** Cleaning agents used for cleaning aircraft and aircraft parts.		
6	**FACILITIES IN THE MAINTENANCE HANGAR**		
7	**AERODROME:** Physical characteristics, LCN etc. , Run way , Stop ways, TORA , TODA, LDA, ASDA of an Aerodrome, Basic concept of operational activities associated with flying task		
8	**RUN WAY MARKING AND LIGHTING:** Markings; edge and threshold; fixed distance; touchdown zone; Un- serviceability ; taxi way ; taxi holding; position and VOR check point markings. Simple		

	approach lighting system; precision approach lighting system cat1; VASI or PAPI system; Run way edge light; threshold light; Intensity control of runway and approach lights ;taxi way and apron lights ; APA- AGNIS , Aerodrome Beacon ; Identification Beacon.	
9	**AERODROME CONTROL SERVICES**: General procedure- control of traffic in circuit ; control of traffic on maneuvering area; light signals and ground signals; Special VFR and IFR	
10	**ATC SERVICES:** ATC service procedures and objective. **AIRSPACE DESIGNATION (** sector Concept**) ;** Air Defense Identification Zone , AD clearance and flight clearance procedures.	
11	**APPROACH CONTROL SERVICES :** Departing aircraft – general procedure; Information to arriving aircraft – Visual approach; Instrument approach ; Holding; expected approach time.	

Subject Code: AV29082	**B.Sc. AME** -27	**Course Title** : **Maintenance Practices**	
Contact Hours: 60	**Lecture**- 0	**Tutorial**-0	**Practical**-4	**Credit**-2
Objective			
UNITS	**Content**		**Contact Hours**
1	Practice single and double splice lap and butt joint using solid rivets and aluminum sheet.		
2	Repair of a punctured non-pressurized airframe skin using plug and doublers		
3	Removal of damaged rivets from fuselage		
4	Tube cutting, bending and flaring practice (single flare)		
5	Removal / installation of bearing, bearing cleaning, inspection and lubrication practice.		
6	Inspection of gears, chains and sprockets for defects.		
7	Control cable swaging practice.		
8	Safety wire locking practices.		
9	Exercise on Continuity, insulation and bonding testing		
10	Crimping practice (joining of wire and attaching lugs) and testing of crimp joints		
11	Connector pin removal and insertion;		
12	Aircraft marshalling, taxing, towing, jacking, chocking and mooring practices		

Subject Code: **AV29084**	**B.Sc. AME** -28	Course Title : **Basic Composite**		
Contact Hours: 30	**Lecture**- 0	**Tutorial**-0	**Practical**-2	**Credit**-1
Objective				
UNITS	**Content**			**Contact Hours**
1	Identify various composite materials - Glass, Kevlar, Carbon / Graphite fibers and matrix.			
2	Identify various types of defects in composite structure.			
3	Repair of core damage to the honeycomb structure.			
4	Repair of multiple plies of composite material following wet layup technique			
5	Prepare a composite laminate of two plies and bonding together with honeycomb sandwich core.			
6	Prepare a propeller blade from wood laminates.			
7	Exercise on fabric covering of Aileron, doping and painting.			
8	Carry out patch repair of damaged or torn fabric covering.			

Subject Code: AV31071	**B.Sc. AME** -29	**Course Title** : **Digital Techniques Electronic Instrument Systems**	
Contact Hours: 60	**Lecture**- 4 **Tutorial**-0 **Practicle**-0		**Creedit**-4
Objective			
UNITS	**Content**		
1	**ELECTRONIC INSTRUMENT SYSTEMS:** Typical systems arrangements and cockpit layout of electronic instrument systems.		
2	**NUMBERING SYSTEMS:** binary, octal and hexadecimal; Demonstration of conversions between the decimal and binary, octal and hexadecimal systems and vice versa.		
3	**DATA CONVERSION:** Analogue Data, Digital Data; Operation and application of analogue to digital, and digital to analogue converters, inputs and outputs, limitations of various types.		
4	**LOGIC CIRCUITS :** (a) - Identification of common logic gate symbols, tables and equivalent circuits; Applications used for systems, schematic diagrams. (b)Interpretation of logic diagrams		
5	**DATA BUSES:** Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications		
6	**BASIC COMPUTER STRUCTURE:** Computer terminology (including bit, byte, software, hardware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems) Computer related terminology; Operation, layout and interface of the major components in a micro computer including their associated bus systems; Information contained in single and multi address instruction words; Memory associated terms; Operation of typical memory devices; Operation, advantages and disadvantages of the various data storage systems.		
7	**MICROPROCESSORS:** Functions performed and overall operation of a microprocessor; Basic operation of each of the following microprocessor elements: control and processing unit, clock, register, arithmetic logic unit.		
8	**INTEGRATED CIRCUITS:** Operation and use of encoders and decoders Function of encoder types Uses of medium, large and very large scale integration.		
9	**MULTIPLEXING:** Operation, application and identification in logic diagrams of multiplexers and de-multiplexers.		
10	**FIBER OPTICS**: Advantages and disadvantages of fiber optic data transmission over electrical wire propagation; Fibre optic data bus; Fibre optic related terms; Terminations; Couplers, control terminals, remote terminals; Application of fibre optics in aircraft systems.		
11	**ELECTRONIC DISPLAYS:**		

	Principles of operation of common types of displays used in modern aircraft, including Cathode Ray Tubes, Light Emitting Diodes and Liquid Crystal Display	
12	**ELECTROSTATIC SENSITIVE DEVICES:** Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices.	
13	**SOFTWARE MANAGEMENT CONTROL:** Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programs.	
14	**ELECTROMAGNETIC ENVIRONMENT** Influence of the following phenomena on maintenance practices for electronic system: EMC-Electromagnetic Compatibility EMI-Electromagnetic Interference HIRF-High Intensity Radiated Field Lightning/lightning protection.	
15	**TYPICAL ELECTRONIC / DIGITAL AIRCRAFT SYSTEMS** General arrangement of typical electronic/digital aircraft systems and associated BITE(Built In Test Equipment) testing such as: ACARS-ARINC Communication and Addressing and Reporting System EICAS-Engine Indication and Crew Alerting System FBW-Fly by Wire, FMS-Flight Management System IRS-Inertial reference system ECAM-Electronic Centralized Aircraft Monitoring EFIS-Electronic Flight Instrument System GPS-Global Positioning System TCAS-Traffic Collision Avoidance System Integrated Modular Avionics Cabin System, Information system.	

Subject Code: AV31073	**B.Sc. AME** -30	**Course Title** : **Aircraft Structure, Aerodynamics and Systems-II**		
Contact Hours: 60	**Lecture**- 4	**Tutorial**-0	**Practical**-0	**Credit**-4
Objective				
UNITS	**Content**			**Contact Hours**
1	**AIR CONDITIONING AND CABIN PRESSURIZATION (ATA 21)** Air supply: Sources of air supply including engine bleed, APU and ground cart; Air Conditioning: Air conditioning systems; Air cycle and vapor cycle machines Distribution systems; Flow, temperature and humidity control system. Pressurization: Pressurization systems; Control and indication including control and safety valves; Cabin pressure controllers. Safety and warning devices: Protection and warning devices			
2	**FUEL SYSTEMS (ATA 28)** System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Re-fuelling and de-fuelling; Longitudinal balance fuel systems			
3	**ICE AND RAIN PROTECTION (ATA 30)** Ice formation, classification and detection; Anti-icing systems: electrical, hot air and chemical; De-icing systems: electrical, hot air, pneumatic and chemical; Rain repellant; Probe and drain heating. Wiper systems			
4	**FIRE PROTECTION (ATA 26)** (a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests. Portable fire extinguisher			
5	**OXYGEN (ATA 35)** System lay-out: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings;			
6	**PNEUMATIC/VACUUM (ATA 36)** System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.			
7	**WATER/WASTE (ATA 38)** Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing; Corrosion aspects.			
8	**ON BOARD MAINTENANCE SYSTEMS (ATA 45)** Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).			
9	**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, 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.	
10	**CABIN SYSTEMS (ATA44)** The units and components which furnish a means of entertaining the passengers and providing communication within the aircraft (Cabin Intercommunication Data System) and between the aircraft cabin and ground stations (Cabin Network Service). Includes voice, data, music and video transmissions. The Cabin Intercommunication Data System provides an interface between cockpit/cabin crew and cabin systems. These systems support data exchange of the different related LRU's and they are typically operated via Flight Attendant Panels. The Cabin Network Service typically consists on a server, typically interfacing with, among others, the following systems: Data/Radio Communication, In-Flight Entertainment System. The Cabin Network Service may host functions such as: Access to pre-departure/departure reports, E-mail/intranet/Internet access, Passenger database; Cabin Core System; In-flight Entertainment System; External Communication System; Cabin Mass Memory System; Cabin Monitoring System; Miscellaneous Cabin System.	
11	**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.	

Subject Code: AV33075	**B.Sc. AME** -31	**Course Title** : Piston Engine -I		
Contact Hours: 75	**Lecture**- 3	**Tutorial**-0	**Practical**-2	**Credit**-4
Objective				
UNITS	**Content**			**Contact Hours**
1	**FUNDAMENTALS** THEORY AND CONSTRUCTION: General ;Comparison of Aircraft Power plants ; Types of Reciprocating Engines, Reciprocating Engine Design and Construction ;Crankshafts ;Connecting Rods; Pistons ; Piston Rings ; Cylinders ,Cylinder Numbering ;Firing Order ;Valves ; Valve-Operating Mechanism ; Bearings; Propeller Reduction Gearing; Propeller Shafts ,Reciprocating Engine Operating Principles ; Operating Cycles- Four Stroke Cycle; two stroke cycle; Wankel cycle, Reciprocating Engine Power and Efficiencies ; Piston displacement and compression ratio; Engine configuration and firing order.			
2	ENGINE PERFORMANCE Power calculation and measurement; Factors affecting engine power; Mixtures leaning / Rich, pre-ignition.			
3	**ENGINE FUEL SYSTEMS** ENGINE FUEL AND FUEL METERING SYSTEMS: Fuel System Requirements; Fuel Quantity Indicating Units ;Basic Fuel System ;Fuel Metering Devices for Reciprocating Engines ;Carburetion Principles ;Carburetor Systems ; Carburetor Types ; Carburetor Icing ; Float-Type Carburetors ;Pressure Injection Carburetors ; Stromberg PS Series Carburetor; Direct Fuel-Injection Systems; Carburetor Maintenance; Fuel System Inspection and Maintenance ; Water Injection System for Reciprocating Engines..			
4	**STARTING AND IGNITION SYSTEMS** ENGINE IGNITION AND ELECTRICAL SYSTEMS: Reciprocating Engine Ignition Systems ; Battery Ignition System; Magneto Ignition System, Magneto types, Operating Principles ;Auxiliary Ignition Units ;Spark Plugs ;Spark plug Inspection and maintenance ; Reciprocating Engine Ignition System Maintenance and Inspection ; Magneto Ignition Timing Devices; Checking the Internal Timing of a Magneto, Ignition harnesses, Timing of high tension distributor finger, STARTING SYSTEM: General, Engine Starting Systems Using - Combination Inertia Starter; Direct Cranking Starter for small A/C; Direct Cranking Electrical Starter for large A/C.			
5	**SUPERCHARGING / TURBO CHARGING** Principles and purpose of supercharging and its effects on engine parameters; Construction and operation of supercharging/ turbo charging systems; System terminology; Control systems; System protection. Sea Level Boosted Turbocharger System; Turbo compound System.			

Subject Code: CC504	**B.Sc. AME** -32	**Course Title** : **Gas Turbine Engine – I**	
Contact Hours: 75	**Lecture**- 3 **Tutorial**-0 **Practical**-1 **Credit**-4		
Objective			
UNITS	**Content**		
1	**FUNDAMENTALS** History of Development, Types of Turbine Engines & operating principles - reaction turbine engine (Rocket, Ramjet, Pulse Jet, Turbo Jet, Turbo Fan Engine), Torque turbine engine (Turbo Shaft, Turbo Prop Engine), Characteristics, Applications, Comparisons and evaluation of the following- Turbo Jet, Turbo Shaft, Turbo Prop. Turbo Fan – High Bypass, Low Bypass, Medium Bypass Turbine Engine. Constructional arrangement of turbo jet, turbo shaft, turbo prop. Turbo fan engines.		
2	**ENGINE PERFORMANCE** Gas turbine engine performance: Potential Energy, Kinetic Energy, Newton's Laws of Motion, Brayton Cycle. The Relationship between Force, Work, Power, Energy, Velocity, Acceleration; 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.		
3	**INLET:** Compressor inlet ducts, Effects of various inlet configurations; Ice protection		
4	**COMPRESSORS:** Axial and centrifugal types; Advantages and disadvantages, 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.		
5	**COMBUSTION SECTION** Constructional features and principles of operation, Types of combustors; Advantages and Disadvantages		
6	**TURBINE SECTION:** Operation and characteristics of different turbine blade types; Merits and demerits, Blade to disk attachment; Nozzle guide vanes; Causes and effects of turbine blade stress and creep. Cascade effect.		
7	**EXHAUST:** Constructional features and principles of operation; Convergent, divergent and variable area nozzles; Engine noise reduction; Thrust reversers.		

8	**BEARINGS AND SEALS:** Constructional features and principles of operation.	
9	**LUBRICANTS AND FUELS**: Properties and specifications; Fuel additives; Safety precautions.	
10	**TURBO-PROP ENGINES:** Gas coupled/free turbine and gear coupled turbines; Reduction gears; Integrated engine and propeller controls; Over speed safety devices.	
11	**TURBO-SHAFT ENGINES:** Arrangements of drive systems, reduction gearing, couplings, and control systems.	
12	**TURBO- FAN ENGINES:** Arrangements of drive systems, reduction gearing, couplings, control systems.	

Subject Code: AV31079	**B.Sc. AME** -33	**Course Title** : **Aircraft Maintenance (Planning & Logistics)**	
Contact Hours: 45	**Lecture**- 3	**Tutorial**-0 **Practical**-0	**Credit**-3
Objective			
UNITS	**Content**		
1	**WHAT IS MAINTENANCE?** Definitions; goals and objectives; goals of a maintenance program, Maintenance program objectives; types of maintenance		
2	**ESTABLISHING A MAINTENANCE PROGRAM** Aircraft maintenance program; development of maintenance programs; Maintenance steering group (MSG); process oriented maintenance; Task-oriented maintenance; maintenance intervals defined		
3	**TYPES OF DOCUMENTATION** Airplane maintenance manual (AMM); Component and vendor manuals; Fault isolation manual (FIM); Fault reporting manual (FRM); Illustrated parts catalog (IPC); Storage & recovery document (SRD); Structural repair manual (SRM); Maintenance planning data document (MPD); Schematic diagram manual (SDM); Wiring diagram manual (WDM); Master minimum equipment list (MMEL); Dispatch deviation guide (DDG); Configuration deviation list (CDL); Task cards (TC); Service bulletins, service letters and maintenance tips; **REGULATORY DOCUMENTATION**: FEDERAL AVIATION REGULATIONS (FARS); advisory circulars (ACS) ; airworthiness directives (ADS); notice of proposed rulemaking (NPRM); **AIRLINES GENERATED DOCUMENTS**: Operations specifications; Technical policies and procedures manual; Inspection manual; Quality assurance manual; Reliability program manual; Minimum equipment list (MEL); Task cards; Engineering orders (EO) / work order; **ATA DOCUMENT STANDARDS**: ATA format for Maintenance Manual; Maintenance and Engineering Organization Manual.		
4	**PRODUCTION PLANNING & CONTROL** Introduction; forecasting; production planning; Maintenance tasks at less than “A” check interval; Multiple checks; Phase check; “A” check planning; “C” check planning; Routine tasks Variable routine tasks; Non routine tasks; Production control; feedback for planning; technical publications: functions of technical publications; airline libraries: control		

	of publications; controlled documents listing; document distribution; technical training; training for aviation maintenance	
5	**LINE MAINTENANCE (ON-AIRCRAFT)** Line maintenance organization; functions that control maintenance; maintenance control centre responsibilities; must have adequate facilities; Line maintenance operation—general: aircraft logbook; ramp & terminal operations; Other line maintenance activities; line station activities; Maintenance crew skill requirements: one of the most important activities, Hangar maintenance (on aircraft): hangar maintenance (on aircraft); Problem areas in hangar maintenance; maintenance support shops; ground support equipment (gse); Ground support equipment categories; hanger maintenance activity– a typical "c" check; maintenance overhaul shops (off-aircraft): types of shops; Operation of overhaul shops:	

Subject Code: **AV39081**	**B.Sc. AME** -34	**Course Title** : **Aircraft Structures and Systems**	
Contact Hours: 60	**Lecture**- 0 **Tutorial**-0 **Practical**-4 **Credit**-2		
Objective			
UNITS	**Content**		**Contact Hours**
1	Familiarization with stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, empennage, engine attachments, doors, Windows, windshield & Position of Inspection Panels		
2	Removal and installation of seats.		
3	Identification of vapor cycle system, its component, functional check of the system and inspection		
4	Identification of Fire and smoke detection and warning and extinguishing systems		
5	Identification of Fuel system components and inspection		
6	fuelling and de-fuelling practice of aircraft		
7	Identification of hydraulic system components and inspection		
8	Carry out landing gear retraction test.		
9	Identification of electrical, hot air, chemical de-icing, indication and warning system		
10	Wheel - removal, inspection and installation of main wheel.		
11	Tire- removal, inspection and installation		
12	Brake-removal, inspection and installation		
13	Identification of external and internal lights and inspection		
14	Identification of oxygen system components		
15	Identification of Pneumatic/Vacuum and Water/Waste system and inspection.		
16	Demonstration and Inspection of control cables, screw jacks, lever devices, push-pull rod, bell crank, turn buckle and cable tension adjustment		
17	Carry out Symmetry check of the aircraft.		
18	Carry out Aircraft weighing, CG calculation and use of relevant documents.		
19	Removal and installation of battery from aircraft.		

Subject Code: AV39083	**B.Sc. AME** -35	**Course Title** : **Basic Electronics**		
Contact Hours: 30	**Lecture**- 0	**Tutorial**-0	**Practical**-2	**Credit**-1
Objective				

UNITS	**Content**	**Contact Hours**
1	Identification and use of basic electronic components (diodes, transistors), digital Multi- meter, Function Generator and Oscilloscope	
2	Familiarization with computer architecture and its components.	
3	Identification of components of Display systems	
4	Operational check of Display system.	
5	Familiarization with CRT and various components associated with EFIS.	
6	Identification of components in engine display systems	
7	Bite / self-test of EFIS system	
8	Operation check of IFE system	
9	Practical on I-V Characteristics of (a) p-n junction Diode, and (b) Zener diode	
10	Conversion of A C Voltage using (a) Half wave rectifier and (b) Full wave rectifier (FWR).	
11	Construct a Universal Gates and test.	
12	Construct a flip flop circuit using elementary gates.	
13	Testing of diodes	
14	Fabricate half wave rectifier circuit using diode & verify its output with the help of oscilloscope	
15	Fabricate full wave bridge rectifier circuit using diode & verify its output with the help of oscilloscope.	
16	Testing of transistor ,use of transistor as a switch,	
17	Construct a simple circuit using IC	
18	Demonstration of various types of printed circuit boards and De-Soldering practices on PCB.	

Subject Code: AV39085	**B.Sc. AME** -36	**Course Title** : **Aircraft Instruments**		
Contact Hours: 30	**Lecture**- 0	**Tutorial**-0	**Practical**-2	**Credit**-1
Objective				
UNITS	**Content**			**Contact Hours**
1	Demonstration of aircraft Pitot-Static system			
2	Carry out leak test of Pitot - Static system			
3	Carry out compass swinging			
4	Use of Dead Weight Tester			
5	Carry out Altimeter Correction			
6	Carry out ASI Correction			
7	Carry out VSI Correction			
8	Carry out fuel quantity Indicator correction			
9	Carry out RR Compass Correction			
10	Demonstration of the following instruments and their operating mechanism : Altimeter, Vertical Speed Indicator, Airspeed Indicator, Artificial Horizon , Attitude Director , Turn and Slip Indicator, turn Coordinator , DR and RR compass etc			
11	Use of Gyro Turn Table			

Subject Code: **AV39087**	**B.Sc. AME** -39	**Course Title** : **Piston Engine -I**		
Contact Hours: 30	**Lecture**- 0	**Tutorial**-0	**Practicle**-2	**Creedit**-1
Objective				

UNITS	**Content**	**Contact Hours**
1	Demonstration of 2-stroke engine, 4- stroke engine	
2	Demonstration of Diesel and Patrol engine	
3	Demonstration of Wankel cycle engine (CBT tutorial)	
4	Demonstration of piston TDC, BDC position	
5	Familiarize with construction and functions of piston engines	
6	Dismantling of engine, cleaning of parts and sub-assemblies	
7	Identification of various sub-assemblies	
8	Identification of piston and cylinder assemblies	
9	Identification of accessory gear box and valve operating mechanism	
10	Identification of various components	
11	Demonstration of firing order	
12	Identification of engine fuel system	
13	Demonstration of carburetor and Injector	
14	Demonstration of other fuel system components / Parts	
15	Identification of Ignition system components	
16	Demonstration of Bendix and Slick magnetos	
17	Function check of magneto and timing with engine	
18	Removal, Inspection, cleaning and testing of spark plug.	
19	Demonstration of starter and starting system	
20	Demonstration of turbo charger.	

Course Structure and Syllabi for B.Sc. (Aircraft Maintenance Engineering)

Subject Code: AV39089	**B.Sc. AME** -40	**Course Title** : **Gas Turbine Engine -I**		
Contact Hours: 30	**Lecture**- 0	**Tutorial**-0	**Practical**-2	**Credit**-1
Objective				

UNITS	**Content**	**Contact Hours**
1	Identify engine types, modules , subassemblies and components of turbine engines	
2	Identification and inspection of compressors stages	
3	Demonstration of centrifugal and axial compressors	
4	Identification of bleed valves , variable inlet guide vanes , variable stator vanes, rotating stator blades	
5	Demonstration of combustion section , associated parts and methods of cooling	
6	Identification of turbine blades, blade to disk attachment, nozzle guide vanes etc	
7	Identification of various engine lubricants.	
8	Drain and replenish engine oil.	
9	Identify methods of noise reduction	
10	Identify normal & electronic fuel control, monitoring and indication system (CBT Tutorial)	
11	Operation check of Engine indicating systems	
12	Identification of Fuels.	
13	Check fuel for water and other contaminants.	

Subject Code: AV33072	**B.Sc. AME** -41	**Course Title** : Piston Engine -II	
Contact Hours: 120	**Lecture**- 4	**Tutorial**-0 **Practical**-4	**Credit**-6
Objective			
UNITS	**Content**		
1	**ELECTRONIC ENGINE CONTROL** Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.		
2	**INDUCTION, EXHAUST AND COOLING SYSTEMS** Construction and operation of: induction systems including alternate air systems; Exhaust systems, engine cooling systems — air and liquid		
3	**LUBRICANTS AND FUELS** Properties and specifications; Fuel additives; Safety precautions.		
4	**LUBRICATION SYSTEMS** System operation/lay-out and components		
5	**ENGINE INDICATION SYSTEMS** Engine speed; Cylinder head temperature; Coolant temperature; Oil pressure and temperature; Exhaust Gas Temperature; Fuel pressure and flow; Manifold pressure.		
6	**POWER PLANT REMOVAL AND 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.		
7	**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.		
8	**ENGINE STORAGE AND PRESERVATION** Preservation and de-preservation for the engine and accessories/ systems		

Course Structure and Syllabi for B.Sc. (Aircraft Maintenance Engineering)

Subject Code: AV33074	**B.Sc. AME** -41	**Course Title** : **Gas Turbine Engine -II**		
Contact Hours: 90	**Lecture**- 4	**Tutorial**-0	**Practical**-2	**Credit**-5
Objective				
UNITS	**Content**			
1	**LUBRICATION SYSTEMS** System operation/ lay-out and components.			
2	**FUEL SYSTEMS** Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.			
3	**AIR SYSTEMS** Operation of engine air distribution and anti-ice control systems, including internal cooling, sealing and external air services.			
4	**STARTING AND IGNITION SYSTEMS** Operation of engine start systems and components; Ignition systems and components; Maintenance safety requirement			
5	**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; Vibration measurement and indication; Torque;			
6	**POWER AUGMENTATION SYSTEMS** Operation and applications; Water injection, water methanol; Afterburner systems			

Course Structure and Syllabi for B.Sc. (Aircraft Maintenance Engineering)

Subject Code: AV33076	**B.Sc. AME** -41	**Course Title** : **Propeller**	
Contact Hours: 90	**Lecture**- 4	**Tutorial**-0 **Practical**-2	**Credit**-5
Objective			
UNITS	**Content**		
1	**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.		
2	**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 speeding propeller; Propeller/spinner installation.		
3	**PROPELLER PITCH CONTROL** Speed control and pitch change methods, mechanical and electrical/electronic; Feathering and reverse pitch; Over speed protection.		
4	**PROPELLER SYNCHRONIZING** Synchronizing and Synchro-phasing equipment		
5	**PROPELLER ICE PROTECTION** Fluid and electrical de-icing equipment		
6	**PROPELLER MAINTENANCE** Static and dynamic balancing; Blade tracking; Assessment of blade damage, erosion, corrosion, impact damage, de-lamination; Propeller treatment/repair schemes; Propeller engine running		
7	**PROPELLER STORAGE AND PRESERVATION** Propeller preservation and de-preservation		

Subject Code: AV39078	**B.Sc. AME** -42	**Course Title** : **Avionic Systems**	
Contact Hours: 30	**Lecture**- 0	**Tutorial**-0 **Practical**-2	**Creedit**-1
Objective			
UNITS	**Content**		**Contact Hours**
1	Familiarization and Demonstration of Flight Director and Auto pilot system and components.		
2	Familiarization and Demonstration of HF and VHF communication system components		
3	Inspection of ELT.		
4	Familiarization and Demonstration of VOR and ADF system and components		
5	Familiarization and Demonstration of GPS system and components		
6	Familiarization and Demonstration of isolation amplifier and marker beacon receiver		
7	Familiarization and Demonstration of CVR, DME.		
8	Familiarization and Demonstration of weather radar system components and how to test		
9	Familiarization and Demonstration of Instrument Landing System (ILS).		
10	Use of various test equipment for avionics system maintenance		
11	Identification of various Antennas		
12	Familiarization and Demonstration of Radio/ Radar Altimeter system and components.		

Subject Code: AV39080	**B.Sc. AME** -43	**Course Title** : Piston Engine-II		
Contact Hours: 60	**Lecture**- 0	**Tutorial**-0	**Practical**- 4	**Creedit**-2
Objective				
UNITS	**Content**			**Contact Hours**
1	Familiarization and demonstration of various fuels and lubricants used.			
2	Rigging of engine controls: Throttle control, Carburetor or Injector control, idle mixture and idle speed adjustment.			
3	Familiarization and demonstration of engine indicating system			
4	Identification and inspection of complete lubrication system and components			
5	Carry out cylinder compression test.			
6	Carry out fuel drain and sampling			
7	Carry out oil drain and replenish it.			
8	Oil filter removal, Inspection, installation and wire locking			
9	Fuels filter removal, inspection, cleaning, installation and wire locking			
10	Demonstration and Inspection of Induction and Exhaust system and components			
11	Carry out cleaning of air filter and inspection of any leakage.			
12	Top overhaul of the engine.			
13	Carry out Crank shaft run out check.			
14	Carry out cylinder compression test.			
15	Check valve clearance			
16	Engine removal and installation.			
17	Engine preservation and De- preservation practice.			

Course Structure and Syllabi for B.Sc. (Aircraft Maintenance Engineering)

Subject Code: **AV39082**	**B.Sc. AME** -44	**Course Title** : **Gas Turbine Engine - II**		
Contact Hours: 30	**Lecture**- 0	**Tutorial**-0	**Practical**-2	**Credit**-1
Objective				
UNITS	**Content**			**Contact Hours**
1	Familiarization and demonstration of lubrication system components : Oil Tank; Oil Pump; Oil Pressure Regulating Valve; Oil Pressure Relief Valve; Pumps; fluid lines and fittings; reservoir ; Lubrication System Instrumentation; Lubrication System Breather Systems (Vents); Lubrication System Check Valve; Lubrication System Thermostatic Bypass Valve; Air Oil Coolers; Fuel Oil Coolers ; Magnetic Chip Detectors and interface with other system.			
2	Familiarization and demonstration of air system and its components: Air System; Turbine Engine Cooling; Accessory Zone Cooling; Anti-Ice Control Systems.			
3	Familiarization and demonstration of engine starting and ignition system and components: Gas Turbine Engine Starter; Starter Generator; Capacitor Discharge Exciter Unit; Igniter Plugs; Ignition System Leads.			
4	Familiarization and demonstration of engine indicating system : Exhaust Gas Temperature Indicator (EGT) l ; Engine Pressure Ratio (EPR)Indicator ; Torque meter (Turboprop Engines)			
5	Tachometer; Fuel-Flow Indicator; Engine Oil Pressure Indicator; Engine Oil Temperature Indicator			
6	Visual Inspection of engine.			
7	Typical engine control rigging.			
8	Familiarization and demonstration of fire monitoring and extinguishing system.			
9	Engine storage and preservation.			

Subject Code: AV39084	**B.Sc. AME** -45	**Course Title** : **Propeller**	
Contact Hours: 30	**Lecture**- 0	**Tutorial**-0	**Practical**-2	**Credit**-1
Objective			
UNITS	**Content**		**Contact Hours**
1	Demonstration of propeller high/low blade angle, reverse angle, angle of attack, blade face, blade back, blade shank, hub assembly and governor mechanism.		
2	Methods of propeller pitch control.		
3	Inspection of blade damage, erosion, corrosion, impact and de-lamination		
4	Demonstration of propeller ice protection system		
5	Propeller servicing and Blade tracking.		
6	Propeller mounting and demounting practice.		

Subject Code: AV37086	**B.Sc. AME** -45	**Course Title** : Three Months Project / Internship	
Contact Hours: N/A	**Lecture**- 0	**Tutorial**-0	**Practical**-0	**Credit**-7
Objective			
UNITS	**Content**		**Contact Hours**