

University of Mumbai



No. UG/37 of 2020-21

CIRCULAR:-

Attention of the Principals of the Affiliated Colleges and Directors of the recognized Institutions in Science & Technology Faculty is invited to the syllabus uploaded Academic Authority Unit which was accepted by Academic Council at its meeting held on June, 2016 vide item No. 4.65 the relating to the revised syllabus for the B. Sc. Aeronautics – Avionics (Sem. I to VI).

They are hereby informed that the recommendations made by the Ad-hoc Board of Studies in Aviation at its online meeting held on 11th May, 2020 vide item No. 2 and subsequently made by the Board of Deans at its meeting held on 26th June, 2020 vide item No. 13 (8) have been accepted by the Academic Council at its meeting held on 23rd July, 2020 vide item No. 4.73 and that in accordance therewith, the revised syllabus as per the (CBCS) of B.Sc. Aeronautics (Avionics) (Sem. I to VI) has been brought into force with effect from the academic year 2020 -21 accordingly. (The same is available on the University's website www.mu.ac.in).

MUMBAI – 400 032

17th November, 2020


(Dr. Vinod Patil)
I/c REGISTRAR

To

The Principals of the Affiliated Colleges and Directors of the recognized Institutions in Science & Technology Faculty. (Circular No. UG/334 of 2017-18 dated 9th January, 2018.)

A.C/4.73/23/07/2020

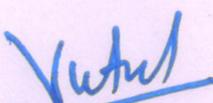
No. UG/37-A of 2020-21

MUMBAI-400 032

17th November, 2020

Copy forwarded with Compliments for information to:-

- 1) The Dean, Faculty of Science & Technology,
- 2) The Chairman, Ad-hoc Board of Studies in Aviation,
- 3) The Director, Board of Examinations and Evaluation,
- 4) The Director, Board of Students Development,
- 5) The Co-ordinator, University Computerization Centre,


(Dr. Vinod Patil)
I/c REGISTRAR

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Item No. _____

UNIVERSITY OF MUMBAI



Program : -B.Sc. Aeronautics

Course : - Avionics
Syllabus for Semester I TO VI

(Choice Based and Credit System with effect from the
Academic year 2020-21)

UNIVERSITY OF MUMBAI**Syllabus for Approval**

Sr. No.	Heading	Particulars
1	Title of the Course	B.Sc. Aeronautics (Avionics)
2	Eligibility for Admission	10+2 with Physics, Mathematics and English
3	Passing Marks	45% for General Category 40% for Reserve Category
4	Ordinances / Regulations (if any)	O-5962 Circular No.UG/147 of 2012-13 dated 14 th March,2013. O-5963
5	No. of Years / Semesters	3 Years / 6 Semesters
6	Level	U.G. (Strike out which is not applicable)
7	Pattern	Semester (Strike out which is not applicable)
8	Status	Revised (Strike out which is not applicable)
9	To be implemented from Academic Year	From Academic Year 2020- 2021

Date:

Signature :

Name of BOS Chairman / Dean :

Wg.Cdr. S.C.Mehta / Dr. Majumdar

BASIC AERODYNAMICS							
Semester	Course Code	Course Title	Credits	Lecture one hour duration	Practical code	Credits	Lecture one hour duration
I	USARA 101	BASIC AERODYNAMICS	3	70	USARA 1P1	2	50
	USARA 102	WORKSHOP TECHNOLOGY	3	70	USARA 1P2	2	50
	USARA 103	ELECTRICAL FUNDAMENTALS (I)	3	70	USARA 1P3	2	50
	USARA 104	ENGINEERING DRAWING	2	50			
	USARA 105	HUMAN FACTORS / COMMUNICATION SKILL	3	70			
	USARA 1P1	BASIC AERODYNAMICS & WORKSHOP TECHNOLOGY-PRACTICAL	2				
	USARA 1P2	ELECTRICAL FUNDAMENTALS (I)-PRACTICAL	2				
	USARA 1P3	ENGINEERING DRAWING-PRACTICAL	2				
			18				

BASIC AERODYNAMICS					
Theory		Internal Marks	Semester end examination marks	Total Marks	Duration of examination
USARA 101		25	75	100	2.5 HOURS
USARA 102		25	75	100	2.5 HOURS
USARA 103		25	75	100	2.5 HOURS
USARA 104		25	75	100	2.5 HOURS
USARA 105		25	75	100	2.5 HOURS
USARA 1P1	Unit 1	-	50	100	2.5 HOURS
	Unit 2	-	50		2.5 HOURS
USARA 1P2		-	50	50	2.5 HOURS
USARA 1P3		-	50	50	2.5 HOURS
			350		

B.Sc. AERONAUTICS (Avionics) SYLLABUS (THEORY)

Course Code	CMM - Avionics	Credit
15A0401	CMM - MC	Credit Elective 1
<p>Avionics</p> <p>a) Physics of the Atmosphere International Standard Atmosphere (ISA), application to aerodynamics.</p> <p>b) Aerodynamics Airflow around a body, Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, upwash and downwash, vortices, stagnation.</p> <p>The terms: camber, chord, mean aerodynamic chord, profile (parasite) drag, induced drag, center of pressure, angle of attack, wash in and wash out, fineness ratio, 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.</p>		1 Elective
<p>Avionics</p> <p>Relationship between lift, weight, thrust and drag; Glide ratio; Steady state flights, performance; Theory of the turn; Influence of load factor: stall, flight envelope and structural limitations; Lift augmentation.</p>		1 Elective
<p>Avionics</p> <p>Introduction to aircraft, major aircraft components, aircraft systems and their functions, reference lines, station and zone identification systems International Standard Atmosphere (ISA), application to aerodynamics. Longitudinal, lateral and directional stability (active and passive).</p>		1 Elective
<p>Reference</p> <p>1. Mechanics of Flight ----- AC Kermode Aviation Maint. Technician Hand Book-General -9A --- FAA Aviation Maint. Technician Hand Book-Airframe -15A --- FAA</p>		

Course Code	Automotive Engineering	Credit
		Credit ECTRE
<p>Fit or Clearance</p> <p>Aspects of safe working practices including precautions to be taken up while working with electricity, gases especially Oxygen, Acetylene, oils and chemicals. 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. Care of tools, control of tools and use of workshop materials. Limits, fits and tolerances, Standards of workmanship, Calibration of tools and equipment, Calibration Standards, Common hand tool types, Common power tool types, 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.</p>		ECTRE
<p>Fit or Clearance</p> <p>Screw threads, screw nomenclature; thread forms. Dimensions and tolerances for standard threads used in aircraft, measuring screw threads; 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, Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, Quick release fasteners, Keys, circlips, cotter pins, Types of solid and blind rivets: specifications and Identification, heat treatment.</p>		ECTRE

Locking devices

Tab and spring washers, locking plates, split pins, palnuts, wire locking, quick release fasteners, keys, circlips, cotter pins Aircraft rivets Types of solid and blind rivets: specifications and identification, heat treatment. Types of cables; End fittings, turnbuckles and compensation devices; Pulleys and cable system components; Bowden cables; Aircraft flexible control systems.

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Locking devices

References

- 1) Airframe & Power plant Mechanics (General Handbook EA-AC 65-9A)
- 2) Shop Theory --- J. A Enderson & Tatro
- 3) Aviation Maint. Technician Handbook-Airframe – 15A (Vol-I & II)

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Significance of the internal resistance of a supply.

Magnetism --- Theory of magnetism; Properties of a magnet Action of a magnet suspended in the Earth's magnetic field; Magnetisation and demagnetisation; Magnetic shielding; Various types of magnetic material; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor. Magneto motive force, field strength, magnetic flux density, permeability, hysteresis loop, retentively, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.

Inductance --- Cited Inductance --- Circuits
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;

Resistance/Resistor -- 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. 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;

Power ---- Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and

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energy,

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. 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

Reference books

1. Electrical technology by B L Theraja
2. Aircraft Electricity and Electronic by Eismen
3. Examples in electrical Calculation by Admiralty

Department of Mechanical Engineering

Course Code	Department of Mechanical Engineering	Credit
18ME401	Mechanical Engineering	Credit 3 Elective 1
<p><u>18ME401</u> Students will have to perform minimum 16 practicals from following list of Practical's {From Unit I minimum 7 Practical's & from Unit II minimum 7 Practical's}</p> <p><u>Unit I</u></p> <p>(Students will have to perform minimum 7 practicals from following list of Practical's)</p> <ol style="list-style-type: none"> 1) To understand the shape of airfoils and wing and how they affect lift and drag, effect of boundary layer on flow around the body. 2) Identifying aircraft reference lines, station and zone numbers 3) Identification of major structural members of fixed wing aircraft. 4) Identification of type of Fuselage and method of pressure sealing. 5) Identification of Pressure bulkheads and unpressurised bulkheads 6) Identification of components of flight control surfaces and landing gear and engine attachment 7) Examinations of the flight control, checking its movement and greasing 8) Visual Checks on spoilers position & Position checks of the flap 9) Assessment of damage on fuselage exterior skin. 10) Identification of various types of wings. 		Credit 3 Elective 1
<p><u>Unit II</u></p> <p>(Students will have to perform minimum 7 practicals from following list of Practical's)</p> <ol style="list-style-type: none"> 1) Demonstration of safety precautions while using fluids, gases, electricity, fire and chemicals & identification of different type of Fire & Fire Extinguishers. 2) Demonstration of hand tools and equipment and their correct use. 3) Demonstration of correct use of measuring equipment (tools) like micrometers, Vernier caliper, 4) Demonstration of correct use of Dial Indicator, bevel protector, combination set etc. 5) Demonstration and use of torque wrench for given torque value. 		Credit 3 Elective 1

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| <ol style="list-style-type: none">6) Demonstration of the use of calipers, feeler, fillet, radius limit, telescopic gauge for inspection of one simple assembly.7) Use hand & power tools to drilling (example: rivet holes drilling).8) Demonstration of the Inspection and lubrication of aircraft control cable.9) Demonstration of the wire and cotter pin licking practice.10) Demonstration of the Inspection and lubrication of aircraft control cable.11) Demonstration of the wire and cotter pin licking practice. | |
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Co re Code	C M io ic r ctic	Credit
	C C M	Credit ect re
<p>□□□□□□□□ Students will have to perform minimum 12 practicals from following list of Practical's</p> <ol style="list-style-type: none"> 1) To verify the ohm law & Kirchoff law using resistive network. 2) To design electrical circuit using electrical appliances like fuse, switch , circuit breaker, socket, bulb, contactor and verify its operation 3) To identify various types of resister on the basis of colour code and validate using DMM/AMM. 4) Demonstration of the resister in series/parallel /in combination and measure the value of resister through AMM/DMM. 5) To demonstrate the use of potentiometer and rheostat by using electrical circuit 6) To study operation of Wheatstone bridge. 7) To identify the various type of capacitor using colour code and validate its value by using LCR Q meter. 8) Connection of the capacitor in series/parallel /in combination and measure the value of Capacitor through capacitor meter. 9) To Demonstrate the process of Magnetization and demagnetization; 10) To demonstrate the faradays law of electromagnetic Induction. 11) To test the armature in Growler and through multimeter / test lamp. 12) To measure the high resistance by megger, and extension of range of voltmeter ammeter and ohm meter. 13) Working of Relays and solenoids 14) Connection of battery cells in series and parallel 		ect re

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Course Code	Computer Graphics	Credit
18EE024	3	Credit Elective
<p>□□□□□□ Students will have to perform minimum 12 practicals from following list of Practical</p> <ol style="list-style-type: none">1) Types of lines, lettering, dimensioning of simple orthographic view2) Engineering curves (minimum 3 problems)3) Projection of points (all possible positions)4) Projection of lines (minimum 3 problems)5) Projection of planes (minimum 3 problems)6) Projection of solids (minimum 3 problems)7) Projection of section of solids (minimum 3 problems)8) Development of lateral surface of solids (minimum 3 problems)9) Orthographic projection (2 Problems)10) Sectional orthographic projection (2 Problems)11) Isometric views (simple solid 2 problem)12) Isometric views (machine component 2 problem)13) Free hand sketches (Hexagonal headed nut and bolt, foundation bolt, shafts, keys, couplings)14) Free hand sketches (springs, screws, threaded forms)		Elective

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Syllabus							
Semester	Course Code	Course Title	Credits	Lecture one hour duration	Practical code	Credits	Elective or elective
III	USARA 201	ELECTRICAL FUNDAMENTALS (II)	3	70	USARA 2P1	2	
	USARA 202	ELECTRONIC FUNDAMENTALS	3	70	USARA 2P2	2	
	USARA 203	MAINTENANCE PRACTICES (I)	3	70	USARA 2P3	2	
	USARA 204	AIRCRAFT STRUCTURE	3	70			
	USARA 205	ENVIRONMENTAL STUDIES	2	50			
	USARA 2P1	ELECTRICAL FUNDAMENTALS (II)	2				
	USARA 2P2	ELECTRONIC FUNDAMENTALS	2				
	USARA 2P3	AIRCRAFT STRUCTURE & MAINTENANCE PRACTICES	2				
			20				

Syllabus					
Theory		Internal Marks	Semester end examination marks	Total Marks	Duration of examination
USARA 201		25	75	100	2.5 HOURS
USARA 202		25	75	100	2.5 HOURS
USARA 203		25	75	100	2.5 HOURS
USARA 204		25	75	100	2.5 HOURS
USARA 205		25	75	100	2.5 HOURS
UAARA 2P1		-	50	50	2.5 HOURS
USARA 2P2		-	50	50	2.5 HOURS
USARA 2P3	Unit 1	-	50	100	2.5 HOURS
	Unit 2	-	50		2.5 HOURS

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Course Code	Electronics and Communication Engineering	Credit
	Electronics and Communication Engineering	Credit Electure
Unit a. DC Motor and Generator --- 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. b. AC 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.		Electure
Unit AC circuit – 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. Transformer - 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.		Electure
Unit Filter ratio ratio d e o the o i filter low pass, high pass, band pass, band stop. AC generator – 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;		Electure

Permanent Magnet Generators.

Construction of Motor----- Construction, principles of operation and characteristics of: AC synchronous and induction motors both single and polyphase; Methods of speed control and direction of rotation; Methods of producing a rotating field: capacitor, inductor, shaded or split pole.

Reference books

- 1) Aircraft Electrical System --- E.H.J.Pallett
- 2) Aircraft Electricity & Electronics ---- Thomas K Eismin
- 3) Aviation Maint. Technician Hand Book-General -9A FAA

Course Code	Computer Microprocessor	Credit
	Computer Microprocessor	Credit Elective
Diode Rectifier Diode <p>(a) Diode symbols; Diode characteristics and properties; Diodes in series and parallel; Main characteristics and use of silicon controlled rectifiers (thyristors), light emitting diode, photo conductive diode, varistor, rectifier diodes; Functional testing of diodes.</p> <p>(b) 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; Operation and function of diodes in the following circuits: clippers, clampers, full and half wave rectifiers, bridge rectifiers, voltage doublers and triplers; Detailed operation and characteristics of the following devices: silicon controlled rectifier (thyristor), light emitting diode, Schottky diode, photo conductive diode, varactor diode, varistor, rectifier diodes, Zener diode.</p>		
Transistor <p>a) Transistor --- Component description and orientation; Transistor characteristics and properties. Construction and operation of PNP and NPN transistors; Base, collector and emitter configurations;</p> <p>b) Other Transistor --- 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 stabilisation; Multistage circuit principles: cascades, push-pull, oscillators, multi vibrators, flip-flop circuits.</p> <p>c) Integrated Circuit --- Description and operation of logic circuits and linear circuits/operational amplifiers. Description and operation of logic</p>		

<p>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.</p> <p>d) Printed Circuit Board- Description and use of printed circuit boards.</p>	
<p>Unit 10</p> <p>a) Servomechanisms 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.</p> <p>a) Understanding of the following terms: Open and closed loop, follow up, servomechanism, analogue, transducer, null, damping, feedback, dead and; 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; Servomechanism defects, reversal of synchro leads, hunting.</p>	<p>Unit 10</p> <p>Structure</p>
<p>Reference Books</p> <p>1) Aircraft Radio System ---- J. Powell</p> <p>2) Electronic Communication System --- George Kennedy</p> <p>3) Digital Principles and Applications by DONALD P. LEACH, ALBERTPAUL ALVINO,GOUTAM SAHA</p>	

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Course Code	Aviation Maintenance Technician	Credit
		Credit Elective
Unit Elementary Concepts 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		
Unit Familiarization of Fuselage types ; Familiarization of Wing Structure ; Familiarization of Control Surface 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;		
Unit Structure assembly techniques: riveting, bolting, bonding Methods of surface protection, such as chromating, anodising, painting; Surface cleaning. Airframe symmetry: methods of alignment and symmetry checks.		
Reference Books 1) FAA H- 8083-31 Aviation Maint. Technician Handbook-Airframe (Vol-I) 2) FAA H- 8083-31 Aviation Maint. Technician Handbook-Airframe (Vol II) 3) Civil Aircraft Inspection Procedures (CAP 459)-- CAIP I		

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Course Code	CMM Environmental Chemistry	Credit
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□□□□□□□□□□□□□□□□□□□□	Environment: definition and composition, atmosphere, biosphere, ecological system and ecology, food chain, exploitation of natural resources in sustainable manner, Global warming, Acid rain.	□□□□ Elective □□
□□□□□□□□□□□□□□□□□□□□	What is disaster, concept of disaster, cause of disaster, major natural disaster, cyclones, Tsunami, disaster management, forms of waste, classification of waste, sources of waste their effects and waste management.	□□□□ Elective □□
□□□□□□□□□□□□□□□□□□□□	Natural resources, ever increasing power requirement, renewable resources, Sustainability, conservation, Environmental clearance for establishing and operating Industries in India. Wildlife protection act,	□□□□ Elective □□
Elective course 1) Environmental Management --Smite Saluki		

Course Code	Electronics Engineering	Credit
	Electronics Engineering	Credit Electure
<p>Students will have to perform minimum 12 practicals from following list of Practical's</p> <ol style="list-style-type: none"> 1) Familiarization with transformers 2) Measurement of output voltage of DC generator 3) Measurement of output voltage of alternator 4) To study the constructional part of DC Generator/Motor & Perform the inspection and operation of DC Generator/motor 5) To test the armature in Growler and through millimeter / test lamp. 6) Familiarize the constructional part of AC generator and motor & perform the inspection and operation of AC Generator/Motor. 7) To demonstrate the reversing the direction of rotation and speed control of AC motor/DC motor. 8) To familiarize the current and voltage transformer and demonstrate the use and testing by simple circuit. 9) To Identify the various type of Inductor and measurement its value by LCR Q meter , 10) Connection of the Inductor in series, parallel and in combination and measure the value of inductor through Inductor meter. 11) Single phase and three phase power supply distribution using star and delta connection 12) Construct series LCR circuit and determine its (a) Resonant Frequency, Quality Factor, 13) Construct parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor Q 14) Use of transformer in power distribution and measurements. □ 15) Make filters circuit to study function of low pass, high pass, band pass and band stop 		

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Course Code	Computer Graphics	Credit
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<p>□□□□□□□□ Students will have to perform minimum 08 practicals from following list of Practical</p> <ol style="list-style-type: none">1) Identification of components of R, L, C and measure values2) Study of the features and controls of CRO & Multi meter3) Study of Operating Controls of Voltmeter, Ammeter, Power meter, Ohm meter, DMM for its use4) Study the characteristics of Electron Tube5) Identification of Semiconductor devices – Diodes, Transistors and perform their characteristics6) Study of SCR and its characteristics and waveform7) Study of Zener diode and its characteristics and waveform8) Study the working of Half wave, Full wave, Bridge Rectifier and observe the waveform9) To check UJT transistor and perform its characteristics10) To observe the performance of choke input and capacitance input filter after the rectification circuit		ECTRE □□

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Co r e Code	C M io ic r ctic	Credit
	C M C	Credit lect re
<p>□□□□□□□□ Students will have to perform minimum 20 practicals from following list of Practical {From Unit I minimum 8Practicals & from Unit II minimum 8 Practical}</p> <p>□□□□□□□□ M □□□□□□□□ C □□□□□□ C □□□□□□□□</p> <p>(Students will have to perform minimum 06 practicals from following list of Practical)□</p> <ol style="list-style-type: none"> 1) Identification of various rivets and use of any one riveting technique □ 2) Identification of various fasteners and locking devices used in aircraft. 3) Single patch riveting 4) Double patch riveting 5) Lap Joint by Riveting. Butt joint by Riveting. 6) Make a rectangular doubler 7) Make a circular doubler 8) Demonstration of simple soldering tasks. 9) Demonstration of electric arc welding. 10) Demonstration of oxy Acetylene welding. 11) Survey of corrosion prone area and suggestion for remedial action. 12) Demonstration of the wire and cotter pin licking practice. 		

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(Students will have to perform minimum 06 practicals from following list of Practical)

- 1) Safety, handling precautions, selection of appropriate tools and manuals.
- 2) Use zonal numbers to record location. Use parts catalogue & component location manual to locate components.
- 3) Identifying different parts of aircraft. And their operation on aircraft.
- 4) Visual inspection of various types of surface defects of aircraft structure using simple aids like magnifying glass, light and mirror.
- 5) Use zonal and station numbers to record defect location
- 6) Identification and inspection of flight control system
- 7) Inspection for lightning strike protection
- 8) Identification of types of rivets: specifications and identification,
- 9) Demonstration of Lap / But Joint by Riveting.
- 10) Demonstration of the Inspection and lubrication of aircraft control cable
- 11) Survey of corrosion prone area and suggestion for remedial action.

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Aircraft Maintenance							
Semester	Course Code	Course Title	Credits	Lecture one hour duration	Practical code	Credits	Lecture one hour duration
III	USARA 301	MAINTENANCE PRACTICES (II)	3	70	USARA 3P1	2	50
	USARA 302	AVIATION LEGISLATION (I)	3	70	USARA 3P2	2	50
	USARA 303	DIGITAL AND COMPUTOR TECHNIQUES	3	70	USARA 3P3	2	50
	USARA 304	AIRCRAFT MATERIALS	2	50			
	USARA 305	THEORY OF FLIGHT & FLIGHT CONTROLS	3	70			
	USARA 3P1	AIRCRAFT MATERIALS & MAINTENANCE PRACTICES(II)	2				
	USARA 3P2	DIGITAL AND COMPUTOR TECHNIQUES	2				
	USARA 3P3	THEORY OF FLIGHT & FLIGHT CONTROLS	2				

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Aircraft Maintenance					
Theory		Internal Marks	Semester end examination marks	Total Marks	Duration of examination
USARA 301		25	75	100	2.5 HOURS
USARA 302		25	75	100	2.5 HOURS
USARA 303		25	75	100	2.5 HOURS
USARA 304		25	75	100	2.5 HOURS
USARA 305		25	75	100	2.5 HOURS
USARA 3P1	Unit 1	-	50	100	2.5 HOURS
	Unit 2	-	50		2.5 HOURS
USARA 3P2		-	50	50	2.5 HOURS
USARA 3P3		-	50	50	2.5 HOURS

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Course Code	Continuity, Insulation and Bonding Techniques	Credit
	Maintenance Procedures	Credit Electre
	<p>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</p> <p>Sheet Metal --- Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.</p>	Electre
	<p>Thread Screw nomenclature; Thread forms, dimensions and tolerances for standard threads used in aircraft; Measuring screw threads; 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.</p> <p>Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.</p>	Electre
	<p>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</p> <p>Abnormal Events (a) Inspections following lightning strikes and HIRF penetration. (b) Inspections following abnormal events such as heavy landings and flight through turbulence.</p>	Electre
	<p>1) Airframe & Power plant Mechanics (General Handbook EA-AC 65-9A)</p> <p>2) Shop Theory --- J. A Enderson & Tatro</p> <p>3) Civil Aircraft Inspection Procedure (CAP 459)</p>	

Course Code	Course Title	Credits
<input type="checkbox"/>	<input type="checkbox"/>	Credit <input type="checkbox"/>
<input type="checkbox"/> it <input type="checkbox"/> operator requirements	Role of ICAO; the aircraft act and rule made there under; role of DGCA; relationship between CAR-21, CAR-M, CAR-145, CAR-66, the aircraft rules (applicable to aircraft maintenance and release); aeronautical information circulars (applicable to aircraft maintenance and release); CAR section 2 volume I.	<input type="checkbox"/> ectre
<input type="checkbox"/> it CAR- 66, CAR 145 and Aircraft operations CAR 66 Certifying staff maintenance Detailed understanding of CAR-66. CAR 145 – Approved maintenance organizations Detailed understanding of CAR 145 and CAR M subpart F. Aircraft Operations Commercial air transport/ Commercial operations Air operators certificate; Operator’s responsibilities, in particular regarding continuing airworthiness and maintenance.		<input type="checkbox"/> ectre
<input type="checkbox"/> it <input type="checkbox"/> ircraft Certification <input type="checkbox"/> er certification rule: such a FAA and 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. <input type="checkbox"/> <input type="checkbox"/> oc <input type="checkbox"/> e <input type="checkbox"/> t Certificate of airworthiness; Certificate of registration; noise certificate; weight schedule; radio station license and approval <input type="checkbox"/>		<input type="checkbox"/> ectre
<input type="checkbox"/> ere <input type="checkbox"/> ce <input type="checkbox"/> oo 1. CAR by DGCA <input type="checkbox"/> 2. CAR 66 by DGCA <input type="checkbox"/> 3. CAR 145 by DGCA <input type="checkbox"/> 4. CAR 21 by DGC <input type="checkbox"/>		

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Course Code	Communication Engineering	Credit
	Communication Engineering	Credit Elective
Unit Electronics Instrumentation --- Typical systems arrangements and cockpit layout of electronic instrument systems. Numbering Systems --- Numbering systems: binary, octal and hexadecimal; Demonstration of conversions between the decimal and binary, octal and hexadecimal systems and vice versa. Analogue to Digital Conversion --- Analogue Data, Digital Data; Operation and application of analogue to digital, and digital to analogue converters, inputs and outputs, limitations of various types. Data Buses --- Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications. Common Logic Circuits --- Identification of common logic gate symbols, tables and equivalent circuits; Applications used for aircraft systems, schematic diagrams. Interpretation of logic diagrams.		Elective
Unit Computer Architecture 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 microcomputer 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. Microprocessor 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. Computer Aided Circuits Operation and use of encoders and decoders Function of encoder types Uses of medium, large and very large scale integration. Multiplexers --- Operation, application and identification in logic diagrams of multiplexers and demultiplexers. Fiber Optic --- Advantages and disadvantages of fiber optic data		Elective

<p>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.</p>	
<p>Unit 1 Electronics --- Principles of operation of common types of displays used in modern aircraft, including Cathode Ray Tubes, Light Emitting Diodes and Liquid Crystal Display. Electrostatic Discharge (ESD) --- Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices. Control Software --- Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes Electromagnetic Interference (EMI) --- 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 Electronic/ Digital Aircraft Systems --- General arrangement of typical electronic/digital aircraft systems and associated BITE (Built In Test Equipment) testing such as: (a) For B1 and B2 only: 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 (b) For B1, B2 and B3: ECAM-Electronic Centralised Aircraft Monitoring EFIS-Electronic Flight Instrument System GPS-Global Positioning System TCAS-Traffic Collisions Avoidance system Integrated modular Avionics Cabin System Information system</p>	<p style="text-align: center;">Unit 1 Electronics</p>
<p>Reference Books</p> <ol style="list-style-type: none"> 1) Aircraft Instruments and Integrated System --- E.H.J. Pallett 2) Digital Principles and Applications by DONALD P. LEACH, ALBERTPAUL ALVINO, GOUTAM SAHA 3) Aviation electronics --- Keith W. Bose 	

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Course Code	Engineering Materials I	Credit
	Engineering Materials II	Credit
Unit Engineering Materials I Characteristics, properties and identification of common alloy steels used in aircraft; Heat treatment and application of alloy steels; Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.	Engineering Materials II Characteristics, properties and identification of common non-ferrous materials used in aircraft; Heat treatment and application of non-ferrous materials; Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance. Aircraft rivets -- Types of solid and blind rivets: specifications and identification, heat treatment	
Unit Engineering Materials I Composite and non-metallic other than wood and fabric. 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. c) Repair of composite and non-metallic material and Non- Metallic		
Unit Wood and Fabric -- structures Construction methods of wooden and fabric. airframe structures; Characteristics, properties and types of wood and fabric glue used in aero planes Preservation and maintenance of wooden and fabric structure; Types of defects in wood and fabric material and wooden structures; Plastics -- Different types of plastics used in aircraft Thermoplastics and Thermosetting plastics. Cleaning ,Storage and Handling Plastics Corrosion -- Chemical fundamentals; Formation by, galvanic action		

material

- 3) Characteristics, properties and identification of Sealant and bonding agents
- 4) The detection of defects/deterioration in composite and non-metallic material
- 5) Identification of various types of corrosion.
- 6) Thread forms, dimensions and tolerances for standard threads used in aircraft
- 7) Identification of various types of bolts used in aircraft.
- 8) Identification of various types of nuts used in aircraft.
- 9) Identification of various types of washers used in aircraft.
- 10) Insertion and removal of various types studs in aircraft.
- 11) Fitment and removal of split pins, pal nuts, wire locking, quick release fasteners, keys, circlips, and cotter pins.

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Course Code	Computer Microprocessor Interfacing	Credit
		Credit Elective
<p> <u>Objectives</u> 1) Perform the addition of two numbers on microprocessor 8085 kit. 2) Perform the subtraction of two numbers on microprocessor 8085 kit. 3) Perform the operation of complement of number on 8085 kit. 4) Introduction to the parts of computer. 5) Operation and identification of electrostatic discharge devices. 6) Awareness of airworthiness requirements to use software programs. 7) Understanding of ARINC data bus. 8) To study the working of A to D converter/ D to A converter. 9) Identification of various ESD warnings. 10) To perform the operation of grounding and bonding. 11) Study of ARINC 429/629 BUS. 12) Study of Fiber optic cable. 13) Pamphlet Design in MS-WORD 2007 14) Article Design in MS-WORD 2007 15) Comparative Worksheet Design in MS-EXCEL 2007 16) Comparative Different Slides in MS-POWERPOINT 2007 with Different Transitions 17) Usage of Record Sets, Passing & Returning of Record Set from a procedure, Usage of Command Object – Parameter Collection 18) Class creation and Usage, Usage of ActiveX components – both ActiveX DLL and ActiveX EXE, Package and Deployment Wizard 19) Interactive Discussion on VB 6.0 </p>		

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Semester	Course Code	Course Title	Credits	Lecture one hour duration	Practical code	Credits	Lecture one hour duration
IV	USARA 401	AIRCRAFT INSTRUMENT SYSTEM (I)	3	70	USARA 4P1	2	50
	USARA 402	ENGINE & SYSTEM	3	70	USARA 4P2	2	50
	USARA 403	COMMUNICATION/NAVIGATION SYSTEM	3	70	USARA 4P3	2	50
	USARA 404	POWER DISTRIBUTION	3	70			
	USARA 405	PROPULSION	2	50			
	USARA 4P1	AIRCRAFT INSTRUMENT SYSTEM (I)	2				
	USARA 4P2	COMMUNICATION/NAVIGATION SYSTEM	2				
	USARA 4P3	POWER DISTRIBUTION & PROPULSION	2				

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Theory		Internal Marks	Semester end examination marks	Total Marks	Duration of examination
USARA 401		25	75	100	2.5 HOURS
USARA 402		25	75	100	2.5 HOURS
USARA 403		25	75	100	2.5 HOURS
USARA 404		25	75	100	2.5 HOURS
USARA 405		25	75	100	2.5 HOURS
USARA 4P1		-	50	50	2.5 HOURS
USARA 4P2		-	50	50	2.5 HOURS
USARA 4P3	Unit 1	-	50	100	2.5 HOURS
	Unit 2	-	50		2.5 HOURS

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2) Automatic Flight control by Pallett

3) Aviation Maint Technician Hand Book-General -15A FAA



Starting systems, -- Starting and Ignition Systems Operation of engine control and fuel metering systems including electronic engine control (FADEC); Fire Protection Systems , Engine Indication Systems Auxiliary Power Units (APUs) Purpose, operation, protective systems.	
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Reference books

- 1) Aircraft Piston Engines -- Herschel Smith
- 2) Aircraft power plant -12A ---Kroes and Wild
- 3) The Jet Engine' by ROLLS ROYCE
- 4) Aircraft Gas Turbine Technology by IRWINE TREAGER

Course Code	COMMUNICATIONS	Credits
	COMMUNICATIONS	Credits Elective
Unit Electronics Fundamentals of radio wave propagation, antennas, transmission lines, communication, receiver and transmitter; Working principles of following systems: Very High Frequency (VHF) communication; High Frequency (HF) communication; Audio; Emergency Locator Transmitters; Cockpit Voice Recorder;		
Unit Navigation Working principle of : Very High Frequency omnidirectional range (VOR); Automatic Direction Finding (ADF); Instrument Landing System (ILS); Microwave Landing System (MLS); Flight Director systems; Distance Measuring Equipment (DME); Very Low Frequency and hyperbolic navigation (VLF/Omega); Doppler navigation; Area navigation, RNAV systems;		
Unit Navigation Flight Management Systems; Global Positioning System (GPS), Global Navigation Satellite Systems (GNSS); Inertial Navigation System; Air Traffic Control transponder, secondary surveillance radar; Traffic Alert and Collision Avoidance System (TCAS); Weather avoidance radar; Radio altimeter; ARINC communication and reporting		
Reference 1) Mechanics of Flight ----- AC Kermode 2) Aviation Maint Technician Hand Book-General -9A FAA 3) FAA H- 8083-31 Aviation Maint. Technician Handbook-Airframe 15A 4) Automatic Flight control by Pallett		

Course Code	CCM (Communication) Year	Credit
		Credit ECTRE
Electronics Engineering	Aircraft electrical power distribution systems, general requirements of power distribution systems, need for protective devices , electrical load , electrical load analysis, a simple electrical system, Main power distribution systems, single engine aircraft, twin engine aircraft, power distribution on composite aircraft, large aircraft electrical systems, The split –bus system, parallel electrical systems split parallel system , DC electrical systems , power distribution hierarchy, Control of power distribution systems, current trans-formers	ECTRE
Electrical Maintenance	Maintenance of aircraft electrical systems, requirements for electrical systems, general requirements , requirements for transport aircraft, typical schematic diagrams, Identification systems for locating electrical components aircraft lights, position lights, anti- collusion lights ,landing lights , instrument lights , warning lights, landing gear circuits ,large aircraft electrical systems, lighting circuits Flight compartment lights passenger compartment lights ,general lighting systems landing gear control circuits ,built in test equipment’s electronic control units equipment cooling, static dischargers. Maintenance and troubleshooting of electrical system, general requirements, inspection schedule, Multi meter trouble shooting ,volt meter troubleshooting , voltmeter and composite aircraft , ohmmeter trouble shooting, trouble shooting with built in test equipment, centralized fault display system, electro static discharge sensitive equipment’s System.	ECTRE
Power Electronics	Batteries Installation and Operation; DC power generation; AC power generation; Emergency power generation; Voltage regulation; Inverters, transformers, rectifiers; Circuit protection; External/Ground power.	ECTRE

Reference books

- 1) Mechanics of Flight ----- AC Kermode
- 2) Aviation Maint Technician Hand Book-General -9A FAA
- 3) FAA H- 8083-31 Aviation Maint. Technician Handbook-Airframe 15A
- 4) Automatic Flight control by Pallett

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Course Code	CMMIOICheor	Credit
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Constructional arrangement and operation of turbojet, turbofan, turboshaft and turbo propeller engines; Electronic Engine control and fuel metering systems (FADEC).		□□□ lectre
Exhaust gas temperature/ Interstage turbine temperature systems; Engine speed; Engine Thrust Indication: Engine Pressure Ratio, engine turbine discharge pressure or jet pipe pressure systems; Oil pressure and temperature; Fuel pressure, temperature and flow; Manifold pressure; Engine torque; Propeller speed.		□□□ lectre
Operation of engine start systems and components; Ignition systems and components; Maintenance safety requirements		□□□ lectre
Reference books 1) Aircraft gas turbine engine by -- Treager 2) Gas turbine engine by -- Otis		

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Co r e Code	C M io ic r ctic	Credit
	C M	Credit ect re
	<p> o i t o r ctic ro o o i t o r ctic </p> <ol style="list-style-type: none"> 1) Disassembly, cleaning, inspection and assembly of VSI 2) Disassembly, cleaning, inspection and assembly of Gyro Horizon Indicator 3) Disassembly, cleaning, inspection and assembly of Turn & Bank Indicator 4) Disassembly, cleaning, inspection and assembly of Hydraulic Pressure Gauge 5) Calibration of Air Speed Indicator 6) Showing the nature of airflow with the help of venturi tube 7) Operation of primary control surfaces by the movement of pilot's control 8) Tracing of pitot and static system pipelines and preparing a detailed schematic diagram 12) Inspection of cabling & wiring and system handling in a/c 13) Familiarization of aircraft autopilot basic functioning 14) Positional familiarization of AFCS inputs 15) Familiarization with location and operation of AFCS computers 16) Positional familiarization of servo alternators 17) Familiarization of AFCS control panel 	

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Course Code	Module CT Diagnostic Practic	Credit
18EE024 18EE024	Diagnostic Practic	Credit Electre 03
<p>NOTE:-- Students will have to perform minimum 14 practicals from following list of Practical: {From Unit I minimum 6 Practical's & from Unit II minimum 6 Practicals}</p> <p>Unit I</p> <p>Identify the following parts on aircraft Jet Engine – Air</p> <p>Identify the following parts on aircraft Jet Engine – Air</p> <ol style="list-style-type: none"> 1) To study the working of current transformer. 2) Troubleshooting with voltmeter. 3) Troubleshooting with ohmmeter 4) Continuity check (testing) of component with the help of ohmmeter 5) Familiarization with basic power distribution system 6) To study the operation and maintenance of output voltage of generator 7) Show the working of Single phase transformer rectifier unit 8) Show the working of 3 phase transformer rectifier unit. 9) Familiarization with single engine power distribution system 		
<p>Unit II</p> <p>Identify the following parts on aircraft Jet Engine – Air</p> <p>Identify the following parts on aircraft Jet Engine – Air</p> <ol style="list-style-type: none"> 1) Identifying the following parts on aircraft Jet Engine – Air 2) Intake, Compressor Combustion Chamber, Turbine, Exhaust 3) Types of Combustion Chamber – Can, Can Annular, Annular 4) Types of Compressor – Axial, Centrifugal Compressor 5) Types of Turbine Blades 6) Types of exhaust Nozzle 7) Fuel system & its components 8) FADEC & its components 		

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Semester	Course Code	Course Title	Credits	Lecture one hour duration	Practical code	Credits	Lecture one hour duration
□ □ □	USARA 501	AIRFRAME SYSTEM (I)	3	70	USARA 5P1	2	50
	USARA 502	LANDING GEAR , WHEELS & BRAKES	3	70	USARA 5P2	2	50
	USARA 503	AIRFRAME SYSTEM (II)	3	70	USARA 5P3	2	50
	USARA 504	DIGITAL TECHNIQUES II	3	70			
	USARA 505	AIRCRAFT FUEL AND FUEL SYSTEM	2	50			
	USARA 5P1	AIRFRAME SYSTEM (I) & AIRFRAME SYSTEM (II)	2				
	USARA 5P2	LANDING GEAR , WHEELS & BRAKES	2				
	USARA 5P3	DIGITAL TECHNIQUES II	2				

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Theory		Internal Marks	Semester end examination marks	Total Marks	Duration of examination
USARA 501		25	75	100	2.5 HOURS
USARA 502		25	75	100	2.5 HOURS
USARA 503		25	75	100	2.5 HOURS
USARA 504		25	75	100	2.5 HOURS
USARA 505		25	75	100	2.5 HOURS
USARA 5P1	Unit 1	-	50	align="center">100	2.5 HOURS
	Unit 2	-	50		2.5 HOURS
USARA 5P2		-	50	50	2.5 HOURS
USARA 5P3		-	50	50	2.5 HOURS

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Course Code	Aviation Maintenance Technician	Credit
	Aviation Maintenance Technician	Credit
Aviation Maintenance Technician	System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical, pneumatic; Emergency pressure generation; Pressure Control; Power distribution; Indication and warning systems; Interface with other systems. Filters.	Credit
Aviation Maintenance Technician	System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.	Credit
Aviation Maintenance Technician	Oxygen system: Purpose of the system; Safety portable & fixed Oxygen systems; low pressure and high pressure oxygen system & components; Installation and replacement of Oxygen lines. General familiarization with provision of emergency equipment on modern aircraft	Credit
Reference 1) Aviation Maint Technician Hand Book-Airframe -15A --- FAA 2) A & P Technician Air Frame Text Book ---- Jeppesen 3) Civil Aircraft Inspection Procedure (CAP 459)---(CAIP II)		

Course Code	Aviation Maintenance	Credit
		Credit Elective
Fire Protection: Fire extinguishing Principles, fire extinguisher mediums & their proper use, Fire warning devices, Thermal switches, Thermocouple system, continuous loop fire warning systems, spot detection, smoke detection ,fire zones, Routine maintenance, inspection.		
Aviation Maintenance Atmosphere; Description of a cabin pressure system; Structural Requirements for pressure cabins; Cabin pressure and rate of change controls; Safety; Discharge and Relief Valves; Recirculation systems; Humidification. Precautions to be observed on ground tests; Understanding the pressure altitudes; cabin altitude; Differential pressure; Operations of pressure controllers; Outflow valve; Safety Valve; Cabin rate of climb indicator; Manual pressure control valve; Negative pressure relief valve; Fault finding.		
Aviation Maintenance Air cycle machines and vapour cycle air conditioning systems. Systems components & their functions Distribution systems; Flow, temperature and humidity control system.		
Reference Books 1) Aviation Maint Technician Hand Book-Airframe -15A --- FAA 2) A & P Technician Air Frame Text Book ---- Jeppesen 3) Civil Aircraft Inspection Procedure (CAP 459)---(CAIP II)		

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Course Code	Computer Maintenance <u>io ic</u> heor	Credit
		Credit Electre
Advantages and disadvantages of fibre 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 Principles of operation of common types of displays used in modern aircraft, including Cathode Ray Tubes, Light Emitting Diodes and Liquid Crystal Display.		
Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.		
Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel antistatic protection devices, 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		
1) Digital Principles and Applications by DONALD P. LEACH, ALBERT PAUL ALVINO, GOUTAM SAHA		

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Course Code	Aviation Fuel and Fuel Systems	Credit
	Aviation Fuel and Fuel Systems	Credit Elective
	Aviation Fuel and Fuel Systems Types of Aviation Fuel. Volatility, Vapor Lock. Carburetor Icing. Aromatic Fuels, Detonation, Surface Ignition and Preignition, Octane and Performance Number Rating, Fuel Identification Purity Types of Aviation Fuel.--- Reciprocating Engine Fuel—AVGAS Turbine Engine Fuels Basic Fuel System Requirements, Fuel System Independence, Fuel System Lightning Protection.	Elective
	Aviation Fuel and Fuel Systems Flow Between Interconnected Tanks Unusable Fuel Supply Fuel System Hot Weather Operation. Fuel Tank Tests. Fuel Tank Installation, Fuel Tank Expansion Space. Fuel Tank Sump, Fuel Tank Filler Connection. Fuel Tank Vents and Carburetor Vapor Vents, Fuel Tank Outlet Fuel Valves and Controls, Fuel Strainer or Filter, Fuel System Drains. Fuel tanks; Supply systems; Fuel Pumps Fuel System Lines and Fittings	Elective
	Aircraft Fuel Systems Small Single-Engine Aircraft Fuel Systems. Gravity Feed Systems, Pump Feed Systems, High-Wing Aircraft With Fuel Injection System Small Multiengine (Reciprocating) Aircraft Fuel Systems. Large Reciprocating-Engine Aircraft Fuel Systems Jet Transport Aircraft Fuel Systems Refueling Pressure Fueling Systems and defueling; Longitudinal balance fuel systems.	Elective

Dumping, venting and draining; Cross-feed and transfer; Fuel Indications and warnings;

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- 1) Aviation Maint Technician Hand Book-Airframe -15A --- FAA
- 2) A & P Technician Air Frame Text Book ---- Jeppesen
- 3) Civil Aircraft Inspection Procedure (CAP 459)---(CAIP II)

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| <ul style="list-style-type: none">6) carry out leak check of aircraft Pressurisation system7) Find the location of different Pressurisation system components8) carry out troubleshooting of pressurization system9) Carry out snag analysis and rectification of Cabin pressure low10) Carry out snag analysis and rectification of Cabin temperature high11) Locate and identify the following :<ul style="list-style-type: none">a. Safety valveb. Discharge valve | |
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Relief Valve

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Theory		Internal Marks	Semester end examination marks	Total Marks	Duration of examination	
USARA 601		25	75	100	2.5 HOURS	
USARA 602		25	75	100	2.5 HOURS	
USARA 603		25	75	100	2.5 HOURS	
USARA 604		25	75	100	2.5 HOURS	
USARA 6P1	Unit 1	-	50	100	2.5 HOURS	
	Unit 2	-	50		2.5 HOURS	
USARA 6P2		-	50	50	2.5 HOURS	
USARA 6P3		-	50	50	2.5 HOURS	
USARA 6P4			100	100	2.5 HOURS	□ ro lect □ e □ □ □ □ tio □ □ □ □ □ □ er □ □ ide □ □ i □ e □ □ □ tt □ ched □
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Course Code	Aviation Maintenance Technician	Credit
	Aviation Maintenance Technician	Credit
Objective	<p>The Snags in the aircraft systems pertaining to syllabus covered in Semester 1 to Semester 5 for Aircraft Electrical systems. The snag analysis, reason finding and rectification required.</p> <p>Batteries Installation and Operation; DC power generation; AC power generation; Emergency power generation; Voltage regulation; Power distribution; Inverters, transformers, rectifiers; Circuit protection. External/Ground power;</p>	Credit
Objective	<p>The snags in the aircraft systems pertaining to syllabus Covered in Semester 1 to Semester 5 for Aircraft Instrument systems. The snag analysis, reason finding and rectification required.</p>	Credit
Objective	<p>The snags in the aircraft Systems pertaining to syllabus covered in Semester 1 to Semester 5 for Aircraft system Flight Control Surfaces</p> <p>Pitot static: altimeter, air speed indicator, vertical speed indicator;</p> <p>Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator;</p> <p>Compasses: direct reading, remote reading; Angle of attack indication, stall warning systems; Other aircraft system indication</p>	Credit
Reference <ol style="list-style-type: none"> 1) --- Aircraft Instruments and Integrated System E.H.J. Pallett 2)FAA H- 8083-31 Aviation Maint. Technician Handbook-Airframe □ 		

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Course Code	Continuum Mechanics and Thermodynamics	Credit
		Credit Reference
	<p>□</p> <p>□ Continuum Mechanics and Thermodynamics</p> <p>Main ignition systems, Continuous duty circuit, Auto ignition, precautions to be observed while handling ignition system, Joule ratings, Intermittent duty low tension ignition system with low DC voltage input.</p>	
	<p>□</p> <p>□ Continuum Mechanics and Thermodynamics</p> <p>High tension intermittent duty AC ignition system, AC versus DC input system, High tension ignition system, Igniter plugs , maintenance of igniter plugs, Trouble shooting of ignition system. □</p>	
	<p>□</p> <p>□ Continuum Mechanics and Thermodynamics</p> <p>Types of ignition systems, Extended duty low tension ignition system, High tension ignition system, spark igniters, Glow plug igniters, maintenance of spark plugs, Trouble shooting of ignition system–</p>	
<p>□ Reference books</p> <ol style="list-style-type: none"> 1) Aircraft Gas Turbine Power Plants by C.E. Otis & Peter A. Vosbury □ 2) Aircraft Gas Turbine Engine Technology by Irwin E. Treager □ 		

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Course Code	Aviation Maintenance Technician Certificate	Credit
	Aviation Maintenance Technician Certificate	Credit Elective
Unit Need of ground handling tasks during the normal day to day operation of an aircraft & Necessary safety precautions. Different Terms used in Ground handling and Aviation Aircraft Weight and Balance-Centre of Gravity/Balance limits calculation, use of relevant documents ,Preparation of aircraft for weighing, Aircraft weighing,		Elective
Unit 1) Ground support and safety equipment 2) Aircraft taxiing / Towing and associated safety precautions, 3) Various marshalling & Taxing Signals. 4) Aircraft parking procedure 5) Identifying different Aircraft fuel & Refueling /defueling procedures, 6) Aircraft jacking, securing and associated safety precautions, 7) Aircraft Handling & storage methods, 8) Servicing of Aircraft oxygen system 9) What is Hot Start, Hung Start, Fail or no start? 10) Engine starting precautions (jet & piston Engines)		Elective
Unit Operation and Maintenance of different Ground Equipment 1) Aircraft Tow bars 2) Aircraft jacks 3) Air starter unit 4) Ground Hydraulic power unit 5) Electrical Ground power unit 6) Hanger Facility		Elective
Reference Book 1) Aviation Maint Technician Hand Book- General -9A --- FAA 2) A & P Technician Air Frame Text Book ---- Jeppesen 3) Civil Aircraft Inspection Procedure (CAP 459)---(CAIP II)		

Course Code	Aviation Maintenance	Credit
	Aviation Maintenance	Credit
<p> <input type="checkbox"/> </p> <p> Practicals:-- Students will have to perform minimum 15 practicals from following list of Practical's: {From Unit I minimum 6 Practical's & from Unit II minimum 6 Practical's} </p> <p> Practicals </p> <ol style="list-style-type: none"> 1. Starter generator removal/installation. 2. Removal and installation of static discharger wick 3. Battery removal and installation on aircraft. 4. Removal and installation of voltage regulator 5. Removal, inspection and installation of anti-collision lights. 6. Removal and installation of navigation light and strobe light 7. Removal and installation and functional check of landing light 8. Checking of electrolyte level and specific gravity of lead acid battery serviceability check of battery. 9. Insertion and extraction of wire in and out the Aircraft connector. 		
<p> <input type="checkbox"/> </p> <p> Practicals </p> <ol style="list-style-type: none"> 1. To analyze Pitot static system related snag and rectification Leak test 2. To analyze Capacitance type Fuel quantity system related snag and its rectification 3. To find stall warning system related snag and its rectification 4. To analyze the EGT System snags and how to rectify it 5. To analyze the N1 & N2 rpm related system snags and how to rectify it 6. To analyze the snag related to fuel flow system related and its rectification 7. To analyze the EPR related system snags and its rectification 8. To analyze the engine oil system related snags and how to rectify it 9. To analyze the auto pilot system related snags and its rectification. 		

- Work effectively as an individual or as a team member to produce correct, efficient, well-organized and documented programs in a reasonable time.
- Top of the ability to communicate effectively.

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The majority of the students are expected to work on a real-life project preferably in some industry/ Research and Development Laboratories/Educational Institution/Airline Company. Students are encouraged to work in the areas of undergraduate program. However, it is *not mandatory* for a student to work on a real-life project. The student can formulate a project problem with the help of her/his Guide and submit the project proposal of the same. □□□ro□□□□□**o****the****□□ro****□ect**□
 □ro□□□□□□□□□□ **□d** **□tor** □ If approved, the student can commence working on it, and complete it.

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- Title Page
- Copy of the Approved Performa of the Project Proposal
- Certificate of Authenticated work
- Abstract
- Acknowledgement
- Table of Contents
- Table of Figures

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- 1.1 Background
- 1.2 Rational / Objectives
- 1.3 Purpose, Scope, and Applicability
- 1.4 Achievements
- 1.5 Organisation of Report

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- Chapter 3. Machine framework or architecture
- Chapter 4. Airframe / Engine Design
- CHAPTER 5: Final design , IMPLEMENTATION AND TESTING
- CHAPTER 6: RESULTS AND DISCUSSION
- 6.1 Test Reports
- 6.2 User Documentation

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- 7.1 Conclusion
- 7.1.1 Significance of the System

Under the fee paid licence of Mr. Mr. e. he. ide. o. d. title case. e. i. tio. o. d. title case.

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This is to certify that the project entitled, "title. o. he. ro. ect", is bonafied work of M. bearing Seat. No: (M) Semester VI AY 2022-2023 submitted in partial fulfillment of the requirements for the award of degree of BACHELOR OF SCIENCE in AERONAUTICS-MECHANICAL from University of Mumbai. (12, times new roman, justified)

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I here by declare that the project entitled, “**it e o the ro ect**” done at (**ce** **here the ro ect i do e**), has not been in any case duplicated to submit to any other university for the award of any degree. To the best of my knowledge other than me, no one has submitted to any other university.

The project is done in partial fulfillment of the requirements for the award of degree of **C C ero tic ech ic** to be submitted as final semester VI project as part of curriculum.

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e ere ce o d

Content (12, LEFT)

[1] Title of the book, Author

[2] Full URL of online references

[3] -----

