



Centurion
UNIVERSITY

Centurion University of Technology & Management

B. Sc. (Aviation)

(Three Years Programme)

School of Applied Sciences

2019

Programme Objectives

- To provide students with the necessary skills and knowledge needed to become industry leaders in a variety of aviation related fields, including pilots, aviation management and ground technicians.
- To introduce the recent advancements in the field of Aviation Industry on developing talented Avionics Stream Personnel trained in new technologies and business management skills.

Eligibility Criteria

Candidate must have passed the HSC (std:XII) examination of science stream or equivalent for 3 years BSc Aviation course.

Award of degree

After successful completion of degree, student will be awarded with Bachelor of Science in Aviation by Centurion University of Technology and Management.

Course Structure

This is a 3-year full-time under graduate program which involves two semesters in each year
(Total 6 semester)

Total Credit: 120

Domain Focus: Piloting (CPL)

Course Structure
B.Sc Aviation

SEMESTER I					
Code	CourseTitle	Type	Credit	Lectures/Week	Lectures/Semester
BSAV103	Human Factor	T	3	3	45
BSAV104	Air Navigation I	T	4	4	60
BSAV105	Air Regulation I	T	3	3	45
BSAV106	Meteorology I	T	3	3	45
BSAV107	Aircraft & Engines I	T	3	3	45
BSAV108	Flying Experience/FlyingCheck-I	P	6		
Total Credit			22		
SEMESTER II					
Code	Course Title	Type	Credit	Lectures/Week	Lectures/Semester
BSAV202	English(R/TCommunication)	T	2	2	30
FCBS0101	Environmental Science	T	3	3	45
BSAV204	Air Navigation II	T	4	4	60
BSAV205	Air Regulation II	T	3	3	45
BSAV206	Meteorology II	T	3	3	45
BSAV207	Aircraft&Engines II	T	3	3	45
BSAV208	FlyingExperience/FlyingCheck-II	P	6		
Total Credit			24		
SEMESTER III					
Code	CourseTitle	Type	Credit	Lectures/Week	Lectures/Semester
BSFL1101	English Language	T	3	3	45
BSAV301	Air Navigation III	T	4	4	60
BSAV302	Air Regulation III	T	3	3	45
BSAV303	Meteorology III	T	3	3	45
BSAV304	Aircraft & Engines III	T	3	3	45
BSAV306	Elective-I	T+P	4		
Total Credit			20		
SEMESTER IV					
Code	CourseTitle	Type	Credit	Lectures/Week	Lectures/Semester
BSAV201	Principles of Management	T	3	3	45
BSAV401	Air Navigation IV	T	4	4	60
BSAV402	Air Regulation IV	T	3	3	45
BSAV403	Meteorology IV	T	3	3	45
BSAV404	Aircraft&Engines IV	T	3	3	45
BSAV406	Elective-II	T+P	4		
Total Credit			20		
SEMESTER V					
Code	CourseTitle	Type	Credits	Lectures/Week	Lectures/Semester
BSAV501	Air Navigation V	T	4	4	60
BSAV502	Air Regulation V	T	3	3	45
BSAV503	Meteorology V	T	3	3	45
BSAV504	Aircraft & Engines V	T	3	3	45
BSAV506	Elective-III	T+P	4		
Total Credit			17		

SEMESTER VI					
CourseCode	CourseTitle	Type*	Credi	Lectures/We	Lectures/Semester
BSAV601	Air Navigation VI	T	4	4	60
BSAV602	Air Regulation VI	T	3	3	45
BSAV603	Meteorology VI	T	3	3	45
BSAV604	Aircraft&Engines VI	T	3	3	45
BSAV606	Elective-IV	T+P	4		
Total Credit			17		

Note:

Means Theoretical (T)-Practical (P)-Project(P)

FLYING: The Students will have to complete minimum 200hrs. of flying training to obtain CPL (Commercial Pilot License) which is the requirement of the DGCA. To obtain B.Sc Degree (Aviation) it is mandatory for the student to obtain CPL (Commercial Pilot Licence) and submit the copy to the examination section of the Centurion University of Technology and Management, Through concerned college.

List of Elective Subjects:

- 1) Ground Handling
- 2) MRO- Maintenance, Repair and Overhaul
- 3) AME–Aircraft Maintenance Engineering
- 4) Airport Operations
- 5) Cargo Management
- 6) Travel Management
- 7) Services Operation Management
- 8) Airline Advertising & Sales Promotion

Other Terms & Condition

- 1) Flying Experience/ Flying Check for Commercial Pilot Officer (CPL) to be conducted By Government Aviation Training Institute (GATI) at their premises.
- 2) Course Delivery shall be provided jointly by Centurion University and Government Aviation Training Institute (GATI)
- 3) Lab Infrastructure to be provided by Government Aviation Training Institute (GATI)
- 4) Practical's & Projects work shall be conducted by Government Aviation Training Institute (GATI)
- 5) Course Evaluation and certifications shall be carried by Centurion University of Technology & Management.

Semester I
Human Factors

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Human Factors	BSAV103	Theory	2-0-0	Nil

MODULE -I : General and Human Performance and Limitations (9 hrs)

General

The need to take human factors into account; Incidents attributable to human factors/human error; Murphy's' law.

Human Performance and Limitations

Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.

MODULE - II : Social Psychology and Factors Affecting Performance(9 hrs)

Social Psychology

Responsibility: individual and group; Motivation and de -motivation; Peer pressure; 'Culture' issues; Team working; Management, supervision and leadership.

Factors Affecting Performance

Fitness/health; Stress: domestic and work related; Time pressure and deadlines; Workload: overload and under load; Sleep and fatigue , shift work; Alcohol, medication, drug abuse.

MODULE – III : Physical Environment and Tasks (9 hrs)

Physical Environment

Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.

Tasks

Physical work; Repetitive tasks; Visual inspection; Complex systems.

MODULE – IV : Communication(9 hrs)

Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information.

MODULE –V :Human Error and Hazards in the Workplace(9 hrs)

Human Error

Error models and theories; Types of error in maintenance tasks; Implications of errors (i.e accidents) Avoiding and managing errors.

Hazards in the Workplace

Recognising and avoiding hazards; Dealing with emergencies.

Text Books

EASA Module-09 Human Factors by AIRCRAFT TECH BOOK CO.

Reference books

CAP 718 - Human Factors in Aircraft Maintenance and Inspection by CAA

Human Factors Training Manual by ICAO Doc 9683

Human Factors Guidelines for Safety Audits Manual by ICAO Doc 9806

Human Factor Guidelines for A/c Maintenance Manual by ICAO Doc 9824

Human Factor Guide for Aircraft Maintenance (FAA) by William Shepard

Air Navigation I

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Air Navigation I	BSAV104	Theory	4-0-0	Nil

Unit I (20 hrs)

1) Direction, Latitude & Longitude

Shape of the earth, geodesy and geoid models, poles, basic directions on the earth, Sexagesimal system/true direction.

2) Circles on the Earth.

Great circle, the Equator, the Meridians, small circle, parallels of latitude, graticule, latitude, geocentric & geodetic latitude, longitude, great circle vortices, the Rhumb Line, Great circle & Rhumb Line track & distances, kilometer statute mile & nautical mile variations in the length of a nautical mile

3) Earth Magnetism .

True and magnetic direction, variation, change of variation, isogonals, magnetic dip angle, vertical and horizontal component, deviation, application of variation and deviation, agonic line, isoclinals, aclinic lines

4) Triangle of velocities .

Definitions of Heading, track, wind velocity, true air speed, ground speed, drift, the air the wind vector, the ground vector

Unit II (20 hrs)

1) Navigation Computer :

Slide rule face, distance, speed, time and conversions, TAS altitude conversions, calculation of track and ground speed, wind finding and calculation of heading, head wind and cross wind component, calculation of fuel consumption

2) Exercises in preparation of flight plans

3) The 1 in 60 rule :- Use in navigation and other application

4) Convergency and conversion angle, departure, scale

5) Maps(Route Mapping)

6) Jeppesen charts

UNIT III (20 hrs)

1) General Chart properties

Prospective and prospective charts, the "Reduced Earth", Types of projection, properties of An ideal chart, orthomorphism/ conformality

2) Mercator Chart

Cylindrical projections, direct Mercator projections, properties of Mercator charts, Mercator

3) Lamberts Conical Orthomorphic Projection

Modification of simple conic projection, orthomorphism, scale errors, chart convergence, properties, advantages and disadvantages.

Reference books

1. Air Pilot's Manual Vol 3 & 5, Peter D Godwin
2. Flight Performance & Planning, Nordian AS
3. General Navigation: ATPL JAR, Nordian AS
4. GSP : Plotting & Flight Planning, Underdown
5. GSP : Radio Aids, Underdown
6. GSP : Flight Instr. & Auto Flt, Underdown
7. GSP : Navigation, Underdown
8. Radio Navigation ATPL JAR, Nordian AS
9. Oxford Aviation Gen Navigation, Jeppesen

Air Regulation I

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Air Regulation I	BSAV105	Theory	3-0-0	Nil

Unit I(15 hrs)

- 1) Aviation Phonetics
- 2) Aviation Terminology
- 3) Aviation Phraseology
- 4) Introduction of Aviation bodies (ICAO, DGCA, FAA, JAR, CASA, WMO, BCAS)
- 5) ICAO Annexure & DGCA Documents
- 6) Introduction of
 - I. Chicago Convention 1944
 - II. Warsaw Convention 1929
 - III. Rome Convention 1952
 - IV. Tokyo Convention 1963

Unit II (15hrs)

1. Aeronautical Information Services
 - I. AIP
 - II. NOTAM
 - III. AIC
 - IV. AIRAC
 - V. PIB
 - VI. CAR

Unit III(15 hrs)

1. Indian A/c Rule 1934 (Rules 1-19)
2. Indian A/c Rules 1937
 - Part I Extent & Definitions
3. Schedule – I Prohibited Areas (Restricted Area and Danger Area)
(ADIZ - Air Defence Identification Zone)
4. Schedule – II Licenses
 - I. Students Pilot License
 - II. Private Pilot License
 - III. Commercial Pilot License
 - IV. Airline Transport Pilots License
 - V. Instrument Rating
 - VI. FRTOL (R)
 - VII. RTR (A)

Reference books

1. Aviation Act 1934, Ministry of Civil Aviation
2. Indian Aircraft Rules, Ministry of Civil Aviation
3. Aeronautical Information Publication, Ministry of Civil Aviation
4. Aircraft Manual Vol I & II, DGCA, India

Meteorology I

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Meteorology I	BSAV106	Theory	3-0-0	Nil

Unit I – Atmosphere (15 hrs)

- a) Reasons for studying MET
- b) The Atmosphere : Composition, and the Structure
- c) Tropopause heights
- d) Indian Standard Atmosphere
- e) Heating of the atmosphere & Latent heat of water
- f) Green house gases
- g) Surface heating and cooling
- h) The earth's heat budget & albedo

Unit II – Temperature and Pressure (15 hrs)

- a) Temperature, effect of latitude, diurnal variation of temperature
- b) Short waves & Long waves of radiation and the related laws
- c) Temperature changes with height, ISA conditions
- d) Inversions in the upper air
- e) Pressure, variation with height
- f) Q code of pressure
- g) Altimeter settings
- h) Pressure altitude, true altitude, height and flight level

Unit III – Air Density & Stability of the Atmosphere(15 hrs)

- a) Density of air, its units and relationship with pressure and temperature
- b) Water within the atmosphere, Water vapors content, Relative humidity
- c) Dew point and its calculation
- d) Stability of the atmosphere
- e) Lapse rate, ELR, DALR, SALER & DPLR
- f) Determination of the stability of the atmosphere and **its calculations**
- g) Freezing level in clouds and outside the clouds
- h) Clouds tops and height of base of clouds **calculations**

Reference books

- a. Aviation Meteorology by I.C. Joshi.
- b. Climatology by Prof. D. Lal

Aircraft & Engines I

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Aircraft & Engines I	BSAV107	Theory	3-0-0	Nil

Unit I (15 hrs)

1. Major components of aircraft, construction material and corrosions.
2. Basic revision of physics, weight, mass, various laws force, work, power energy
3. Principle of flights, aerodynamics, AC & CP – Pitching moments
4. Forces acting on Aircraft during ST & LVL – climb descent turn
5. Types of drag, lift drag ratio & drag speed rotation
6. Flight controls, primary controls primary & second load factors stability controllability & maneuraeability

Unit II (15 hrs)

1. Atmosphere – Pressure Altitude, Density Altitude, OAT, SAT, TAT & Conversions
2. Light A/C Single engine speeds & T/O , CLB Range max endurance & landing performance, various segments, ground effect & stabilities, controllability & manueraeability
3. RTOW & various calculation, Speeds V1, V2, Vr, Vlof, Vfs Max Structural- field length, ZFW, MLW, VMBE- Various other restrictions

Unit III(15 hrs)

1. Electrical power, DC, AC, Various Laws, Power distribution to various buses, Ammeter/ Load meters
2. Fire protection & Detection system
3. Engine fire on ground & In flight & procedures for Basic Engine Aircraft
4. Various types of DC/ AC Switches, Batteries – DC Electric & Magnetism Molecular Theory
5. Generator & Alternator – Rectifier, Inverters

Reference books

1. Flight Without Formula, Kermode
2. From the Ground Up, Sandy A. F. Macdonald
3. Manual of Flying (AP 129), Air Ministry UK
4. Pilot's Handbook for Aeronautical, FAA Knowledge
5. Flight without formula, AC Kermode
6. Mechanics Of Flight, AC Kermode
7. JAR – ATPL Gen Knowledge, Jeppesen
8. Manual of flying AP 129, Air Ministry U.K

Semester - II
Environmental Science

Course	Code	Type of course	T-P-PJ	Prerequisite
Environmental Science	FCBS0101	Theory	3-0-0	Nil

MODULE-I (15 hrs)

Environment and its multidisciplinary nature; Need for public awareness; Renewable and non-renewable resources—forest, water, mineral, land, food and energy resources; Structure and function of ecosystems of forest, grass land, desert and aquatic types.

MODULE –II(15 hrs)

Biodiversity and its conservation: Biodiversity at global, national and local levels; Threats to biodiversity - Habitat loss; wild life poaching and man - wildlife conflicts; Endangered and endemic species; conservation measures.

Causes, effects and control measures of pollution, air, water and noise pollution; Nuclear hazards; solid-waste management—Causes, effects and control measures; Management of disasters due to natural causes of floods, earthquakes, cyclones and landslides.

MODULE-III(15 hrs)

Social issues and the environment; Sustainable environment, Water conservation measures; Rain water harvesting; Resettlement and rehabilitation of people; Climate change and global warming; Acid rain; Ozone layer depletion; water land reclamation; Consumerism and waste products; Features of Environment Protection Act, Air pollution and Control of Pollution Acts; Water Pollution and its Control Act. Effects of Pollution explosion on environment and public health; Need for value education to Protect environment and resources.

Text Book:

1. Anubhav Kaushik & C.P. Kaushik: Environmental Studies-New age International Publishers.

Reference Books:

1. Benny Joseph: Environmental Studies-Tata Mac Graw Hill
2. E. Bharucha: Text book of Environmental Studies for under graduate courses– Universities Press. (Book prepared by UGC Committee).

Air Navigation II

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Air Navigation II	BSAV204	Theory	4-0-0	Nil

Unit 1(20 hrs)

1) Basic Radio Theory

Wave Motion, electro-magnetic waves, properties of radio waves, refraction, diffraction

And reflection, relationship between frequency, wavelength and velocity, Phase difference, surface waves, sky waves, space waves, critical angle dead space, the ionosphere, skip distance, duct propagation, aerials, polar diagrams, aerial feeders and directivity, modulation, keying, amplitude modulation (AM), frequency modulation (FM), pulse modulation (PM), classification of emissions.

2) Communications

Long range communication, HF communications, short-range communication, Selective calling system (SELCAL), internal communications (INTERCOM), Satellite communications (SATCOM), search and rescue satellites, ACARS

3) ADF

Loop Theory, Resolution of Ambiguity, ADF control unit, BFO or CW / RT, uses of ADF, Homing and Tracking away from the station, Factors affecting range and accuracy of ADF

Unit II (20 hrs)

1) VOR

Principle of Operation, Derivation of Phase difference, airborne equipment, OBS, to/from

And left/right deviation indicator, VOR frequencies, use of VOR, cone of confusion, factors affecting VOR range and accuracy, advantages/disadvantages as navigational aid, TVOR, DVOR, exercises on use of VOR indications and RBI

2) RMI

QDM's and relative bearing indications, discrepancies in VOR and ADF indications, advantages of

3) Instrument Landing System

Introduction, ILS components/frequencies, DME paired with ILS channels, ILS, Marker Beacons, Ground Monitoring, Coverage, Principle of Operation Localiser, Back-course ILS, Glideslope, False Glideslopes, ILS categories, Operational Performance Categories, Errors and Accuracy, ILS calculations, Introduction to Microwave Landing System

Unit III (20 hrs)

1) Air Speed Indicator: -

Static Pressure, pitot pressure, dynamic pressure, IAS, CAS, EAS, TAS, Square law compensation, limiting speeds, ASI errors.

2) Altimeters

Principle of construction of simple altimeter, Rate of pressure change with altitude, Sensitive ,Altimeter constructions, subscale setting, servo assisted altimeter, altimeter errors

3) Vertical speed indicator

Principle of operation, Instantaneous vertical speed indicator, errors. **shifted from unit II in old sem**

10) Air Temperature Measurement

Effect of Compressibility, static air temperature (SAT), Total air temperature (TAT), Ram Rise, Errors

11) Machmeter

High speed flight, operating limits, speed of sound, principle of construction, machmeter errors, blockages, relationship between mach number, true air speed and RAS in climb and descent in standard atmosphere, isothermal layer and inversion. Mach/Airspeed indicator, numerical problems of machmeter

12) Gyroscopes

Fundamental properties, factors affecting rigidity, precession rate, wander, real wander, apparent wander, tied gyros, rate gyros, application of the properties of a gyro, suction and electric gyros, Tuned rotor gyro, laser gyro, fibre-optic gyro, advantages and disadvantages of electric and suction gyros

Reference books

1. Air Pilot's Manual Vol 3 & 5, Peter D Godwin
2. Flight Performance & Planning, Nordian AS
3. General Navigation: ATPL JAR, Nordian AS
4. GSP : Plotting & Flight Planning, Underdown
5. GSP : Radio Aids, Underdown
6. GSP : Flight Instr. & Auto Flt, Underdown
7. GSP : Navigation, Underdown
8. Radio Navigation ATPL JAR, Nordian AS

Air Regulation II

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Air Regulation II	BSAV205	Theory	3-0-0	Nil

Unit I

Air Traffic Services (15 hrs)

1. Airspace Organization
2. Flight Information Service & alerting service
3. Aerodrome Control Service
4. Vicinity Separation in the vicinity of aerodromes
5. Separation Methods & Minima

Unit II(25 hrs)

Schedule – IV (Rules of Air)

1. Definitions
2. General Rules
3. Rules of Air (IFR, VFR & Special VFR)
4. Avoidance of collision
5. Flight Plan
6. ATC Control service
7. Unlawful Interference
8. Interception
9. VMC Visibility & distance from cloud minima
10. Signals (Distress, Urgency, Light & Visual)
11. Semi – Circular Rules & RVSM
12. Navigation lights displayed on A/C.
13. May Day X 3 - PANPAN X 3

Unit III(5 hrs)

Search & Rescue Organisation and procedures in India as per Indian aircraft rules.

Reference books

1. Aviation Act 1934, Ministry of Civil Aviation
2. Indian Aircraft Rules, Ministry of Civil Aviation
3. Aeronautical Information Publication, Ministry of Civil Aviation
4. Aircraft Manual Vol I & II, DGCA

Meteorology II

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Meteorology II	BSAV206	Theory	3-0-0	Nil

Unit 1 - Clouds & Precipitation (15 hrs)

- a) Structure of the clouds and its basic definition
- b) Types of clouds
- c) General classification and the heights over tropical, temperate and polar latitudes
- d) Special names of some famous clouds
- e) Cloud formations and their characteristics and dispersal
- f) Isothermal and adiabatic cooling of the atmosphere
- g) Clouds and classifications as per their formations
- h) Clouds in stable and unstable air
- i) Fair weather clouds
- j) Convective clouds and **their relation with the ELR**
- k) Turbulence clouds
- l) Precipitation and its types

Unit 2 – Thunderstorms(15 hrs)

- a) Definition
- b) Development
- c) Lightening
- d) Hazards
- e) **Tornadoes**
- f) **Water spouts**
- g) Microburst's

Unit 3 – Visibility, Fog & measurement of met parameters (15 hrs)

- a) General visibility
- b) Slant visibility
- c) Reasons of poor visibility
- d) RVR
- e) Dust devils
- f) Fog, haze & mist'
- g) Steaming fog, smoke haze
- h) Diurnal, seasonal & location variations of fog
- i) Formation of fog and relation to winds

Reference Book

1. Aviation Meteorology, I.C. Joshi.
2. Climatology , Prof. D. Lal
3. Ground Studies for pilots, R. B. Underdown & John Standan
4. Meteorology for Pilots, Mike Wickson
5. Meteorology for Pilots, Mcgraw Hill

6. Meteorology for Aviators, Sutcliffe
7. Elementary Note on Indian Climatology, India Met Dept..
8. Ground Study for Pilots, Taylor & Parmar
9. Indian Climatology, IMD Publications
10. Climatology, Satvindra Singh
11. Met Question Bank, Joshi

Aircraft & Engines II

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Aircraft & Engines II	BSAV207	Theory	3-0-0	Nil

Unit I (15 hrs)

1. Pitot Static Systems:-
Pressure Instruments, Altimeter, Airspeed Indicators, VSI, IVSI with errors
Effect of Non- standard Atmosphere Pressure & Temperature, Various Altimeters Setting Procedure
2. Airspeed Indicator Markings, IAS, CAS/RAS, EAS, TAS and other airspeed limitations- V_{lo} , V_{le} , V_x , V_y , V_{mca} , V_{mcg} , V_{yse} , V_{so} , V_{s1} , V_{ne} , V_{app} , V_{ref} , Approach & landing Climb
3. Principle of magnetic compass, variation compass deviation, DRC, VCC, Acceleration/ Dec & Turning errors

Unit II(15 hrs)

1. Gyroscopic flight instrument properties rigidity, precession, source of power (Turn 7 slip indicator, Turn Coordinator, Inclinometer, All Indicator Heading Indicator) Gyro Instruments.
2. Mach no. SST A/C Supersonic or Subsonic flow various Mach speeds Shock wave, Mach Tuck & Tuck under Mach Trim System
3. Sweep Back & High speed, Mac Buffet & Control Reversers & Powered flight Controls – SHIFTED FROM UNIT I OF SEM III

Unit III (15 hrs)

1. AUX Power Unit, Ground Electrical & Air Conditioning Units & Supports APU Operation, APU Operation, APU Air Supply, Lubrication Cooling, Antiskid System, Fire Detection & Protection for APU, APU precautions, Auto shut down.
2. APU Air operation - speed & High Altitude Restrictions
APU doors – squat switch operation
3. Heating system windows, Pitot – Nacelle, drains, Anti-ice, De-ice

Reference books

1. Flight Without Formula, Kermode
2. Aero Engines for students, Allen and Unwin
3. Gas Turbine and Jet Propulsion, Smith
4. Handbook of Aeronautics, Royal Aeronautical Society
5. Civil Aviation Requirements, DGCA India
6. Principles of Flight, Bert A Shield
7. Performance of Civil Aircraft, Barker
8. System Commercial Pilot study manual, Mike Burton
9. Handling of Big Jet, D.P Davis
10. JAA – ATPL A/C Gen Knowledge, Oxford

Semester – III

Course Title	Code	Type of course	T-P-PJ	Prerequisite
English Language	BSFL1101	Theory	3-0-0	Nil

Module-I: Communication Skill (15 hrs)

Communication: Definition, concept

Channels of Communication: Sender, receiver, channel, message, encoding, decoding, context, feedback

Verbal & Non-Verbal Communication: Spoken & written-advantages & disadvantages, Bias free English,

Formal & informal style.

Module-II: Communicative Grammar (15 hrs)

Time, Tense & Aspect

Verbs of state & events

Modality

Active & Passive voice

Antonyms, Synonyms, Homonyms, one word substitutions & correction of errors

Module-III: Sounds of English (15 hrs)

Length of vowels:

Long vowels as in the words feel, food, shoot, card etc.

Short vowels as in the words pen, sun, cut, shut, etc.

Consonants

Stress pattern

Intonation: Rising & Falling.

Text Book:

1. Effective technical communication by M.A.Rizvi

Reference Books:

1. Communicative English & Business Communication by R.K.Panda, J.Khuntia, M.Pati, Alok Publication.
2. Communicative Grammar of English Geoffrey Leech

Air Navigation III

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Air Navigation III	BSAV301	Theory	4-0-0	Nil

Unit 1(20 hrs)

1) **Directional Gyro Indicator (DGI)**

Principle and construction of DGI, The control system – suction gyros, the caging device, DGI limitations, DGI errors, gimbaling errors, random wander, apparent wander, latitude nut correction, errors due to unstable rotor RPM, transport wander-change of latitude, drift rate calculations

2) **The artificial Horizon**

Construction, limitations, control systems, air driven artificial horizon, acceleration error in the air driven artificial horizon electric artificial horizon control system, acceleration errors in electric horizon, fast erection system,

3) **Turn and Slip Indicator**

Rate of turn indicator, rate gyros, operation, turn and slip displays, rate one turn & Turn co-ordinator

4) **Polar Stereographic projection**

Polar stereographic graticule, properties and uses

5) **Transverse and Oblique Mercator Charts**

Meridian of tangency, uses and properties of transverse Mercator, great circle of tangency,uses

Unit II(20 hrs)

1) **Aircraft Magnetism**

Permanent magnetism, soft iron magnetism, analysis of components P+c, Q+f and R, Calculation of coefficients A, B, C and total deviation. Effect of change of latitude on compass deviation, calculation of maximum and zero deviation headings.

2) **Compass Swing**

Requirement, correcting swing, check swing and calculation of residual deviation

3) **Remote indicating compass**

Principle of operation, flux valve, detector unit, signal selsyn operation of gyro compass,

Manual synchronizing variation setting precession mechanism, erection mechanism, annunciator, control panel, adjustment of coefficients A, B and C. Advantages & Disadvantages of remote indicating compasses.

Unit III(20 hrs)

9) Solar System

Planetary orbits, Kepler's laws, seasons, Plane of ecliptic and plane of equator, measurement of days and years, Hour angle, Measurement of time, mean solar time, local mean time, UTC, standard time, international date line, sunrise sunset, twilight moonrise & moonset

10) Radio Altimeter

Principle of FM altimeters, decision height indicator, accuracy, uses, principle of Pulse modulation altimeters and its limitations

11) Terrain Avoidance System

Purpose & working principle, alert & warning elements of GPWS, modes of operation, winds

Reference books

1. Air Pilot's Manual Vol 3 & 5, Peter D Godwin
2. Flight Performance & Planning, Nordian AS
3. General Navigation: ATPL JAR, Nordian AS
4. GSP : Plotting & Flight Planning, Underdown
5. GSP : Radio Aids, Underdown
6. GSP : Flight Instr. & Auto Flt, Underdown
7. GSP : Navigation, Underdown
8. Radio Navigation ATPL JAR, Nordian AS
9. Oxford Aviation Gen Navigation, Jeppesen

Air Regulation III

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Air Regulation III	BSAV302	Theory	3-0-0	Nil

Unit I (15 hrs)

Indian A/C Act 1937

1. Part II – General conditions of flying
(4 – 20)
2. Part III – General Safety Conditions
(21 – 29C)
3. Part IV – Registration & Marking of A/c
(30 – 37)
4. Part V – Personnel of Aircraft
(38 – 48)
5. Part VI – Airworthiness
(49 – 60)
6. Part VII – Radio Telegraph Apparatus
(63)

Unit II(15 hrs)

1. Altimeter Setting Procedure
2. Air Defense Identification Zone & Procedure for ADC
3. Aerodrome Operating Minima
4. Clearance
 - I. Definitions
 - II. Scope & Purpose
 - III. Content & Description
5. Position Report, Voice Report & Air Report

Unit III(15 hrs)

Aerodrome

1. Aerodrome Data
2. Physical characteristics
3. TODA, ASDA, TORA & LDA
4. Markings
5. Lightings
6. Aerodrome Beacon & Identification Beacon
7. Intensity Control of runway
- 8. PAPA – AGNIS**

Reference books

1. Indian Aircraft Manual, Ministry of Civil Aviation
2. Air Regulation 2 Vol, Wg. Cdr R.K.Bali
3. ATPL Training Manual Air Law, Oxford
4. JAA – ATPL Aviation Law, Jeppesen

Meteorology III

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Meteorology III	BSAV303	Theory	3-0-0	Nil

Unit I – Icing(15 hrs)

- a) Formation of ice in the atmosphere
- b) Freezing level and index of icing
- c) Hazards of icing for aviation
- d) Types of icing
- e) Ice accretion in flight / preflight
- f) Super – cooled water droplets
- g) Carburetor icing

Unit II – Winds(15 hrs)

- a) Definition & estimation of winds
- b) Terms used for winds
- c) Units used
- d) Geostrophic, Gradient winds and coriolis force
- e) Thermal winds
- f) Jet streams
- g) Mountain and lee wave
- h) Anabatic & Katabatic winds
- i) Local winds and their names in different parts of the world

Unit III – Thunderstorms, Cyclones & Extra-Tropical Depressions (15 hrs)

- a) Definitions
- b) Conditions for formation
- c) Areas of formations on the world map
- d) Measuring instruments for met parameters at Observatories and airports
- e) Decoding of Met data, Metar, Speci, Tafs for aviation
- f) Sigmet

Reference books

1. Aviation Meteorology, I.C. Joshi.
2. Climatology, Prof. D. Lal
3. Climatology, Prof. Savindra Singh
4. Aviation Meteorology, R.B Underdown & Standen
5. Oxford Aviation Academy, E-Book from Oxford University
6. Elementary Note on Indian Climatology, Indian MET Dept.
7. Meteorology for Pilots, Mcgraw Hill

Aircraft and Engines III

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Aircraft and Engines III	BSAV304	Theory	3-0-0	Nil

Unit I(15 hrs)

1. Low Speed Buffet, High Speed Buffet, Mach Crit, Coffin Corner, THS & Mach Trim System
2. MAC, Dependencies of stall speed, Stall Root of wing, Stall tip of sweep back, T type Tail A/c Deep Stall, Stick Shaker, Stick Pusher & Stall Working System, Auto Ignition System, Fuel Dipper System

Unit II(15 hrs)

1. Flap Selection for Takeoff landing, Flapless T/o & landing, Flap Jam, Flap Mechanism, Flaps Aerodynamic Load & Auto flaps roll to neutral
2. Spoilers various functions speed brake, roll spoilers, ground spoilers, flutter of controls, flutter dampening
3. Helicopter flight control, control components operation, cyclic pitch, collective pitch, hovering & helicopter stabilities

Unit III(15 hrs)

1. Concept of normal checklist, Abnormal & Emergencies Procedure & Checklist, MEL, MMEL
2. Take off techniques, Power setting procedures, T/O call & speed calls & RTO procedure , over weight
3. A/C Emergency equipment & Contents- ADDITION

Reference books

1. Principle of flight, Beitz Ashield
2. Pilot Handbook of Aeronautical Knowledge, FAP
3. Manual of Flying AP 129, Air Ministry U.K
4. JAA – ATPL Principle of flight, Oxford/ Jeppesen

SEMESTER IV

Principles of management

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Principles of management	BSAV201	Theory	3-0-0	Nil

1.

1. Overview of Management(9 hrs)

Definition - Management - Role of managers - Evolution of Management thought -Organization and the environmental factors – Trends and Challenges of Management in Global Scenario.

2. Planning(9 hrs)

Nature and purpose of planning - Planning process - Types of plans – Objectives - - Managing by objective (MBO) Strategies - Types of strategies - Policies - Decision Making - Types of decision - Decision Making Process - Rational Decision Making

3. Organizing(9 hrs)

Nature and purpose of organizing - Organization structure - Formal and informal groups /organization - Line and Staff authority - Departmentation - Span of control - Centralization and Decentralization - Delegation of authority - Staffing - Selection and Recruitment - Orientation - Career Development - Career stages – Training - - Performance Appraisal.

4. Directing(9 hrs)

Creativity and Innovation - Motivation and Satisfaction - Motivation Theories - Leadership Styles - Leadership theories - Communication - Barriers to effective communication - Organization Culture - Elements and types of culture - Managing cultural diversity.

5. Controlling (9 hrs)

Process of controlling - Types of control - Budgetary and non-budgetary control Q techniques - Managing Productivity - Cost Control - Purchase Control –Maintenance Control - Quality Control - Planning operations.

*- Ground handling, Airport Operation, Cargo Operation

Text books:

1. Stephen P. Robbins and Mary Coulter, 'Management', Prentice Hall of India, 8th edition.
2. Charles W L Hill, Steven L McShane, 'Principles of Management', Mcgraw Hill

Reference books:

1. Hellriegel, Slocum & Jackson, ' Management - A Competency Based Approach', Thomson South Western, 10th edition, 2007.
2. Harold Koontz, Heinz Weihrich and Mark V Cannice, 'Management - A global

Air Navigation IV

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Air Navigation IV	BSAV401	Theory	4-0-0	Nil

Unit I (20 hrs)

1) Basic Radar Theory

Radar Frequencies, Pulse Technique, Echo Principle, Factors affecting range of Radar, Primary & Secondary Radars, Advantages of Secondary Radar, Continuous Wave Radar & its Advantages Components of CRT & their Functions.

2) Ground Radars

Types of Ground Radars, Precision Approach Radar & Surveillance Radar Approaches

3) Doppler Radar

Doppler Shift and its Calculation, Principle of Ground Speed measurement, Doppler Aerials, Two beam, Three beam, Four beam systems & Janus Aerials, Doppler Spectrum, Airborne Doppler, Doppler Limitations.

4) Secondary Surveillance Radar (SSR)

Principle of Operation, Frequency, Modes A,B,C & D, Pre-allotted codes, Automatic Altitude Reporting, unwanted echoes, Mode 'S' data link, Advantages & Disadvantages of SSR

Unit II(20 hrs)

5) Distance Measuring Equipment

Principle of Operation, Random PRF Technique, Frequency & Channel Spacing, Beacon Saturation, Range, Accuracy & Uses of DME

6) Airborne Weather Radar

Components, Functions, Principle of Operation, Weather Depiction, Mapping Operation, Plotting a Navigation Fix, Weather Operation, Colour AWR Controls, Calculation of cloud height

7) Airborne Collision and Avoidance System (ACAS)

Introduction, TCAS I, TCAS II, Principle, Aircraft Equipment, Operation, System Interconnections,

Synthetic Voice Prioritisation, Traffic Advisories (TAs) Resolution Advisories, Proximate Traffic/Other Traffic, TCAS Displays, Action to be taken on receiving TA's and RA's.

*EGPWS (Enhanced Grand Proximity Warning System)

8) I.L.S - CAT-I, CAT-II, CAT-III (A, B, C)

Unit III (20 hrs)

8) Grid Navigation

Necessity for Using Gridded chart, Grid North, Grid Convergence, Grivation, Example of use Of Polar Stereographic and Lamberts Chart

9) Point of Safe Return

Definition, Practical Significance, Formula for Calculation, PSR on Two or more legs, Engine Failure PSR, Factors affecting PSR, Radius of Action, Practice Exercises.

10) Point of Equal Time (PET) or Critical Point

Definition, Practical Significance, Formula for Calculation, Several Track PET, Factors Affecting PET, Relationship of PET and PSR, Practice Exercises.

Reference books

1. Air Pilot's Manual Vol 3 & 5, Peter D Godwin
2. Flight Performance & Planning, Nordian AS
3. General Navigation: ATPL JAR, Nordian AS
4. GSP : Plotting & Flight Planning, Underdown
5. GSP : Radio Aids, Underdown
6. GSP : Flight Instr. & Auto Flt, Underdown
7. GSP : Navigation, Underdown
8. Radio Navigation ATPL JAR, Nordian AS
9. Oxford Aviation Gen Navigation, Jeppesen

Air Regulation IV

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Air Regulation IV	BSAV402	Theory	3-0-0	Nil

Unit I(15 hrs)

1. Indian A/C Act 1937
 - I. Part VIII
 - II. Part IX
 - III. Part X
 - IV. Part X-A (68,69,70,77B,77C & 77D)
 - V. Part XI
 - VI. Part XII-A
 - VII. Part XIII (140, 140 A, 140B, 140C, 141 & 143)
 - VIII. Part XIV
2. Indian A/C Act 1920
(53 – 62)
3. Act 2003
(1,2,3,4,5,6,7,8,9,10 & 11)

Unit II(15 hrs)

1. Emergencies, Communication Failure & Contingencies
 - I. Definitions
 - II. Emergency Procedure
 - III. Communication Failure
 - IV. Assistance to strayed VFR & VFR flights Encountering adverse weather
 - V. Other In flight contingencies
 - VI. Fuel Dumping
1. Carriage of Radio Equipment
2. Use of Emergency Locator Transmitter
3. Responsibility of Monitoring Emergency Signals, Interception of signals
4. Use of SSR Transmitter

Unit III (15 hrs)

1. Identification & Interception Procedures
2. Air miss Reporting procedure
3. Air – Traffic Incident
4. Anti-hijacking Act 1982
5. The suppression of unlawful act against the safety of Civil Aviation Act 1982

Reference books

1. Indian Aircraft Manual Vol I & II, Ministry of Civil Aviation
2. Air Regulation 2 Volume, Wing Cdr. R.K Bali
3. JAA – ATPL Communication,Jeppesen
4. Aviation Act 1934,Ministry of Civil Aviation

Meteorology IV

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Meteorology IV	BSAV403	Theory	3-0-0	Nil

Unit I (15 hrs)

- a) Weather charts- types of charts, times of issue, plotting of data & reading the plotted data
- b) Prognostic weather charts and interpreting the data
- c) Various symbols used
- d) Jet streams plotting and upper winds
- e) Significant weather charts
- f) Documentations given to pilots

Unit II(15 hrs)

- a) Tropical climatology / Indian Climatology
- b) ITCZ and its movement in different seasons
- c) Weather in different seasons
- d) Tropical cyclones- cause and development
- e) Tornadoes, microburst water spouts
- f) Trade winds and doldrums
- g) Sand storms

Unit III(15 hrs)

- a) Air masses – names origin and properties
- b) Movement of air masses
- c) Fronts, front zone and front surface
- d) Warm and cold fronts – their movements
- e) Formation of clouds in fronts
- f) Occluded fronts warm or cold
- g) Changes in weather parameters on front movements
- h) Extra tropical depressions- their formations and associated weather

Reference books

1. Aviation Meteorology, I.C. Joshi.
2. Climatology, Prof. D. Lal
3. Climatology, Prof. Savindra Singh
4. Aviation Meteorology, R.B Underdown & Standen
5. Oxford Aviation Academy, E-Book from Oxford University
6. Elementary Note on Indian Climatology, Indian MET Dept.
7. Meteorology for Pilots, Mcgraw Hill

Aircraft and Engines IV

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Aircraft and Engines IV	BSAV404	Theory	3-0-0	Nil

Unit I(15 hrs)

1. A/C Basic, Requirements for Air Conditioning
Various Methods used for Air Conditioning
2. Ram Air, Bootstrap Bleed system, Displacement Blower System, Evaporation System
3. Aircraft Pressurization System
4. Zone temp control & unpressurized flight
5. Cockpit pressure controller ditching valve switch manual & auto

Unit II(15 hrs)

1. Crew Oxygen, Pax Oxygen System & Portable Oxy system
2. Deicing System, Anti Icing system & other heating in A/C
3. Hydraulic system & Primary Secondary system
4. Operated by Hydraulics – Hydraulics Fuses – Powered Flight controls., Landing gear system
5. A/c Wheel, Tyres, brake, Auto brakes Antiskid System - ADDITION

Unit III(15 hrs)

1. 1. A/C Fuel System- Tank, vents, boost pumps + various types of fuel
2. Refueling – Defueling auto refueling system- Fuel gauges, Quantity Measuring System
3. Fuel Jetesioning system – fuel quantity systems
4. Fire & crash protection system
5. Types of cruise, MRC, LRC, Max speed cruise

Reference books

1. Commercial Pilot Study Manual, Mike Burton
2. JAA – ATPL Systems, Oxford / Jeppesen
3. Hand book of Aeronauticals, Royal Air Force
4. Pilots Handbook for Aeronautical Knowledge , Aeronautical Society FAA

SEMESTER V

Air Navigation V

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Air Navigation V	BSAV501	Theory	4-0-0	Nil

Unit I (20 hrs)

1) Ground Proximity Warning System (GPWS)

Introduction, Definitions, EGPWS Operating Modes, Enhanced Ground Proximity Warning Systems (EGPWS)

2) Flight Management System

Principle of Operation, Control and Display Unit (CDU), Database, Operational Procedures Climb Vertical Navigation (VNAV), Cruise Lateral Navigation (LNAV), Descent, Accuracy

3) Electronic Flight Information System (EFIS)

EFIS Introduction, Units, Symbol Generators (SGs), Display Units, Color display system, Remote Light sensor, control panel, Decision Height (DH), EADI display presentation, EHSI section of the control panel, system symbols, EHSI display presentation – VOR, ILS, MAP & PLAN, Navigation Displays

Unit II (20 hrs)

1) Satellite Navigation System

Principle of Operation, Space Segment, Control Segment, User Segment, GLONASS & GPS, Selective Availability, Errors of GPS, GPS Integrity & Augmentation, RAIM, Differential GPS, Use advantages & Disadvantages of Satellite Navigation System

2) Introduction to Jeppesen Charts

Definitions, Enroute Chart Legend, High Altitude Charts, Area Charts, SID/DP and Star Legend, Approach Chart Legend, Airport Chart Format, Arrival Charts (STARs)

3) Area Navigation System (RNAV)

Introduction, Benefits of RNAV, Types & levels of RNAV, Components and Operation of 2D RNAV system, Principle of Operation and limitations of simple RNAV systems, Level 4 RNAV system, control display unit (CDU)

Unit – III (20 hrs)

1) Atc Flight Plan

Individual (CA48) and repetitive flight plan, procedures to fill up the flight plan VFR & IFR flight plans

2) Mass and Balance

Limitations, Effects of overloading, Effects of out of limit CG position, Movement of CG in flight, Definitions, Centre of Gravity, Centre of Gravity limits, Centre of Gravity Datum, Arm, Moment, Loading Index, Dry Operating Index, Basic Empty Mass, Dry Operating Mass, Operating Mass, Traffic Load, Useful Load, Zero fuel mass, maximum zero fuel mass, take-off mass, maximum structural take off mass, maximum structural landing mass, maximum range mass (Max structural taxi mass), calculation of fuel mass, calculation of centre of gravity

3) Fuel Planning

Calculation of minimum quantity of fuel for a flight based in taxi fuel, trip fuel, contingency fuel, alternative fuel and holding fuel & decision point procedure

Reference books

1. Air Pilot's Manual Vol 3 & 5, Peter D Godwin
2. Flight Performance & Planning, Nordian AS
3. General Navigation: ATPL JAR, Nordian AS
4. GSP : Plotting & Flight Planning, Underdown
5. GSP : Radio Aids, Underdown
6. GSP : Flight Instr. & Auto Flt, Underdown
7. Range & Endurance, Hitchens
8. Radio Navigation ATPL JAR, Nordian AS
9. JAA ATPL Performance, Jeppesen
10. JAA ATPL Mass & Balance, Jeppesen
11. Mass & Balance, Cranfield
12. Performance, Cranfield
13. Jeppesen Chart Training, Jeppesen

Air Regulation V

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Air Regulation V	BSAV502	Theory	3-0-0	Nil

Unit I (15 hrs)

1. Act 1954 (Part I, II, III, IV & V)
2. Wake Turbulence Categories
3. All types of licenses other than Pilot's License

Unit II (15 hrs)

1. Carriage by Air Act 1972
Liabilities of the Carrier Rules (17-22)
2. Regulation for use of AAI Aerodromes & Airfields
3. Area navigation
4. Required Navigation Performance on ATS routes
5. FDTL (Flight Duty Time Limit)

Unit III (15 hrs)

1. Schedule – V Penalties
2. Bird Strike
3. Entry Transit & Departure
4. Minimum Oil & Fuel to be carried by public transport A/C
5. Procedure in regard to A/C equipped with ACAS
6. Minimum safe altitude warning procedures
7. Priority landing
8. Oxygen Supply

Reference books

1. Radio Telephony, Peter D Godwin
2. Human Factors and Pilot performance, Trever Throme
3. JAA- ATPL Communications, Jeppesen
4. Indian Aircraft Manual Vol I & II, Ministry of Civil Aviation
5. Aeronautical Information, Ministry of Civil Aviation

Air Regulation V

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Air Regulation V	BSAV503	Theory	3-0-0	Nil

Unit I(15 hrs)

Flight Hazards

- a) Icing
 - Weather conditions for Ice Accretion,
 - Types of Ice Accretion
 - Avoidance
- b) Turbulence
 - Effects on Flight, Avoidance
 - CAT – Effects on Flight
- c) Wind Shear
 - Definition of Wind Shear
 - Weather conditions for Wind Shear
 - Effects on Flight
- d) Mountain waves & Standing waves

Unit II(15 hrs)

- a) Low pressure systems and Fronts- cold Fronts, warm fronts cloud sequences in them, warm and cold occluded fronts, depressions, and their effects on aviation.
- b) Non frontal depressions – orographic, thermal, cyclones and tornadoes
- c) Anti cyclones and cols and associated weather in summer and winter, upper level, convergence and subsidence

Unit III(15 hrs)

- a) Meteorological organization in India and in world and station model
- b) Measuring instruments used for measuring weather parameter
- c) METARS, TAFS, ROFORS, and Aireps
- d) Sigmet
- e) Weather charts and prognostic charts, times of issue and validity
- f) Reading the charts and interpreting data plotted

Reference books

1. Aviation Meteorology, I.C. Joshi.
2. Climatology, Prof. D. Lal
3. Ground Studies for pilots, R. B. Underdown & John Standan
4. Meteorology for Pilots, McGraw Hill
5. Elementary Note on Indian Climatology, India Met Dept.
6. Handbook of Aviation Meteorology, HMSO
7. Meteorology for Airmen, Dept. Parts I & II Met.
8. Ground Study for Pilots, Taylor & Parmer
9. Climatology, Prof Savindra Singh
10. Oxford Aviation Academy, E- BOOK Oxford University

Meteorology V

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Meteorology V	BSAV503	Theory	3-0-0	Nil

Unit I(15 hrs)

Flight Hazards

- a) Icing
 - Weather conditions for Ice Accretion,
 - Types of Ice Accretion
 - Avoidance
- b) Turbulence
 - Effects on Flight, Avoidance
 - CAT – Effects on Flight
- c) Wind Shear
 - Definition of Wind Shear
 - Weather conditions for Wind Shear
 - Effects on Flight
- d) Mountain waves & Standing waves

Unit II (15 hrs)

- a) Low pressure systems and Fronts- cold Fronts, warm fronts cloud sequences in them, warm and cold occluded fronts, depressions, and their effects on aviation.
- b) Non frontal depressions – orographic, thermal, cyclones and tornadoes
- c) Anti cyclones and cols and associated weather in summer and winter, upper level, convergence and subsidence

Unit III(15 hrs)

- a) Meteorological organization in India and in world and station model
- b) Measuring instruments used for measuring weather parameter
- c) METARS, TAFS, ROFORS, and Aireps
- d) Sigmet
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- f) Reading the charts and interpreting data plotted

Reference books

1. Aviation Meteorology, I.C. Joshi.
2. Climatology, Prof. D. Lal
3. Ground Studies for pilots, B. Underdown & John Standan
4. Meteorology for Pilots, Mcgraw Hill
5. Elementary Note on Indian Climatology, India Met Dept.
6. Handbook of Aviation Meteorology, HMSO
7. Meteorology for Airmen, Dept. Parts I & II Met.
8. Ground Study for Pilots, Taylor & Parmar
9. Climatology, Prof Savindra Singh
10. Oxford Aviation Academy, E- BOOK Oxford University

Aircraft & Engines V

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Aircraft & Engines V	BSAV504	Theory	3-0-0	Nil

Unit I(15 hrs)

1. Jet Engine Principle & working cycle, Major components, Compressor, Burner, Turbines, centrifugal & Axial Compressor. Advantages and Disadvantages of these compressors.
2. Jet engine fuel, oil internal cooling & sealing, gear box , accessory gear box.
3. Starting- Wet start, Hot start, Hung Start, Engine Surge & compressor stall engine Flow oil & restart in flight.
4. Ignition and various methods of starting, fire detection & protection system of Jet engine Thrust Reverser system, thrust augmentation system after burner & noise suppression System.

Unit II(15 hrs)

1. Piston engine cylinder, magnetos, ignition, low tension, T/P/M & Power setting procedure
2. Left hand turning tendencies of conventional type of A/C
3. Propeller blade and various associated terms with it – Prop Thrust power and drag Torque
4. Artificial Feel & principle powered controls & feel - Addition

Unit III(15 hrs)

1. FADAC, FADAC Engine, CVR, DFDR, Engine failure mode in glass cockpit
2. Emergency force landing landing, ditching & evacuations and safety equipmentt
3. Spiral dive, stall, Spin, dutch roll entry & recovery procedures, skid, slip & cross control procedure.

Reference books

- 1) Jet engine, Rolls Royce
- 2) Jet Engine, Pratt & Whitney
- 3) Piston Engine & Turbine Engine, Mike Burton
- 4) Aircraft General Knowledge, Oxford/ Jeppesen

SEMESTER VI
Air Navigation VI

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Air Navigation VI	BSAV601	Theory	4-0-0	Nil

Unit 1(20 hrs)

- 1) **Calculation of Payload**
- 2) **Holding of Patterns**
Identification of Sectors, Procedure for Joining the Holding Pattern, Holding Procedure with correction for leg timing and Drift due to wind
- 3) **Low Visibility Operations**
Requirements to be fulfilled for low visibility operations, ILS, CAT I, CAT II and CAT III operations, conditions for approval of low visibility take-off operations

Unit II(20 hrs)

- 1) **Minimum Navigation performance specification airspace (MNPSA)**
Introduction, Considerations, Transoceanic navigation problems
- 2) **Reduced Vertical Separation Minimum (RVSM)**
Aeroplane requirements, navigation system requirements, and serviceability, NAT tracks, OTS track designation, OTS changeover, Track message (TM), Track message identifier, Track routings, allocation of Flight levels
- 3) **Search and Rescue**
Definitions – Alert Phase, Distress Phase, Emergency Phase, Operator, Pilot-in-command (PIC), Rescue co-ordination centre (RCC), State of Registry, Uncertainty phase, Establishment and provision of SAR Service, co-operation between states, operating procedures, communication with survivors, signals with surface aircraft, SAR signals, Ground air visual signal code for use by survivors, air to ground signals, types of searches

Unit III(20 hrs)

- 1) **Inertial Navigation System**
Introduction, Basic principles, Accelerometer and integrators, Effects of gravity on Accelerometer, Integrating Gyroscope, Platform , Earth orientation, Apparent wander, Alignment of the system, Schuler period, Errors of INS, INS control and display panels, LED display, Manual and automatic system checks
- 2) **Inertial Reference System**
Introduction, Primary source of information, laser gyro, principles of laser gyros and IRS, construction and operation, limitations and accuracy, platform/strap down principles, platform alignment, advantages

3) Aircraft Performance

Definitions – Alternate airport, accelerate-stop distance available (ASDA), take-off run available (TORA), Take off Distance available (TODA), balanced field, calibrated airspeed, ceiling, climb gradient, clearway, critical engine, density altitude, equivalent airspeed, stopway, runway slope, unaccelerated flight, available distance for take-off, Dry, Wet and Contaminated runway, Obstacle clearance altitude height (OCA/H), Decision altitude/Height (DA/H), Minimum Descent Altitude/Height (MDA/H), Runway Visual Range (RVR)

Reference books

1. Air Pilot's Manual Vol 3 & 5, Peter D Godwin
2. Flight Performance & Planning, Nordian AS
3. General Navigation: ATPL JAR, Nordian AS
4. GSP : Plotting & Flight Planning, Underdown
5. GSP : Radio Aids, Underdown
6. GSP : Flight Instr. & Auto Flt, Underdown
7. Range & Endurance, Hitchens
8. Radio Navigation ATPL JAR, Nordian AS
9. DGCA Ops Circular 06/1999, Aerodrome Operating Minima
10. DGCA Ops Circular 07/2010 , Operational Procedures and Trg Reqts for ACAS Eqpt
11. CAR Air Operations Series B Pt I, ILS CAT II/IIIA/B Operations
12. CAR Air Operations Series O Pt 11, Requirements for implementation of RVSM
13. CAR Air Operations Series O Pt XII PBN, Airworthiness, Operational and Trg

Air Regulation VI

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Air Regulation VI	BSAV602	Theory	3-0-0	Nil

Unit I(15 hrs)

1. Aviation and Medicine
2. Effect of smoking
3. Effect of Alcohol and drugs
4. Rapid decompression
5. Middle ear discomfort and Pain
6. Hypoxia and types
7. Hyperventilation
8. Spatial disorientation
9. Effect of scuba diving
10. Effect of carbon mono oxide poisoning
11. Blood donation
12. Jet lag
13. Circadian/ Bio – rhythms

Unit II (15 hrs)

Crew resource management and Flight Safety

1. Need for CRM
2. Human factors and flight safety
3. Situation awareness
4. Team performance
5. Decision making
6. Stress
7. Error Performance and safety

Unit III(15 hrs)

Security

1. Introduction
2. Objectives
3. Organizations
4. Preventive security measures
5. Management of response to Act of Unlawful Interference

Aircraft Accident and Incident Investigation

1. Introduction
2. Objective of Investigation
3. Investigation
4. Serious Incidents
5. EU Considerations

Human Factors and Pilot Performance

Safety, First Aid and Survival

Reference books

1. Aviation Act 1934, Ministry of Civil Aviation
2. Indian Aircraft Rules, Ministry of Civil Aviation
3. Aeronautical Information Publication, Ministry of Civil Aviation
4. Aircraft Manual, India
5. Human factors and Pilot performance, Trever Throme
6. ATPL Training Manual Air Law, Oxford
7. JAA – ATPL Communication, Jeppesen

Meteorology VI

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Meteorology VI	BSAV603	Theory	3-0-0	Nil

Unit I(15 hrs)

Meteorological Information

- a) Observations
- b) On the Ground – pressure, temperature, humidity
- c) Visibility, RVR, Transmissometers
- d) **Clouds, types height of bases Ceilometers**
- e) Upper air observations
- f) Weather radar satellite observations, interpretations & **Doppler radar**
- g) Aircraft observations
- h) Supplying the weather information's to pilots and air traffic controllers
- i) Volmet broadcasts
- j) Weather warning for adverse weather

Unit II (15 hrs)

- a) World climatology
- b) January and July weather conditions in Northern hemisphere and southern hemisphere**
- c) Surface weather charts
- d) Upper air charts
- e) Symbols and signs used on the charts

Unit III(15 hrs)

- a) Information on flight planning
- b) Aeronautical codes
- c) Meteorological broadcasts
- d) Meteorological briefings
- e) Symbols and signs used on the charts

Reference books

1. Aviation Meteorology, I.C. Joshi.
2. Climatology, Prof. D. Lal
3. Ground Studies for pilots, R. B. Underdown & John Standan
4. Meteorology for Pilots, Mcgraw Hill
5. Elementary Note on Indian Climatology, India Met Dept.
6. Handbook of Aviation Meteorology, HMSO
7. Meteorology for Airmen, Dept. Parts I & II Met.

8. Ground Study for Pilots, Taylor & Parmar
9. Climatology, Prof Savindra Singh
10. Oxford Aviation Academy,E- BOOK Oxford University

Aircraft & Engines VI

Course Title	Code	Type of course	T-P-PJ	Prerequisite
Aircraft & Engines VI	BSAV604	Theory	3-0-0	Nil

Unit I (15 hrs)

- Comparison of Jet Engine & Piston Engine performance, Acceleration time, Slipstream & absence of propeller drag, response of throttle
- Noise abatement technique
- Various engine locations, advantages & disadvantages of engine operation, engine damage by FOB, Bird, Water, Ice and jet engine intake stall

Unit II(15 hrs)

- Flying faster & low sweptback, yaw & roll damper, trimmer stall & super stall
- Flying higher & controllability, mach trim & emergency descent
- Aqua planning
- Reduce power takeoff; flex power, d-rated power, T/O, RTO & landing performance

Unit III(15 hrs)

- Contaminated runway Take off & landing
- Flight through severe weather & turbulence

ENROUTE FLYING THROUGH VOLCANIC ASHES

- Jet upset recovery from mild, moderate & gross upset
- Partial gear operation, landing, gear down ferry flight & abnormal operation
- Emergency brakes & steering system

Reference books

1. Flight Without Formula, Kermode
2. Aero Engines for students, Allen and Unwin
3. Gas Turbine and Jet Propulsion, Smith
4. Handbook of Aeronautics, Royal Aeronautical Society
5. Civil Aviation Requirements, DGCA India
6. Principles of Flight, Bert A Shield
7. Performance of Civil Aircraft, Barker
8. From the Ground Up, Sandy A. F. Macdonald
9. Manual of Flying (AP 129), Air Ministry UK
10. Handling Big Jets, D P Davis

Projects (4 lectures per week)

1. CRM & Human Factors
2. Aviation Medicine & First Aid
3. Flight Safety
4. Air Traffic Control & Management
5. Aviation Safety & Security Management
6. Fuel Economy
7. Aircrew Survival over Sea and Land
8. Future Air Navigation Systems
9. Airline Route Planning
10. Airline Operations and Scheduling

Out of the Projects listed above, Four Projects will be allotted by the college during Semester VI. Students will only be required to study and submit these four projects. The Projects are to be completed under the guidance of the teacher from the institute/ college/ any other related industry.

Reference books

- 1) Crew Resource Management, Brian Mcallister
- 2) Human Factors for General Aviation, Jeppesen
- 3) JAA ATPL Book 08 Human Performance OAT & Limitations
- 4) Air Transportation: A Management, J.G.Wensvenn perspective
- 5) Airline Operations & Scheduling, M. Bazargan
- 6) Aviation Security (Legal & Regulatory Aspects), Abeyratne
- 7) Pilot Judgment & Crew Resource Management, Jensen
- 8) Aircraft Safety: Accident Investigations Analyses & Applications, Krause
- 9) Aviation & Airport Security, Sweet
- 10) Commercial Aviation Safety 3 / E, Wells
- 11) Vol. 06 Aviation Medicine & Survival, Royal Airforce Publications
- 12) Future Air Navigation System (FANS) , V.P.Galotti

Evaluation of Projects (Where ever Applicable)

- i) A student who passes in all the theory courses but does not secure minimum grade 'E' in project as applicable has to resubmit a fresh project till he/she secures a minimum grade 'E'. His/her marks and/or grades in the theory courses that the student has passed will be carried forward but he/she shall be entitled for grade "E" on passing.
- ii) The evaluation of project and viva-voce examination shall be by awarding grade in the seven point scale as given in (1) above.
- iii) A student shall have to obtain minimum of grade 'E' (or its equivalent marks) in project evaluation and viva/voce taken together. i.e. 40% marks in project work. The evaluation of project will be based on the following guidelines.

