



B.Sc. AVIATION

CHOICE BASED CREDIT SYSTEM –

LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS - LOCF)

(Applicable to the candidates admitted from the academic year 2023-24 onwards)

Eligibility: Maths & Physics +2 (Regular Stream)

Sem.	Part	Course	Title	Ins. Hrs.	Credit	Exam Hours	Marks		Total	
							Int.	Ext.		
I	I	Language Course – I (Tamil \$ / Other Languages + #)	Language I	6	3	3	25	75	100	
	II	English Course – I	English - I	6	3	3	25	75	100	
	III	Core Course – I (CC)		Familiarization of Aircraft	5	5	3	25	75	100
		Core Practical – I (CP)		Familiarization of Airport	4	4	3	40	60	100
		First Allied Course – I (AC)		Introduction to Physics	4	4	3	25	75	100
	First Allied Practical (AP)		Physics (Lab)	3	-	-	-	-	-	
	IV	Value Education		Value Education	2	2	3	25	75	100
TOTAL				30	21	-	-	-	600	
II	I	Language Course – II (Tamil \$ / Other Languages + #)		6	3	3	25	75	100	
	II	English Course – II		6	3	3	25	75	100	
	III	Core Course – II (CC)		Theory of Flight (Aerodynamics)	5	5	3	25	75	100
		Core Practical – II (CP)		Radio Telephony and Communications	4	4	3	40	60	100
		First Allied Practical (AP)		Physics (LAB)	3	2	3	40	60	100
	First Allied Course – II (AC)		Basic Electricity and Aircraft Electrical System (Avionics)	4	4	3	25	75	100	
	Add on Course – I ##		Professional English – I	6*	4	3	25	75	100	
IV	Environmental Studies			2	2	3	25	75	100	
VI	Naan Mudhalvan Scheme (NMS) @@		Language Proficiency for Employability	2	2	3	25	75	100	
TOTAL				30	29	-	-	-	900	

III	I	Language Course – III (Tamil \$ / Other Languages + #)		6	3	3	25	75	100	
	II	English Course – III		6	3	3	25	75	100	
	III	Core Course – III (CC)	Piston Engines and Propellers		5	5	3	25	75	100
		Core Practical – III (CP)	ATC Communication and its Units		4	4	3	40	60	100
		Second Allied Course – I (AC)	Aviation Calculation and Numerical		4	4	3	25	75	100
		Second Allied Practical (AP)	Air Navigation		3	-	-	-	-	-
		Add on Course – II ##	Professional English – II		6*	4	3	25	75	100
	IV	Non-Major Elective – I @ Those who choose Tamil in Part I can choose a non-major elective course offered by other departments. Those who do not choose Tamil in Part I must choose either a) Basic Tamil if Tamil language was not studied in school level or b) Special Tamil if Tamil language was studied up to 10 th & 12 th std.	Introduction to Airlines		2	2	3	25	75	100
	VI	Naan Mudhalvan Scheme (NMS) @@			-	2	3	25	75	100
	TOTAL				30	27	-	-	-	800
IV	I	Language Course –IV (Tamil \$ / Other Languages + #)		6	3	3	25	75	100	
	II	English Course – IV		6	3	3	25	75	100	
	III	Core Course – IV (CC)	Meteorology		5	5	3	25	75	100
		Core Practical – IV (CP)	Hangar Workshop – I		4	4	3	40	60	100
		Second Allied Practical (AP)	Air Navigation		3	2	3	40	60	100
		Second Allied Course – II (AC)	Principles of Management		4	4	3	25	75	100
		Internship	Industrial Training Programme / Internship			2				100
	IV	Non-Major Elective II @ - Those who choose Tamil in Part I can choose a non-major elective course offered by other departments. Those who do not choose Tamil in Part I must choose either a) Basic Tamil if Tamil language was not studied in school level or b) Special Tamil if Tamil language was studied up to 10 th & 12 th std.	Radio Telephony		2	2	3	25	75	100
	VI	Naan Mudhalvan Scheme (NMS) @@			-	2	3	25	75	100
	TOTAL				30	27	-	-	-	900

V	III	Core Course –V (CC)	Aircraft Systems	5	5	3	25	75	100
		Core Course – VI(CC)	Flight Performance and Planning	5	5	3	25	75	100
		Core Course – VII(CC)	Air Regulation	5	5	3	25	75	100
		Core Practical –V (CP)	Hangar Workshop - II	4	4	3	40	60	100
		Major Based Elective – I (Any one)	Aviation Security	5	4	3	25	75	100
	Aero Engines								
	IV	Skill Based Elective I	Ticketing and Visa	4	2	3	25	75	100
		Soft Skills Development		2	2	3	25	75	100
	VI	Naan Mudhalvan Scheme (NMS) @@		-	2	3	25	75	100
TOTAL				30	29	-	-	-	800
VI	III	Core Course – VIII (CC)	Aircraft Instruments	6	5	3	25	75	100
		Core Course – IX (CC)	Radio Aids	6	5	3	25	75	100
		Core Practical – VI(CP)	Flight Synthetic	4	4	3	40	60	100
		Major Based Elective – II (Any one)	Civil Aviation Requirements (CAR) and Management Systems	5	4	3	25	75	100
			Dangerous Goods Management						
	Project	Core Project	4	3	-	20	80	100	
	IV	Skill Based Elective – II	Airport Ground Handling	4	2	3	25	75	100
	V	Extension Activities **		-	1	-	-	-	-
		Gender Studies		1	1	3	25	75	100
	VI	Naan Mudhalvan Scheme (NMS) @@		-	-	-	-	-	-
TOTAL				30	25	-	-	-	700
GRAND TOTAL				180	158	-	-	-	4700

\$ For those who studied Tamil up to 10th +2 (Regular Stream).

+ Syllabus for other Languages should be on par with Tamil at degree level.

Those who studied Tamil up to 10th +2 but opt for other languages in degree level under Part- I should study special Tamil in Part – IV.

The Professional English – Four Streams Course is offered in the 2nd and 3rd Semester (only for 2022-2023 Batch) in all UG Courses. It will be taught apart from the Existing hours of teaching / additional hours of teaching (1 hour /day) as a 4 credit paper as an add on course on par with Major Paper and completion of the paper is must to continue his / her studies further. (As per G.O. No. 76, Higher Education (K2) Department dated: 18.07.2020).

* The Extra 6 hrs / cycle as per the G.O. 76/2020 will be utilized for the Add on Professional English Course.

@ NCC Course is one of the Choices in Non-Major Elective Course. Only the NCC cadets are eligible to choose this course. However, NCC Course is not a Compulsory Course for the NCC Cadets.

** Extension Activities shall be outside instruction hours.

@@ Naan Mudhalvan Scheme.

SUMMARY OF CURRICULUM STRUCTURE OF UG PROGRAMMES

Sl. No.	Part	Types of the Courses	No. of Courses	No. of Credits	Marks
1.	I	Language Courses	4	12	400
2.	II	English Courses	4	12	400
3.	III	Core Courses	9	45	800
4.		Core Practical	6	24	700
5.		Allied Courses I & II	4	16	400
6.		Allied Practical	2	4	200
7.		Major Based Elective Courses	2	8	200
8.		Add on Courses	2	8	200
9.		Project	1	3	100
10.	IV	Non-Major Elective Courses (Practical)	2	4	200
11.		Skill Based Elective Courses	2	4	200
12.		Soft Skills Development	1	2	100
13.		Value Education	1	2	100
14.		Environmental Studies	1	2	100
15.	V	Gender Studies	1	1	100
16.		Extension Activities	1	1	--
17.	VI	Naan Mudhalvan Scheme	2	4	200
		Total	45	152	4400

PROGRAM OUTCOMES – B.Sc. - AVIATION

On Successful completion of the Program the under grandaunt of aviation will be able to,

KNOWLEDGE

- PO1** Exhibit knowledge on difference element used together for sale conduct of flight.
- PO2** Comprehend knowledge on working principles of aviation tools, instruments and equipment's.
- PO3** Exhibit advanced knowledge of functions and importance of various aviation department such as meteorology department and air traffic service department in streamlined flow of airline business

SKILLS

- PO4 Demonstrate** skill in handling & operating various aviation tools, instruments & equipment's.
- PO5** Exhibit intra and interpersonal skills including wide knowledge of Indian and international air law.
- PO6** Demonstrates soft communication skill that uplifts passenger handling.

ATTITUDES

PO7 Demonstrate importance teamwork decision making and crew coordination.

ETHICAL AND SOCIAL VALUES

PO8 Practice airmanship and work together for the safety and well-being of coworker, uphold ethical and social values in personal and in work environment

PO9 Practice and exhibit time management and quick decision making thereby reducing unwanted delays as a byproduct reducing carbon emission and helping to make a green environment

PROGRAM SPECIFIC OUTCOMES Knowledge & Skills:

PSO1 Advanced knowledge about the various equipment's and instruments used in and around airport.

PSO2 Interpret aviation phraseology markings, difference lightings signage used in airport and decode meteorological reports and importance coded aviation information's.

PSO3 Evaluate plan construct a flight plan, gather all necessary information and convey it to the concerned person for successful conduct of flight from departure to destination.

PSO4 Get a clear knowledge to choose their field of interest in aviation sector.

First Year

**CORE COURSE I
FAMILIARIZATION OF AIRCRAFT
(Theory)**

Semester I

Code:

Credit: 5

COURSE OUTCOMES:

On completion of this course, the students will be able to:

Sl. No.	Course Outcomes	Level	Unit Covered
1	Understanding basic fluid mechanisms	K2	I
2	To understand the basic components of aircraft airframe	K2	II
3	To be familiar with aircraft controls	K4	III
4	To know the various purposes of landing gear	K2	III
5	Able to understand the basic working principles of aircraft engines. (piston)	K1	IV
6	Able to understand the basic working principles of aircraft engines. (piston)	K1	V

COURSE OBJECTIVE:

To know the various system and their utilization / involvement in an aircraft.

UNIT – I UNDERSTANDING OF BASIC MECHANICS, THERMODYNAMICS AND FLUID MECHANICS:

Speed, Velocity, Newton's laws of motion, Friction, Centre of Mass, Centre of Gravity, Torque, Work, Energy, Power, Pressure, Stress, Elasticity of Material, Principle of the Gyroscope; Laws of Thermodynamics, Heat Transfer, Specific Heat, Calorific values of fuels; Viscosity, Fluid Resistance, Specific Gravity, Absolute and relative humidity, Pascal's law & its application in Hydraulic press, Hydraulic and Pneumatic system, Bernoulli's Theorem, Venturi's tube theory, Streamline, Laminar and turbulent flow.

UNIT – II AIRFRAME & SYSTEMS:

Types of Fuselages, Load transfer technique, Various Wing Structures- Rectangular, Elliptical, Swept back, Swept forward, Anhedral, Dihedral; Definition of Control Surfaces, Primary control surface, Secondary control Surface, Working Of Aileron, Elevator, Rudder, Flaperons; Airframe, fuel system, Cooling System

UNIT – III LANDING GEAR, WHEEL BRAKES:

Purpose of landing gear, Types of Landing Gear- Retractable and Non-Retractable landing gear, Tri cycle type, Tail Dragger Landing Gear, Main Landing Gears and different types of Shock Strut- Rigid struts, Spring Steel Struts, Bungee cords, Shock struts, oleo struts; Brake System.

UNIT – IV AIRCRAFT ENGINE (PISTON):

Basic understanding of Piston engine components: Crankcase, Crankshaft, Camshaft, Bearings, Connecting Rod, Piston, Piston Rings, Four-Stroke engine cycle, carburetor, Engine Handling, normally aspirated, Turbo charging, Supercharging.

UNIT – V AIRCRAFT ENGINE (JET):

Basic understanding of Jet engines, Propeller, Parts of Propeller, Difference between jet engine and piston engine, Types of Compressors: Axial, Centrifugal, Fuel injection, Types of Combustion Chambers, gas turbine engine.

TOPICS FOR SELF STUDY:

Sl. No	Topics	Web Links
1	Basic Mechanics, Thermodynamics and Fluid Mechanics	https://iubtgedu.org.com
2	Airframe & systems	https://www.aircraftsystemstech.com
3	Aircraft Engine	https://www.sciencedirect.com

REFERENCE BOOKS:

1. Oxford – Aircraft General Knowledge 1(Airframe and systems)
2. Oxford – Aircraft General Knowledge 3(power plant)
3. Aero plane Technical by Trevor Thom

SPECIFIC LEARNING OUTCOMES (SLO):

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
I	Understanding of Basic Mechanics, Thermodynamics and Fluid Mechanics		
1.1	Speed, Velocity	What is Speed, Velocity	K1
1.2	Newton's laws of motion	Explain Newton's laws of motion	K3
1.3	Centre of Mass Centre of Gravity	Comparisons of Centre of Mass Centre of Gravity	K2
1.4	Torque, Work, Energy, Power, Pressure, Stress, Elasticity of Material	Define	K1
1.5	Principle of the Gyroscope	Explain the working	K3
1.6	Laws of Thermodynamics	Define	K3
1.7	Heat Transfer, Specific Heat	What	K1
1.8	values of fuels; Viscosity, Fluid Resistance, Specific	What	K2

	Gravity		
1.9	Pascal's law & its application	Hydraulic press, Hydraulic and Pneumatic system	K3
1.10	Bernoulli's Theorem	Explain	K3
1.11	Venturi's tube theory	Define	K2
1.12	Laminar and turbulent flow. Streamline	Compare	K2
II	Airframe & systems		
2.1	Types of Fuselages	Load transfer technique in Fuselages	K1
2.2	Various Wing Structures	Rectangular, Elliptical, Swept back, Swept forward, Anhedral, Dihedral	K2
2.3	Control Surfaces	Primary control surface, Secondary control Surface	K1
2.4	Aileron, Elevator, Rudder	Working Of Aileron, Elevator, Rudder	K2
2.5	fuel system	What is Fuel system	K1
2.6	Cooling System	Define Cooling System	K1
III	Landing Gear, Wheel brakes		
3.1.0	Types of Landing Gear	Retractable and Non-Retractable landing gear	K2
3.1.1	landing gear	Purpose of landing gear	K1
3.1.2	Types of Landing Gear	Tri cycle type	K2
3.1.3	Types of Landing Gear	Tail Dragger Landing Gear, Main Landing Gears	K4
3.1.4	Shock Strut	Define Shock Strut	K1
3.1.5	types of Shock Strut	Rigid struts, Spring Steel Struts	K2
3.1.6	Brake System	Define Brake System	K1
IV	Aircraft Engine (Piston)		
4.1.0	Basic Piston engine components:	Crankcase, Crankshaft, Camshaft, Bearings, Connecting Rod, Piston, Piston Rings	K2
4.1.1	Four-Stroke engine	Explain Four-Stroke engine	K4
4.1.2	Engine components	Define engine Handling	K4
	charging	Compare Turbo charging, Supercharging	K1
V	Aircraft Engine (Jet)		
5.1.0	Basic Jet engines	Propeller, Parts of Propeller	K2
5.1.1	Comparisons of Jet engines, piston engine	Difference between Jet engines, piston engine	K2
5.1.2	Types of Compressors	Compare Axial, Centrifugal	K2
5.1.3	Fuel injection	Define Fuel injection	K1
5.1.4	Types of Combustion Chambers	Types of Combustion Chambers	K2
5.1.5	Gas turbine engine	What is gas turbine engine	K1

First Year

**CORE PRACTICAL I
FAMILIARIZATION OF AIRPORT
(Practical)**

Semester I

Code:

Credit: 4

COURSE OBJECTIVE:

To acquire basic understanding of the layout at airport its building facilities installation and their functioning.

BUILDINGS & INSTALLATIONS:

- Basic definitions and understanding of Terminals, Security, Apron, Hangar, Taxiway, Runway, Fire Station, Airport Vehicles, Fuel depot. Regulations related to each of airport services.
- Purpose hanger, apron, aircraft stand, taxiway and runway.

MARKINGS& LIGHTINGS:

- Difference between markings, Lightings and Signboards
- Apron markings- aerobridge movement area markings, stand lead in line, Apron edge marking
- Aircraft stand identification marking, Taxiway centerline and edge marking & lighting, Runway centerline and edge line marking & lighting
- Threshold, aiming point, touch down zone marking & lighting Declared distances, PCN, Lighting system, Aerodrome Beacon, Obstacle Lighting & Marking. Location, Direction & Destination signboard.

FACILITIES&EQUIPMENT'S:

- Basic understanding of Navigational facilities.
- Basic radio principle, frequency used and introduction about various navigational equipment's VOR, NDB/ADF, DME;
- Basic radar principle, Primary and secondary radar, Surveillance equipment's: Primary Radar, SSR, Surface Movement Radar, ADS; GPS, VHF antennae, ILS

AIR TRAFFIC CONTROL:

- Different Air Traffic Control Units, Concept of Flight Information Region, Role of Flight Information Centre,
- Five different Flight information region in India, Roles and responsibilities of Various air traffic control units- Ground control, Tower, Approach, Area control,
- Flight Plan briefing and filling, Flight Dispatch, ATC briefing

FOR SELF STUDY

Sl. No	Topics	Web Links
1	Airport Marking Aids and Signs	https://www.faa.gov/air_traffic/publications/atpubs/aim_html/chap2_section_3.html
2	Air traffic control position	https://mediawiki.ivao.aero/index.php?title=Air_traffic_control_position
3	Important Aviation organization	https://www.civilaviation.gov.in/en/aboutus/orgsetup

REFERENCE BOOKS:

1. ICAO Annex 14 Volume 1 Aerodrome Design and Operations
2. Civil Aviation Requirements Section-4, Aerodrome Standards & Air Traffic Services.
3. R.K. Bali Air Regulations.
4. Airport council international (Second Edition)

LEARNING OUTCOMES:

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
I	Buildings & Installations		
1.1	Basic definitions and understanding of Terminals, Apron, Hangar, Taxiway, Runway, Fire Station, Airport Vehicles, Fuel depot	Explain the definitions of Terminals, Security, Apron, Hangar, Taxiway, Runway, Fire Station, Airport Vehicles, Fuel depot	K2
1.2	Regulations related to each of airport services	Identify the relevant air regulations related to a particular airport service	K3
1.3	Purpose hanger, apron, aircraft stand, taxiway and runway	Analyse the work done in a particular area in an airport	K4
II	Markings & Lightings		
2.1.0	Difference between markings, Lightings and Signboards	Distinguish the purpose of marking, lighting and signage	K4
2.1.1	Apron markings- movement area markings, stand lead in line, Apron edge marking, Aircraft stand identification marking, Taxiway centreline and edge marking & lighting, Runway marking & lighting	Interpret apron, Taxiway, Runway marling and lightings	K2
2.1.2	Declared distances	Identify the different declared distances	K3
2.1.3	PCN	Solve PCN calculations	K3
2.1.4	Lighting system, Aerodrome Beacon, Obstacle Lighting & Marking.	Distinguish different lights used in and around airport	K4
2.1.5	Location, Direction & Destination signboard.	Interpret the meaning of different sign board	K2
III	Facilities & Equipment's		
3.1.0	Basic understanding of Navigational facilities	Outline the purpose and uses of navigation facilities	K2
3.1.1	Basic radio principle	Explain the basic principle of radio aids	K2
3.1.2	Frequency used	Choose the appropriate Radio frequency	K5
3.1.3	introduction about various navigational equipment VOR, NDB/ADF, DME	Explain the functions of various Navigation Equipment's	K2
3.1.4	Basic radar principle	Summarize the basic Principle of	K2

		RADAR	
3.1.5	Primary and secondary radar	List out the principle, advantages and disadvantages of primary and secondary RADAR	K4
3.1.6	SSR, Surface Movement Radar, ADS; GPS, VHF antennae, ILS	Make use of different Navigation Instrument for safe and efficient conduct of flight	K3
IV	Air Traffic Control		
4.1.0	Different Air Traffic Control Units	Compare the different air traffic control unit	K4
4.1.1	Concept of FIR	List out the boundaries and functions of FIR	K4
4.1.2	Role of FIC	Identify a particular FIC to obtain Information service	K3
4.1.3	Five different Flight information region in India	Identify a particular region comes under which FIR	K3
4.1.4	Roles and responsibilities of Various air traffic control units- Ground control, Tower, Approach, Area control	List out the roles and responsibilities of various ATC control unit	K3
4.1.5	Flight Plan briefing and filling	Built a fully filled flight plan	K3
4.1.6	Flight Dispatch	Explain the functions of flight Dispatch	K2
4.1.7	ATC briefing	Interpret ATC briefing	K2
V	Important Organizations		
5.1.0	Roles and Responsibility of International Air Transport Association (IATA)	List out the Roles and Responsibilities of IATA	K4
5.1.1	International Civil Aviation Organization (ICAO)	Explain the various functions of ICAO	K2
5.1.2	DGCA	Categorize the roles and functions of DGCA	K4
5.1.3	AAI and its wings	Explain the functions of AAI and its Units	K2
5.1.4	Ministry of Civil Aviation	Outline the functions of civil Aviation ministry	K2
5.1.5	BCAS	Analyse how security is maintained in Aviation	K4
5.1.6	CISF	Summarize the function of CISF under the guidance of BCAS	K2
5.1.7	Important convention with these organization	List out the important convention made by the important organization	K4

COURSE OUTCOMES:

CO1	Apply concept of vectors to understand concepts of Physics and solve problems
CO2	Appreciate different forces present in nature while learning about phenomena related to these different forces.
CO3	Quantify energy in different process and relate momentum, velocity and energy
CO4	Differentiate different types of motions they would encounter in various courses and understand their basis
CO5	Relate various properties of matter with their behavior and connect them with different physical parameters involved.

UNIT – I MEASUREMENTS:

Vectors, scalars –examples for scalars and vectors from physical quantities – addition, subtraction of vectors – resolution and resultant of vectors – units and dimensions– standard physics constants

UNIT – II FORCE:

Different types of forces–gravitational, electrostatic, magnetic, electromagnetic, nuclear –mechanical forces like, centripetal, centrifugal, friction, tension, cohesive, adhesive forces

UNIT – III ENERGY:

Different forms of energy– conservation laws of momentum, energy – types of collisions –angular momentum– alternate energy sources–real life examples

UNIT – IV MOTION:

Types of motion– linear, projectile, circular, angular, simple harmonic motions – satellite motion – banking of a curved roads – stream line and turbulent motions – wave motion – comparison of light and sound waves – free, forced, damped oscillations

UNIT – V SURFACE TENSION:

Surface tension – shape of liquid drop – angle of contact – viscosity –lubricants – capillary flow – diffusion – real life examples– properties and types of materials in daily use- conductors, insulators – thermal and electric

TEXT BOOKS:

1. D.S. Mathur, 2010, Elements of Properties of Matter, S.Chand and Co

2. Brijlal and N. Subrahmanyam, 2003, Properties of Matter, S.Chand and Co.

REFERENCE BOOKS:

1. H.R. Gulati, 1977, Fundamental of General Properties of Matter, Fifth edition, S.Chand and Co.

WEB RESOURCES:

1. <http://hyperphysics.phy-astr.gsu.edu/hbase/permot2.html><https://science.nasa.gov/ems/>
2. https://eesc.columbia.edu/courses/ees/climate/lectures/radiation_hays/

COURSE OUTCOMES (CO)

After the completion of this course the student will be able to:

Sl. No.	Course Outcomes	Level	Unit Covered
1	Determine surface tension and interfacial tension by weight drop method	K5	3
2	Analyse the basic operations and the characteristics of Zener diode in various configuration	K6	6
3	Demonstrate and apply the concept of optical theory of lenses to find the focal Length, radius of curvature of long focus convex lens	K2	5
4	Determine the frequency of AC mains using Sonometer and find wavelength, period, amplitude using Meldes method	K5	4, 13
5	Estimate the moduli of elasticity, rigidity modulus for different materials using non uniform bending pin and microscope and torsion method.	K6	1, 14
6	Determine refractive index of given prism by spectrometer and measure g and K using compound pendulum.	K5	2, 8, 14

List of experiments

- Non-uniform bending – microscope method.
- Compound pendulum – g and K.
- Surface tension and interfacial tension – drop weight method.
- Sonometer-verification of laws.
- Long focus convex lens-f, R.
- Characteristics of junction diodes.
- Static torsion - determination of n.
- Spectrometer-refractive index of the prism.
- Digital Screw Gauge - Basic measurements
- Digital Vernier Callipers – Dimensions of materials
- Mega Ohm meter – Measurement of High Resistance
- Cantilever depression – scale and telescope.
- Meld's string Arrangement-Transverse and longitudinal mode

COURSE ASSESSMENT METHODS**Direct**

1. Continuous Assessment Test (Model Practical Exams).
2. Record, Assignment, Problem solving, Design new circuits and set up, Skill Assessment etc.,
3. End Semester Examination

Indirect

1. Course-end survey

First Year

CORE COURSE II
THEORY OF FLIGHT (AERODYNAMICS)
(Theory)

Semester II

Code:

Credit: 5

COURSE OUTCOMES:

On completion of this course, the students will be able to:

Sl. No.	Course Outcomes	Level	Unit Covered
1	Basic understanding of airflow around the airframe	K1	I
2	To understand the aircraft flight controls	K3	II
3	To learn about aircraft stability and its controllability	K3	III
4	To learn about aircraft ability and dynamics	K4	IV
5	To learn about aircraft stability and dynamics	K4	IV
6	To understand basic knowledge of subsonic flight and supersonic	K1	V

COURSE OBJECTIVE:

Under The Principles of Flying Application at Theory Is Subsonic and Transonic Operation

UNIT – I AERODYNAMICS:

Airflow around a body; Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, up wash and downwash, vortices, stagnation; stagnation aerodynamic chord, aerodynamic centre, centre of pressure, stagnation point, profile (parasite) drag, induced drag, 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.

UNIT – II 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, rudder, elevators; 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; Pressure measuring devices and systems

UNIT – III THEORY OF FLIGHT:

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.

UNIT – IV FLIGHT STABILITY AND DYNAMICS:

Definition of Stability, Different type of Stability- Static stability, Dynamic Stability, Positive, Neutral and Negative stability, Longitudinal, lateral, and directional stability, Explanation of Controllability, Relationship between stability and Controllability

UNIT – V HIGH SPEED FLIGHT:

Speed of sound, subsonic flight, transonic flight, supersonic flight, Mach number, critical Mach number, compressibility effect, buffet, shock wave, aerodynamic heating, Factors affecting airflow in engine intakes of high-speed aircraft; Effects of sweepback on critical Mach number.

TOPICS FOR SELF STUDY

Sl. No	Topics	Web Links
1	Aerodynamics & flight controls	https://en.wikipedia.org
2	Theory of flight	https://web.mit.edu
3	High speed flight	https://en.wikipedia.org

REFERENCE BOOKS:

1. Oxford – Principles of flight
2. The professional pilot study guide 01series by mike burton

SPECIFIC LEARNING OUTCOMES (SLO)

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
I	Aerodynamics		
1.1	Airflow around a body	Define Boundary layer, laminar and turbulent flow, free stream flow, relative airflow	K1
1.2	The terms	Define camber, chord mean aerodynamic chord, aerodynamic center	K4
1.3	Pressure	centre of pressure, stagnation point, profile (parasite) drags, induced drag, wash in and wash out	K2
1.4	Ratio	incenses ratio, wing shape and aspect ratio	K1

1.5	Aerodynamic Resultant	Thrust, Weight, Lift and Drag	K2
1.6	Lift and Drag	Lift coefficient, Drag coefficient, polar curve, stall Angle of Attack	K3
II	Aerodynamics and Flight Controls.		
2.1	Operation and effect	Roll control pitch control yaw control	K2
2.2	Flight Controls	Working principal of elevons, rudder, elevators	K2
2.3	Effects of wing fences	Explain effects of wing fences, saw tooth leading edges	K2
2.4	Operation and effect of trim tabs	Define trim tabs, balance and anti-balance spring tabs, mass balance	K1
2.5	Aerodynamic balance panels	Explain Pressure measuring devices and systems	K4
III	Theory of Flight		
3.1.0	lift, weight, thrust drag	Relationship between lift, weight, thrust and drag	K2
3.1.1	Glide ratio	Steady state flights, performance	K3
3.1.2	Theory of the turn	Explain Influence of load factor	K3
3.1.3	Influence of load factor	Stall, flight envelope and structural limitations;	K2
3.1.4	Lift.	What is Lift augmentation?	K1
IV	Flight Stability and Dynamics		
4.1.0	Stability	Definition of Stability	K1
4.1.1	Type of Stability	Static stability, Dynamic Stability	K2
4.1.2	Types of Stability	Positive, Neutral and Negative stability, Longitudinal, lateral, and directional stability	K2
4.1.3	Controllability	Explain of Controllability	K3
4.1.4	Stability and Controllability	Relationship between stability and Controllability	K2
V	High Speed Flight		
5.1.0	Speed of sound	Define Speed of sound	K3
5.1.1	Types of flight,	subsonic flight, transonic flight, supersonic flight	K2
5.1.2	Mach number	Define Mach number, critical Mach number	K1
5.1.3	compressibility effect	buffet, shock wave, aerodynamic heating	K1
5.1.4	Factors affecting	Factors affecting airflow in engine intakes of high-speed	K3
5.1.5	sweepback	Effects of sweepback on critical Mach number	K2

First Year

CORE PRACTICAL II
RADIO TELEPHONY AND COMMUNICATIONS
(Practical)

Semester II

Code:

Credit: 4

COURSE OUTCOMES:

On completion of this course, the students will be able to:

Sl. No	Course Outcomes	Level	Unit Covered
1	Explain the duties of different bodies in aviation and the rules made by them.	K2	I
2	Outlines the modes of radio propagation and its application.	K2	II
3	Interprets the appropriate phraseology as per the situations.	K5	III
4	Assess the pressure value and appropriate solves the Q – codes problems associated with Px difference	K5	IV
5	Analyze basic commercial between aircrafts ATC & Aircraft	K4	V
6	Gain the knowledge about ATC to aircraft cockpit radio communication.	K4	V

COURSE OBJECTIVE:

Understand Various Aviation Terminologies Standard Universal Communication Procedures Followed by Different Department of Aviation.

RADIO PROPAGATION:

- Relationship between wavelength, frequency and speed of light
- Frequency bands and ranges
- Ionosphere layers during day and night
- Mode of Propagation MF, HF and VHF & above
- Operation of Geostationary Satellites
- Operation of Polar orbiting Satellites
- Skip Distance
- Choice of Frequencies during Day & Night

PHRASEOLOGY

Phraseology used in Aeronautical Communication Services; Abbreviations used in Aeronautical Communication Services.

- Distress
- Distress Relay
- Direction Finding
- Flight Safety
- Metrological Information
- Flight regulatory

‘Q’ CODES:

- Q’ Codes used in Aeronautical Communication Services,

- Basic Understanding of atmospheric pressure, QNH, QFE, QFF, QNE, Understanding difference between Height, Elevation, Altitude and Flight Level, QDR, QDM, QUJ, QTE,
- Relative bearing, Radial, Magnetic Heading, Compass Heading, True Heading, Variation & Deviation

COMMUNICATION:

- Introduction to radio call format, Radio strength check call, Start-up clearance and pushback clearance call, Taxi clearance call, ATC clearance call.

TOPICS FOR SELF STUDY:

Sl. No	Topics	Web Links
1	Regulations ICAO, AAI, WPC ICAO	https://www.aai.aero
2	Phraseology	https://www.phraseexpress.com
3	'Q' Codes, Communication	https://en.wikipedia.org

REFERENCE BOOKS:

1. Radio telephony, K.D. Tuli
2. Radio telephony manual by R.K. Bali
3. Air Regulation by R.K Bali

SPECIFIC LEARNING OUTCOMES (SLO):

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
I	Regulations		
1.1	Duties of ITU	Analysis's duties of ITU	K4
1.2	ICAO	Develops and understanding of their rules & regulation	K3
1.3	AAI	Develops and understanding of their rules & regulation	K3
1.4	WPC	Develops and understanding of their rules & regulation	K3
1.5	ICAO annexure	Classifies contents of difference annexure	K2
1.6	Spelling of alphabets & transmission of numerical	Demonstrates the pronunciation of alphabet & numerical	K2
1.7	Aircraft indent	Interprets basic indent	K2
1.8	Location indicators	Interprets basic indent	K2
1.9	FIR	Analyses difference FIR & ground services	K4
1.10	Identification of ground services	Analyses difference FIR & ground services	K4
II	Radio Propagation		
2.1	Wavelength, frequency and speed of light	Analyses the relationship between wavelength, frequency, & speed of light	K4
2.2	Frequency bands and ranges	Compares the bonds & ranges	K2

2.3	Ionosphere layers	Explains the ionosphere layer during day & night	K2
2.4	Mode of Propagation	Compares MF, HF, VHF & above	K4
2.5	Operation of Geostationary Satellites	Analyses the OPS of geostationary	K4
2.6	Polar orbiting Satellites	Analyses the OPS of polar	K4
2.7	Skip Distance	Explain about skip distance	K2
2.8	Frequencies during Day & Night	Summarizes about the frequency used at night	K2
III	Phraseology		
3.1.0	Phraseology abbreviations	Choose appropriate phrases	K3
3.1.1	Aeronautical Communication Services.	Outlines the type of call to be given during emergency	K2
3.1.2	Distress Relay	Explains about type of commercial during RCF unable for each ATC	K2
3.1.3	Direction Finding	Identifies the methods of direction finding from station	K2
3.1.4	Flight Safety	Examines the safety on board	K4
3.1.5	Metrological Information	Analyses met condition	K4
3.1.6	Flight regulatory	Develops basic regulation & rules of fit	K3
IV	'Q' Codes		
4.1.0	Q- Codes	Illustrates the difference types of Q codes	K2
4.1.1	atmospheric pressure	Understanding of atmospheric pressure	K2
4.1.2	Height, Elevation, Flight Level, Altitude	Classifies the difference between Altitude Elevation, Height, Flight Level	K4
4.1.3	QDR, QDM, QUJ, QTE	Classifies the variation of QDR, QDM, QUJ, QTE	K4
4.1.4	Relative bearing, Radial, Magnetic Heading, Compass Heading, True Heading, Variation & Deviation	What the Relative bearing, Radial, Magnetic Heading, Compass Heading, True Heading, Variation & Deviation	K3
V	Communication		
5.1.0	Intro to radio call format	Explains basic RT	K2
5.1.1	Radio strength check	Demonstrates how to check quality of call	K3
5.1.2	S/UP clearance	Outlines the type of call for S/U & pushback based on aircraft cat	K2
5.1.3	P/B clearance	Outlines the type of call for S/U & pushback based on aircraft cat	K2
5.1.4	Taxi clearance	Explains RT call	K2
5.1.5	ATC clearance	Explains RT call	K2

COURSE OUTCOMES:

On completion of this course, the students will be able to:

Sl. No	Course Outcomes	Level	Unit Covered
1	To understand structure and distribution of electrical charges within atoms molecules ions compounds	K3	I
2	To understand about the behavior of charge in various states of matter i.e., solid liquid gas and vacuum	K2	II
3	To learn about the following terms their units and factors affecting them potential difference electromotive force conventional current flow electron flow	K4	III
4	To learn about the laws used for studying static charges	K3	IV
5	To learn about various laws and its application ohms law Kirchhoff's voltage and current laws	K3	V
6	Calculation using the above laws to find resistance voltage and current	K5	V

COURSE OBJECTIVE:

To understand the theory concepts and working of ac and dc circuit.

UNIT – I STATIC ELECTRICITY AND CONDUCTION:

Distribution of electrostatic charges; Unit of charge; Polarity of a charge; Electric Field of Static Charge; Electrostatic laws of attraction and repulsion- Coulomb's Law; Electrostatic induction; Conduction of electricity through Solid, liquid and gas.

UNIT – II ELECTRICAL TERMINOLOGIES:

The following terms, their units and factors affecting them: potential difference, electromotive force, voltage, current, resistance, conductance, charge, Power, Work, conventional current flow, electron flow, Sources of Electricity, Meters used for measurement; Direct Current and Alternating Current.

UNIT – III RESISTANCE/RESISTOR:

Ohm's law, Resistors in series and parallel; Calculation of total resistance using series, parallel and series parallel combinations; Conductance in series and

parallel; Open and short circuits; Operation of Wheatstone Bridge. Fixed resistors, Variable resistors, stability, tolerance and limitations, methods of construction; Construction and operation of potentiometers and rheostats.

UNIT – IV DC CIRCUITS AND CIRCUIT PROTECTION:

Electric circuit terminologies; Kirchhoff’s Voltage and Current Laws; Calculations using the above laws to find resistance, voltage and currents; Significance of the internal resistance of a supply; Electrical faults; Circuit protection devices.

UNIT – V AC THEORIES AND AIRCRAFT ELECTRICAL SYSTEM:

Capacitance; Inductance; Electromagnetic induction; 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, Single/3 phase principles.

TOPICS FOR SELF STUDY:

S. No	Topics	Web Links
1	Static Electricity and Conduction	https://stickmanphysics.com
2	Resistance/Resistor DC Circuits and Circuit Protection	https://ecstudiosystems.com
3	AC Theories and Aircraft Electrical System	https://aerotoobox.com › electrical

REFERENCE BOOKS:

1. Basic Electronics- BernadGrob
2. Electrical systems- BL Thereja
3. Oxford ATPL ground training series- Electrics

SPECIFIC LEARNING OUTCOMES (SLO):

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
I	Static Electricity and Conduction		
1.1	Electrostatic charges	Distribution of electrostatic charges	K3
1.2	Unit of charge	Define Polarity of a charge	K2
1.3	Electric Field	Define Electric Field of electronic charger	K3
1.4	Electrostatic laws	Electrostatic laws of attraction and repulsion	K3
1.5	Coulomb’s Law	Explain Coulomb’s Law	K3
1.6	Conduction of electricity	What Conduction of electricity through Solid	K1

II		Electrical Terminologies	
2.1	Terms, their units	potential difference, electromotive force, voltage, current, resistance, conductance, charge, Power, Work,	K2
2.2	Factors affecting	conventional current flow	K1
2.3	Sources of Electricity	Define Sources of Electricity	K2
2.4	Types of Current	Direct Current and Alternating Current.	K3
III		Resistance/Resistor	
3.1.0	Ohm's law	Define Ohm's law	K3
3.1.1	Resistors in series and parallel	Explain Resistors in series and parallel	K1
3.1.2	Resistance	Calculation of total resistance using series, parallel	K4
3.1.3	Conductance	Conductance in series and parallel	K2
3.1.4	Open and short circuits	Define Open and short circuits	K1
3.1.5	Operation of wheat shone bridge	Explain wheat shone bridge	K3
3.1.6	Types of rheostats.	Variable resistors, stability, tolerance and limitations	K2
3.1.7	Potentiometers and rheostats.	Construction and operation of potentiometers and rheostats.	K3
IV		DC Circuits and Circuit Protectionk3	
4.1.0	Electric circuit terminologies	Kirchhoff's Voltage and Current Laws	K3
4.1.1	Kirchhoff's Voltage and Current Laws	Calculations using the laws to find resistance and voltage	K4
4.1.2	internal resistance	Significance of the internal resistance of a supply	K1
	Circuit protection	Circuit protection; Electrical faults	K1
V		AC Theories and Aircraft Electrical System	
5.1.0	Capacitance; Inductance; Electromagnetic induction	Define Capacitance; Inductance; Electromagnetic induction	K1
5.1.1	Sinusoidal waveform	Define Sinusoidal waveform: phase, period, frequency, cycle	K1
5.1.2	Instantaneous, average, root mean square	Explain Instantaneous, average, root mean square	K2
5.1.3	peak, peak to peak current values and calculations	Explain peak, peak to peak current values and calculations	K2

Second Year

**CORE COURSE III
PISTON ENGINES AND PROPELLERS
(Theory)**

Semester III

Code:

Credit: 5

COURSE OUTCOMES:

On completion of this course, the students will be able to:

Sl. No	Course Outcomes	Level	Unit Covered
1	DETAIL about the fundamentals and working principle at piston engines	K4	I
2	Explain the working principle of 2 stroke 4 stroke otto and easel engine	K3	I
3	Define engine construction and performance	K3	II
4	Study the carburetor and lubrication	K2	III
5	Explain about chargers	K4	IV
6	Explain briefly about propeller	K3	V

COURSE OBJECTIVE:

Understand basic working of piston engines and propellers effects on performance

UNIT – I PISTON ENGINE:

Fundamentals, Mechanical, thermal and Volumetric efficiencies operating principles -2 stroke, 4 stroke, Otto and Diesel, Piston displacement and Compression ratio, Engine configuration and firing order

UNIT – II ENGINE CONSTRUCTION AND PERFORMANCE:

Crank case, Crank shaft, Cam shafts, Sumps, Cylinder and piston assemblies, connecting rods, inlet and exhaust manifolds, valve mechanism, power calculation measurement, factors affecting engine power, mixture rich-lean, pre-ignition.

UNIT – III CARBURETOR AND LUBRICATIONS:

Working principle simple Carburettor, Advantages and Disadvantages of Carburettor, Introduction to Fuel injector, Wet sump and dry lubrication, properties of Lubrication Liquid

UNIT – IV SUPERCHARGING AND TURBO CHARGING:

Principle and Purpose of Super Charging and its Effect on Engine Parameters, Construction and Operation of Super charging/ Turbo charging Systems Terminology,

UNIT – V PROPELLER:

Fundamentals, 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, Blade phase, Blade shank, Blade back and Hub assembly, fixed pitch, Control pitch, Constant speeding Propeller, Propeller Pitch Control, Propeller ice Protection.

TOPICS FOR SELF STUDY:

Sl. No	Topics	Web Links
1	Piston Engine	https://en.wikipedia.org/wiki/Piston
2	Carburettor and Lubrications	https://en.wikipedia.org/wiki/Carburetor
3	Propeller	https://en.wikipedia.org/wiki/Propeller

REFERENCE BOOKS:

1. Oxford – General knowledge 3 (power plant)
2. Airframe and power plant mechanics – power plant hand FAA

SPECIFIC LEARNING OUTCOMES (SLO):

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
I	PISTON ENGINE		
1.1	Fundamentals, Mechanical, thermal and Volumetric efficiencies	Explain About 2 stroke	K3
1.2	Fundamentals, Mechanical, thermal and Volumetric efficiencies	Explain About 4 stroke,	K3
1.3	Fundamentals, Mechanical, thermal and Volumetric efficiencies	Explain About Otto and Diesel	K3
1.4	Piston displacement and Compression ratio	Define Piston displacement and Compression ratio	K2
1.5	Engine configuration and firing order	What is Engine configuration and firing order	K2
II	ENGINE CONSTRUCTION AND PERFORMANCE		
2.1	Crank case	What is Crank case	K2
2.2	Crank shaft	What is Crank shaft	K2
2.3	Cam shafts	What is Cam shafts	K2
2.4	Sumps, Cylinder and piston assemblies	Define Sumps, Cylinder and piston assemblies	K2
2.5	Connecting rods,	Define connecting rods	K2
2.6	Inlet and exhaust manifolds	Define inlet and exhaust manifolds	K2
2.7	Valve mechanism	Explain valve mechanism	K3

2.8	Power calculation measurement	Explain power calculation measurement	K4
2.9	Factors affecting engine power	Explain factors affecting engine power	K3
2.10	Mixture rich-lean, pre-ignition.	Define mixture rich-lean, pre-ignition.	K2
III	CARBURETOR AND LUBRICATIONS		
3.1.0	Carburettor	Working principle simple Carburettor	K3
3.1.1	Carburettor	Advantages and Disadvantages of Carburettor	K2
3.1.2	Introduction to Fuel injector	Introduction to Fuel injector	K1
3.1.3	Wet sump and dry lubrication	Explain Wet sump and dry lubrication	K3
3.1.4	Lubrication Liquid	Properties of Lubrication Liquid	K2
IV	SUPERCHARGING AND TURBO CHARGING		
4.1.0	Super Charging	What is Principle and Purpose of Super Charging	K3
4.1.1	Super Charging	Explain its Effect on Engine Parameters, Construction and Operation	K3
4.1.2	Turbo charging	What is Principle and Purpose of Turbo Charging	K3
4.1.3	Turbo charging	Explain its Effect on Engine Parameters, Construction and Operation, Terminology	K3
V	PROPELLER		
5.1.0	Propeller	Fundamentals of Propeller	K3
5.1.1	Propeller angle	Define high-low blade angle	K1
5.1.2	Angle of attack	Explain Angle of attack	K3
5.1.3	Rotational speed	Define Rotational speed	K1
5.1.4	Propeller slip	What is Propeller slip	K1
5.1.5	Aerodynamic	Define Aerodynamic	K3
5.1.6	Centrifugal and Thrust Forces	What is Centrifugal and Thrust Forces	K3
5.1.7	Torque	What is Torque	K1
5.1.8	Relative airflow on Blade angle of attack	Relative airflow on Blade angle of attack	K2
5.1.9	Blade phase, Blade shank, Blade back and Hub assembly	Define Blade phase, Blade shank, Blade back and Hub assembly	K2
5.1.10	fixed pitch, Control pitch	Explain fixed pitch, Control pitch	K3
5.1.11	Constant speeding Propeller,	What Constant speeding Propeller	K2
5.1.12	Propeller Pitch Control	What is Propeller Pitch Control	K1
5.1.13	Propeller ice Protection	Define Propeller ice Protection	K1

COURSE OUTCOMES:

On completion of this course, the students will be able to:

Sl. No	Course Outcomes	Level	Unit Covered
1	Study of regulation	K4	I
2	Outline of radio propagation	K2	II
3	Explain phraseology used in aeronautical communication service	K3	III
4	Q codes used in aeronautical communication service	K3	IV
5	Outline the communication and frequencies	K2	V
6	Outline of ATC communication	K3	I

COURSE OBJECTIVE:**The aim of course is to:**

- Understand basic aviation RT phonetics
- Understand different phraseology in RT communication
- Make students familiarize with different aviation charts
- Introduce to various radio equipment's.

RADIO PROPAGATION:

- (a) Relationship between wavelength, frequency and speed of light
- (b) Frequency bands and ranges
- (c) Ionosphere layers during day and night
- (d) Mode of Propagation MF, HF and VHF & amp; amp; above
- (e) Operation of Geostationary Satellites
- (f) Operation of Polar orbiting Satellites
- (h) Skip Distance
- (l) Choice of Frequencies during Day & amp; amp; Night 12

PHRASEOLOGY:

Phraseology used in Aeronautical Communication Services; Abbreviations used in Aeronautical Communication Services.

- (a) Distress
- (b) Distress Relay
- (d) Direction Finding
- (e) Flight Safety
- (f) Metrological
- (g) Flight regulatory

'Q' CODES:

'Q' Codes used in Aeronautical Communication Services, QNH, QFE, Height, Elevation, Altitude, Flight Level

COMMUNICATION:

Terminal Communication & En-route Communication, NOTAM and SNOWTAM, Need of Primary and Secondary Frequencies

TOPICS FOR SELF STUDY

Sl. No	Topics	Web Links
1	ATC communication	https://www.aerospace-technology.com/contractors/training/atc-comm/#:~:text=ATC%2DCommunications%20is%20provider%20of,flight%20including%20vision%20and%20sounds.
2	Radio Propagation	https://en.wikipedia.org/wiki/Radio_propagation
3	Phraseology & Q codes	https://en.wikipedia.org/wiki/Q_code

REFERENCE BOOKS:

- Radio telephony by K.D. Tuli

SPECIFIC LEARNING OUTCOMES (SLO):

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
I	Regulations		
1.1	Duties of ITU	Analysis's duties of ITU	K4
1.2	ICAO	Develops and understanding of their rules & regulation	K3
1.3	AAI	Develops and understanding of their rules & regulation	K3
1.4	WPC	Develops and understanding of their rules & regulation	K3
1.5	ICAO annexure	Classifies contents of difference annexure	K2
1.6	Spelling of alphabets & transmission of numerical	Demonstrates the pronunciation of alphabet & numerical	K2
1.7	Aircraft indent	Interprets basic indent	K2
1.8	Location indicators	Interprets basic indent	K2
1.9	FIR	Analyses difference FIR & ground services	K4
1.10	Identification of ground services	Analyses difference FIR & ground services	K4
II	Radio Propagation		
2.1	Wavelength, frequency and speed of light	Analyses the relationship between wavelength, frequency, & speed of light	K4
2.2	Frequency bands and ranges	Compares the bonds & ranges	K2
2.3	Ionosphere layers	Explains the ionosphere layer during day & night	K2
2.4	Mode of Propagation	Compares MF, HF, VHF & above	K4
2.5	Operation of Geostationary Satellites	Analyses the OPS of geostationary	K4

2.6	Polar orbiting Satellites	Analyses the OPS of polar	K4
	Skip Distance	Explain about skip distance	K2
	Frequencies during Day & Night	Summarizes about the frequency used at night	K2
III	Phraseology		
3.1.0	Phraseology abbreviations	Choose appropriate phrases	K3
3.1.1	Aeronautical Communication Services.	Outlines the type of call to be given during emergency	K2
3.1.2	Distress Relay	Explains about type of commercial during RCF unable for each ATC	K2
3.1.3	Direction Finding	Identifies the methods of direction finding from station	K2
3.1.4	Flight Safety	Examines the safety on board	K4
3.1.5	Metrological Information	Analyses met condition	K4
3.1.6	Flight regulatory	Develops basic regulation & rules of fit	K3
IV	'Q' Codes		
4.1.0	Q- Codes	Illustrates the difference types of Q codes	K2
4.1.1	atmospheric pressure	Understanding of atmospheric pressure	K2
4.1.2	Height, Elevation, Flight Level, Altitude	Classifies the difference between Altitude Elevation, Height, Flight Level	K4
4.1.3	QDR, QDM, QUJ, QTE	Classifies the variation of QDR, QDM, QUJ, QTE	K4
4.1.4	Relative bearing, Radial, Magnetic Heading, Compass Heading, True Heading, Variation & Deviation	What the Relative bearing, Radial, Magnetic Heading, Compass Heading, True Heading, Variation & Deviation	K3
V	Communication		
5.1.0	Intro to radio call format	Explains basic RT	K2
5.1.1	Radio strength check	Demonstrates how to check quality of call	K3
5.1.2	S/UP clearance	Outlines the type of call for S/U & pushback based on aircraft cat	K2
5.1.3	P/B clearance	Outlines the type of call for S/U & pushback based on aircraft cat	K2
5.1.4	Taxi clearance	Explains RT call	K2
5.1.5	ATC clearance	Explains RT call	K2

COURSE OUTCOMES:

On Completion of this course, the student will be able to,

Sl. No	Course Outcomes	Level	Unit Covered
1	Construct and analysing graphs of Trigonometric functions and their inverse	K4	I
2	Distinguish the different metric units and understand how to convert from one metric unit to another	K2	II
3	Demonstrate the ability to use the Compass rose to indicate directions, create and use map symbols	K2	III
4	Basic understanding of calculating speed, distance, time, Rate of climb (ROC), Rate of descent (ROD)	K4	IV
5	Explanation about fuel and Time management	K3	V
6	Develop a basic fuel management to track all aspects of fuel consumption	K1	V

COURSE OBJECTIVE:

To understand the importance of various calculation and the implementation of the same in aviation industry.

UNIT – I BASIC TRIGONOMETRY & PYTHAGORAS THEOREM:

Revision of trigonometric Ratios and Pythagoras theorem and their applications, Revision of Mathematical calculations, BODMAS Rule, Algebra calculations, Percentage calculation.

UNIT – II CONVERSIONS:

Conversions between units, Basic definitions of Kilometres, Statute mile, Nautical Mile, feet, meter and conversion between each other. Temperature Conversions, Kelvin to Celsius, Celsius to Kelvin, Fahrenheit to Celsius and its importance in aviation and their applications

UNIT – III COMPASS:

Basic understanding of Compass it's working Principle, Basic understanding about magnetism, Earth magnetism, Understanding Compass errors- Variation and deviation, Calculating Aircraft direction, Relative heading, True Heading magnetic heading, compass heading and Heading Calculation

UNIT – IV RELATIVE MOTION AND VERTICAL SPEED:

Calculation of Speed in relation to speed, distance, time. Calculating Estimated Time of Arrival (ETA), Estimated Time of Departure (ETD), Estimated Elapsed Time (EET), Calculating Endurance and Still Air Range (SAR)

Calculation of Rate of Climb (ROC), Rate Of Descent(ROD)& selection of Altitude according to the flight path, Top Of Climb (TOC)&Top Of Descent (TOD), its understanding and Implementation.

UNIT – V TIME CALCULATION AND FUEL CALCULATION:

Understanding Coordinated Universal Time (UTC), Calculation of LMT at any given place, longitude, latitude, meridians, Standard meridian, rhumb line, Indian Standard Time (IST), Difference in longitude, Difference in latitude. Calculating IST and LMT from GMT. Selection of alternate aerodrome, Different alternate, Take off alternate, Enroute Alternate, Destination Alternate, Fuel calculation for the flight, minimum fuel requirement and payload.

TOPICS FOR SELF STUDY:

Sl. No	Topics	Web Links
1	Study about Algebraic equation	https://en.m.wikipedia.org/wiki/Algebraic_equation
2	Study about CDMVT and wind corrections	https://youtu.be/-Hlx7i5eEwQ
3	Study about importance of fuel cost index in aviation	https://youtu.be/6GBf1keuwhY

REFERENCE BOOKS:

1. Aviation's Mathematics, Oxford Publications
2. Oxford General Navigation.
3. Ground Studies for Pilots (General Navigation)
4. General navigation by R.K. Bali

LEARNING OUTCOMES:

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
I	Basic Trigonometry & Pythagoras theorem		
1.1	Trigonometric Ratios	To find the measure of an angle of a right triangle	K2
1.2	Pythagoras theorem	Learn to use the Pythagoras Theorem to identify right triangles.	K2
1.3	BODMAS Rule	How to break down a calculation using the order of operations	K3
1.4	Algebra calculation	Be able to read and write expressions, and to be skilled in computations and manipulations of algebraic expressions	K5

1.5	Percentage calculation	Convert the percentage into a decimal. convert the percentage into a fraction	K4
II	Conversions		
2.1	Conversions between units	Identify the metric system, Know the basic prefixes associated with metric units and understand how to convert from one metric unit to another	K4
2.2	Basic definitions of Kilometre, Statute mile, Nautical Mile, feet, metre and conversion between each other	Understand the basic units for distance calculations and how to convert the units	K5
2.3	Temperature Conversions and its importance in aviation	Definition of different types of Temperature Measurement	K3
2.4	Conversion of Kelvin to Celsius, Celsius to Kelvin, Fahrenheit to Celsius	Calculations of Temperature Conversions from one unit to another	K2
III	Compass		
3.1	Basic understanding of Compass it's working Principle	Explained the Compass and its working in detail	K3
3.2	Basic understanding about magnetism	Basic law of magnetism	K2
3.3	Earth magnetism	Understand the earth magnetic field determine the location of a magnet's poles.	K2
3.4	Understanding Compass errors	How Compass errors affect the Compass readings and make difference for flying aircraft	K1
3.5	Variation and deviation	Define and calculate the Compass Errors	K2
3.6	Calculating Aircraft direction	Understand the directions and bearing	K1
3.7	Relative heading	Calculations for finding Aircraft Relative bearing in relation to station	K4
3.8	True Heading magnetic heading, compass heading	Different types of North's and Calculation of their respective headings	K1
IV	Relative Motion and Vertical Speed		
4.1	Calculation of Speed in relation to speed, distance, time	Basic calculations of speed, distance and time	K6
4.2	Calculating Estimated Time of Arrival (ETA), Estimated Time of Departure (ETD), Estimated Elapsed Time (EET)	Understanding the Calculations of Estimated Time for different phases of Flight	K3
4.3	Calculating Endurance and Still Air Range (SAR)	Basic calculations of time and range	K3
4.4	Calculation of Rate of	Analyse the fastest and steepest	K3

	Climb (ROC)	climbing Rate	
4.5	Calculation of Rate of descent (ROD)	Calculate at what rate aircraft can descent with time	K3
4.6	Selection of Altitude according to the flight path	Understanding optimal cruising altitude range that is the best trade-off of speed and fuel efficiency	K3
4.7	Top Of Climb (TOC) & Top of Descent (TOD)	Calculations of TOC & TOD	K3
V	Time Calculation and Fuel Calculation		
5.1	Understanding Coordinated Universal Time (UTC)	Basic time standard used in aviation	K3
5.2	Definition of Longitude, latitude, meridians, Standard meridian	Understanding the geographic coordinate system of earth spheroid	K6
5.3	Rhumb lines	To compare the lengths of different paths connecting two points on the Earth's surface.	K6
5.4	Difference in longitude and Difference in latitude	Calculate the Dlat and DeLong of different positions	K6
5.5	Calculating IST and LMT from GMT	Conversions of different time zones	K6
5.6	Selection of alternate aerodrome	Importance of Alternate aerodrome	K3
5.7	Different alternate, Take off alternate, Enroute Alternate, Destination Alternate, Fuel calculation for the flight plan	Fuel calculations for different phases of Flight path	K5
5.8	Minimum fuel requirement and payload	Detailed information of payload	K6

COURSE OUTCOMES:

On completion of this course, the students will be able to:

Sl. No	Course Outcomes	Level	Unit Covered
1	Explain various terms of imagination line over globe	K2	I
2	Solve the problem related to speed conversion	K4	II
3	Explain the different measurement of airspeed	K3	II
4	explain the triangle of velocity	K4	III
5	Select a particular chart for a particular region	K2	IV
6	Choose the efficient fuel and detail at the navigation emergency data	K2	V

COURSE OBJECTIVE:

To gain the knowledge about the art of navigation an aircraft from any given points understands the geographical positions their relation and effects in navigation

COURSE CONTENT:

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
I	The Earth		
1.1	Cardinal points	List out the cardinal directions	K4
1.2	The earth graticule	Illustrate graticule	K2
1.3	Great circle	Explain great circle	K2
1.4	Meridian & anti-meridian	Classify meridian and anti-meridian	K4
1.5	Small circle	Define small circle	K1
1.6	Great direction	Classification Great direction	K2
1.7	Grivation,	Classification Grivation,	K1
1.8	Isogrivs	Classification Isogrivs	K1
II	Speed Conversions		
2.1	Statue mile	Define statute mile	K1
2.2	Nautical mile	Define nautical mile	K1
2.3	Kilometer	Recall the definition of Kilometer	K1
2.4	Conversion between units	Solve the problem of unit conversion	K6
2.5	Departure	Define departure	K1
2.6	Basic principle of semi Circular rule	Outline the principle of semi Circular rule	K2
2.7	IAS, TAS, EAS, Ground Speed, Mach. No, CAS	Explain the different methods of Measurements of airspeed	K2
2.8	Corrected outside air Temperature	Explain the purpose of measuring Outside air temperature	K2
2.9	Conversion of RAS to TAS, Mach no to TAS	Solve the airspeed conversion	K6
2.10	Speed, Distance, Time, Relationship & calculation	Compare the relationship between speed, distance and time	K2

III	Triangle of Velocities		
3.1.0	Three basic velocity vectors	Define Three basic velocity vectors	K2
3.1.1	Vector Triangle	Solve Vector Triangle	K4
3.1.2	Introduction to Flight Computer	Explain Introduction to Flight Computer	K2
3.1.3	Navigation Computer	Explain Geometrical Solution and Solutions on the Navigation Computer,	K2
3.1.4	wind Velocity	Finding the wind Velocity at a turning point	K2
3.1.5	Head and Crosswind	Find the Head and Crosswind on a Runway	K1
3.1.6	TOC, TOD, TMG Aircraft Air Velocity	Explain Aircraft Air Velocity	K1
IV	Maps and Charts		
4.1.0	Mercator projection	Elaborate Mercator projection	K4
4.1.1	Lamberts conical	Explain the places where LCC can be used	K2
4.1.2	Polar stereographic	Choose the appropriate chart for Appropriate area	K4
	Orthomorphism scale	Explain Orthomorphism scale	K2
	Reduced earth	Construct reduced earth	K4
	Topographical maps	Explain topographical maps	K2
V	Fuel and Navigational Emergency Data		
5.1.0	Imperial and US gallons	Distinguish between Imperial and US gallons	K4
5.1.1	Conversion factor	Solve the problems related to unit conversion	K4
5.1.2	Specific gravity	Explain specific gravity	K2
5.1.3	Fuel flow and fuel consumption	Compare flow of fuel and consumption of fuel	K4
5.1.4	Select the most economical cruising level	Choose the economical cruising level	K4
5.1.5	Payload	Explain Payload	K2
	Imperial and US gallons	Distinguish between Imperial and US gallons	K4

TOPICS FOR SELF STUDY:

Sl. No	Topics	Web Links
1	Latitudes and longitudes	https://www.techtarget.com/whatis/definition/latitude-and-longitude
2	Different measurements at airspeed	https://commons.erau.edu/cgi/viewcontent.cgi?article=1178&context=bollinger-rosado
3	Comparison between different chart & maps and its properties	http://www.differencebetween.net/miscellaneous/geography-miscellaneous/difference-between-maps-and-charts/

REFERENCE BOOKS:

1. Air Navigation by R.K. Bali
2. Oxford – Navigation 1(General Navigation

Second Year

**NON MAJOR ELECTIVE I
INTRODUCTION TO AIRLINES
(Theory)**

Semester III

Code:

Credit: 2

COURSE OUTCOMES:

On Completion of this course, the student will be able to,

Sl. No	Course Outcomes	Level	Unit Covered
1	Outline the evaluation of aviation industry	K2	I
2	Categorize the organization responsible for safe operation of aircraft	K4	II
3	Compare the time zones & time difference between different parts of globe	K2	III
4	Inspect the aircraft before departure	K4	IV
5	Explain the procedures of aborted t/o	K2	V
6	List the functions of different emergency equipment's	K4	III

COURSE OBJECTIVE:

The aim of the course is to

- Study about the history of aviation and know about the World wars.
- Have good knowledge about the basics of aviation and parts of an aircraft.
- Learn about the different time zones, names of airports and cities with 3 letter codes.
- Inculcate the pre-flight procedures to be followed and basic knowledge in different checking procedures in the aircraft.
- Understand the diverse concepts like airline meals, kitchens, aborted take-off and emergency landings etc.

UNIT - I:

History and Evolution of flying-Basic principles of Flying-Atmosphere and its properties, Standard atmosphere

UNIT- II:

Classification of Aircraft/Airlines-Narrow Body- Wide body- Propeller Aircraft- Jet Aircraft-Supersonic-Scheduled -Non-Scheduled-Charter Flights

UNIT - III:

Major Components of an Aircraft-Engine-Propeller-Fuselage Tail-Rudder-Landing Gear

UNIT - IV:

Airline Organizational structure – Corporate Office – Regional Office- City office- Ticketing Agents

UNIT - V:

Airline Functional Structures - Engineering- Operation – Finance –Administration - Marketing-Customer relation

TOPICS FOR SELF STUDY:

Sl. No	Topics	Web Links
1	History of Aviation	https://www.spartan.edu/news/history-of-aviation/#:~:text=The%20history%20of%20aviation%20dates,four%20pairs%20of%20glider%20wings.
2	The Basics of Aviation	https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/airplane_handbook/media/05_afh_ch3.pdf
3	Pre-Flight Procedure	https://www.firstflight.com/private-pilot-course/preflighting-the-aircraft/

REFERENCE BOOKS:

1. R.K. Bali- Air Regulation
2. Oxford – Navigation
3. Oxford – Aircraft general knowledge

COURSE OUTCOMES

On completion of this course, the students will be able to:

Sl. No	Course Outcomes	Level	Unit Covered
1	Types of cloud and the study of Clouds	K2	I
2	Illustrate Knowledge On the thunderstorm	K3	II
3	Illustrate Knowledge On the Air masses	K3	II
4	Explain Dangers of Icing And how to rectify in the pilot static System	K3	III
5	Outline of the Weather forecast And its Report	K2	IV
6	Symbols And Abbreviation in Weather On MET Chart	K2	V

COURSE OBJECTIVE:

- To know the various aspects of weather

UNIT – I CLOUDS:

Types of clouds according to their height and form, Precipitation, Humidity, Dew point temperature, Adiabatic process, the Fohn wind effect, Precipitation associated with cloud, cumino nimbus, Ice crystal theory, Coalescence theory, Giant nuclei theory, Types of cloud, Various Mountain Clouds, necessary condition for the formation of clouds, condensation trails.

UNIT – II THUNDERSTORM AND AIR MASSES:

Necessary conditions for thunderstorm, life cycle of a thunderstorm, the danger of thunderstorm Air masses, the origin of an air mass, its path, divergence and convergence, the warm front, observation from the ground, observation from the air, the cold front, observation from the ground, observation from the air, the occluded front, depressions, weather associated with it, trough of low pressure, the wave of frontal depression, the cyclone storm, anti-cyclone, weather associated with it, a ridge of high pressure.

UNIT – III ICING:

The dangers of icing, the formation of ice, super-cooled water drops, clear ice, Rime ice, cloudy ice, hoar frost, De-icing, anti-icing, structural icing and cloud type, carburettor icing, pitot static system icing.

UNIT – IV WEATHER FORECAST AND REPORTS:

Dissemination of weather information, AIR MET service, types of weather information, meteorological forecast, special forecast, aerodrome forecast, Terminal Aerodrome forecast (TAF), METAR, TRENDS, Speci, Cloud base, VFR- in flight weather report, Automatic Terminal Information System (ATIS), Notam, Sigmet.

UNIT –V SYMBOLS AND ABBREVIATIONS:

Symbols for significant weather on MET charts, weather abbreviations (Cloud Type), Cloud amount, CB amount, common MET abbreviations, CAVOK, TEMPO, lasting change, Synoptic charts, wind symbols, visibility, METAR decoding.

TOPICS FOR SELF STUDY:

Sl. No	Topics	Web Links
1	Types of Clouds	https://www.weather.gov/jetstream/corefour
2	Weather Forecast and report	https://en.wikipedia.org/wiki/Weather_forecasting
3	Icing and De-icing	https://en.wikipedia.org/wiki/Deicing

REFERENCE BOOKS:

1. Aviation meteorology by I.C. Joshi
2. Oxford- meteorology
3. Ground Studies for Pilots – Meteorology

SPECIFIC LEARNING OUTCOMES (SLO):

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
I	Clouds		
1.1	Types of clouds	Types of clouds according to their height and form	K2
1.2	Precipitation, Humidity, Dew point temperature, Adiabatic process	Explain Precipitation, Humidity, Dew point temperature, Adiabatic process	K2
1.3	the Fohn wind effect, Precipitation associated with cloud	The Fohn wind effect, Precipitation associated with cloud	K2
1.4	Cumin nimbus, Ice crystal theory, Coalescence theory, Giant nuclei theory,	Cumino nimbus, Ice crystal theory, Coalescence theory, Giant nuclei theory,	K3
1.5	Types of cloud, Various Mountain Clouds	Types of cloud, Various Mountain Clouds	K2
1.6	Necessary condition for the formation of clouds, condensation trails.	What is the necessary condition for the formation of clouds, condensation trails?	K3
2	Thunderstorm and Air Masses		
2.1.0	Necessary conditions for thunderstorm	Necessary conditions for thunderstorm	K2
2.1.1	Life cycle of a thunderstorm, the danger of thunderstorm	Life cycle of a thunderstorm, the danger of thunderstorm	K3
2.1.2	Air masses, the origin of an air mass its path, divergence and convergence	Explain Air masses, the origin of an air mass its path, divergence and convergence	K2
2.1.3	The warm front, observation from the ground	What is the warm front, observation from the ground	K2
2.1.4	Observation from the air, the cold front, observation from the ground, observation from the air, the occluded front, depressions,	Observation from the air, the cold front, observation from the ground, observation from the air, the occluded front, depressions,	K2

2.1.5	Weather associated with it, trough of low pressure, the wave of frontal depression, the cyclone storm, anti-cyclone	Weather associated with it, trough of low pressure, the wave of frontal depression, the cyclone storm, anti-cyclone	K3
2.1.6	Weather associated with it, a ridge of high pressure.	Weather associated with it, a ridge of high pressure.	K2
3	Icing		
3.1.0	The dangers of icing	Explain The dangers of icing	K3
3.1.1	The formation of ice	Explain the formation of ice	K3
3.1.2	Super-cooled water drops	What is super-cooled water drops	K2
3.1.3	Clear ice, Rime ice, cloudy ice, hoar frost	Explain Rime ice, cloudy ice, hoar frost	K2
3.1.4	De-icing, anti-icing	Classify De-icing, anti-icing	K3
3.1.5	Structural icing and cloud type	Structural icing and cloud type	K2
3.1.6	Carburettor icing, pitot static system icing	Explain carburettor icing, pitot static system icing	K3
4	Weather Forecast and Reports		
4.1.0	Dissemination of weather information	Dissemination of weather information	K2
4.1.1	AIR MET service	What is AIR MET service	K2
4.1.2	Types of weather information	Classify the types of weather information	K3
4.1.3	Meteorological forecast	Explain meteorological forecast	K2
4.1.4	Special forecast	Explain special forecast	K2
4.1.5	Aerodrome forecast	Explain aerodrome forecast	K2
4.1.6	Terminal Aerodrome forecast (TAF),	Define Terminal Aerodrome forecast (TAF),	K2
4.1.7	METAR, Trans species	Classify METAR, Trans species	K1
4.1.8	VFR- in flight weather report,	Define VFR- in flight weather report,	K2
4.1.9	Automatic Terminal Information System (ATIS)	Explain Automatic Terminal Information System (ATIS)	K3
4.1.10	Notam, Sigma.	Notam, Sigmet	K1
5	Symbols and Abbreviations		
5.1.0	Symbols for significant weather on MET charts	Short note on Symbols for significant weather on MET charts	K4
5.1.1	Weather abbreviations (Cloud Type),	What weather abbreviations (Cloud Type),	
5.1.2	Cloud amount	Cloud amount	K2
5.1.3	CB amount, common MET abbreviations	CB amount, common MET abbreviations	K2
5.1.4	CAVOK, TEMPO, lasting change,	CAVOK, TEMPO, lasting change,	K2
5.1.5	Synoptic charts, wind symbols, visibility, METAR decoding	Synoptic charts, wind symbols, visibility, METAR decoding	K3

COURSE OUTCOMES:

On completion of this course, the students will be able to:

Sl. No	Course Outcomes	Level	Unit Covered
1	Experiment with Different Aviation tool	K3	I
2	Identify a particular tool for a particular Purpose	K3	I
3	Organize the used files	K3	I
4	Classify the Different classes of fire	K4	II
5	Inspect the Source of fire	K4	II
6	Choose the Correct fire extinguishers	K5	II

COURSE OBJECTIVE;

➤ To familiarize with the general tools used in aircraft maintenance

➤

1. FAMILIARIZATION OF GENERAL HAND TOOLS:

- General Purpose Tools, Hummers and Mallets,
- Screwdrivers, Pliers and Plier-Type Cutting Tools.
- Punches Wrenches, Special Wrenches, Torque Wrench, Strap Wrenches.
- Impact Drivers, Metal Cutting Tools.
- Hand Snips, Hacksaws, Chisels, Vices, Files, Files—care and Use, Most Commonly Used Files, Care of files.
- Drills. Twist Drills, Reamers, Countersink, Taps and Dies, Layout and Measuring Tools, Rules.
- Combination Sets, Scribe, Dividers and Pencil Compasses, Callipers, Micrometre Callipers, Micrometre Parts.
- Reading a Micrometer, Vernier Scale, using a Micrometre, Vernier Scale, Using a Micrometre, callipers.

2. FIRE TRAINING:

- Different Types & class of fire.
- Different types of fire-extinguishers.
- Procedure of use of fire extinguishers, fire-alarm bell.

TOPICS FOR SELF STUDY:

Sl. No	Topics	Web Links
1	General Hand Tools	https://generaltools.com/hand-tools
2	Fire Training	https://emergency.yale.edu/sites/default/files/files/TMS-Fire-Extinguisher-Training.pdf

REFERENCE BOOKS:

1. Shop Theory.
2. Airframe and Power plant Mechanics Airframe Handbook (Ac65- 9A) by Shroff Publishers.
3. Airframe and Power Plant mechanics Airframe handbook (Ac65- 15A) by Shroff Publishers

PECIFIC LEARNING OUTCOMES (SLO):

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
I	Familiarization of general hand tools		
1.1	Experiment with Different Aviation tool	Experiment with Different Aviation tool	K3
1.2	Identify a particular tool for a particular Purpose	Identify a particular tool for a particular Purpose	K3
1.3	Organize the used files	Organize the used files	K3
1.4	Categories the files Selection	Categories the files Selection	K4
1.5	Explain the procedure to read venire scale	Explain the procedure to read venire scale	K2
II	Fire Training		
2.1	Classify the Different classes of fire	Classify the Different classes of fire	K4
2.2	Inspect the Source of fire	Inspect the Source of fire	K4
2.3	Choose the Correct fire	Choose the Correct fire	K5
2.4	Demonstrate the procedure to use fire extinguisher	Demonstrate the procedure to use fire extinguisher	K2
2.5	Explain Different fire warning Experiment	Explain Different fire warning Experiment	K2

Second Year

**SECOND ALLIED COURSE II
PRINCIPLES OF MANAGEMENT
(Theory)**

Semester IV

Code:

Credit: 4

COURSE OBJECTIVES:

- To impart knowledge about evolution of management
- To provide understanding on planning process and importance of decision making in organization
- To learn the application of principles in organization
- To study the process of effective controlling in organization
- To familiarize students about significance of ethics in business and its implications.

UNIT - I:

Management: Importance – Definition – Nature and Scope of Management – Process – Role and Functions of a Manager – Levels of Management – Development of Scientific Management and other Schools of thought and approaches

UNIT - II:

Planning: Nature – Importance – Forms – Types – Steps in Planning – Objectives – Policies – Procedures and Methods – Natures and Types of Policies – Decision – making – Process of Decision – making – Types of Decision.

UNIT - III:

Organizing: Types of Organizations – Organization Structure – Span of Control and Committees – Departmentalization – Informal Organization- Authority – Delegation – Decentralization – Difference between Authority and Power – Responsibility.

UNIT - IV:

Direction – Nature and Purpose. Co- ordination – Need, Type and Techniques and requisites for excellent Co-ordination – Controlling – Meaning and Importance – Control Process.

UNIT - V:

Definition of Business ethics - Types of Ethical issues -Role and importance of Business Ethics and Values in Business - Ethics internal - Ethics External - Environment Protection - Responsibilities of Business

REFERENCE BOOKS:

1. JAF Stoner, Freeman R.E and Daniel R Gilbert “Management”, 6th Edition, Pearson Education, 2004.

2. Griffin, T.O., Management, Houghton Mifflin Company, Boston, USA, 2014.
3. Stephen A. Robbins & David A. Decenzo & Mary Coulter, “Fundamentals of Management” 7th Edition, Pearson Education, 2011
4. Stoner, Freeman, Gilbert Jr. (2014). Management (6th edition), New Delhi: Prentice Hall India
5. Robbins, S., Coulter, M., Sidani, D., and Jamali, D., Management: Arab World Edition, Pearson, 2014.

E – Reference:

1. <https://www.toolshero.com/management/14-principles-of-management/>
2. <https://open.umn.edu/opentextbooks/textbooks/693>
3. <https://open.umn.edu/opentextbooks/textbooks/34>
4. <https://openstax.org/subjects/business>
5. <https://blog.hubspot.com/marketing/management-principles>

Second Year

**NON MAJOR ELECTIVE II
RADIO TELEPHONY
(Theory)**

Semester IV

Code:

Credit: 2

COURSE OUTCOMES:

On completion of this course, the students will be able to:

Sl. No	Course Outcomes	Level	Unit Covered
1	Explain the Duties of Different Bodies In aviation and The Rule Made by them	K2	I
2	Interpret the Meaning of marking and lighting In airport	K2	II
3	Outline Of the Air traffic Service	K3	III
4	What is basic Radio Propagation	K2	IV
5	What is Frequency Bands	K2	IV
6	Analyze Basic Communication between ATC and Aircraft	K4	V

COURSE OBJECTIVE:

To understand various aviation terminologies, Standard Universal Communication Procedures followed by different departments of Aviation.

UNIT – I REGULATIONS:

Duties of International Telecommunication Union (ITU), International Civil Aviation Organization (ICAO), Airport Authority of India (AAI), Wireless Planning and Coordinating Wing (WPC), ICAO Annexure, Spelling of Alphabets and Transmission of numerical, Aircraft Identification, Location Indicators, Flight Information Regions (FIR), Identification of Ground Services.

UNIT – II RADIO PROPAGATION:

Relationship between wavelength, frequency and speed of light. Frequency bands and ranges. Ionosphere layers during day and night. Mode of Propagation MF, HF and VHF & above. Operation of Geostationary Satellites. Operation of Polar orbiting Satellites. Skip Distance. Choice of Frequencies during Day & Night

UNIT – III PHRASEOLOGY:

Phraseology used in Aeronautical Communication Services; Abbreviations used in Aeronautical Communication Services. Distress, Distress Relay, Direction Finding, Flight Safety, Metrological Information, Flight regulatory.

UNIT – IV ‘Q’ CODES:

Q’ Codes used in Aeronautical Communication Services, Basic Understanding of atmospheric pressure, QNH, QFE, QFF, QNE, Understanding difference between

Height, Elevation, Altitude and Flight Level, QDR, QDM, QUJ, QTE, Relative bearing, Radial, Magnetic Heading, Compass Heading, True Heading, Variation & Deviation

UNIT – V COMMUNICATION:

Introduction to radio call format, Radio strength check call, Start-up clearance and pushback clearance call, Taxi clearance call, ATC clearance call.

TOPICS FOR SELF STUDY:

Sl. No	Topics	Web Links
1	Marking and lighting	https://www.icao.int/NACC/Documents/Meetings/2012/ICAOFAAAGACertification2012/ICAOFAACertification07.pdf
2	Air Traffic Services (ATS)	https://mediawiki.ivao.aero/index.php?title=Air_traffic_services
3	Radio Propagation Basic	https://en.wikipedia.org/wiki/Radio_propagation

REFERENCE BOOKS:

1. Radio telephony, K.D. Tuli
2. Air Regulation by R.K Bali
3. Air navigation by R.K Bali

SPECIFIC LEARNING OUTCOMES (SLO):

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
I	Regulations		
1.1	Duties of ITU	Analysis's duties of ITU	K4
1.2	ICAO	Develops and understanding of their rules & regulation	K3
1.3	AAI	Develops and understanding of their rules & regulation	K3
1.4	WPC	Develops and understanding of their rules & regulation	K3
1.5	ICAO annexure	Classifies contents of difference annexure	K2
1.6	Spelling of alphabets & transmission of numerical	Demonstrates the pronunciation of alphabet & numerical	K2
1.7	Aircraft indent	Interprets basic indent	K2
1.8	Location indicators	Interprets basic indent	K2
1.9	FIR	Analyses difference FIR & ground services	K4
1.10	Identification of ground services	Analyses difference FIR & ground services	K4

II		Runway Markings	
2.1	Runway marking	Explain Runway marking	K2
2.2	Threshold markings	Explain threshold markings	K3
2.3	Taxiway markings	Detail about taxiway markings	K2
2.4	Runway lights	Explain About runway lights	K3
2.5	Threshold lights	Detail About threshold lights	K2
2.6	Taxiway lights	Explain About taxiway lights	K2
III		Air Traffic Services (ATS)	
3.1.0	Objective of ATS	Explain Objective of ATS	K2
3.1.1	Flight Information service	Explain Flight Information service	K2
3.1.2	Alerting Service	Detail about Alerting Service	K2
3.1.3	Air Traffic Advisory Service	What is Air Traffic Advisory Service	K2
3.1.4	Air Traffic control Service	Air Traffic control Service Provided by various Air traffic control Units And its control Boundary	K3
IV		Basic Radio Propagation	
4.1.0	Properties of radio wave	Explain Properties of radio wave	K2
4.1.1	Wave length, Frequency, Frequency bands, frequency modulation, Amplitude modulation	Types : Wave length, Frequency, Frequency bands, frequency modulation, Amplitude modulation	K3
4.1.2	Types of propagation, Refraction, reflection, diffraction, Attenuation	Types of propagation, Refraction, reflection, diffraction, Attenuation	K2
V		Communication	
5.1.0	Introduction to radio call format	Introduction to radio call format	K1
5.1.1	Radio strength check call	What is Radio strength check call	K2
5.1.2	Start-up clearance and pushback clearance call	Explain Start-up clearance and pushback clearance call	K2
5.1.3	Taxi clearance call, ATC clearance call	What Taxi clearance call, ATC clearance call	K2

Third Year

**CORE COURSE V
AIRCRAFT SYSTEMS
(Theory)**

Semester V

Code:

Credit: 5

COURSE OUTCOMES:

On completion of this course, the students will be able to:

Sl. No.	Course Outcomes	Level	Unit Covered
1	Outline of the Hydraulic and Pneumatic Power systems	K2	I
2	Illustrate the Air conditioning And Cabin Pressurization of the Aircraft	K3	II
3	Identify the Details of the Fuel System	K2	III
4	Classify the Landing Gear system	K2	IV
5	Explain the Landing Gear Systems	K3	IV
6	To know the Knowledge about the Engine Fuel System	K4	V

COURSE OBJECTIVE:

To understand the various principles and functions of Hydraulic and Pneumatic Power Systems, Fuel Systems

UNIT – I HYDRAULIC AND PNEUMATIC POWER SYSTEMS:

Hydraulic System lay-out; Reservoir, pumps, actuator, valves. Pneumatic System lay-out; sources: engine/APU, compressors, air bottles, ground supply, pressure control; distribution.

UNIT – II AIR CONDITIONING AND CABIN PRESSURIZATION:

Air Supply-sources of air supply including engine bleed, APU and ground cart; Air conditioning systems; Air cycle and vapour 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.

UNIT – III FUEL SYSTEMS:

System lay-out, fuel tanks, supply systems, dumping, venting and draining, cross-feed and transfer, indications and warnings, refuelling and defueling, longitudinal balance fuel systems.

UNIT – IV LANDING GEAR:

Construction, shock absorbing, extension and retraction systems, normal and emergency, Indications and warning, wheels, brakes, antiskid and auto braking, tyres, steering, air-ground sensing, skids, floats.

UNIT – V ENGINE FUEL SYSTEMS:

Carburettor types, construction and principles of operation, icing and heating, Types of fuel system, construction and principle of operation, Starting systems, pre-heat systems, Magneto types, construction and principles of operation, ignition harness, spark plugs-, low- and high-tension systems.

TOPICS FOR SELF STUDY:

Sl. No	Topics	Web Links
1	Hydraulic and Pneumatic power systems	https://www.nexflow.com/blog/difference-between-pneumatics-and-hydraulics/
2	Engine Fuel Systems	https://www.skybrary.aero/articles/aircraft-fuel-systems
3	Landing Gear	https://simpleflying.com/how-does-landing-gear-work/

REFERENCE BOOKS:

1. Professional Pilot Study Guide (Mike Burton)
2. Oxford ATPL ground training series-Airframe system.

PECIFIC LEARNING OUTCOMES (SLO):

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
I	Hydraulic and Pneumatic power systems		
1.1	Hydraulic System lay-out	Explain Hydraulic System lay-out	K3
1.2	Reservoir, pumps, actuator, valves. Pneumatic System lay-out	Explain Reservoir, pumps, actuator, valves. Pneumatic System lay-out	K3
1.3	Engine/APU	Define engine/APU	K3
1.4	Compressors, air bottles, ground supply	Explain compressors, air bottles, ground supply	K2
1.5	Pressure control; distribution	Define pressure control; distribution	K2
II	Air Conditioning and Cabin Pressurization		
2.1	Air Supply-sources of air supply including engine bleed	Explain Air Supply-sources of air supply including engine bleed	K2
2.2	APU and ground cart	Illustrates APU and ground cart	K2
2.3	Air conditioning systems; Air cycle and vapour cycle machines distribution systems	Explain Air conditioning systems; Air cycle and vapour cycle machines distribution systems	K3
2.4	Flow, temperature and humidity control system	Explain Flow, temperature and humidity control system	K1
2.5	Pressurization systems	Define Pressurization systems	K2

2.6	Control and indication including control and safety valves	Control and indication including control and safety valves	K3
2.7	Cabin pressure controllers	Illustrate cabin pressure controllers	K2
2.8	Safety and warning devices	What safety and warning devices	K1
2.9	Protection and warning devices	Explain protection and warning devices	K3
III	Fuel Systems		
3.1.0	System lay-out	What is System lay-out	K1
3.1.1	Fuel tanks	Explain fuel tanks and its use	K2
3.1.2	Supply systems	Explain supply systems	K2
3.1.3	Dumping	What is dumping	K2
3.1.4	Venting and draining	What is venting and draining	K3
3.1.5	Cross-feed and transfer	Explain cross-feed and transfer	K2
3.1.6	Indications and warnings	What is indications and warnings	K3
3.1.7	Refuelling and defueling	Refuelling and defueling	K2
3.1.8	Longitudinal balance fuel systems	Explain longitudinal balance fuel systems	K2
IV	Landing Gear		
4.1.0	Construction, shock absorbing,	Construction, shock absorbing,	K2
4.1.1	Extension and retraction systems	Explain extension and retraction systems	K2
4.1.2	Normal and emergency Landing Gear	Explain normal and emergency Landing Gear	K2
4.1.3	Indications and warning Landing Gear	Indications and warning Landing Gear	K3
4.1.4	Wheels, brakes, antiskid and auto braking	Define wheels, brakes, antiskid and auto braking	K1
4.1.5	Tyres, steering, air-ground sensing, skids, floats	Explain tyres, steering, air-ground sensing, skids, floats	K2
V	Engine Fuel Systems		
5.1.0	Carburettor types	Carburettor types construction and principles of operation	K3
5.1.1	Icing and heating,	Illustrate icing and heating,	K 2
5.1.2	Types of fuel system,	Types of fuel system, construction and principle of operation	K2
5.1.3	Starting systems, pre-heat systems	What is Starting systems, pre-heat systems	K2
5.1.4	Magneto types, construction and principles of operation	Magneto types, construction and principles of operation	K3
5.1.5	Ignition harness, spark plugs-, low- and high-tension systems	Ignition harness, spark plugs-, low- and high-tension systems	K2

COURSE OUTCOMES:

On completion of this course, the students will be able to:

Sl. No	Course Outcomes	Level	Unit Covered
1	Apply the previous knowledge in different scenario take off Performance	K3	I
2	Performance based on the Landing	K2	II
3	Characteristics of the Runway Details	K2	III
4	Plan for diversion & rerouting	K3	IV
5	Plan for En rerouting	K3	IV
6	Explain About Weight And Balancing	K2	V

COURSE OBJECTIVE:

To understand, infer and interpret performance charts, weight and balance restrictions and its effects.

UNIT – I TAKE-OFF PERFORMANCE:

Using performance data, effects of weight and altitude, Take- Off performance, wind factors, Runway inclination, Condition of Runway, V1, V2, Vr, Vlof, Vmbe, Vmcg, Vmca, Take- Off flap setting, factors affecting take-off performance.

UNIT – II LANDING PERFORMANCE:

Landing performance data, factors affecting landing performance, effects of weight and altitude, wind factors, runway surface, runway slope, Runway condition, flap setting, recommended safety factors for landing, approach speeds.

UNIT – III RUNWAY CHARACTERISTICS:

Take-off distance available (TODA), Take-Off run available (TORA), clearway, rejected Take-Offs, emergency distance, stop way, landing distance available (LDA). Accelerate Stop Distance Available (ASDA)

UNIT – IV EN ROUTE PERFORMANCE:

Power required and power available curves, range and endurance, best -range speed, maximum- range speed, best endurance speed, cost index, influence of density, weight of aircraft, winds, ceiling, service ceiling, absolute ceiling.

UNIT – V WEIGHT AND BALANCE:

Definitions (basic empty weight, maximum zero fuel weight, maximum take-off weight, maximum landing weight, payload, ramp weight), weight of fuel, weight restrictions, effect of cg on the position of airplane, movement of CG position, mathematical approaches to weight and balance, dangerous goods, baggage and cargo restraint.

TOPICS FOR SELF STUDY:

Sl. No	Topics	Web Links
1	Landing and Take-off Performance	https://www.flight-study.com/2021/04/aircraft-takeoff-and-landing-performance.html#:~:text=Takeoff%20and%20landing%20performance%20is,and%20decelerates%20to%20zero%20speed.
2	En Route Performance	https://ansperformance.eu/methodology/en-route-vertical-flight-efficiency-pi/
3	Weight and Balance	https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/media/aa-h-8083-1.pdf

REFERENCE BOOKS:

1. Oxford – Flight Performance and planning.
2. Ground studies for pilots, Flight planning.

SPECIFIC LEARNING OUTCOMES (SLO)

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
I	Take-Off Performance		
1.1	Using performance data, effects of weight and altitude	Using performance data, effects of weight and altitude	K2
1.2	Take- Off performance	Wind factors, Runway inclination, Condition of Runway	K3
1.3	V1, V2, Vr, Vlof, Vmbe, Vmcg, Vmca,	Explain V1, V2, Vr, Vlof, Vmbe, Vmcg, Vmca,	K2
1.4	Take- Off flap setting	Detail about Take- Off flap setting	K2
1.5	Factors affecting take-off performance	Factors affecting take-off performance	K3
II	Landing Performance		
2.1	Landing performance data	Explain Landing performance data	K2
2.2	Factors affecting landing performance	Factors affecting landing performance	K2
2.3	Effects of weight and altitude	Effects of weight and altitude	K2

2.4	Wind factors, runway surface, runway slope, Runway condition, flap setting	Classifies the wind factors, runway surface, runway slope, Runway condition, flap setting	K2
2.5	Recommended safety factors for landing, approach speeds	Recommended safety factors for landing, approach speeds	K3
III	Runway Characteristics		
3.1.0	Take-off distance available (TODA),	Explain Take-off distance available (TODA),	K2
3.1.1	Take-Off run available (TORA)	Explain Take-Off run available (TORA)	K2
3.1.2	Clearway rejected Take-Offs, emergency distance, stop way	What is clearway rejected Take-Offs, emergency distance, stop way	K2
3.1.3	Landing distance available (LDA).	Landing distance available (LDA).	K3
3.1.4	Accelerate Stop Distance Available (ASDA)	Accelerate Stop Distance Available (ASDA)	K2
IV	En Route Performance		
4.1.0	Power required and power available curves	Explain Power required and power available curves	K2
4.1.1	Range and endurance, best -range speed, maximum- range speed, best endurance speed,	What range and endurance, best -range speed, maximum- range speed, best endurance speed,	K2
4.1.2	Cost index, influence of density, weight of aircraft, winds, ceiling, service ceiling, absolute ceiling	Explain cost index, influence of density, weight of aircraft, winds, ceiling, service ceiling, absolute ceiling	K2
V	Weight and Balance		
5.1.0	Definitions (basic empty weight, maximum zero fuel weight, maximum take-off weight, maximum landing weight, payload, rap weight)	Definitions (basic empty weight, maximum zero fuel weight, maximum take-off weight, maximum landing weight, payload, rap weight)	K3
5.1.1	Weight of fuel	What is weight of fuel	K2
5.1.2	Weight restrictions,	What is weight restrictions	K2
5.1.3	Effect of cg on the position of airplane	Effect of cg on the position of airplane	K3
5.1.4	Movement of CG position	Explain movement of CG position	K2
5.1.5	Mathematical approaches to weight and balance	Explain mathematical approaches to weight and balance	K4
5.1.6	Dangerous goods, baggage and cargo restraint.	Define dangerous goods, baggage and cargo restraint	K2

Third Year

**CORE COURSE VII
AIR REGULATION
(Theory)**

Semester V

Code:

Credit: 5

COURSE OUTCOMES:

On completion of this course, the students will be able to:

Sl. No.	Course Outcomes	Level	Unit Covered
1	Explain about the rules at the air and navigation light in the aircraft	K4	I
2	What is the function of interception at civil aircraft	K4	II
3	Define details of margins and lighting	K2	III
4	Definition of airport document provide	K3	IV
5	Define Requirement for passenger and Customs	K2	V
6	Explain ICAO Annexure terminology	K3	V

COURSE OBJECTIVE:

Get an insight into the various laws and rules applicable during flight, airspace restrictions and terminologies associated therewith.

UNIT – I RULES OF THE AIR:

Applicability of rules of the air, General Rules-Protection of persons & property, Surface movement of Aircraft, Lights to be displayed by aircraft, Flight plans, VFR, IFR, SVFR, Airspace classification, FIRs & Location indicator, Air Defence Identification Zones, Restricted Areas, Prohibited Area, Danger Area, Navigational lights to be displayed in the aircraft

UNIT – II INTERCEPTIONS OF CIVIL AIRCRAFT:

Interceptions of civil aircraft, procedure, signals for use in the event of interception, phrases for use by intercepting/intercepted aircraft, signals initiated by intercepted aircraft and response by intercepting aircraft, visual signals for aerodrome traffic, visual ground signals, marshalling signals, indicators & signalling devices wind direction indicators, landing direction indicator, signalling lamp, signal panel and signal area

UNIT – III AERODROMES:

Aeronautical Beacon- Location- Characteristics- Identification Beacon- Characteristics, right of way on the ground, Runway Markings-Threshold Markings-Holding position markings, Taxiway markings, Runway lightings-wing bar lights, Taxiway lightings-stop way lights, Isolated aircraft parking position, Aircraft stand markings, Apron safety lines, Road holding position marking, mandatory instruction marking, Declared Distances

UNIT – IV FACILITATION:

Definitions, Entry & Departure of aircraft-Description, Purpose & use of aircraft documents, General Declaration-Entry & departure of persons and their baggage-Entry requirement & procedures for crew & other operator's personnel, National Provisions-Customs duty on aircraft, Customs requirement

UNIT – V ICAO ANNEXURE TERMINOLOGY:

Various definitions, terminologies used in aviation.

TOPICS FOR SELF STUDY:

Sl. No	Topics	Web Links
1	Rule of Aircraft	https://www.civilaviation.gov.in/sites/default/files/moca_000947.pdf
2	Civil Aviation Requirement	http://164.100.60.133/rules/car-ind.htm
3	ICAO Annexure	https://www.icao.int/safety/airnavigation/nationalitymarks/annexes_booklet_en.pdf

REFERENCE BOOKS:

1. Air Pilot's Manual, Vol 2, and Aviation Laws by Peter. D. Godwin
2. Air Regulation Part 1 by R.K Bali.
3. Air Regulation Part 2 by R.K Bali.

SPECIFIC LEARNING OUTCOMES (SLO):

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
I	Rules of the Air		
1.1	Applicability of rules of the air	Explain Applicability of rules of the air	K3
1.2	General Rules- Protection of persons & amp	General Rules-Protection of persons & amp	K1
1.3	Surface movement of Aircraft	Define Surface movement of Aircraft	K3
1.4	Lights to be displayed by aircraft	What are the Lights to be displayed by aircraft	K1
1.5	Flight plans	What is Flight Plans	K1
1.6	VFR, IFR, SVFR	Explain VFR, IFR, SVFR	K2
1.7	Airspace classification	Explain Airspace classification	K3
1.8	FIRs & amp	Define FIRs & amp	K3
1.9	Location indicator	What is Location indicator	K1
1.10	Air Defence Identification Zones	Explain Air Defence Identification Zones	K2

1.11	Restricted Areas, Prohibited Area, Danger Area	Explain Restricted Areas, Prohibited Area, Danger Area	K2
1.12	Navigational lights to be displayed in the aircraft	Explain Navigational lights to be displayed in the aircraft	K3
II	Interceptions of Civil Aircraft		
2.1	Interceptions of civil aircraft	Interceptions of civil aircraft	K2
2.2	Signals for use in the event of interception	What are signals for use in the event of interception	K3
2.3	Phrases for use by intercepting/intercepted aircraft	Define phrases for use by intercepting/intercepted aircraft	K1
2.4	Signals initiated by intercepted aircraft and response by intercepting aircraft	Explain signals initiated by intercepted aircraft and response by intercepting aircraft	K3
2.5	Signals	Visual signals for aerodrome traffic, visual ground signals, marshalling signals, indicators & amp	K3
2.6	Signalling devices wind direction indicators	Explain signalling devices wind direction indicators	K1
2.7	Landing direction indicator, signalling lamp, signal panel and signal area	Define landing direction indicator, signalling lamp, signal panel and signal area	K3
III	Aerodromes		
3.1.0	Aeronautical Beacon	Explain Beacon Aeronautical	K3
3.1.1	Beacon	Location- Characteristics- Identification Beacon	K1
3.1.2	Runway Markings- Threshold Markings Holding position markings , Taxiway markings	Define Runway Markings- Threshold Markings Holding position markings , Taxiway markings	K2
3.1.3	Runway lightings	Explain Runway lightings	K3
3.1.4	wing bar lights	What is wing bar lights	K1
3.1.5	Taxiway lightings-stop way lights	Define Taxiway lightings-stop way lights	K3
3.1.6	Isolated aircraft parking position	Explain Isolated aircraft parking position	K3
3.1.7	Aircraft stand markings	What Aircraft stand markings	K1
3.1.8	Apron safety lines	What is Apron safety lines	K1
3.1.9	Road holding position marking	What is Road holding position marking	K1

3.1.10	Mandatory instruction marking	What is mandatory instruction marking	K1
IV	Facilitation		
4.1.0	Entry &	Definitions Entry &	K2
4.1.1	Departure of aircraft-Description	Departure of aircraft-Description	K1
4.1.2	Use of aircraft documents	use of aircraft documents	K2
4.1.3	General Declaration-Entry &	General Declaration-Entry &	K3
4.1.4	departure of persons and their baggage-Entry requirement &	departure of persons and their baggage-Entry requirement &	K1
4.1.5	procedures for crew &	procedures for crew &	K1
4.1.6	National Provisions-Customs duty on aircraft, Customs requirement	National Provisions-Customs duty on aircraft, Customs requirement	K2
V	ICAO Annexure Terminology		
5.1.0	Various definitions	Various definitions ICAO	K3
5.1.1	Terminologies	Terminologies used in aviation.	K3

Third Year

**CORE PRACTICAL V
HANGAR WORKSHOP II
(Practical)**

Semester V

Code:

Credit: 4

COURSE OUTCOMES:

On completion of this course, the students will be able to:

Sl. No	Course Outcomes	Level	Unit Covered
1	Demonstrate the working of c152 aircraft systems	K2	I
2	Function as aircraft technician under suberized environment	K4	I
3	Take part in maintenance schedule of Cessna 152 aircraft	K4	I
4	Demonstrate the working of c 172 aircraft system	K2	II
5	Examine the function of auto pilot system in Cessna 172	K4	II
6	Take part in maintenance schedule of Cessna 172 aircraft	K4	II

COURSE OBJECTIVE:

To Familiarize with the Cessna 152 and Cessna 172 aircraft and their systems.

1. FAMILIARIZATION ON CESSNA 152

- Airframe familiarization
- Engine familiarization
- Cessna 152 Electrical system
- Cessna 152 Hydraulic system
- Cessna 152 Landing gear system
- Cessna 152 Aircraft Instrument system

2. FAMILIARIZATION ON CESSNA 172

- Airframe familiarization
- Engine familiarization
- Cessna 172 Electrical system
- Cessna 172 Hydraulic system
- Cessna 172 Landing gear system
- Cessna 172 Aircraft Instrument system

TOPICS FOR SELF STUDY:

Sl. No.	Topics	Web Links
1	Cessna 152	https://en.wikipedia.org/wiki/Cessna_152
2	Cessna 172	https://en.wikipedia.org/wiki/Cessna_172

REFERENCE BOOKS:

1. Cessna 152 Aircraft Service manual by Cessna Aircraft Company
2. Cessna 172 Aircraft Maintenance manual by Cessna Aircraft Company

SPECIFIC LEARNING OUTCOMES (SLO):

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
1	Fire Training.		
1.1	Aircraft frame	Explain the basics of Cessna 172 aircraft	K2
1.2	Engine frame	Interpret the basic parts of Cessna 172 aircraft	K2
1.3	Cessna 172 electrical	Demonstrable the working principle of electrical system in Cessna 172	K2
1.4	Cessna 172 by hydraulic system	Apply the theoretical knowledge of hydraulics in practical session	K3
1.5	Cessna 172 landing gear system	Experiment with the working of long gear of Cessna 172	K3
1.6	Cessna 172 aircraft instrument system	Apply the theoretical knowledge of aircraft instruments in practical session	K3

COURSE OUTCOMES:

On completion of this course, the students will be able to:

Sl. No	Course Outcomes	Level	Unit Covered
1	Define the terms related to aviation security	K1	I
2	Identify the process & equipment required for screening	K3	II
3	Identify the objects which are restricted in flight	K3	III
4	Determine the threat level for aviation and convention Related to safeguarding aviation	K5	IV
5	Summarize host age negotiation plan	K2	V
6	Outline the objective of aviation security	K2	I

COURSE OBJECTIVE:

The aim of the course is to

- Train various terminologies and threats in aviation.
- Learn to screen and search the passengers and staffs.
- Study about the restricted articles and substances regarding aircraft.
- Know about the aircraft hijacking and different international conventions.
- Have good knowledge in situation of hostage negotiation and their role.

UNIT – I DEFENITIONS, OBJECTIVES AND THREATS:

Aviation security and Airport security – Terminologies related to aviation security – Objectives of Aviation security – Nature of threats – Types / Characteristics of offenders.

UNIT – II SCREENING AND SEARCHING OF PASSENGERS AND STAFF:

Stages involved in inspection/screening process – Equipment's required for screening – X-ray examination of baggage – Physical inspection of baggage.

UNIT – III RESTRICTED ARTICLES AND SUBSTANCES:

Definition – Categories of restricted articles – Improvised explosive devices – Places of concealment of Explosives – Types of explosives detectors – Bomb threat – Threat to an airborne aircraft.

UNIT – IV AIRCRAFT HIJACKING AND INTERNATIONAL CONVENTIONS:

Unlawful seizure of Aircraft (Hijacking) – Why is Civil aviation considered as an attractive target? Where can the threats come from? – Historical review of the past incidents – Dealing with the hijacking situation onboard – Tokyo convention Hague convention – Montreal convention.

UNIT – V HOSTAGE NEGOTIATION:

Hostage situation – Hostage situation move through several distinct phases – Hostage takers – The negotiator arrives on the scene – Negotiator objectives and tactics – Making a deal with the hostage taker – Role of Cabin crew in hostage situation.

TOPICS FOR SELF STUDY:

Sl. No	Topics	Web Links
1	Emerging security threat in Aviation security	http://blog.safe-passage.com/emerging-threats-to-aviation-security
2	Improvised explosive devises	https://en.wikipedia.org/wiki/Improvised_explosive_device
3	Improved passenger screening technology	https://www.futuretravelexperience.com/2016/08/new-technologies-strive-to-enhance-airport-security/

REFERENCE BOOKS:

1. R.K. Bali – Regulation
2. Kathleen M. Sweet – Aviation and airport security
3. ICAO Annex 17

SPECIFIC LEARNING OUTCOMES (SLO):

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
I	DEFENITIONS,OBJECTIVESANDTHREATS		
1.1	Aviation security and airport security	Exploited of aviation security	K2
1.2	Terminology related to aviation security	Definition related to aviation security	K1
1.3	Objectives of aviation security	List roles & responsibilities of aviation security units	K4
1.4	Nature of threats	Determine the threats for aviation	K5
1.5	Characteristics of offenders	Identify the offenders	K3
II	SCREENINGANDSEARCHINGOFFPASSENGERSANDSTAFF		
2.1	Stages involved in inspection/screening process	List out the stages in screening process	K4
2.2	Equipment required for screening	Choose the correct equipment for specific purpose of screening	K3
2.3	X-ray examination of baggage	Explain the process of screening Baggage using x-ray	K2

2.4	Physical inspection of baggage	Explain the process of physical Inspection of baggage	K2
III	RESTRICTEDARTICLESANDSUBSTANCES		
3.1.0	Definition	Define the terms related with restricted article	K1
3.1.1	Categories of restricted items	List of the items which are restricted	K4
3.1.2	Improvised explosive Devises	Explained	K2
3.1.3	Places of concealment of explosive	Identify the places of concealment of explosives	K3
3.1.4	Types of explosive detector	Compare different type of detector For a particular purpose	K4
3.1.5	Bomb threat	Decide what to do in bomb threat Situation	K5
3.1.6	Threat to an airborne aircraft	Plan contingency procedure	K6
IV	AIRCRAFTHIJACKINGANDINTERNATIONALCONVENTIONS		
4.1.0	Un lawful seizure of aircraft	Explain the meaning of hijack	K2
4.1.1	Why civil aviation Considered as an attractive target	List out the reason for hijack	K4
4.1.2	Where are the threats come from	Identify the area of threats	K3
4.1.3	Historical review of past incidents	Recall past incidents for future protection	K1
4.1.4	Dealing with hijacking situation on board	Explain The procedure of negotiation	K2
4.1.5	Tokyo convention Hague convention, Montreal convention	List out the important contents of these convention	K4
V	HOSTAGENEGOTIATION		
5.1.0	Hostage situation	Assume the situation of hostages	K4
5.1.1	Hostage situation move through several distinct phases	Explain the situation of hostages during several phases	K2
5.1.2	The negotiators arrives on the scene	Outline the negotiation of the scene	K2
5.1.3	Negotiator's objectives & tactics	Formulate the objective of negotiator	K6
5.1.4	Making a deal with hijackers	Outline the procedure of negotiation	K2
5.1.5	Relocating crew in hijacking situation	Decide the responsibility of cabin crew during negotiation process	K5

COURSE OUTCOMES:

On completion of this course, the students will be able to:

Sl. No	Course Outcomes	Level	Unit Covered
1	Summaries the Basics of set Principle	K2	I
2	Illustrate the working of air Intake	K2	II
3	List out the various types of compressor and its benefits	K4	III
4	Dissect and Explain the different part of a combustion chamber	K4	IV
5	Explain the working principle of Fuel Atomizer And Igniter	K2	IV
6	Discuss the faults of a compressor	K6	V

COURSE OBJECTIVE:

Understand the principle behind Gas Turbine Engine operation, their working, types and components.

UNIT - I GAS TURBINE THEORY:

Introduction, Jet engine types, principle of jet thrust, engine efficiency, factors affecting thrust, internal engine parameter change, The gas turbine cycle, effects of Ram, density, and Temperature.

UNIT - II AIR INTAKES:

Intake design, Design requirement of an ideal air intake, Airflow through Ducts, Types of Air intake design (simple pitot, conical spike, wedge type), Subsonic Intake & Intake operation (critical, sub critical & super critical operations), Supersonic intake, shock waves, supersonic theory & supersonic inlet duct three speed zones operations (subsonic, Transonic & supersonic), Types of intakes for supersonic flight (pitot type & External compression, External compression types (Two shock, three shocks, Isentropic Amp; variable geometry intakes), Super intake critically (critical, sub critical & super critical operations).

UNIT - III COMPRESSORS:

Introduction, design basic requirement of a compressor, Centrifugal Compressor, Main feature of single stage centrifugal compressor, Principles of operation & efficiency loss of CF Compressor, airflow through double entry impeller, , diffuser system, Axial flow compressor , construction & its principles of operation, Reverse flow compressor, The main features of axial flow compressors,

compressor stall & surging, Stall conditions/occasions (At low & high RPM & acceleration stall) effects of compressor surge, Avoidance of compressor stall & surge (variable position guide vanes, air release valves (Bleed valves), multi spool engines, Variable area nozzle), compressor icing Axial & centrifugal type and causes of icing, comparison of axial flow and centrifugal flow compressor engines.

UNIT – IV COMBUSTION SYSTEMS:

Introduction, combustion system requirements, Basic types of combustion chambers, multiple combustion chambers, The annular combustion chamber, cannular combustion chamber, The direct flow type combustion chamber, Reverse flow combustion chamber, Advantage & disadvantages of Annular over other two types of CC, Fuel injection and vaporization, Atomization of fuel, Types of Burners (simplex, duplex, spill & Lubbock).

UNIT – V TURBINES:

Introduction, turbine principle of operation, constructions of Reaction and impulse turbine, Basic Material requirements of turbine, turbine faults (loss of tip clearance, buckling, cracking and distortion, FOD, Turbine blade containment), turbine blade creep, Types of installations (Single spool, multi-spool, Direct couple & free turbines), nozzle guide vanes (NGV), Exhaust system & its components (Exhaust unit, Jet pipe & Propelling Nozzle), Turbofan Engines: Turbofan engine layout, Bypass ratio, Turbofan engine performance, Turboprop Engines: principle of operation, types of turboprop engines, turboprop reduction gearing, propeller and engine control (constant speed control unit), turboprop performance, Introduction, Turbo Prop aircraft, principle of operation.

TOPICS FOR SELF STUDY:

Sl. No	Topics	Web Links
1	Gas Turbine Theory	https://en.wikipedia.org/wiki/Gas_turbine
2	Air Intakes	https://www.sciencedirect.com/topics/earth-and-planetary-sciences/air-intakes
3	Combustion Systems	https://www.sciencedirect.com/topics/engineering/combustion-system

REFERENCE BOOKS:

1. The Professional Pilot Study Guide Series, Mike Burton.
2. Aerodynamics, Engines and Airframe Systems for Air Transport Pilot, A Trevor Thom Manual.

SPECIFIC LEARNING OUTCOMES (SLO):

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
I	Gas Turbine Theory		
1.1	Introduction	Outline the basic about jet engine	K2
1.2	Jet engine types	List out the different type of Jet engine	K4
1.3	principle of jet thrust	Illustrate the working principle of jet thrust	K2
1.4	engine efficiency	Decide the factors which Influence the efficiency of engine	K5
1.5	Factors affecting thrust	List out the factors which affect thrust	K4
1.6	internal engine parameter change	Inspect the factors which changes the engine parameter	K4
1.7	The gas turbine cycle	Explain\ e the cycle of gas turbine engine	K2
1.8	Effects of Ram	Summarise the effects of Ram in jet engine	K2
1.9	Density and temperature	Summarised the effects of Ram in jet engine	K2
II	Air Intakes		
2.1	Intake design	Introduction of Intake design	K2
2.2	Design requirement of an ideal air intake	Design requirement of an ideal air intake	K2
2.3	Airflow through Ducts	Define Airflow through Ducts	K3
2.4	Types of Air intake design (simple pitot, conical spike, wedge type)	Explain Types of Air intake design (simple pitot, conical spike, wedge type)	K2
2.5	Subsonic Intake &	What is Subsonic Intake &	K3
2.6	Intake operation (critical, sub critical & super critical operations), Supersonic intake, shock waves, supersonic theory &	Explain Intake operation(critical, sub critical & super critical operations), Supersonic intake, shock waves, supersonic theory &	K2
2.7	supersonic inlet duct three speed zones operations (subsonic, Transonic & supersonic),	Discuss about supersonic inlet duct three speed zones operations (subsonic, Transonic & supersonic),	K2
2.8	Types of intakes for supersonic flight (pitot type & External compression, External compression types (Two shock, three shocks, Isentropic & variable geometry intakes)	Types of intakes for supersonic flight (pitot type & External compression, External compression types (Two shock, three shocks, Isentropic & variable geometry intakes)	K2

2.9	Super intake critically (critical, sub critical & super critical operations).	Super intake critically (critical, sub critical & super critical operations).	K2
III	Compressors		
3.1.0	Introduction	Introduction of compressor	K1
3.1.1	design basic requirement of a compressor	design basic requirement of a compressor	K2
3.1.2	Centrifugal compressor	Explain Centrifugal compressor	K3
3.1.3	Main feature of single stage centrifugal compressor	Explain Main feature of single stage centrifugal compressor	K2
3.1.4	Centrifugal Compressor	efficiency loss of CF Compressor, airflow through double entry impeller, , diffuser system	K2
3.1.5	Axial flow compressor	Axial flow compressor , construction & its principles of operation, Reverse flow compressor	K3
3.1.6	The main features of axial flow compressors, compressor stall & surging, Stall conditions/occasions (At low & high RPM & acceleration stall) effects of compressor surge	The main features of axial flow compressors, compressor stall & surging, Stall conditions/occasions (At low & high RPM & acceleration stall) effects of compressor surge	K2
3.1.7	Avoidance of compressor stall & surge (variable position guide vanes, air release valves (Bleed valves), multi spool engines, Variable area nozzle),	Explain Avoidance of compressor stall & surge (variable position guide vanes, air release valves (Bleed valves), multi spool engines, Variable area nozzle),	K3
3.1.8	Compressor icing Axial & centrifugal type and causes of icing, comparison of axial flow and centrifugal flow compressor engines.	Explain compressor icing Axial & centrifugal type and causes of icing, comparison of axial flow and centrifugal flow compressor engines.	K3
IV	Combustion Systems		
4.1.0	Introduction, combustion system requirements	Introduction, combustion system requirements	K2
4.1.1	Basic types of combustion chambers multiple combustion chambers, The annular combustion chamber, Cannular combustion chamber, The direct flow type combustion	Basic types of combustion chambers multiple combustion chambers, The annular combustion chamber, Cannular combustion chamber, The direct flow type combustion chamber, Reverse flow combustion chamber	K2

	chamber, Reverse flow combustion chamber		
4.1.2	Advantage & disadvantages of Annular over other two types of CC,	Advantage & disadvantages of Annular over other two types of CC,	K2
4.1.3	Fuel injection and vaporization, Atomization of fuel	Explain Fuel injection and vaporization, Atomization of fuel	K3
4.1.4	Types of Burners (simplex, duplex, spill & Lubbock).	Types of Burners (simplex, duplex, spill & Lubbock).	K2
V	Turbines		
5.1.0	Introduction, turbine principle of operation	Introduction, turbine principle of operation	K2
5.1.1	constructions of Reaction and impulse turbine,	Explain constructions of Reaction and impulse turbine	K3
5.1.2	Basic Material requirements of turbine	Discuss about Basic Material requirements of turbine	K2
5.1.3	turbine faults (loss of tip clearance, buckling, cracking and distortion, FOD, Turbine blade containment), turbine blade creep,	Define turbine faults (loss of tip clearance, buckling, cracking and distortion, FOD, Turbine blade containment), turbine blade creep,	K3
5.1.4	Types of installations (Single spool, multi-spool, Direct couple & free turbines), nozzle guide vanes (NGV),	Types of installations (Single spool, multi-spool, Direct couple & free turbines), nozzle guide vanes (NGV),	K2
5.1.5	Exhaust system & its components (Exhaust unit, Jet pipe & Propelling Nozzle),	Illustrate Exhaust system & its components (Exhaust unit, Jet pipe & Propelling Nozzle),	K3
5.1.6	Turbofan Engines	Turbofan engine layout, Bypass ratio, Turbofan engine performance	K2
5.1.7	Turboprop Engines	principle of operation, types of turboprop engines, turboprop reduction gearing, propeller and engine control (constant speed control unit), turboprop performance	K3
5.1.8	Turbo Prop aircraft	Introduction, Turbo Prop aircraft, principle of operation.	K2

Third Year

**SKILL BASED ELECTIVE I
TICKETING AND VISA
(Theory)**

Semester V

Code:

Credit: 2

COURSE OBJECTIVES:

- The nature and types of business organizations-Principles & functions of Management
- Process of decision making
- Advanced level of theoretical and applied knowledge in subjects concerning with the business of Travel Agency and tour operator.

UNIT – I Concepts of Service-Learning:

Service-learning – Definition, Principles- engagement, reflection, reciprocity, public dissemination; Meaning of community and understanding of community dynamics. Project Planning stages and Ethical concerns Activity: Assignment/Role Play/Case Study/Any other

UNIT – II Fundamentals of Airline Ticketing (Theoretical Concepts):

Introduction to Airline ticketing –Policy and Procedures – location Geography & Reservation – Ticketing Formalities – Refund & Cancellation policy Activity: Assignment / Seminar / Group Discussion / Hands-on Training / Designing Pamphlets / Handouts / Any other

UNIT – III Types of Visa (Theoretical Concepts):

Visa Understanding and important technologies - Business – Work – Tourism - Research – Student - On Arrival – Transit – J1 (Minor) – PR – NRI – Steps to apply any visa for any country. Activity: Assignment / Seminar / Group Discussion / Hands-on Training / Designing Pamphlets / Handouts / Any other

UNIT – IV Ticketing Audit (Practical Community Engagement):

Ticket Fares – Availability – Class – Connections – Meal plan - E-Boarding Procedures - Security Producers – Baggage limitation Activity: Preparation of Questionnaire for preliminary survey / Video Presentations / Journal Maintenance / Any other

UNIT – V Visa filling (Community Engagement):

Understanding types of Visa – Refusal Avoidance – Covering Letter – Travel Itinerary – Hotel Vouchers – Supporting Documents – Financial Documents – Submission of Visa – Visa Appointment

Practical: (i) Travel Agency Visit (ii) Domestic and International Departure formalities Practice (iii) Case Studies on Foreign Currency Conversion (iv) Tour Brochures and Package Preparation & Calculation Practical.

TEXT BOOKS:

1. Aviation Maintenance Management – Harry A. Kinnison McGraw Hill Reference Books:
2. Risk Management and Error Reduction in Aviation Maintenance – Manoj S. Patankar and James C. Taylor – Ashgate Publishing Ltd.

REFERENCE BOOKS:

1. Managing Maintenance Error – James Reason and Alan Hobbs – Ashgate Publishing Ltd.
2. TOURISM OPERATIONS AND MANAGEMENT–, 25 March 2009
3. Airline Airport & Tourism Management by Dr.SumeetSuseelan

E- REFERENCE:

<http://teamslive.com/DOWNLOADS/Bharathiar%20University%20Study%20Materials/UG/BBA%20Airline%20&%20Airport%20Management/Third%20Year/Travel%20Agency%20Operations.pdf>

COURSE OUTCOMES:

- Categories of tour operators
- Preparation of holiday packages and Brochure
- To know types of holiday packages
- Managing time and tasks and clarifying personal values
- Collaborative study practice and independent learning,

Third Year

**CORE COURSE VIII
AIRCRAFT INSTRUMENTS
(Theory)**

Semester VI

Code:

Credit: 5

COURSE OUTCOMES:

On completion of this course, the students will be able to:

Sl. No	Course Outcomes	Level	Unit Covered
1	Outline of the Pressure instrument And types of pressure	K3	I
2	Describe About working principle and construction of Air speed indicator	K3	II
3	Describe About working principle and construction of Vertical Speed Indicator	K3	III
4	Study of Earth Magnetism	K2	IV
5	Study of Magnetic Compass	K2	IV
6	Describe about Gyro Instrument	K2	V

COURSE OBJECTIVE:

To understand the various principles and functions of pressure instruments and gyro instruments.

UNIT – I PRESSURE INSTRUMENTS:

Revision on atmospheric pressure, static pressure, dynamic pressure, Pressure system, Pressure altimeter, simple altimeter, sensitive altimeter, servo-assisted altimeter- its working principle and construction, 10000 feet warning flag, altimeter errors, blockage and leakage associated with altimeter, purpose of servo assisted altimeter, Hysteresis.

UNIT – II AIRSPEED INDICATORS:

Working Principle and construction of ASI, speeds which are mentioned on the dial of ASI using coloured ark, IAS, TAS, EAS, CAS, RAS, conversion, error, leakages and blockages associated with ASI. Mach meter, its principle, Mach/TAS calculations, Mach meter errors.

UNIT – III VERTICAL SPEED INDICATOR:

Working principle and construction of VSI, Delayed Static pressure, best rate of climb (V_y), Best angle of climb (V_x), Pressure error, Time lag, Position error and blockages, Instantaneous vertical speed indicator (IVSI), Purpose of IVSI, Dashpot, Problem with Dashpot during turn.

UNIT – IV MAGNETISM AND COMPASS:

Earth magnetism, Properties of magnet, Horizontality, sensitivity, aperiodicity, turning error, acceleration error, variation and deviation, Compass heading, magnetic heading, true heading.

UNIT – V GYRO INSTRUMENTS:

Properties and fundamentals of gyros, types of gyros-space gyro, earth gyro, tied gyro, rate gyro, drift, topple and wander, gyro rotor, spin axis Direction Indicator-Principle of operation, adjustment procedure, erection system, gimbal error, Drift calculation, Drift compensation Attitude Indicator- Principle and construction, erection mechanism, acceleration errors, turning errors, electrically driven attitude indicator and its errors Turn and slip Indicator- Principle and construction, bank indication, turn coordinator.

TOPICS FOR SELF STUDY:

S. No	Topics	Web Links
1	Pressure Instruments, Gyro Instruments	https://pilotinstitute.com/gyroscopic-instruments/#:~:text=The%203%20main%20gyroscopic%20instruments,aircraft's%20orientation%20can%20be%20measured.
2	speed Indicators	https://www.skybrary.aero/articles/air-speed-indicator#:~:text=An%20air%20speed%20indicator%20(ASI, and%20thus%20determine%20forward%20speed.
3	Magnetism and compass	https://www.exploratorium.edu/snacks/circles-of-magnetism#:~:text=A%20compass%20allows%20us%20to,parallel%20to%20magnetic%20field%20lines.

REFERENCE BOOKS:

1. GSP – Flight instruments
2. Oxford – general Knowledge 4 (Instrumentation)

SPECIFIC LEARNING OUTCOMES (SLO):

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
I	Pressure Instruments		
1.1	Revision on atmospheric pressure, static pressure, dynamic pressure, Pressure system	Revision on atmospheric pressure, static pressure, dynamic pressure, Pressure system	K2
1.2	Pressure altimeter, simple altimeter, sensitive altimeter,	Pressure altimeter, simple altimeter, sensitive altimeter, servo-assisted altimeter- its	K3

	servo-assisted altimeter- its working principle and construction	working principle and construction	
1.3	10000 feet warning flag, altimeter errors,	Define 10000 feet warning flag, altimeter errors,	K2
1.4	Blockage and leakage associated with altimeter	Explain blockage and leakage associated with altimeter	K2
1.5	Purpose of servo assisted altimeter, Hysteresis.	Purpose of servo assisted altimeter, Hysteresis.	K2
II	Airspeed Indicators		
2.1	Working Principle and construction of ASI	Working Principle and construction of ASI	K3
2.2	speeds which are mentioned on the dial of ASI using coloured ark	Explain speeds which are mentioned on the dial of ASI using coloured ark	K3
2.3	IAS, TAS, EAS, CAS, RAS, conversion, error, leakages and blockages associated with ASI	Detail about IAS, TAS, EAS, CAS, RAS, conversion, error, leakages and blockages associated with ASI	K2
2.4	Mach meter, its principle, Mach/TAS calculations,	What is Mach meter, its principle, Mach/TAS calculations	K2
2.5	Mach meter errors.	Explain Mach meter errors.	K3
III	Vertical speed indicator		
3.1.0	Working principle and construction of VSI	Explain Working principle and construction of VSI	K3
3.1.1	Delayed Static pressure	What is Delayed Static pressure	K2
3.1.2	best rate of climb (Vy), Best angle of climb (Vx),	Explain best rate of climb (Vy), Best angle of climb (Vx),	K2
3.1.3	Pressure error, ,	What is Pressure error	K2
3.1.4	Time lag, Position error and blockages	What is Time lag, Position error and blockages	K3
3.1.5	Instantaneous vertical speed indicator (IVSI)	Explain Instantaneous vertical speed indicator (IVSI)	K2
3.1.6	Purpose of IVSI, Dashpot, Problem with Dashpot during turn.	Purpose of IVSI, Dashpot, Problem with Dashpot during turn.	K3
IV	Magnetism and compass		
4.1.0	Earth magnetism	Explain Earth magnetism	K2
4.1.1	Properties of magnet	Horizontality, sensitivity, aperiodicity, turning error, acceleration error, variation	K2

		and deviation	
4.1.2	Compass	Compass heading, magnetic heading, and true heading	
V	Gyro Instruments		
5.1.0	Properties and fundamentals of gyros	Properties and fundamentals of gyros	K2
5.1.1	Types of gyros-space gyro, earth gyro, tied gyro, rate gyro, drift, topple and wander, gyro rotor, spin axis	Types of gyros-space gyro, earth gyro, tied gyro, rate gyro, drift, topple and wander, gyro rotor, spin axis	K3
5.1.2	Direction Indicator-Principle of operation	What is Direction Indicator-Principle of operation	K2
5.1.3	Adjustment procedure, erection system, gimbal error,	Adjustment procedure, erection system, gimbal error	K3
5.1.4	Drift calculation, Drift compensation	Drift calculation, Drift compensation	K4
5.1.5	Attitude Indicator-Principle and construction, erection mechanism, acceleration errors, turning errors	Attitude Indicator- Principle and construction, erection mechanism, acceleration errors, turning errors	K3
5.1.6	Electrically driven attitude indicator and its errors Turn and slip Indicator-	Explain electrically driven attitude indicator and its errors Turn and slip Indicator	K4
5.1.7	Principle and construction, bank indication, turn coordinator.	Principle and construction, bank indication, turn coordinator.	K2

COURSE OUTCOMES:

On completion of this course, the students will be able to:

Sl. No	Course Outcomes	Level	Unit Covered
1	Understand about the Direction finding Aids	K4	I
2	What is Radar and It's types	K2	II
3	Classify the Advantage and Disadvantage of the Radar	K2	II
4	What is cockpit Display And it's types	K2	III
5	Explain Secondary Radar theory And DME	K3	IV
6	Explain Secondary Surveillance Radar	K3	V

COURSE OBJECTIVE:

Understand the functioning of various Nav aids that are made available inflight, on ground, principle behind their operation.

UNIT – I DIRECTION FINDING AIDS:

Basic Radio Propagation Principles.

VDF-Principles, Factors affecting range (D), Factors affecting accuracy, VHF let-down service.

ADF/NDB-Types of NDB, principles of airborne D/F, frequency range, ADF, RBI, RMI, uses of RBI, Errors (ADF and NDB), and Accuracy.

VOR (VHF OMNIRANGE)-Principle of operation, airborne equipment, frequency range, Factors affecting accuracy, factors affecting range.

RMI- Advantages and use of RMI, HSI.

UNIT – II BASIC RADAR:

Introduction to RADAR principles, Primary RADAR, Secondary RADAR, Terminology, Advantages and Disadvantages of primary and secondary RADAR, RADAR parameters, use of RADAR, Types of ground radar services, Use of Surveillance RADAR, Types of radar approaches.

UNIT – III AIRBORNE WEATHER RADAR AND COCKPIT DISPLAYS:

Introduction to CRT and LCD Head-up display, Principle of operation and functions of airborne weather Radar, Types of antennae and beam used, Selection of frequency, Intensity of weather displayed in colour display, Iso echo circuit, Controls in panel, Mapping display, hazard detections.

UNIT – IV SECONDARY RADAR THEORY AND DME:

Introduction to Secondary Radar principle, Transponder, airborne equipment, working principle of DME, Saturation of ground equipment, Distance calculation, slant range, Search mode, Track mode, co-located VOR and DME, ILS paired DME, Use of the equipment.

UNIT – V SECONDARY SURVEILLANCE RADAR:

Working principle of SSR, Frequency used, Advantages and disadvantages of SSR, current modes and codes, Mode ‘C’ and ‘S’ interrogation, Advantage of Mode S, SQUAWK codes, Fruiting and Garbling.

TOPICS FOR SELF STUDY:

Sl. No	Topics	Web Links
1	Basic principle of Radio Propagation	https://www.eetimes.com/rf-basics-radio-propagation/#:~:text=Radio%20waves%20can%20propagate%20from,the%20surface%20of%20the%20earth.
2	Radar theory	https://www.infineon.com/cms/en/product/promopages/makeradar/makeradar-school/radar-theory/
3	Secondary Surveillance Radar	https://en.wikipedia.org/wiki/Secondary_surveillance_radar

REFERENCE BOOKS:

1. Oxford- Navigation 2(Radio Navigation)
2. Ground studies for Pilots-Radio Aids
3. General navigation by R.K. Bali
4. Guide to Radio telephony, Radio aids and avionics.

PECIFIC LEARNING OUTCOMES (SLO):

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
I	Direction Finding Aids		
1.1	VDF -Principles, Factors affecting range (D)	Explain VDF -Principles, Factors affecting range (D)	K3
1.2	Factors affecting accuracy, VHF let-down service.	Factors affecting accuracy, VHF let-down service.	K2
1.3	ADF/NDB -Types of NDB, principles of airborne D/F	Explain ADF/NDB -Types of NDB, principles of airborne D/F	K3
1.4	Frequency range, ADF, RBI, RMI, uses of RBI, Errors (ADF	Frequency range, ADF, RBI, RMI, uses of RBI, Errors (ADF and NDB), and Accuracy.	K2

	and NDB), and Accuracy.		
1.5	VOR (VHF OMNIRANGE)- Principle of operation, Airborne equipment, frequency range	Explain VOR (VHF OMNIRANGE)- Principle of operation, Airborne equipment, frequency range	K3
1.6	Factors affecting accuracy, factors affecting range. RMI- Advantages and use of RMI, HSI.	Factors affecting accuracy, factors affecting range. RMI- Advantages and use of RMI, HSI.	K2
II	Basic RADAR		
2.1	Introduction to RADAR principles	Define Introduction to RADAR principles	K1
2.2	Primary RADAR, Secondary RADAR, Terminology	What Is Primary RADAR, Secondary RADAR, Terminology	K2
2.3	Advantages and Disadvantages of primary and secondary RADAR, RADAR parameters, use of RADAR,	Advantages and Disadvantages of primary and secondary RADAR, RADAR parameters, use of RADAR,	K3
2.4	Types of ground radar services	Types of ground radar services	K2
2.5	Use of Surveillance RADAR,	Use of Surveillance RADAR,	K2
2.6	Types of radar approaches.	Types of radar approaches.	K2
III	Airborne Weather RADAR and Cockpit Displays		
3.1.0	Introduction to CRT and LCD Head-up display	Introduction to CRT and LCD Head-up display	K1
3.1.1	Principle of operation and functions of airborne weather Radar	Explain Principle of operation and functions of airborne weather Radar	K2
3.1.2	Types of antennae and beam used	Types of antennae and beam used	K2
3.1.3	Selection of frequency, Intensity of weather displayed in colour display	Selection of frequency, Intensity of weather displayed in colour display	K2
3.1.4	Iso echo circuit, Controls in panel, Mapping display, hazard detections.	Iso echo circuit, Controls in panel, Mapping display, hazard detections.	K1

IV	Secondary RADAR Theory and DME		
4.1.0	Introduction to Secondary Radar principle	Introduction to Secondary Radar principle	K1
4.1.1	Transponder, airborne equipment, working principle of DME, Saturation of ground equipment, Distance calculation, slant range	Explain Transponder, airborne equipment, working principle of DME, Saturation of ground equipment, Distance calculation, slant range	K3
4.1.2	Search mode, Track mode, co-located VOR and DME, ILS paired DME, Use of the equipment	What is Search mode, Track mode, co-located VOR and DME, ILS paired DME, Use of the equipment	K2
V	Secondary Surveillance RADAR		
5.1.0	Working principle of SSR, Frequency used	Working principle of SSR, Frequency used	K3
5.1.1	Advantages and disadvantages of SSR, current modes and codes,	Advantages and disadvantages of SSR, current modes and codes,	K2
5.1.2	Mode 'C' and 'S' interrogation,	What is Mode 'C' and 'S' interrogation,	K2
5.1.3	Advantage of Mode S, SQUAWK codes, Fruiting and Garbling	Advantage of Mode S, SQUAWK codes, Fruiting and Garbling	K2

Third Year

**CORE PRACTICAL VI
FLIGHT SYNTHETIC
(Practical)**

Semester VI

Code:

Credit: 4

COURSE OUTCOMES:

On Completion of this course, the student will be able to,

Sl. No	Course Outcomes	Level	Unit Covered
1	Learn how to make the Starting procedure for aircraft	K2	I
2	Learn the procedure how to make Taxing for aircraft	K3	II
3	Illustrate the Take Off synthetic procedure	K3	III
4	Learn about the Landing procedure from ATC	K3	IV
5	Outline of the Aircraft Instrument Identification	K2	V
6	Understanding the synthetic procedures of aircraft	K4	VI

- Starting procedure
- Taxing
- Take Off
- Landing
- Instrument Identification
- Understanding the synthetic procedures

TOPICS FOR SELF STUDY:

Sl. No	Topics	Web Links
1	Starting procedure	https://www.boldmethod.com/learn-to-fly/systems/how-does-a-plane-start/
2	Taxing take-off and landing	https://www.faa.gov/air_traffic/publications/atpubs/atc_html/chap3_section_7.html
3	Understanding the synthetic procedures	https://en.wikipedia.org/wiki/Flight_simulator

REFERENCE BOOKS:

1. Cessna 152 Aircraft Service manual by Cessna Aircraft Company
2. Cessna 172 Aircraft Maintenance manual by Cessna Aircraft Company

LEARNING OUTCOMES:

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
1.1	Starting procedure	Starting procedure	K3
1.2	Taxing	Taxing	K3
1.3	Take Off	Take Off	K3
1.4	Landing	Landing	K3
1.5	Instrument Identification	Instrument Identification	K2
1.6	Understanding the synthetic procedures	Understanding the synthetic procedures	K4

COURSE OUTCOMES:

On completion of this course, the students will be able to:

Sl. No	Course Outcomes	Level	Unit Covered
1	Purpose of the civil Aviation And Introduction of Civil Aviation Requirement	K4	I
2	Monitoring the Aircraft and the airport Regulation and noise management in Civil Aviation	K3	II
3	Study in Terms of General terms of Civil Aviation Requirement.	K2	III
4	Study of Airworthiness and air space and air navigation service standard	K3	III
5	Safety management System And Indian safety policy	K2	IV
6	Describe the Error and case study for the Accidents	K3	V

COURSE OBJECTIVE:

Understanding the various laws and regulations pertaining to aviation safety and standards.

UNIT – I INTRODUCTION:

Purpose of Civil Aviation requirement (CAR), purpose of safety management systems, applications, circulars, sections pertaining to various operations.

UNIT – II AVIATION ENVIRONMENTAL PROTECTION:

Noise management of aircraft, Noise Abatement operational Procedure, aircraft operations at airport, climate change initiatives and local air quality monitoring in civil aviation.

UNIT – III CIVIL AVIATION REQUIREMENTS (CAR):

Section 1 to Section 11

- General
- Airworthiness
- Air transport
- Aerodrome standards
- Air safety
- Design standard and type certification
- Flight crew standard training & licensing

- Aircraft operations
- Airspace and air navigation service standards
- Aviation environment protection
- Safe transport of dangerous goods by air

UNIT – IV SAFETY MANAGEMENT SYSTEM (SMS):

Indian safety policy, Indian safety plan, SMS, SSP, ICAO ANNEX 19- Safety management, establishment of safety management system, applicability of SMS, safety policy and objective, coordination of emergency response planning, documentation, safety management system manual, safety risk management, safety assurance, safety promotions, quality policy.

UNIT – V CASE STUDIES:

Description, error, cause of accident and solution of following accidents.

- American Airlines Flight 587
- Aires Flight 8250
- American airlines flight 191
- Air France 447
- Flight Itavia 870

TOPICS FOR SELF STUDY:

SL. No	Topics	Web Links
1	Safety Management System	https://www.faa.gov/about/initiatives/sms
2	Case study accidents	https://www.aopa.org/training-and-safety/online-learning/accident-case-studies
3	CAR	http://164.100.60.133/rules/car-ind.htm

REFERENCE BOOKS:

1. DGCA website for latest CAR updates.
2. Aerodrome Information Publication (AIP)

SPECIFIC LEARNING OUTCOMES (SLO):

UNIT	COURSE CONTENTS	LEARNING OUTCOMES	TAXONOMY LEVEL
I	Introduction		
1.1	Purpose of Civil Aviation requirement (CAR)	Explain Purpose of Civil Aviation requirement (CAR)	K2
1.2	purpose of safety management systems	Explain purpose of safety management systems	K3
1.3	applications, circulars, sections pertaining to	applications, circulars, sections pertaining to various	K2

	various operations	operations	
II	Aviation Environmental Protection		
2.1	Noise management of aircraft	Explain Noise management of aircraft	K2
2.2	Noise Abatement operational Procedure	Explain Noise Abatement operational Procedure	K2
2.3	Aircraft operations at airport	Aircraft operations at airport	K3
2.4	Climate change initiatives and local air quality monitoring in civil aviation.	Climate change initiatives and local air quality monitoring in civil aviation.	K3
III	Civil Aviation Requirements (CAR)		
3.1.0	Section 1 to Section 11	General	K1
3.1.1	Airworthiness	Explain Airworthiness	K2
3.1.2	Air transport	Explain Air transport	K2
3.1.3	Aerodrome standards	Explain Aerodrome standards	K2
3.1.4	Air safety	Explain Air safety	K3
3.1.5	Design standard and type certification	Define Design standard and type certification	K2
3.1.6	Flight crew standard training & licensing	Explain Flight crew standard training & licensing	K3
3.1.7	Aircraft operations	Describe the Aircraft operations	K3
3.1.8	Airspace and air navigation service standards	Illustrate Airspace and air navigation service standards	K2
3.1.9	Aviation environment protection	Explain Aviation environment protection	K2
3.1.10	Safe transport of dangerous goods by air	Safe transport of dangerous goods by air	K3
IV	Safety Management System (SMS)		
4.1.0	Indian safety policy	Explain Indian safety policy	K3
4.1.1	Indian safety plan, SMS, SSP, ICAO ANNEX 19- Safety management,	Indian safety plan, SMS, SSP, ICAO ANNEX 19- Safety management,	K3
4.1.2	Establishment of safety management system	Establishment of safety management system	K2
4.1.3	Applicability of SMS	Explain the applicability of SMS	K3
4.1.4	Safety policy and objective	Safety policy and objective	K4
4.1.5	Coordination of emergency response planning, documentation,	Coordination of emergency response planning, documentation,	K3

4.1.6	Safety management system manual	What is safety management system manual	K2
4.1.7	Safety risk management, safety assurance, safety promotions, quality policy.	Explain safety risk management, safety assurance, safety promotions, quality policy.	K3
V	Case Studies		
5.1.0	American Airlines Flight 587	Description, error, cause of accident and solution of following accidents.	K3
5.1.1	Aires Flight 8250	Description, error, cause of accident and solution of following accidents.	K3
5.1.2	American airlines flight 191	Description, error, cause of accident and solution of following accidents.	K3
5.1.3	Air France 447	Description, error, cause of accident and solution of following accidents.	K3
5.1.4	Flight Itavia 870	Description, error, cause of accident and solution of following accidents	K3

Third Year

MAJOR BASED ELECTIVE II
2. DANGEROUS GOODS MANAGEMENT
(Theory)

Semester VI

Code:

Credit: 4

COURSE OBJECTIVES:

- Understand the ICAO requirements, government of India requirements and Aircraft Act 1934, the Aircraft Rules 2003.
- Have basic understanding about the definitions on dangerous goods.
- Acquire good knowledge in divisions in dangerous goods.

UNIT - I CARRIAGE OF DANGEROUS GOODS:

ICAO requirements – Government of India requirements – Aircraft Act 1934 – The aircraft (Carriage of dangerous goods) Rules, 2003.

UNIT - II DANGEROUS GOODS DEFINITIONS:

Definition of dangerous goods – Dangerous goods categories.

UNIT - III CLASSIFICATION OF DANGEROUS GOODS:

Name of the class – Divisions – Identification – Packing – Marking and labelling.

UNIT - IV AIRCARGO CONCEPT:

Introduction–OperationsandIndustryRegulations–ServiceFunction,Organisation and Liability – SLI, Types of cargo-Handling of Perishable, Valuable Cargo and Special Cargo.-Air cargo Tariff, Rates & Charges – Valuation charges and Disbursement-Airway Bill, Function, Purpose and Validation

UNIT - V HANDLING FACILITY:

Airport Cargo Activity & Cargo Zone.-Aircraft Handling with Cargo.-Cargo Terminals and Facilities.-Emerging trend in Cargo & Cargo Carriers.

TEXT BOOK:

1. R.K.Bali – Regulation
2. The handling of dangerous goods – Phillips H Joshua

REFERENCE BOOK:

1. Annex 19
2. Oxford – Air Law
3. John F Magee & William C Copalino, – Modern Logistics Management, John Wiley & Sons

E- REFERENCE:

1. <https://www.icao.int/safety/dangerousgoods/working%20group%20of%20th>

[e%20whole/wp.50.appb.pdf](#)

2. <https://skybrary.aero/sites/default/files/bookshelf/1178.pdf>

COURSE OUTCOME:

- Learn the ICAO requirements, government of India requirements and Aircraft Act 1934, the aircraft Rules 2003.
- Understand about the various definitions regarding dangerous goods.
- Perceive good knowledge in divisions in dangerous goods.
- Know how to tackle dangerous goods and to proceed with precautionary actions.
- Maintain emergency response drills in aircrafts

Code:**Credit: 3**

The candidate shall be required to take up a Project Work by group or individual and submit it at the end of the final year. The Head of the Department shall assign the Guide who, in turn, will suggest the Project Work to the students in the beginning of the final year. A copy of the Project Report will be submitted to the University through the Head of the Department on or before the date fixed by the University.

The Project will be evaluated by an internal and an external examiner nominated by the University. The candidate concerned will have to defend his/her Project through a Viva-voce.

ASSESSMENT/EVALUATION/VIVA VOCE:

1. PROJECT REPORT EVALUATION (Both Internal & External)

I. Plan of the Project - 20 marks

II. Execution of the Plan/collection of Data / Organisation of Materials / Hypothesis, Testing etc. and presentation of the report. - 45 marks

III. Individual initiative - 15 marks

2. Viva-Voce / Internal & External - 20 marks

TOTAL - 100 marks**PASSING MINIMUM:**

Project	Vivo-Voce 20 Marks 40% out of 20 Marks (i.e. 8 Marks)	Dissertation 80 Marks 40% out of 80 marks (i.e. 32 marks)
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A candidate who gets less than 40% in the Project must resubmit the Project Report. Such candidates need to defend the resubmitted Project at the Viva-voce within a month. A maximum of 2 chances will be given to the candidate.

Third Year

**SKILL BASED ELECTIVE II
AIRPORT GROUND HANDLING
(Practical)**

Semester VI

Code:

Credit: 2

COURSE OBJECTIVE:

- To acquire basic understanding passenger handling;
- Understand the basic about the Dangerous Goods
- Classify the different organization works together for safe conduct of flight

COURSE OUTCOMES:

- Understand about aviation history and terminologies
- Have good idea about buildings and installation.
- Study the importance of Safety and Emergency Procedures
- Understand about various CRM Standards and Training.

UNIT – I Passenger Service and Principles of Handling:

Passenger Service and Principles of Handling – Principles of Service – Flight Information Facility – Handling – Transit/Connection – Connection/Transfer-Special Passenger – Special Passenger Handling - Interline Connection Process - Safety and Emergency Procedures

UNIT – II Dangerous Goods:

Introduction to Dangerous Goods -Introduction to Dangerous Goods - Dangerous Goods - What are Dangerous Goods - Regulations and Standards – Hazard Class Definitions - Identification and Recognition- Dangerous Goods or Hazard Class Definitions - Precautionary Measures Enforcement and Reporting - UNIT Summary - Cabin crew Duties- Roles and Responsibilities.

UNIT – III Crew Resource Management (CRM):

Classifications of Dangerous Goods - Why Dangerous Goods at All Pre Take-Off Preparations - - Passenger Safety Brief – Introduction of Cabin Crew - Pre-flight Preparations - Flight Preparation - Boarding Process - Crew Resource Management (CRM)

UNIT – IV Grooming:

Grooming: Beauty Tips - Steps to a Pedicure -Frugal Beauty Tips -Beat Dry Skin - Simple Beauty Tips-Tips for Radiant Skin – Tips for Perfect Lips -Look Years Younger -Perfect Eyes -Fade Your Freckles-Look after Your Pores -Makeup Beauty Tips-Shaving -Skin Care- Body Language – Swimming, Yoga & Fitness.

UNIT – V CRM Training:

CRM Training Evolution and CRM Desired Skills - Performance Standards for Instructors in CRM - CRM Standards and Training - CRIMs (CRM Instructors) and CRIMEs (CRM Instructor Examiners) CRM: Evolution and Basics - Flight

Control Crew Management - Maintenance Resource Management- Impact of CRM in Aviation Safety

REFERENCE BOOKS:

1. Alexander T.Well, Seth Young –Principles of Airport Management-McGraw Hill 2003
2. P.S.Senguttuvan –Fundamentals of Airport Transport Management – McGraw Hill 2003
3. The Complete Cabin Crew Interview Manual. 4. Aviation Maintenance Management – Harry A. Kinnison – McGraw Hill
