BANASTHALI VIDYAPITH

Bachelor of Science (Aviation Science)

Curriculum Structure

First Semester Examination, December-2019
Second Semester Examination, April/May-2020
Third Semester Examination, December-2020
Fourth Semester Examination, April/May-2021
Fifth Semester Examination, December-2021
Sixth Semester Examination, April/May-2022

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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No. F. 9-6/81-U.3

Government of India
Ministry of Education and Culture
(Department of Education)

New Delhi, the 25th October, 1983

N O T I F I C A T I O N

In exercise of the powers conferred by Section 3 of the University Grants Commission Act, 1956 (3 of 1956) the Central Government, on the advice of the Commission, hereby declare that Banasthali Vidyapith, P. O. Banasthali Vidyapith, (Rajasthan) shall be deemed to be a University for the purpose of the aforesaid Act.

Sd/-
(M. R. Kolhatkar)
Joint Secretary of the Government of India

N O T I C E

Changes in Bye-laws/Syllabi and Books may from time to time be made by amendment or remaking, and a Candidate shall, except in so far as the Vidyapith determines otherwise, comply with any change that applies to years she has not completed at the time of change.

Programme Educational Objectives

Becoming an Aviator is about more than training and building flying skills. Beyond the technical abilities required to earn their wings, they must also develop a balance of leadership skills, discipline, critical thinking skills, and a proper attitude. When it comes to flying, small mistakes can make a big impact, and there's little room for error in the skies. Throughout all stages of flight, whether it's following a preflight checklist or calculating course corrections, pilots need to have a high level of attention to detail and precision to promote better flight safety. In general, there are few traits expected from a good pilot like *Situational awareness, Self-confidence, Humility, Clear communication skills, Ability to remain calm under pressure, Desire to learn.*

The curriculum has identified essential competencies in the these areas respectively. The curriculum also incorporates the components of Safety, Human Factor, Communication skills, case study of accident/incident investigations and project works in the specific domains of aviation.

The main objectives of the Aviation program are:

[PEO1]: Furnish the Airlines of the country with professional, well-trained, enlightened & educated pilots,

[PEO2]: Stress on ACADEMICS and studies to make a very strong foundation for the pilots and airline managers,

[PEO3]: Inculcate the essential virtues of professionalism, discipline and responsibility

[PEO4]: To introduce language proficiency requirements [as per ICAO] for pilots with the objective to improve the level of language proficiency globally and reduce the frequency of communication errors.

[PEO5]: Describe the professional attributes, requirements or certifications, and planning applicable to aviation careers.

[PEO6]: Describe the principles of aircraft design, performance and operating characteristics; and the regulations related to the maintenance of aircraft and associated systems.

[PEO7]: Evaluate *aviation safety* and the impact of *human factors* on safety.

[PEO8]: Discuss the impact of international aviation law, including applicable International Civil Aviation Organization (ICAO) or other International standards and practices, and applicable national aviation law, regulations and labor issues on aviation operations.

[PEO9]: Explain the integration of airports, airspace, and air traffic control in managing the National Airspace System.

[PEO10]: Discuss the impact of meteorology and environmental issues on aviation operations.

Programme Outcomes

PO1: Aviation Knowledge: Basic knowledge associated with the profession of Aviator, including Basic sciences and technology, behavioral, social, and administrative skills, and Basic Aircraft design and maintenance practices.

PO2: Problem Analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decision during daily practice of practical flying and Aircraft maintenance workshop. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

PO3: Design/development of solutions: An aviator should be exposed to various maintenance practices of Aircrafts so that he/she can detect the kind of snag.

PO4: Conduct investigations of complex Problems : To study and critically investigate accident/incident from the aircraft accidents in history.

PO5: Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern computing tools with an understanding of the limitations.

PO6: The Aviator and society: An Aviator is a Global Citizen. So, Students will demonstrate an awareness and knowledge of international cultures and societies along with awareness and knowledge of social, cultural and personal values of others. Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional Aviation practice.

PO7: Sustainability: Growing environmental pressures relating to greenhouse gas emissions, local air quality and noise around airports.

PO8: Aviation Professional Ethics: Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

PO9: Individual and team work: Understand and consider the human reaction to change, motivation issues, leadership and team building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizen or leadership roles when appropriate to facilitate improvement in health and well-being.

PO10: Aviation Communication [RT]: Communication, in aviation, is very important. An aviator has to be level-4 of ICAO level in English.

PO11: Project management and finance: To regulate and oversee aviation safety, security and environment, deliver air navigation services and facilitate air connectivity through international collaboration in order to serve the general public and the civil aviation industry in a responsive and cost effective manner

PO12: Life - long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self access and use feedback effectively from others to identify learning needs and to satisfy theses needs on an ongoing basis.

Curriculum Structure
Bachelor of Science (Aviation Science)

First Year

Semester - I

Course	Code	Course Name	L	T	P	C*
BVF BVF	011/ 014	General English/सामान्य हिन्दी	2	0	0	2
		Core Foundation Course - I	2	0	0	2
ENGL	108	English Language - I	4	0	0	4
AVS	111	Basic Aviation Mechanics and Electrics	6	0	0	6
MATH	102	Basic Mathematics	4	0	0	4
PHY	102	Basic Physics - I	4	0	0	4
AVS	112	Flight Fundamentals (SPL/FRTOL)	6	0	0	6
AVS	113L	Hangar Workshop - I Lab	0	0	4	2
Semester Total:			**28**	**0**	**4**	**30**

Semester - II

Course	Code	Course Name	L	T	P	C*
BVF BVF	014/ 011	सामान्य हिन्दी /General English	2	0	0	2
		Core Foundation Course - II	2	0	0	2
AVS	110	Basic Aircraft Radios	4	0	0	4
AVS	115	Meteorology - I	4	0	0	4
AVS	116	Navigation-I (General Navigation And Radio Navigation)	4	0	0	4
AVS	109	Air Regulations - I	4	0	0	4
AVS	117	Technical-I (Principles of Flight)	4	0	0	4
ENGL	109	English Language - II	4	0	0	4
AVS	114L	Hangar Workshop - II Lab	0	0	4	2
		Semester Total:	**28**	**0**	**4**	**30**

Second Year

Semester – III

Course	Code	Course Name	L	T	P	C*
		Core Foundation Course - III	2	0	0	2
		Elective Foundation Course - I	2	0	0	2
ENGL	207	English - III (R/T Communication)	4	0	0	4
AVS	217	Meteorology - II	4	0	0	4
AVS	212	Air Regulation - II	4	0	0	4
AVS	218	Navigation – II (Aircraft Instruments)	4	0	0	4
AVS	220	Technical -II (Aircraft Systems)	4	0	0	4
AVS	213	Aircraft Powerplants	4	0	0	4
AVS	203L	Hangar Workshop - III Lab	0	0	4	2
		Semester Total:	**28**	**0**	**4**	**30**

Semester - IV

Course	Code	Course Name	L	T	P	C*
		Core Foundation Course - IV	2	0	0	2
		Elective Foundation Course - II	2	0	0	2
ENGL	208	English - IV (ICAO Level - 5)	4	0	0	4
AVS	221	Technical-III (Aircraft Electricals)	4	0	0	4
AVS	219	Navigation-III (Flight Planning and Performance)	4	0	0	4
AVS	214	Aircraft Specifics	4	0	0	4
AVS	215	Aviation Maintenance Management	4	0	0	4
AVS	216L	Hangar Workshop - IV Lab	0	0	4	2
		Semester Total:	**24**	**0**	**4**	**26**

Third Year

Semester - V

Course	Code	Course Name	L	T	P	C*
		Vocational Course – I	2	0	0	2
		Core Foundation Course - V/ Elective Foundation Course - III	2	0	0	2
AVS	315	Advanced Flight Operational Procedures	4	0	0	4
AVS	320	Human Performance and Limitations	4	0	0	4
AVS	323	Navigation-IV (Auto Flights Warning and Recordings)	4	0	0	4
AVS	102L	Flying Experience/Flying check - I Lab	0	0	4	2
AVS	321P	Minor Project - 1	0	0	8	4
		Discipline Elective - I	4	0	0	4
		Discipline Elective - II	4	0	0	4
		Semester Total:	**24**	**0**	**12**	**30**

Semester - VI

Course	Code	Course Name	L	T	P	C*
		Vocational Course – II	2	0	0	2
		Elective Foundation Course - III/ Core Foundation Course - V	2	0	0	2
AVS	307	Dangerous Goods	4	0	0	4
AVS	305	Crew Resources Management	4	0	0	4
AVS	202L	Flying Experience/Flying check (Practical) - II	0	0	4	2
AVS	322P	Minor Project - 2	0	0	8	4
		Discipline Elective - III	4	0	0	4
		Discipline Elective - IV	4	0	0	4
		Semester Total:	**20**	**0**	**12**	**26**

List of Discipline Elective

Course	Code	Course Name	L	T	P	C*
AVS	317	Airline Management	4	0	0	4
AVS	325	Remotely Piloted Aircraft System	4	0	0	4
AVS	324	Pilot Theory	4	0	0	4
AVS	316	Advanced Human Factors	4	0	0	4
AVS	318	Aviation Operations Management	4	0	0	4
AVS	319	Aviation Safety Management	4	0	0	4
ENGL	307	English - V (ICAO Level - 6)	4	0	0	4

List of Core Foundation Courses

#	Course Code		Course Name	L	T	P	C*
1.	BVF	002	Environment Studies	2	0	0	2
2.	BVF	013	Indian Cultural Heritage	2	0	0	2
3.	BVF	017	Selected Writings of Great Authors-I	2	0	0	2
4.	BVF	020	Women in Indian Society	2	0	0	2
5.	BVF	015	Parenthood and Family Relation	2	0	0	2

List of Elective Foundation Courses

#	Course Code		Course Name	L	T	P	C*
1.	BVF	016	Science of Happiness	2	0	0	2
2.	BVF	012	Human Body and Health	2	0	0	2
3.	BVF	010	Design Thinking	2	0	0	2
4.	BVF	019	Universal Human Values	2	0	0	2
5.	BVF	018	Selected Writings of Great Authors-II	2	0	0	2

List of Vocational Courses

Course Code	Course Name	L	T	P	C*
VOC 011L	Basic Dress Making	0	0	4	2
VOC 005L	Dress Designing	0	0	4	2
VOC 014	Entrepreneurship - I	2	0	0	2
VOC 015	Entrepreneurship - II	2	0	0	2
VOC 020	Radio Production - I	2	0	0	2
VOC 021	Radio Production - II	2	0	0	2
VOC 022	Web Designing and Internet Technology-I	1	0	0	1
VOC 022L	Web Designing and Internet Technology-I Lab	0	0	2	1
VOC 023	Web Designing and Internet Technology-II	1	0	0	1
VOC 023L	Web Designing and Internet Technology-II Lab	0	0	2	1
VOC 009	Library Science – I	1	0	0	1
VOC 009L	Library Science – I Lab	0	0	2	1
VOC 010	Library Science – II	1	0	0	1
VOC 010L	Library Science – II Lab	0	0	2	1
VOC 018	Photography – I	0	0	4	2
VOC 019	Photography – II	0	0	4	2
VOC 016	Introduction to Artificial Intelligence – I	2	0	0	2
VOC 017	Introduction to Artificial Intelligence – II	2	0	0	2
VOC 012	Computer Assisted Learning and Teaching	1	0	0	1
VOC 012L	Computer Assisted Learning and Teaching Lab	0	0	2	1
VOC 013	Emerging Technologies for Learning and Teaching	2	0	0	2

1. Student can opt for at most 2 additional Open (Generic) audit/credit Elective from other disciplines opting at most 1 per semester from Semesters III onwards with prior permission of respective heads and time table permiting.
2. Every Student shall also opt for:
   Five Fold Education: Physical Education I, Physical Education II,
   Five Fold Education: Aesthetic Education I, Aesthetic Education II,
   Five Fold Education: Practical Education I, Practical Education II
   one each semester

*** L - Lecture hrs/week ; T - Tutorial hrs/week;**
P - Project/Practical/Lab/All other non-classroom academic activities, etc. hrs/week; C- Credit Points of the Course

Note: Syllabus of Foundation and Vocational courses are available in separate booklet, "Curriculum Structure and Syllabus Foundation and Vocational Courses"

Five Fold Activities

Fine Arts		Physical Education and Sports	
BVFF 101	Classical Dance (Bharatnatyam)	BVFF 201	Aerobics
BVFF 102	Classical Dance (Kathak)	BVFF 202	Archery
BVFF 103	Classical Dance (Manipuri)	BVFF 203	Athletics
BVFF 104	Creative Art	BVFF 204	Badminton
BVFF 105	Folk Dance	BVFF 205	Basketball
BVFF 106	Music-Instrumental (Guitar)	BVFF 206	Cricket
BVFF 107	Music-Instrumental (Orchestra)	BVFF 207	Equestrian
BVFF 108	Music-Instrumental (Sarod)	BVFF 208	Flying - Flight Radio Telephone Operator's Licence (Restricted)
BVFF 109	Music-Instrumental (Sitar)	BVFF 209	Flying - Student Pilot's Licence
BVFF 110	Music-Instrumental (Tabla)	BVFF 229	Aeromodelling
BVFF 111	Music-Instrumental (Violin)	BVFF 210	Football
BVFF 112	Music-Vocal	BVFF 211	Gymnastics
BVFF 113	Theatre	BVFF 212	Handball
		BVFF 213	Hockey
Social Service and Extension Activities		BVFF 214	Judo
BVFF 301	Banasthali Sewa Dal	BVFF 215	Kabaddi
BVFF 302	Extension Programs for Women Empowerment	BVFF 216	Karate – Do
BVFF 303	FM Radio	BVFF 217	Kho-Kho
BVFF 304	Informal Education	BVFF 218	Net Ball
BVFF 305	National Service Scheme	BVFF 219	Rope Mallakhamb
BVFF 306	National Cadet Corps	BVFF 220	Shooting
		BVFF 221	Soft Ball
		BVFF 222	Swimming
		BVFF 223	Table Tennis
		BVFF 224	Tennis
		BVFF 225	Throwball
		BVFF 226	Volleyball
		BVFF 227	Weight Training
		BVFF 228	Yoga

Evaluation Scheme and Grading System

Continuous Assessment (CA) (Max. Marks)					End-Semester Assessment (ESA) (Max. Marks)	Grand Total (Max. Marks)
Assignment		Periodical Test		Total (CA)		
I	II	I	II			
10	10	10	10	40	60	100

In all theory, laboratory and other non classroom activities (project, dissertation, seminar, etc.), the Continuous and End-semester assessment will be of 40 and 60 marks respectively. However, for Reading Elective, only End semester exam of 100 marks will be held. Wherever desired, the detailed breakup of continuous assessment marks (40), for project, practical, dissertation, seminar, etc shall be announced by respective departments in respective student handouts.

Based on the cumulative performance in the continuous and end-semester assessments, the grade obtained by the student in each course shall be awarded. The classification of grades is as under:

Letter Grade	Grade Point	Narration
O	10	Outstanding
A+	9	Excellent
A	8	Very Good
B+	7	Good
B	6	Above Average
C+	5	Average
C	4	Below Average
D	3	Marginal
E	2	Exposed
NC	0	Not Cleared

Based on the obtained grades, the Semester Grade Point Average shall be computed as under:

$$SGPA = \frac{CC_1 * GP_1 + CC_2 * GP_2 + CC_3 * GP_3 + ---- + CC_n * GP_n}{CC_1 + CC_2 + CC_3 + ---- + CC_n} = \frac{\sum_{i=1}^{n} CC_i * GP_i}{\sum_{i=1}^{n} CC_i}$$

Where n is the number of courses (with letter grading) registered in the semester, CC_i are the course credits attached to the i^{th} course with letter

grading and GP_i is the letter grade point obtained in the i^{th} course. The courses which are given Non-Letter Grades are not considered in the calculation of SGPA.

The Cumulative Grade Point Average (CGPA) at the end of each semester shall be computed as under:

$$CGPA = \frac{CC_1 * GP_1 + CC_2 * GP_2 + CC_3 * GP_3 + ---- + CC_n * GP_n}{CC_1 + CC_2 + CC_3 + ---- + CC_n} = \frac{\sum_{i=1}^{n} CC_i * GP_i}{\sum_{i=1}^{n} CC_i}$$

Where n is the number of all the courses (with letter grading) that a student has taken up to the previous semester.

Student shall be required to maintain a minimum of 4.00 CGPA at the end of each semester. If a student's CGPA remains below 4.00 in two consecutive semesters, then the student will be placed under probation and the case will be referred to Academic Performance Review Committee (APRC) which will decide the course load of the student for successive semester till the student comes out of the probationary clause.

To clear a course of a degree program, a student should obtain letter grade C and above. However, D/E grade in two/one of the courses throughout the UG/PG degree program respectively shall be deemed to have cleared the respective course(s). The excess of two/one D/E course(s) in UG/PG degree program shall become the backlog course(s) and the student will be required to repeat and clear them in successive semester(s) by obtaining grade C or above.

After successfully clearing all the courses of the degree program, the student shall be awarded division as per following table.

Division	CGPA
Distinction	7.50 and above
First Division	6.00 to 7.49
Second Division	5.00 to 5.99
Pass	4.00 to 4.99

CGPA to % Conversion Formula: % of Marks Obtained = CGPA * 10

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ENGL 108 English Language-I

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of the course, the students will be able to:

- show an understanding of RP sounds
- speak with proper stress, rhythm and intonation.
- apply the knowledge of weak forms, tonal functions and connected speech to general and work-related communication
- speak in an accent or dialect that can be understood
- demonstrate an understanding of native speakers' nuances of connected speech

UNIT I Introduction to Basic RP sounds

Phonetic Transcription of Mono, Bi and Tri-syllabic words

UNIT II Word Stress

UNIT III Weak Forms

UNIT IV Aspects of Connected speech: Elision and Assimilation

UNIT V Intonation: Basic Patterns- Rise,Fall,Fall Rise, Rise Fall

Recommended Reading

Roach, Peter.(2010) *English Phonetics and Phonology Fourth Edition:* A Practical Course. Cambridge University Press.

Connor, J.D.O. (1980)*Better English Pronunciation*. Cambridge University Press

Dhamija and Sethi.(1999) *A Course in Phonetics and Spoken English*. PHI Learning Pvt. Ltd,

Balasubramanian, T.(2012) *English Phonetics for Indian Students*. Trinity Press Pvt. Ltd.

Suggested E-learning materials

Phonetics

https://scholar.harvard.edu/files/adam/files/phonetics.ppt.pdf

https://www.dvusd.org/cms/lib/AZ01901092/Centricity/Domain/3795/Sound_Spelling_Chart.pdf

http://egyankosh.ac.in/bitstream/123456789/14174/1/Unit-5.pdf

Word Stress

http://www.medecine.ups-tlse.fr/anglais/docs/Pronunciation-stress.pdf

http://ocw.metu.edu.tr/mod/resource/view.php?id=4789

https://static1.squarespace.com/static/55a6e8e8e4b055a1ea2ecd5b/t/58d1f6c71e5b6c1243a7349e/1490155219247/Stress.pdf

Weak forms in English

https://www.perfect-english-grammar.com/support-files/weak-forms-list.pdf

http://www.serwis.wsjo.pl/lektor/276/13_weak%2520forms%2520in%2520BrE.pdf

http://www.siff.us.es/fil/publicaciones/apuntes/teresals/apartado%2010-0.pdf

http://smart2.ums.edu.my/mod/resource/view.php?id=5855pects of connected speech

Intonation

https://www.uts.edu.au/sites/default/files/Pronunciation%204%20-%20Intonation%20%26%20Connected%20Speech%20(MaryAnn).pdf

http://www.ling.cam.ac.uk/francis/FN_inton_prepub.pdf

AVS 111 Basic Aviation Mechanics and Electrics

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**6**	**0**	**0**	**6**

Learning Outcomes:

Upon the successful completion of the course, student will be able to:

- Explain the various laws of mechanics and calculate the different forces and effects.
- Discuss and estimate the various parameters associated with objects in motions.
- Describe the fundamental laws and apply them to solve electrical problems.
- Describe the construction and working of various electrical machines.
- Describe the principles of devices and its applications.

UNIT I MECHANICS, STATICS

Introduction, Units and Dimensions, Laws of Mechanics, Lame's theorem

Parallelogram and triangular Law of forces,Resolution and Composition of forces, Equilibrium of a particle,Forces in space, Equilibrium of a particle in space, Equivalent systems of forces,Principle of transmissibility, Single equivalent force.

UNIT II MECHANICS, DYNAMICS

Displacements Velocity and acceleration their relationship, Relative motion, Curvilinear motion, Newton's law, Work Energy Equation of particles, Impulse and Momentum, Impact of elastic bodies.

UNIT III ELECTRICAL CIRCUITS

Ohm's Law, Kirchhoff's Laws, Steady State Solution of DC Circuits, Introduction to AC Circuits, Waveforms and RMS Value, Power and Power Factor, Single Phase and Three Phase Balanced Circuits.

UNIT IV ELECTRICAL MACHINES

Construction Principle of Operation Basic Equations and Applications of DC Generators DC Motors Single Phase Transformer Single Phase Induction Motor.

UNIT V SEMICONDUCTOR DEVICES AND APPLICATIONS

Characteristics of PN Junction Diode, Zener Effect, Zener Diode and its Characteristics, Half Wave and Full Wave Rectifiers, Voltage Regulation. Bipolar Junction Transistor, CB CE CC Configurations and Characteristics

TEXT BOOKS

1. Hibbeller, R.C. (2000). *Engineering Mechanics.* (Vol. 1) Statics, (Vol. 2) Dynamics. Pearson Education Asia Pvt. Ltd.
2. Chakrabati A. (1999). *Circuits Theory (Analysis and synthesis).* New Delhi. Dhanpath Rai & Sons.
3. Charles K. Alexander & Mathew N.O. Sadik (2003). *Fundamentals of Electric Circuits.*2nd Edition. McGraw Hill.

SUGGESTED E-LEARNING RESOURCES:

1. Online Lecture, "Basic Electricals and Electronics" – "www.edx.org"
2. Online Lecture, "Electrical Circuits" – www.nptel.ac.in
3. Aviation 101 (Canvas net): https://www.mooc-list.com/course/aviation-101-canvas-net.

MATH 102 Basic Mathematics

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of the course, the student will be able to,

- Determine the particular progression work (AP, GP, HP)
- Demonstrate the determinant of a matrix up to third order.
- Identify function and relations, notations, operations and applications of sets.
- Locate the quadrant in Cartesian plain.
- Recognize real-world problems that are amenable to mathematical analysis, and formulate mathematical models of such problems

UNIT I Relations and Functions

Types of relations: Reflexive, symmetric, transitive and equivalence relations. One to one and onto functions, composite functions, inverse of a function. Binary operations.

Inverse Trigonometric Functions

Definition, range, domain, principal value branches. Graphs of inverse trigonometric functions. Elementary properties of inverse trigonometric functions.

UNIT II Matrices

Matrices: Concept, notation, order, equality, types of matrices, zero matrix, transpose of a matrix, symmetric and skew symmetric matrices. Addition, multiplication and scalar multiplication of matrices, simple properties of addition, multiplication and scalar multiplication. Non-commutativity of multiplication of matrices and existence of non-zero matrices whose product is the zero matrix (restrict to square matrices of order 2). Concept of elementary row and column operations. Invertible matrices and proof of the uniqueness of inverse, if it exists; (Here all matrices will have real entries).

UNIT III Determinants

Determinant of a square matrix (up to 3×3 matrices), properties of determinants, minors, cofactors and applications of determinants in finding the area of a triangle. Adjoint and inverse of a square matrix. Consistency, inconsistency and number of solutions of system of linear equations by examples, solving system of linear equations in two or three variables (having unique solution) using inverse of a matrix.

UNIT IV Vectors

Vectors and scalars, magnitude and direction of a vector. Direction cosine/ratios of vectors. Type of vectors (equal, unit, zero, parallel and collinear vectors), position vectors of a point, negative of a vector, components of a vector, addition of vectors, multiplication of a vector by a scalar, position vector of a point dividing a line segment in a given ratio. Scalar (dot) products of vectors, projection of a vector on a line. Vector (cross) product of vectors.

UNIT V Three Dimensional Geometry

Direction cosine/ratios of a line joining two points. Cartesian and vector equation of a line, coplanar and skew lines, shortest distance between two lines. Cartesian and vector equation of a plane. Angle between two lines. Cartesian and vector equation of a plane. Angle between (i) two lines, (ii) two planes (iii) a line and a plane. Distance of a point from a plane.

Text Books:-

1. Mathematics-I: N.C.E.R.T., New Delhi, 2007-08.
2. R. S. Agarwal, Mathematics-I , New Delhi.

Suggested E-learning material

1. Sequence and Series: http://mycatguide.yolasite.com/resources/sequence.pdf
2. Matrix: https://www.hec.ca/en/cams/help/topics/Matrix_determinants.pdf
3. Binomial Theorem: http://ncert.nic.in/ncerts/l/keep208.pdf
4. Set: http://ncert.nic.in/ncerts/l/keep201.pdf
5. Function & Relation: http://ncert.nic.in/ncerts/l/keep202.pdf

PHY 102 Basic Physics-I

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of this course, the students will be able to-

- Have knowledge about semiconductors and semiconductor devices
- Under electromagnetic phenomena and to have knowledge of Maxwell equations
- Understand the thermodynamics laws and their applications

Unit I: Vectors: Vectors, Properties of vectors, Position, Velocity and Acceleration vectors, Vector addition and subtraction, Resolution of vectors, products of vector, Electrostatics: Fundamental forces of nature, conservation and quantization of charge, Coulomb's law, Intensity of electric field, electric flux, Electric field (discrete and continuous charge distributions), Electrostatic potential and Electrostatic potential energy, Gauss' law and its applications, Electric dipole, Electrical capacitance, principle of a capacitor, parallel plate capacitor with dielectric, combinations of capacitors.

Unit II: Mechanics of Solids and Fluids: Elasticity, Hooke's Law, Young's modulus, bulk modulus, modulus of rigidity, Poisson's ratio, Pressure due to a fluid column, Pascal's law and its applications, Pressure, Density, Viscosity, Stokes' law, Bernoulli's principle and its applications, Surface Tension, angle of contact, application of surface tension - drops, bubbles and capillary rise.

Unit III: Oscillations and Waves: Simple Harmonic Motion, Loaded spring, Simple and Compound Pendulum, Longitudinal and Transverse waves, Stationary waves, Superposition of waves, Beats, Doppler's effect for sound and light waves, Lissajous figures. Atomic Physics: Dual nature of radiation, Photoelectric effect, De Broglie hypothesis, Davisson-Germer experiment, Bohr's theory of hydrogen spectrum, x-rays

Unit IV: Optics: Laws of reflection and refraction, Corpuscular theory of light, wave theory of light, Dispersion, Fraunhoffer lines, Interference, Coherence, Young's double slit experiment, Freshel's Biprism, Michelson's interferometer, Diffraction, Fresnel's half period zones, Idea of polarization with the help of light vector, double refraction, Nicol prism, Polaroid.

Unit V: Rotational Motion: Centre of mass, motion of center of mass, Rigid body, Rotational motion, moment of a force, torque, angular momentum, conservation of angular momentum and its applications, moment of inertia and radius of gyration, Values of moments of inertia for simple geometrical objects i.e. ring, solid disc, cylinder, sphere, hollow sphere, rectangular rod, parallel and perpendicular axes theorems and their applications, Rigid body rotation

Recommended Books:

1. Saxena M. P. (1997) Electricity and Magnetism, College Book House.
2. Bhargava N N (2000), Basic Electronic, Tata McGraw Hill.

3. Mehta V.K., Chand S. (2002), Principles of Electronics.
4. Zeemansky M.W. (1968) Heat and Thermodynamics, McGraw Hill, 5th ed.
5. Singhal, Agrawal Prakash (2007)Heat and Thermodynamics, Pragati Prakashan.

References Books:

1. Sadiku Mathew N.O.(2005) Elements of Electromagnetics, New Delhi, Oxford Univ. Press
2. Purcell, E. M. (1963). Berkeley physics course. *Electricity and magnetism*.
3. Millman, J., & Halkias, C. C. (1972). *Integrated electronics: analog and digital circuits and systems*. McGraw-Hill..

Suggested web-resources:

1. https://www.coursera.org/browse/physical-science-and engineering/electrical-engineering
2. https://www.edx.org/learn/electronics

AVS 112 Flight Fundamentals (SPL/FRTOL)

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**6**	**0**	**0**	**6**

Learning Outcomes:

Upon the successful completion of the course, student will be able to:

- Describe the fundamental rules and regulations of flying an aircraft.
- Describe the various navigation techniques and flight instruments
- Explain the various weather phenomena and aviation hazard.
- Explain the principles of aircraft mechanics and define various factors involved.
- Explain the various aircraft systems and working of aircraft engines.

UNIT I AIR REGULATIONS

Knowledge of Terms Used in Aviation Such as Aircraft, Aeroplane, Aerodrome, Balloon, Co-Pilot, Director General, Flight Time, Solo Time, Dual Flight Time, Log Book, Flight Crew Member, Helicopter, Prohibited Area, Take off, Landing, Air Traffic Control, Mayday, PAN, etc. - The Different

Categories of Pilots' Licenses - Student Pilot Licence, Requirements for Issue, Renewal, Validity and Privileges - Visual Flight Rules - Ground Markings, Visual and Light Signals with Specific Reference to Visual Flights and Circuit Flying, Elementary Knowledge of - Certificate of Airworthiness, Certificate of Registration, Certificate of Release to Service, Airworthiness Review Certificate

UNIT II AIR NAVIGATION

Basic Knowledge of Form of Earth and The Method of Representing Sphere (Earth) on a Flat Surface Mapping, Basic Knowledge of Various Units of Measure Such as - Nautical Miles, Kilometre, Statute Mile, Fahrenheit and Celsius, Milibars (Hectopascal), Lbs., Kilogram, US and Imperial Gallons, Litre and Conversion From One to Other, Elementary Knowledge of Some Navigation Instruments such as Magnetic Compass, Air Speed Indicator, Altimeter and Basic Knowledge of Magnetism, Use of Radio Telephony, VHF etc. Elementary Understanding of Radio Navigational Aids Such as NDB, VOR, and their Uses in Aviation (Appreciation Only)

UNIT III AVIATION METEOROLOGY

Elementary Knowledge of Atmosphere and Its Properties, Basic Knowledge of Temperature, Pressure and Its Density and Their Relationship, Elementary Knowledge of Relationship Between Pressure & Wind, Elementary Knowledge of Variation of Wind With Height, Sea Breeze and Land Breeze, Elementary Knowledge of Different Types of Clouds and Precipitation, Basic Understanding of Hazards Associated With Certain Types of Clouds, Elementary Knowledge of The Terms – Visibility, Fog, Mist andHaze, Elementary Knowledge of Variation of Pressure With Height, and The Q Codes – QNH, QFE and QNE, Etc., Basic Understanding ofMETAR, SPECI and Aerodrome Warnings and Their Importance in Aviation, Elementary Knowledge of The Uses ofAnemometer, Aneroid Barometer, Wind Stock Etc.

UNIT IV AIRCRAFT

Elementary Knowledge of – Density, Pressure, Temperature, Humidity andThe Relationship Between Them, Understanding of The Terms – Thrust, Drag, Lift, Weight, Aerofoil, Angle of Attack, Centre of Lift, Stalling, Range, Endurance Etc.,

Elementary Knowledge of The Forces Acting on an Aerofoil in Level Flight; Understanding of Bernoulli's Theorem - Elementary Knowledge of The Primary Controls, Understanding of The Uses of Aileron, Rudder, Elevator, Stabilizer, Trimming Devices, Flaps, Landing Gear etc., General Knowledge of The Principle of Operation of a Piston Engine an Associated Systems. - Elementary Knowledge of The Principle of a Fixed Pitch Propeller, Elementary Knowledge of Weight and Balance, Basic Knowledge of First-Aid, The Use of Generally Available First-Aid-Kits

UNIT V ENGINES AND SYSTEMS

Basic Knowledge of The Systems of The Type of Aircraft: Flying Controls And Flaps, Landing Gear, Electrical System, Heating And Ventilating System, Flight Instruments, Type of Propellers - Adequate Knowledge of The Instrumentation and Radio Navigation Aids Pertaining to The Aircraft - Basic Handling and Care of Aircraft

Text books:

1. *Pilot's Handbook for Aeronautical Knowledge.* FAA Publication.
2. Group Capt. I C Joshi. (2015). *Aviation Meteorology.* Himalayan Book Publication.
3. Wg. Cdr. R K Bali. *Air Regulations.* Sterling Book House.
4. (2016). *General Navigation.* CAE Oxford Aviation Academy Publication.
5. (2016). *Instrumentation.* CAE Oxford Aviation Academy Publication.
6. (2016). *Radio Navigation*. CAE Oxford Aviation Academy Publication.

SUGGESTED E-LEARNING RESOURCES:

1. Computer Based Trainer, "General Navigation", Oxford 2016 Edition
2. Computer Based Trainer, "Instrumentation", Oxford 2016 Edition
3. Computer Based Trainer, "Radio Navigation", Oxford 2016 Edition
4. Computer Based Trainer, "Air Law", Oxford 2016 Edition
5. Computer Based Trainer, "Meteorology", Oxford 2016 Edition

AVS 113L Hangar Workshop - I Lab

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning outcomed:

Upon the successful completion of the course, student will be able to:

- Get familiarization with Aircraft Structure
- Understand the working of Engines
- Explain use and types of flight controls.
- Explain use of landing gears and their types.

PART A AIRFRAME FAMILIARIZATION COURSE

1. Aircraft, Types of aircraft, Principal parts and components of Aircraft.
2. Aerodynamic terms, CG, CP, MAC, LIFT, DRAG, THRUST, WEIGHT, Bernoulli's theorem.
3. Fuselage, Wings, Stabilizers.
4. Flight controls and flight control surfaces.
5. Landing gear and types of Landing Gear.

PART B AIRCRAFT ENGINE FAMILIARIZATION COURSE

1. Engine and different types of Engines.
2. Principal parts of Piston Engine.
3. Working principal of piston engine, Four-strokes and five event cycles.
4. Basic concept and main component of Aircraft engine.
5. Purpose of Crankcase, Cylinder, Piston, Crank Shaft and Cam shaft.

Text books:

1. Airframe and Power plant Mechanics (AC 65 -15A,12A and 9A)-Airframe Hand Book.
2. Kermode A.C. *Mechanics of Flight.*
3. Heywood J. E. *Light Aircraft Maintenance*.
4. Heywood J. E. *Light Aircraft Inspection*
5. Pallet E. H. J. *Aircraft Electrical Systems.*
6. Pallet E. H. J. *Aircraft Instruments*.

7. Pilot Operating handbook (P.O.H.) of Cessna 152 and Cessna 172 aircraft
8. CARs and Human Factors

SUGGESTED E-LEARNING RESOURCES:

1. Aviation 101 (Canvas net): https://www.mooc-list.com/course/aviation-101-canvas-net.
2. Technical maintenance of aircraft and aircraft engines : https://www.class-central.com/course/stepik-technical-maintenance-of-aircraft-and-aircraft-engines-10489

AVS 110 Basic Aircraft Radios

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes:

Upon the successful completion of the course, student will be able to:

- Explain the concept of radio communication fundamentals and different forms of wave propagation.
- Describe the purpose and methods of HF communication and different types of modulation.
- Calculate resonant frequency bandwidth of any given RLC circuit.
- Explain the working of a radio transmitter and receiver and explain the heterodyne.
- Convert numbers between different number system solve digital logic and identify the component of digital computer.

UNIT I RADIO PRINCIPLES AND PROPAGATION THEORY

Electromagnetic Radiation, Polarization, Radio Waves, Frequency Bands, Phase Comparison, Frequency Wavelength Relationship, Radio Wave Propagation, Factors Affecting Propagation, Inverse Square Law, Propagation Path, Non-Ionosphere Propagation, Ionospheric Propagation, Sky wave, Super-refraction, Sub-refraction

UNIT II MODULATION AND ANTENNA

Need for Modulation, Keyed Modulation, Amplitude Modulation, Single Side Band, HF Communications, SELCAL,

Frequency Modulation, Advantages and Disadvantages of Different Modulation Techniques, Emission Designators, Antenna Principles, Types, Loaded Antenna, Aerial Feeders, Polar Diagrams, Directivity, Radar Aerials

UNIT III OSCILLATORS

Pure Resistive Circuit, Pure Inductive Circuit, Pure Capacitive Circuit, Series RLC Circuit, Parallel RLC Circuit, Impedance, Resonance, Resonant Frequency, Selectivity, Bandwidth, LC Oscillator, Piezo Oscillator, Microwave Oscillators

UNIT IV RADIO APPARATUS

Radio Transmitter and Receiver, Tuned Radio Frequency Receiver, Super-heterodyne Receiver, Automatic Gain Control, Squelch, Microphones- Construction, Working and Types, Speaker- Construction, Working and Types

UNIT V DIGITAL PRINCIPLES

Binary Number System, Logic Gates, Boolean Algebra, Half and Full Adders, Flip-flops, Registers and Counters, Digital Computer Components, Application of Digital Computers in Aircraft

TEXT BOOKS:

1. Edminister Joseph A. & Mahmood Nahri (2001). *Electric Circuits.* Shaum Series. Tata McGraw Hill.
2. Salivahanan S., kumar N. Suresh & Vallavanraj A. (2008). *Electronic Devices and Circuits*. 2ndEdition. Tata McGraw Hill.
3. Bell David A. (2008). *Electronic Devices and Circuits*. 5thEdition. Oxford University Press.

SUGGESTED E-LEARNING RESOURCES:

1. Online Lecture, “Wireless Telecomunications” – “www.nptel.ac.in”
2. Online Lecture, “Basic Electricals and Electronics” – “www.edx.org”
3. Online Lecture, “Radio circuits” – “www.nptel.ac.in”

AVS 115 Meteorology – I

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes:

Upon the successful completion of the course, student will be able to:

- Explain the composition of atmosphere and how the properties changes with altitude
- Interpret how various pressure patterns affect the movement of winds and describe the types of local winds
- Translate the various atmospheric properties identify the stability of the atmosphere and explain the formation and recognise that types of fog
- Explain the formation and aviation hazard of turbulent weather and explain the formation and identify different types of clouds.
- Decode METAR, SPECI, TREND and TAF messages.

UNIT I THE ATMOSPHERE

Earth's Atmosphere – structure, significance, hazards, International Standard Atmosphere, ISA Deviation,Pressure – Variations of pressure, Types of Pressure, Analysis Charts,Density – Effects of Changes of Pressure, Humidity, Temperature, Altitude and Latitude on Density,Pressure Systems – Buys Ballot's Law, Advection, Depression, Anti-cyclonic Weather, Temperature variation with height, Lapse Rate, Humidity, Bergeron Theory, Dry Bulb and Wet Bulb Hygrometer, Altimetry – QNH, QNE, QFE, Altimeter Errors, Transition Altitude, Transition Level

UNIT II WINDS

Introduction, Gusts, Squalls, Geostropic Wind, Pressure Gradient Force, Coriolis Force, Gradient Wind, Diurnal Variation of Surface Winds, Land Breeze, Sea Breeze, Ravine Winds, Coastal Effects, Venturi Effect, Katabatic Winds, Anabatic Winds, Föhn Winds, Mountain Waves, Isotach, Thermal Wind, Forecasting

UNIT III ATMOSPHERIC STABILITY AND CLOUDS

Adiabatic temperature changes, DALR, SALR, ELR, Stability, Absolute Stability, Absolute Instability, Conditional Stability, Clouds – Amount, Base, Ceiling, Measurement, Classification, Condensation Level, Inversions, Visibility, Fog – Radiation Fog, Hill Fog, Advection Fog, Optical Phenomena – Halo, Corona, Mirage

UNIT IV PRECIPITATION

Turbulence, Wind Shear, Friction Layer, Thunderstorm, Types, Development, Movement, Alignment, Avoidance, Precipitation – Coalescence Theory, Bergeron Theory, Types, Icing – Types,Factors affecting the Severity of Icing, Icing forecasts, Freezing Level, Piston Engine Induction Icing, Jet Engine Icing

UNIT V WEATHER REPORTS – I

METAR, SPECI, TREND, TAF – Decoding, Report Type, Special Reports, The Becoming Group, The Temporary Group, The Probability Indicator, Amendments

Text books:

1. Group Capt. I C Joshi. (2015). *Aviation Meteorology*. Himalayan Book Publication.
2. (2016). *Meteorology*. CAE Oxford Aviation Academy Publication.
3. *Meteorology.* 10th Edition. Jeppesen Atlantic Flight Training Limited Pub.
4. *Meteorology*. 12th Edition. Nordian. A.S.

SUGGESTED E-LEARNING RESOURCES:

1. Computer Based Trainer, "Meteorology", Oxford 2016 Edition
2. Online Lecture, "Geography" – "www.nptel.ac.in"
3. Online Lecture, "Earth Science" – "www.edx.org"
4. Online Lecture, "Meteorology" – www.edx.org
5. Online Course on "Aviation Meteorology", Udemy Academy

AVS 116 Navigation I– (General Navigation and Radio Navigation)

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes:

Upon the successful completion of the course, student will be able to:

- Identify the shortest route under constant heading route between any two points on earth.

- Locate the position and determine the track to travel between any two points on the surface of the earth with the help of different types of aeronautical.
- Navigate effectively between any places on earth and compute the safe distance the can travel.
- Describe and demonstrate the various radio navigation techniques followed in aircraft flight navigation.
- Explain and identify the various levels and applications of radar in aircraft navigation and monitoring.

UNIT I BASIC NAVIGATION

The Earth – Latitudes, Longitudes, Directions, Great Circle, Rhumb Line, Small Circle, Parallels of Latitude, Convergency, Conversion Angle, Departure, Grid Navigation

UNIT II CHARTS

Scale, Chart Properties, Types of Projection, Mercator chart – Its Properties, Direct Mercator Chart, Transverse Mercator, Oblique Mercator, Lambert Conformal Chart, Polar Stereographic Chart, Application and Uses of Charts

UNIT III DEAD RECKONING AND SOLAR SYSTEM

The Navigation Computer, Triangle of Velocities Range and Endurance, Point of Equal Time, Point of Safe Return, 1 in 60 Rule and its application, Solar System, Time

UNIT IV RADIO NAVIGATION

Basic Radio propagation theory Modulation Antennae VHF Direction Finder Automatic Direction Finder VHF Omni–Directional Range Instrument Landing System Microwave Landing System

UNIT V RADAR AND SATELLITE SYSTEMS

Radar principles Doppler Radar Systems Ground Radar Airborne Weather Radar Secondary Surveillance Radar Distance Measuring Equipment Global Navigation Satellite System.

Text books:

1. (2016). *General Navigation*. CAE Oxford Aviation Academy Pub.
2. (2016). *Radio Navigation.* CAE Oxford Aviation Academy Pub.
3. *General Navigation*. Jeppesen 10th Edition. Atlantic Flight Training Limited.
4. *Radio Navigation.* Jeppesen 10th Edition. Atlantic Flight Training Limited.

SUGGESTED E-LEARNING RESOURCES:

1. Computer Based Trainer, "General Navigation", Oxford 2016 Edition
2. Computer Based Trainer, "Radio Navigation", Oxford 2016 Edition

AVS 109 Air Regulation - I

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes:

Upon the successful completion of the course, student will be able to:

- Describe the various International conventions and agreements made for CA firm safe and efficient flight operation.
- Identify the fulfilment suitability of a flight crew for particular operation purpose and demonstrate fundamental rules followed in flight operations.
- Demonstrate safe and efficient approach and departure from an airport.
- Explain various levels of Air Traffic services and flight information available for the pilots.
- Decode and interpret the various aviation documents required for flight operations.

UNIT I INTERNATIONAL AGREEMENTS AND ORGANISATIONS

The Chicago Convention, ICAO, Organisation, Structure, Duties, Publications, Freedom of Air, The Conventions of Tokyo The Hague and Montreal, The Warsaw Convention– The Rome Convention

UNIT II PERSONAL LICENSING AND RULES OF AIR

Licensing Requirements and Privileges for SPL PPL CPL and ATPL, General Rules, Right of Way– Interception Procedure, Visual Flight Rules, PIC, Instrument Flight Rule, Semicircular Rule, RVSM, Special VFR, Distress and Urgency Signals, Restricted Prohibited or Danger Areas, Aerodrome Light Signals and Marshalling Signals

UNIT III PROCEDURE FOR AIR NAVIGATION SERVICES

PANS OPS, Instrument Departure Procedure, Obstacle Clearance, Departure Types, Approach Procedure Design, Missed Approach Segments, Track Reversal and Racetrack Procedure, Circling Approach, Parallel Runway Operation, Holding Procedures, Altimeter Setting Procedures, Transponders,ACAS

UNIT IV AIRSPACE AND AIR TRAFFIC SERVICES

Introduction,Control Areas and Zones, Classes of Airspace, Airways and ATS Routes, Objectives of ATS Units, The Flight Information Service, Alerting Service, Separation, Stacking, Air Traffic Control, Area Approach and Aerodrome Control Services, Information for The Aircraft

UNIT V AERONAUTICAL INFORMATION SERVICES

Aeronautical Information Publication, NOTAM, SNOWTAM, ASHTAM, Aeronautical Information Circulars, Pre Flight and Post Flight Information, AIRAC

Text books:

1. Bali R K. *Air Regulations Part-II*. 11TH Revised Edition. Sterling Book House.
2. Bali R K. *Air Regulations Part-I*. 11TH Revised Edition. Sterling Book House.
3. (2018). *Air Law*. (2nd Edition). Oxford OAA series CAE Aviation Academ
4. (2017). *Air Law and ATC Procedures*. Nordian Press. A.S.

SUGGESTED E-LEARNING RESOURCES:

1. Computer Based Trainer, “Air Law”, Oxford 2016 Edition
2, DGCA CAR Section-7, “www.dgca.nic.in”
3, DGCA manuals and procedures, “www.dgca.nic.in”

AVS 117 Technical – I (Principles of Flight)

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes:

Upon the successful completion of the course, student will be able to:

- Apply the various concepts applied mechanics and calculate the aerodynamic effects on the various aircraft components.
- Analyse and operate the stability and control requirements and criticize the created associated problems.
- Calculate the various performance parameters at different phases of flight.
- Describe and explain the various problems and solutions associated with high speed flights.
- Describe the flight operational limitations and describe and explain various types of propellers used in aircrafts.

UNIT I AERODYNAMICS

Static and Dynamic Pressure, Airspeed Relationship, Principle of Continuity, Bernoulli's Theorem, Streamline and Streamtube, Airfoil Terminology, Airflow over an Airfoil, Airflow over a Wing, Lift, Drag, Ground Effect, Stall, Effects and Prevention, High Lift Devices

UNIT II STABILITY AND CONTROL

Static and Dynamic Stability, Static Longitudinal Stability, Effect of CG position Power and High Lift devices of Static Longitudinal Stability, Longitudinal Control, Static Lateral Stability and Control, Static Directional Stability and Control, Long and Short Period Mode, Roll Subsidence, Spiral Divergence, Dutch Roll, Pilot Induced Oscillation, Mach Trim, Aerodynamic Balancing

UNIT III FLIGHT MECHANICS

Balance of Forces, Straight and Level Flight, Steady Climb, Power On Descent, Gliding, Turning Flight, Flight with Asymmetric Thrust, Minimum Control Speeds

UNIT IV HIGH SPEED FLIGHTS

Speed of Sound, Mach Number, Mach CAS TAS Relationship with Altitude, Normal Shock Wave, Critical Mach Number,

Area rule, Super Critical Airfoil, Sweep Back, Oblique Shock Wave, Buffet, Aerodynamic Heating, Mach Angle, Mach Cone, Bow Wave, Expansion Wave

UNIT V FLIGHT LIMITATIONSAND PROPELLERS

Load Factor, Manoeuvre Envelope (V–n Diagram), Gust Loads, Aero Elasticity, Flutter, Control Reversal, Propeller Terminology, Forces acting on the Propeller, Centrifugal Twisting Moment, Popular Efficiency, Variable Pitch Propeller, Power Absorption, Propeller Turning Effects

Text books:

1. *Principles of flight.* Jeppesen Series JAA ATPL Atlantic Flight Training (2nd Edition).
2. Wiley Blackwell. (2010). *Principles of Flight.* CAE Oxford Aviation Academy.
3. Peter Swatton. (2010). *Principles of Flight.* Nordian A.S.

SUGGESTED E-LEARNING RESOURCES:

1. Computer Based Trainer, "Principles of Flight", Oxford 2016 Edition
2. Online Lecture, "Flight Mechanics" – "www.nptel.ac.in"
3. Online Lecture, "Aircraft Performances" – "www.nptel.ac.in"

ENGL 109 English Language-II

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of the course, the students will be able to:

- have a basic understanding of the targeted grammatical structures
- show consistent and appropriate language use in extended conversation and discussion
- demonstrate understanding of tense and mood of a message containing specific modal auxiliaries
- recognize basic constructions as Subject-Verb agreement
- transfer the knowledge of grammatical structures and vocabulary to communicate effectively
- use the knowledge of idioms and phrases in their day-to-day conversation

UNIT I
- Word Class and Functional Elements of a Clause
- Basic Sentence Patterns: SVC, SVOC, SVO, SVA, SVOA, SVOO

UNIT II
- Tense , Aspect, Number, Person, Voice, Mood

UNIT III
- Subject- Verb Agreement

UNIT IV
- Modality

UNIT V
- Phrasal Verbs And Idioms

Recommended Reading:

1. Corder, Pitt. *(*2009). *An Intermediate English Practice Book*. London: Orient Longman.
2. Greenbaum, Sidney. (2005). *English Grammar*. OUP.
3. Hornby, A.S, (1954). *A Guide to Patterns and Usage in English*. Delhi: Oxford University Press.
4. Leech, Geoffery N and Jan Svartvik. (2016). *A Communicative Grammar of English.* London: Routledge.
5. Leech, Geoffery N. (1982). *English Grammar for Today.* London: Palgrave Macmillan.
6. Murphy and Reynold. (2008). *Essentials of English Grammar*. Cambridge University Press.
7. Quirk, Randolph and Sydney Greenbaum. (1976) *University Grammar of English*. Longman Publications.
8. Swain, Michael. (2016) *Practical English Usage*. London: OUP.
9. Wren and Martin. (2010). *English Grammar and Composition*, Delhi: S. Chand and Company.

Suggested E-learning Materials

Word-Class:

1. https://en.oxforddictionaries.com/grammar/word-classes-or-parts-of-speech
2. https://prowritingaid.com/art/385/What-are-Word-Classes.aspx

Clauses:

3. https://writingexplained.org/grammar-dictionary/clauses

Basic Sentence Patterns:

4. http://www.grammarinenglish.com/sentencepattern/?lesson=examples

Tense:

5. https://grammar.collinsdictionary.com/easy-learning/tense_1

Subject Verb Agreement:

6. https://www.grammarbook.com/grammar/subjectVerbAgree.asp
7. https://www.flocabulary.com/unit/subject-verb-agreement/

Modality:

8. http://www.thelogician.net/FUTURE-LOGIC/Modality-Categories-and-Types-11.htm
9. https://dictionary.cambridge.org/grammar/british-grammar/modals-and-modality/modality-introduction

Phrasal Verbs/Idioms:

10. https://www.espressoenglish.net/collocations-idioms-and-phrasal-verbs-with-set/

AVS 114L Hangar Workshop – II

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes:

Upon the successful completion of the course, student will be able to:

- Understand the safety precautions in Aviation
- Understand the human component in aviation incidents/accidents
- To understand the ground handling of Aircrafts and marshalling signals.
- To understand re-fuelling of Aircrafts
- To understand various fire fighting equipments

Significance of Safety Precautions

Familiarization with aircraft documents and Basic concept of Tools and ground handling

1. General Safety Precautions
2. On board documents
3. Basic concept of marshalling signals

4. Significance of aircraft documents
5. Human factor
6. Concept of ground handling and taxing, towing, mooring, parking area etc
7. Human factor
8. Human factor

Text books:

1. Airframe and Power plant Mechanics (AC 65 -15A,12A and 9A)-Airframe Hand Book: Issued by FAA(US department of transportation), 2007 edition. Year of publication 1999.
2. Pilot Operating handbook (P.O.H.) of Cessna 152 and Cessna 172 aircraft: Issued by Cessna (Manufacturer of Aircraft). Updated time to time, last updated on Jan 2019.
3. CARs and Human Factors: Issued by DGCA, Updated time to time. Last updated on Jan 2019.

SUGGESTED E-LEARNING RESOURCES:

1. Aviation 101 (Canvas net): https://www.mooc-list.com/course/aviation-101-canvas-net.
2. Technical maintenance of aircraft and aircraft engines : https://www.class-central.com/course/stepik-technical-maintenance-of-aircraft-and-aircraftengines10489

ENGL 207 English – III (R/T Communication)

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

- After the completion of the course, the students will be able to:
- Define the various regulations and the communication procedures involved in proper Aeronautical vocal information exchange.
- Describe and apply the various principles involved in operation of the aircraft radios and explain the favorable and the adverse effects due to different parameters.
- Describe the working of the aircraft radio apparatus and operating procedures to operate the aircraft radio systems.

- Demonstrate the method of conversation and list the various aviation vocabulary and the phrases used in aviation vocal communication.
- Describe the various communication and Air Traffic control protocols.

UNIT I REGULATION AND PROCEDURE

International Telecommunication Convention & Radio Regulations, General and Aeronautical 'Q' Code Signals and other abbreviations as contained in Annexure 10 (Vol. I & II) of International Civil Aviation Organization. General Radio telephone Communication procedures and radio telephone communication procedure for distress urgency and direction finding. Procedures for distress communication in Maritime Mobile Service. Licensing requirements of installation and operation of radio apparatus used in aircraft.

UNIT II RADIO PRINCIPLES

Knowledge of Electrical Units Such as Volt. Ampere, Ohm and Watt, Wave Length, Frequency and Their Relationship, Knowledge of Radio Frequency Propagation, Day and Night Frequencies, Skip Distance, Fading Ground Shadow and Its Effect on Communication, Choice of Frequencies to Attain Maximum Efficiency in Handling Air-Ground HF Communications.

UNIT III RADIO TELEPHONY EQUIPMENTS

General Knowledge of System Employed for Air Ground Communication Including SELCAL Operation, Inter Communication and Announcing System of Aircraft, Elementary Knowledge of Radio Navigation Aids, Operation of Microphones and Headphones, Squelch, A. V. C Volume Control, Tuning of Transmitter, Simplex and Duplex Operation, Advantages and Disadvantages of H.F. Radiotelephony Communication and Limitations of Range Due to Frequency Interference etc.

UNIT IV PHRASEOLOGY

General Phraseology, Area Control Services, Approach Control Services, Starting Procedures, Coordination Between ATS Units, General Radar Phraseology, Radar in Approach Control Service, Surveillance Radar Approach, PAR Approach, SSR Phraseology

UNIT V GENERAL OPERATING PROCEDURES

Technique, Transmission of Time, Standard Words and Phrases, Call Signs, Direction Finding, Radio Test Procedures, Transfer of Communications, Read Back, Radar Procedures, Conditional Clearances, Hypothetical Charts and their Usage.

Recommended Reading

1. ITU Radio Regulations.
2. ICAO Publications:-
   a. ICAO Annexure – 10 Vol. I & II.
   b. DOC 4444 – Procedure of Air Navigation Service (PANS) and Air Traffic Management (ATM)
   c. DOC 9432 – Manual of Radio Telephony.
   d. DOC 8400 – Abbreviations and codes.
3. AAI/DGCA Publications:-
   a. Aeronautical Information Publication (AIP).
4. AERADIO

Suggested E- Learning material

1. Computer Based Trainer, "Communication", Oxford 2016 Edition
2. DGCA CAR Section-7 "www.dgca.nic.in"
3. DGCA manuals and procedures "www.dgca.nic.in"

AVS 217 Meteorology - II

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes:

Upon the successful completion of the course, student will be able to:

- Describe the Global circulation and the associated weather patterns
- Locate and identify the various Jet streams and choose the flight parameters for the efficient air travel
- Recognize and explain the various global weather patterns
- Recognize and explain the weather patterns of India
- Discuss the function of Indian Meteorology department and decode the various weather information representation

UNIT I GLOBAL CIRCULATION AND FRONTS

General Circulation– Three cell model, Air Masses, Identification, Fronts, Polar Front, Arctic Front, Warm Front, Cold Front, Occlusions, Warm Front occlusions, Cold front occlusions, Occlusion Weather, Movement Growth and Decay, Western Disturbances

UNIT II UPPER WINDS

Jet Streams – Causes, Location, Direction , Speed, Clear Air Turbulence – Movement, Recognition, Forecasting

UNIT III TROPICAL SYSTEMS

Tropical Discontinuities, Lee Depression,The Monsoon Low, Polar Air Depression, Inter Tropical Convergence Zone, Easterly Waves, Peninsular Discontinuity, Surge, Shear Lines, Monsoon Depression, Tropical Revolving Storms, Frontal Depression, Cold Air Pools

UNIT IV CLIMATOLOGYOF INDIA

Seasons in India – NE Monsoon, Pre Monsoon, SW Monsoon, Post Monsoon,Pressure Distribution, Surface Temperature, Surface Winds, Upper Winds, Synoptic Systems, Weather, Advance of Monsoon, Axis of Monsoon Trough, Break Monsoon, Subtropical Cyclone, Southern Oscillation (ESNO)

UNIT V INDIAN MET DEPARTMENTAND WEATHER REPORTS - II

Meteorological Services for Aviation – Meteorological Organisations for Providing Aviation Services, Indian Meteorological Department, Routine Meteorological Observations, Weather Radar and Met Satellites, Airborne Weather Radar, Interpretation of Station Model

Text books:

1. Group Capt. I C Joshi. (2015). *Aviation Meteorology*. Himalayan Book Publication.
2. (2016). *Meteorology*. CAE Oxford Aviation Academy Publication.
3. *Meteorology.* 10th Edition. Jeppesen Atlantic Flight Training Limited Pub.
4. *Meteorology*. 12th Edition. Nordian. A.S.

SUGGESTED E-LEARNING RESOURCES:

1. Computer Based Trainer, "Meteorology", Oxford 2016 Edition
2. Online Lecture, "Geography" – "www.nptel.ac.in"
3. Online Lecture, "Earth Science" – "www.edx.org"
4. Online Lecture, "Meteorology" – "www.edx.org"

AVS 212 Air Regulation - II

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes:

Upon the successful completion of the course, student will be able to:

- Illustrate different aviation related National Law of India and work in accordance
- Locate and identify different aerodromes signs, markings and facilities.
- Describe the actions to be taken and act in the event of accidents or incident.
- List different procedures in the process of registration of new aircraft.
- Describe different operational procedures followed in flight operation and in the event of unusual circumstances.

UNIT I NATIONAL LAW

Indian Aircraft Act 1934:Section 1281011A11B 17&18(3/9),

Aircraft Rule 1937: Rule No. 1–19,21–29A ,30, 33, 37A, 38–48,50,52,53,55,65,67,67A,67B,68–70,76,79–89,133A,134,140, 140(AB&C)15&161Schedule I, II, VI & XI

Indian Aircraft Rules 1920, Rule No. 53–64

Aircraft Rules 1954 (Public Health Rules)

Aircraft Rules 2003 (Carriage of Dangerous Goods)

UNIT II AERODROMES AND FACILITATION

Introduction, Aerodrome Reference Code, Aerodrome Data, Runways and Taxiways, Apron, Visual AIDS for Navigation,

Runway and Taxiway Markings, Signs and Markers, Aerodrome Lighting, PAPI, VASI, Runway Lighting, Obstacles Markings, Aims of Facilitation, Entry and Departure of Aircraft

UNIT III AIRCRAFT ACCIDENT INVESTIGATION SEARCHAND RESCUE

Aircraft Accident and Incident Investigation, Provisions, Accident, Serious Incident, Serious Injury, Notification of Accident, Removal and Preservation of Damaged Aircraft, Search and Rescue Services, Search and Rescue Region, Rescue Coordination Centre, Units and Equipments, Procedures, Search and Rescue Signals, National Provisions and Responsibilities

UNIT IV AIRWORTHINESS AIRCRAFT NATIONALITYAND REGISTRATION MARK

Standards and Applicability, Certificate of Air Worthiness, Continuing Airworthiness, Validity of C of A, Nationality and Registration Marks,Marking, Common Mark, Exclusion, Certification of Registration, Marking Dimensions

UNIT V OPERATIONAL PROCEDURES

CAR OPS Requirements, Operator Certification Requirements, Operational Procedures Requirements, All Weather Operation Requirements, Instrument and Safety Equipment Requirements, Special Operational Procedures, Minimum Equipment List, Ground De-icing, Bird Strike Risk and Avoidance, Noise Abatement, Fire and Smoke, Decompression of Pressurized Cabins, Windshear and Microburst, Wake Turbulence, Emergency and Precautionary Landings, Fuel Jettisoning, Contaminated Runways

TEXT BOOKS

1. Bali R. K. *Air Regulations Part-II*. (11TH Revised Edition).
2. Bali R. K. *Air Regulations Part-I*. (11TH Revised Edition).
3. (2018). *Air Law*. Oxford OAA series CAE Aviation Academy. (2nd Edition)
4. *Air Law and ATC Procedures*. Nordian Press.
5. (2018) *Operational Procedures*. Oxford OAA series CAE Aviation Academy(2nd Edition).

SUGGESTED E-LEARNING RESOURCES:

1. Computer Based Trainer, “Air Law”, Oxford 2016 Edition
2. DGCA CAR Section-7, “www.dgca.nic.in”
3. DGCA manuals and procedures “www.dgca.nic.in”

AVS 218 Navigation – II (Aircraft Instruments)

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes:

Upon the successful completion of the course, student will be able to:

- Describe how changes in temperature influence the speed of an aircraft, and apply the concept of dynamic and static pressure various flight instruments.
- Describe the properties of gyroscopic and errors in gyroscope instruments.
- Evaluate to operation of compass with the earth magnet and the associated errors. Review the ideal properties which are required for a compass.
- Explain the principle of how ring laser gyro and explain the purpose and properties of INS and IRS. Describe working of Radio Altimeter, EFIS and HUD.
- Explain the construction and working of various engine instruments.

UNIT I AIR DATA INSTRUMENTS

Air Temperature Measurements , TAT Probe, Ram rise, Pitot and Static Pressure Sources, Airspeed Indicator, Altimeter, Sensitive Altimeter, Servo Assisted Altimeter, Vertical Speed Indicator, Machmeter, Mach CAS TAS Relationship

UNIT II GYROSCOPIC INSTRUMENTS

Principle of Gyroscopic, Rigidity, Precession, Types, Wander, Directional Gyro Indicator, Latitude Nut Correction, Drift Rate Calculation, Artificial Horizon, Acceleration and Turning Errors, Fast Erection System, Turn and Slip Indicator

UNIT III MAGNETISMAND COMPASS

Earth Magnetism, Variation, Dip, Aircraft Magnetism, Compass Swing, Hard and Soft Iron Magnetism, Deviation, Direct Indicating Compass, Remote Indicating Compass

UNIT IV ELECTRONIC INSTRUMENTATION

Inertial Navigation System, Ring Laser Gyro, Inertial Reference System, Air Data Computer, Radio Altimeter, Flight Management System, EFIS, HUD

UNIT V ENGINE INSTRUMENTS

Thrust and Power Measurements, Torque and RPM Indicator, Temperature and Pressure Gauges, Engine Vibration Measurement, Fuel Gauge, Remote Transmission System, Flight Hour Meter

Text books:

1. (2011). *Instrumentation*. Oxford OAA series, CAE Oxford Aviation Academy.
2. *Instrumentation*. Nordian Series.
3. Nagabhushana S. & Sudha L.K. *Aircraft Instrumentation and Systems*.
4. Williams C. A. *Aircraft Instrument*.
5. *Flight Instrument & Automatic Flight Control System*. GSP Series.

SUGGESTED E-LEARNING RESOURCES:

1. Computer Based Trainer, "Instrumentation", Oxford 2016 Edition

AVS 220 Technical – II (Aircraft Systems)

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes:

Upon the successful completion of the course students will be able to:

- Explain the different loads acting on the aircraft. List and explain different parts and functions of an aircraft hydraulic system.
- Describe and explain the mechanism of the various flight controls and landing gears. Appraise the need of trim tab and artificial feel system.
- Identify and discuss the various systems powered by the engine bleed air and identify the problems and their solutions altitude aircraft operation.
- Explain the various components of the aircraft fuel system and describe the various emergency equipments.
- Describe the various adverse environmental effects on aircraft's performance and the solutions.

UNIT I AIRCRAFT STRUCTURES AND HYDRAULICS

Definitions, Loads, Fuselage Structure, Wing Structure, Materials, Hydraulics, Pascal's Law, Bramah's Press, Hydraulic

Fluids, Seals, Open and Closed Centre System, Reservoirs, Filters, Pumps- Automatic Cut Out Values, Accumulators, Actuators

UNIT II FLIGHT CONTROLS AND LANDING GEAR

Conventional Flight Control Mechanism, High Lift Devices, Speed Brakes and Spoilers, Automatic Ground Speed Brake Control, Flight Controls, Rudder Ratio Changer, Trim Tabs, Artificial Field Trim, Power Operated Controls, Artificial Feel Unit, Fly By Wire, Landing Gear Purpose and Design, Types, Oleo Pneumatic Strut, Retractable Landing Gear, Castering, Self Centering, Nose Wheel Steering, Power Steering System, Nose Wheel Shimmy, Gear Position Indication, Emergency Lowering, Air/Ground Logic, Wheels and Tyres, Aqua Planning, Brakes, Brake Modulation System, Anti Skid and Auto Brakes

UNIT III PNEUMATICS AND CABIN SUPPORT SYSTEM

Engine Bleed Air System, Air Conditioning, Ram Air System, Combustion Heater, Air Cycle Cooling, Turbo Compressor, Brake Turbine, Fan Turbine, Heat Exchanger, Water Separator and Humidifier, Air Flow Control and Distribution, Gasper Air, Trim Air, Recirculation Fans, Vapour Cycle System, Cabin Pressurization, Control Operation and Instrumentation, Oxygen System, Continuous Flow Oxygen System, Diluter Demand System, Emergency Regulating Oxygen System, Chemical Oxygen Generator, Portable Oxygen System

UNIT IV AIRCRAFT FUEL SYSTEM AND EMERGENCY EQUIPMENTS

Fuel System, Fuel Properties, Multi Engine Fuel System, Operations and Instrumentation, Refuelling, Precautions, Emergency Lighting, Megaphone, Emergency Exit Descent Devices, Crew Escape Methods, Escape Hatches and Slides, Floating Equipments, Locator Beacons, First Aid Equipments

UNIT V ICE RAINAND FIRE PROTECTION

Aircraft Icing, Ice Detection, De-icing and Anti Icing, Windscreen Protection, Propeller Protection, Method of Treatment, Common Practices, Smoke and Fire Detection, Indications, Fire Protection, APU Protection, Extinguisher

Text books:

1. (2007). *Airframes & Systems*. 2nd Edition. Jeppesen Series. Atlantic Flight Training Limited
2. (2018). *Airframes & Systems*. 2nd Edition. CAE Oxford Aviation Academy
3. (2017). *Airframes and Systems*. Nordian A.S.
4. Gupta Lalit. (2014). *Fundamentals of Flight Volume 4: Aircraft Systems*. Himalayan Books Publication.

SUGGESTED E-LEARNING RESOURCES:

1. Computer Based Trainer, "Airframes & Systems", Oxford 2016 Edition

AVS 213 Aircraft Powerplants

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes:

Upon the successful completion of the course, student will be able to:

- Describe the working principle, parts and functions of an aircraft piston engine and subsystems
- Define the various performance specifications and describe the construction and working of different power argumentation systems and propeller mechanism
- Describe the working principle parts functions of an aircraft gas turbine engine.
- Define the various performance specifications and describe the construction and working of different thrust argumentation systems for a gas turbine engine
- Explain the working and function of various gas turbine subsystems.

UNIT I PISTON ENGINE, CONSTRUCTION AND WORKING

Force, Work, Energy, Power, Boyle's Law, Charles Law, Construction and Working of Piston Engine, Parts of Piston Engine, Lubrication, Cooling, Ignition System

UNIT II PISTON ENGINE, FUEL PERFORMANCE AND PROPELLER

Fuel, Calorific Value, Detonation, Pre Ignition, Mixture Ratio and its Importance, Simple Carburettor Modifications, Air Bleed Diffuser, Slow Running System, Mixture Control, Accelerator Pump, Priming, Engine Icing, Fuel Injection, Performance, Supercharger, Turbocharger, Automatic Boost Control, Variable Pitch Propeller, Single Acting Propeller, Double Acting Propeller, Constant Speed Propeller, Constant Speed Unit, Synchronising and Synchrophasing, Torque Metre

UNIT III GAS TURBINES, CONSTRUCTION AND WORKING

Principle of Gas Turbine Engine, Brayton Cycle, Turbojet, Propulsive Efficiency, Turbofan, Bypass Ratio, Turboprop, Turboshaft, Air Inlet, Centrifugal and Axial Flow Compressor, Compressor Stall and Surge, Combustion Chamber, Combustion, Types, Pressure Losses, Fuel Spray Nozzle, Turbine, Free (Power) Turbine, Multi Spool Engine, Turbine Blade Fixing, Jet Pipe, Noise Suppression

UNIT IV GAS TURBINES, FUEL AND PERFORMANCE

Fuel, Specific Fuel Consumption, Thrust and Power, Effect of Temperature Speed and Altitude, Ram Recovery, Engine Starting, Thrust Augmentation

UNIT V GAS TURBINES, SUBSYSTEMS

Lubrication , Lubrication Oil , Reverse Thrust, Gearboxes and Accessory Drive, Ignition System, Auxiliary Power Unit, Bleed Air and Cooling

Text books:

1. (1991). *Piston Engines and Supercharging*. Mike Burton Series. Airlife Publishing.
2. (1991). *Gas Turbine Engine*. Mike Burton Series. Airlife Publishing.
3. *Gas Turbine Engine*. (2nd Edition). Jeppesen Atlantic Flight Training Ltd.
4. Chowdhury S. N. (1995). *Aircraft Gas Turbine Engine*. 3rd edition. McGraw-Hill Education.
5. Smith Herschel. (1981). *Aircraft Piston Engines*. McGraw-Hill Education.

SUGGESTED E-LEARNING RESOURCES:

1. Computer Based Trainer, "Powerplant", Oxford 2016 Edition
2. Online Lecture, "IC Engines" – "www.nptel.ac.in"
3. Online Lecture, "Gas turbines" – "www.nptel.ac.in"
4. Online Lecture, "Aircraft Propulsions" – "www.nptel.ac.in"

AVS 203L Hangar Workshop – III Lab

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning outcomes:

Upon the successful completion of the course, student will be able to:

- To understand Aircraft system components and instruments
- To understand brake system and pneumatic system
- To understand various documentation related to aircraft maintenance
- To understand Aircraft flight control system
- To understand Engine oil system

PART A AIRCRAFT SYSTEM CONCEPT

1. Aircraft system components, including Instruments system and their functions.
2. Aircraft Fuel System
3. Aircraft Brake system, Aircraft Pneumatic system.
4. Aircraft Fight Control system

PART B ENGINE SYSTEM CONCEPT

1. Engine working Principal and applicability
2. Various Engine components and Engine oil system.
3. Induction and exhaust system
4. Engine Fuel system

Text books:

1. Airframe and Power plant Mechanics (AC 65 -15A,12A and 9A)-Airframe Hand Book.
2. Kermode A.C. *Mechanics of Flight.*
3. Heywood J. E. *Light Aircraft Maintenance*.

4. Heywood J. E. *Light Aircraft Inspection*
5. Pallet E. H. J. *Aircraft Electrical Systems.*
6. Pallet E. H. J. *Aircraft Instruments*.
7. Pilot Operating handbook (P.O.H.) of Cessna 152 and Cessna 172 aircraft
8. CARs and Human Factors

SUGGESTED E-LEARNING RESOURCES:

1. Aviation 101 (Canvas net): https://www.mooc-list.com/course/aviation-101-canvas-net.
2. Technical maintenance of aircraft and aircraft engines : https://www.class-central.com/course/stepik-technical-maintenance-of-aircraft-and-aircraft-engines-10489

ENGL 208 English - IV (ICAO Level - 5)

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

- After the completion of the course, the students will be able to:
- ask grammatically structured questions related to basic needs and respond appropriately
- participate in all types of conversation situations
- use prediction strategies to understand expanded range of new vocabulary items in context and in their daily and work related communication situations
- apply the learned grammatical and idiomatic structures to communicative situations

UNIT I Direct and Indirect narration

Unit II Conversion of sentences

Unit III Questions and Question Tags

Unit IV Word formation: Affixation, Compounding and Conversion, Back Formation, Clipping, Blending

Unit V Vocabulary Expansion: Synonyms and Antonyms, Homonyms and Homophones

One Word Substitution

Recommended Readings:

1. Corder, Pitt. *An Intermediate English Practice Book*. London: Orient Longman, 2009. Print.
2. Greenbaum, Sidney. *English Grammar*. OUP, 2005. Print.
3. Hornby, A.S, *A Guide to Patterns and Usage in English*. Delhi: Oxford University Press, 1954. Print.
4. Leech, Geoffery N and Jan Svartvik. *A Communicative Grammar of English*. London: Routledge, 2016.Print.
5. Leech, Geoffery N. *English Grammar for Today*. London: Palgrave Macmillan, 1982. Print.
6. Murphy and Reynold. *Essentials of English Grammar*. Cambridge University Press, 2008. Print.
7. Quirk, Randolph and Sydney Greenbaum. *University Grammar of English*. Longman Publications, 1976. Print.
8. Swain, Michael. *Practical English Usage*. London: OUP, 2016. Print.
9. Wren and Martin. *English Grammar and Composition*, Delhi: S. Chand and Company, 2010. Print.

Suggested E learning material

1. Direct/Indirect:

   https://www.tolearnenglish.com/exercises/exercise-english-2/exercise-english-72035.php
2. For tense chart and verb forms:

   https://www.edudose.com/english/direct-and-indirect-speech-rules/
3. Transformation of sentences:

   http://www.perfectyourenglish.com/grammar/transformation-sentences-4.htm
4. Question Tag:

   https://learnenglish.britishcouncil.org/intermediate-grammar/question-tags
5. Word formation devices:

   http://www.ruf.rice.edu/~kemmer/Words/defs.html
6. One word substitution:

   https://www.worldclasslearning.com/english/list-of-one-word-substitution.html

AVS 221 Technical - III (Aircraft Electricals)

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes:

Upon the successful completion of the course, student will be able to:

- Describe and explain the various electrical components used in aircraft electrical circuits.
- Compare and illustrate the various types of batteries used in aircraft and explain the construction and working of DC motor and generator.
- Explain the working of various aircraft power generation system and ac machines.
- Explain the principle and working of transformers, rectifiers and inverters.
- Explain the various power control, transfer and distribution system in aircraft.

UNIT I ELECTRICS

Voltage, Current, Resistance, Factors affecting Resistance, Resistor, Ohm's Law, Power, Circuits in Series and Parallel, Kirchhoff's Law, Wheatstone Bridge, Switches, Proximity Detectors, Time Switches, Centrifugal Switches, Circuit Protection Devices, Fuses, High Rapture Capacity Fuse, Dummy Fuses, Current Limiter and Circuit Breaker, Reverse Current Circuit Breaker, Capacitors and Inductors, Capacitors and Inductors in DC and AC Circuits, Capacitors and Inductors in Series and Parallel

UNIT II BATTERIES GENERATOR AND DC MOTOR

Primary and Secondary Cell, Lead Acid Battery, Alkaline Battery, Battery Checks and Charging, Magnetism, Permeability, Corkscrew Rule, Right Hand Grasp Rule, Solenoid and Relay,Fleming's Right Hand Rule,Faraday's Law, Lenz Law,DC Generator, Voltage Control and Regulator, Load Sharing Circuits,DC Motor, Starter Generator System, Solenoid Actuators

UNIT III ALTERNATORS AND AC MOTOR

Single Phase Alternator, Polyphone Alternator, Star and Delta Connection, Constant Speed Generator Drive System, Real Load and Reactive Load, Load Sharing, Bus Tie Breaker, Synchronising Units, Load Meters, Generator Control Unit,Ram Air Turbine, Auxiliary Power Unit, Static Inverter, Principles of AC Motor, Synchronous Motor, Induction Motor, Squirrel Cage Rotor, Slip Speed, Induction Motor Starting

UNIT IV TRANSFORMERS

Transformer, Transformation Ratio, Power, Three Phase Transformer, Auto Transformer, Half Wave and Full Wave Rectifiers, Three Phase Rectifiers,Transformer Rectifier Unit, Inverters

UNIT V AIRCRAFT ELECTRICAL POWER SYSTEMS

Dipole and Single Pole System, Voltage Regulator, Over Voltage Protection Unit, Generator Cut Out, Generator Differential Cut Out, Ammeters and Voltmeters, Power Distribution, Bus Bar System, Split Bus-Bar System, Parallel Bus-Bar System

Text books:

1. (2016). *Aircraft General Knowledge I, Electrics and Electronics*. CAE Oxford Aviation Academy Limited .
2. (2007). *Electrics*. Jeppesen Series. Atlantic Flight Training Ltd.
3. (2017). *Electrics*. Nordian A. S. Series.
4. Mike Burton. (1998*). Professional Pilot's Study Guide Volume 4 Electrics*. Airlife Publishing Ltd., Edition

SUGGESTED E-LEARNING RESOURCES:

1. Computer Based Trainer, "Electrics and Electronics", Oxford 2016 Edition
2. Online Lecture, "Basic Electricals and Electronics" – "www.edx.org"
3. Online Lecture, "Electrical Circuits" – "www.nptel.ac.in"

AVS 219 Navigation-III (Flight Planning And Performance)

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes:

Upon the successful completion of the course, student will be able to:

- Calculate and confirm the position of CG after the load on the aircraft is altered. Estimate the payload carrying capacity for example flight profile.
- Estimate the fuel requirement are given aircraft load underplayed and the flight profile. Define the various types of flight plan and it sections.
- Estimate the aircraft performance during different phases of flight
- Calculate the takeoff distance required for the given aircraft load and the Runway condition
- Calculate flight parameters for optimal climb and Cruise, and estimate landing distance required for the given aircraft load and the runway condition

UNIT I MASS AND BALANCE

Terminology, Movement of CG, Repositioning of Mass, Adding/Removing Mass, Load and Trim Sheet, Mass Definitions, Traffic Load Calculations

UNIT II FLIGHT PLANNING

Fuel policy, Calculation of Fuel and Payload, Decision Point Procedure, Isolated Aerodrome Procedure, ATC Flight Plan, Definitions, Submission and Acceptance of Flight Plan, RPL

UNIT III AIRCRAFT GENERAL PERFORMANCE

Introduction, Take off,Climb, Descent, Cruise, Landing

UNIT IV CLASS A AIRCRAFT,TAKEOFF PERFORMANCE

Operational and Field Length Requirements,V Speeds, Balanced Field, Unbalanced Field, Takeoff from an Unbalanced Field, Climb Gradient Limit Mass, Maximum Takeoff Mass, Calculating Takeoff Speed and Thrust Setting, Correction for Stopway and Clearway

UNIT V CLASS A AIRCRAFT, CLIMB EN ROUTEAND LANDING PERFORMANCE

Takeoff Climb, Segments of Takeoff Climb, Obstacle Clearance, Noise Abatement Procedure, En Route Phase, Climb Profile and Climb Schedule, Cruise Speed, Cost Index, Cruise Altitude, Normal Descent, Landing Consideration,Landing Climb Requirements,Landing Distance Requirements

Text books:

1. Wiley Blackwell. (2002). *Flight Planning*. 6th Revised Edition. GSP Series.
2. (2018). *Mass and Balance and Performance*. 2nd Edition. Oxford CAE Aviation Academy.
3. (2018). *Flight Planning and Monitoring*. 2nd Edition. Oxford CAE Aviation Academy.
4. (2017). *Flight Planning*. Nordian AS.
5. (2017). *Mass and Balance*. Nordian AS.

SUGGESTED E-LEARNING RESOURCES:

1. Computer Based Trainer, "Mass and Balance and Performance", Oxford 2016 Edition
2. Computer Based Trainer, "Flight Planning and Monitoring", Oxford 2016 Edition
3. Online Lecture, "Flight Mechanics" – "www.nptel.ac.in"
4. Online Lecture, "Aircraft Performances" – "www.nptel.ac.in"

AVS 214 Aircraft Specifics

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes:

Upon the successful completion of the course, student will be able to:

- Describe the various specifications and operating procedures of Cessna aircraft series.
- Explain the various systems and handling procedures of Cessna aircraft series.
- Describe the various specifications and operating procedures of Partenavia P68C aircraft series.

- Explain the various systems and handling procedures of Partenavia P68C aircraft series.
- Operate and describe the various functions of Garmin 1000 integrated electronic flight instrumentation system.

UNIT I CESSNA SERIES (C152A, C172R)- SPECIFICATIONS AND PROCEDURES

General – Descriptive data – Engine, Propeller, Fuel, Oil, Maximum Certificated Weight, Specific Loading, Limitations – Airspeed Limitations, Power plant Limitations, Weight Limits, Center of Gravity Limits, Manoeuvre Limits, Flight

Load Factor Limits, Emergency Procedures – Engine Failure, Forced Landings, Fires, Icing, Abnormal Landings, Normal Operating Procedures – Airspeeds, Normal Procedures, Amplified Procedures, Performances – Use of Performance Charts, Cruise Performance, Range Profile, Weight and Balance – Airplane Weighing Procedure, Loading Arrangements, Center of Gravity Moment Envelope

UNIT II CESSNA SERIES (C152A C172R)- SYSTEMS AND HANDLING

Airframe and Systems – Airframe, Flight Controls, Instrument Panel, Wing Flap System, Electrical System, Seats, Engine, Propeller, Fuel System, Brake System, Lighting System, Stall Warning System, Cabin Heating and Ventilating System, Equipments, Handling, Services, Maintenance –Identification Plate, Airplane File, Airplane Inspection HRS, Servicing, Cleaning and Care

UNIT III PARTENAVIA P68C- SPECIFICATIONS AND PROCEDURES

General Descriptive data – Engine, Propeller, Fuel, Oil, Maximum Certificated Weight, Specific Loading,Limitations – Airspeed Limitations, Power plant Limitations, Weight Limits, Center of Gravity Limits, Manoeuvre Limits, Flight

Load Factor Limits, Emergency Procedures – Engine Failure, Forced Landings, Fires, Icing, Abnormal Landings, Normal Operating Procedures – Airspeeds, Normal Procedures, Amplified Procedures, Performances – Use of Performance Charts, Cruise Performance, Range Profile, Weight and Balance – Airplane Weighing Procedure, Loading Arrangements, Center of Gravity Moment Envelope

UNIT IV PARTENAVIA P68C- SYSTEMSAND HANDLING

Airframe and Systems – Airframe, Flight Controls, Instrument Panel, Wing Flap System, Electrical System, Seats, Engine, Propeller, Fuel System, Brake System, Lighting System, Stall Warning System, Cabin Heating and Ventilating System, Equipments , Handling, Services, Maintenance –Identification Plate, Airplane File, Airplane Inspection HRS, Servicing, Cleaning and Care

UNIT V MASTERING GARMIN 1000

System Overview – PFD/MFD Controls, PFD Softkeys, MFD Softkeys, MFD Page Groups, Vertical Navigation, Backlighting, Flight Instruments – Airspeed Indicator, Attitude Indicator, Altimeter,Vertical Deviation/Glidepath/Glideslope

Indicator, Marker Beacon Annunciations, Vertical Speed Indicator, Barometric Altitude Minimums, Horizontal Situation Indicator (HSI), EIS, Audio Panel and CNS, Automatic Flight Control, Flight Management, Hazard Avoidance, AFCS, Additional Features

Text books:

1. Pilot Operating Handbook, C152A
2. Pilot Operating Handbook, C172R
3. Pilot Operating Handbook, Partenavia P68C
4. Garmin 1000 Cockpit Reference Guide

SUGGESTED E-LEARNING RESOURCES:

1. Computer Based Trainer, “Mass and Balance and Performance”, Oxford 2016 Edition
2. Computer Based Trainer, “Flight Planning and Monitoring”, Oxford 2016 Edition
3. Online Lecture, “Flight Mechanics” – “www.nptel.ac.in”
4. Online Lecture, “Aircraft Performances” – “www.nptel.ac.in”

AVS 215 Aviation Maintenance Management

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes:

Upon the successful completion of the course, student will be able to:

- Explain the objectives roles and types of aircraft maintenance program.
- Explain the various documentation requirements and procedures involved in aircraft maintenance and engineering operations.
- Explain the line maintenance and hanger maintenance procedure.
- Explain the various levels of quality and safety ensuring mechanism.

UNIT I MAINTENANCE PROGRAM

Goals and Objectives, Roles and Responsibilities, Maintenance Steering Group, Process Oriented Maintenance, Task Oriented Maintenance, Maintenance Interval, Certification

UNIT II DOCUMENTATION

Manufacture's Documentation, Regulatory Documentation, Airline Generated Documentation, ATA Documentation Standards, M&E Organizational Chart, Engineering Department

UNIT III LINEAND HANGER MAINTENANCE

Maintenance Control Center Responsibilities, Line Maintenance Operation, Aircraft Log Book, Ramp and Terminal Operation, Line-Station Activities, Organization of Hanger Maintenance, Morning Meetings, Shops and Supports, Ground Support Equipment, Outsourcing

UNIT IV QUALITY RELIABILITYAND SAFETY

Quality Control Organization, QC Inspector Qualification, Inspection Policies, Introduction to Reliability, Types of Reliability, Reliability Program, Safety Regulation, Responsibilities for Safety, General Safety Rules, Accident and Injury Reporting

UNIT V CASE STUDY

Text book:

1. Kinnison Harry A & Siddiqui Tariq. *Aviation Maintenance Management*.
2. Kinnison Harry. *Aviation Maintenance Management*. 2nd Edition. Tata McGraw-Hill Education India. ISBN: 9781259064760, 125906476X
3. Haguma Timothee. (2016). *Fundamentals of Aircraft Maintenance Management*. 1st Edition. Notion Press. 978-1945825996

SUGGESTED E-LEARNING RESOURCES:

1. DGCA CAR Section-7 "www.dgca.nic.in"
2. DGCA manuals and procedures www.dgca.nic.in
3. IATA Aviation Management Certificate: Stanford University, http://stanford.edu/~veena14/cgi-bin/minisite_php_IATA/program-overview/overview.php
4. Psychology at Work by https://www.coursera.org/learn/work-psychology
5. Advanced Safety Management Systems (SMS) and Integrated Management Systems (IMS):https://jaato.com/courses/627/advanced-safety-management-systems-sms-and-integrated-management-systems-ims/

AVS 216L Hangar Workshop - IV Lab

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning outcomes:

Upon the successful completion of the course, student will be able to:

- Identify various Aircraft Instruments.
- Explain the operation of Brakes.
- Explain Oil and lubrication system.
- Understand marshalling for aircrafts
- Understand propellers and ignition system

PART A AIRCRAFT SYSTEM IN DETAILS

1. Aircraft Cockpit demo and importance of Radio equipment and instruments, location of various antennas.
2. Stability and control
3. Primary and secondary control surfaces
4. Axes of Aircraft and controls around the axes.
5. Pre flight and daily inspection.

PART B ENGINE SYSTEM IN DETAILS

1. Propeller and types of propellers.
2. Fuel system
3. Oil system
4. Ignition system
5. Engine controls.

Text books:

1. Airframe and Power plant Mechanics (AC 65 -15A,12A and 9A)-Airframe Hand Book.
2. Kermode A.C. *Mechanics of Flight.*
3. Heywood J. E. *Light Aircraft Maintenance*.
4. Heywood J. E. *Light Aircraft Inspection*
5. Pallet E. H. J. *Aircraft Electrical Systems.*
6. Pallet E. H. J. *Aircraft Instruments*.
7. Pilot Operating handbook (P.O.H.) of Cessna 152 and Cessna 172 aircraft
8. CARs and Human Factors

SUGGESTED E-LEARNING RESOURCES:

1. Aviation 101 (Canvas net): https://www.mooc-list.com/course/aviation-101-canvas-net.
2. Technical maintenance of aircraft and aircraft engines : https://www.class-central.com/course/stepik-technical-maintenance-of-aircraft-and-aircraft-engines-10489

AVS 315 Advanced Flight Operational Procedures

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes:

Upon the successful completion of the course, student will be able to:

- Explain the regulations related to Aircraft Operations.
- Explain the various documentation requirements and procedures involved in aircraft Navigation.
- Explain the navigation using Jeppesen chart.
- Explain the various Aerodrome operating minima.
- Explain aircraft monitoring system

UNIT I AIRCRAFT OPERATIONS

All Weather Operations CAR Section 8 Series 'C' Part I, Extended Diversion Time Operations, Conversion of Meteorological Visibility to RVR, Low Visibility take off

UNIT II PERFORMANCE BASED NAVIGATION

Required Navigation Performance, Continuous Descent Final Approach, Instrument Approach Procedure, Constant Angle Non Precision Approach, Approach Ban Policy, Future Air Navigation System, GPS Aided Geo Augmented Navigation, Local Area Augmentation System, Wide Area Augmentation System

UNIT III INTRODUCTION TO JEPPESEN CHART

Charting Symbols, En route Chart, Standard Instrument Departure Charts, Departure, Standard Terminal Arrival Routes, Airport Chart, Approach Chart, Minimums

UNIT IV AERODROME OPERATING MINIMA

Normal Aerodrome Operating Minima, Restricted Aerodrome Operating Minima, CAT I, Approach Procedure with Vertical Guidance, Non Precision Approach Operation, Take off , Monsoon Operations, MEL Requirements

UNIT V LATERAL NAVIGATION AND MONITORING

Approach and Landing Accident Reduction, Controlled Flight into Terrain, Stabilized Approach, Minimum Navigation Performance Specifications, Strategic Lateral offset Procedure, Automatic Dependence Surveillance, Broadcast

Text books:

1. Jeppesen Airway Manual
2. Jeppesen En-route Charts
3. ICAO DOC 8168

SUGGESTED E-LEARNING RESOURCES:

1. DGCA CAR Section-7, "www.dgca.nic.in"
2. DGCA manuals and procedures, "www.dgca.nic.in"

AVS 320 Human Performances and Limitations

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

Upon the successful completion of the course, student will be able to:

- Explain the Human Physiology and human physiological limitations in flying.
- Explain the vision problems and illusion involved in flying.
- Explain the various factors painting affecting human psychomotor performances.
- Explain the Dynamics of group behaviour and elements of interpersonal skill development.
- Explain the man and machine interaction on the advantages and disadvantages associated with that.

UNIT I HUMAN PHYSIOLOGY I

The Circulation System, Blood Circulation, Composition of Blood, The Heart, The Circulation System, Carbon Monoxide, Smoking, Blood Pressure, Pressoreceptors and Their Function Maintaining Blood Pressure, Pulmonary Embolism, Oxygen and Respiration, Oxygen Intake, Composition of Standard Atmosphere, Hypoxia, Types, Time of Useful Consciousness, Effective Performance, Hyperventilation, Cabin Decompression, Decompression Sickness

UNIT II HUMAN PHYSIOLOGY II

The Nervous System, The Sense Organs, Audible Range, Hearing Impairment, The Ear Imbalance and Disorientation, Somatogyral and Somatogravic Illusion, Motion Sickness , The

Eye, Function and Structure, Light and Dark Adaptation, Night Vision, The Blind Spot, Stereopsis, Empty Visual Field Myopia, High Light Levels, Sunglasses, Visual Defects, Colour Vision, Colour Blindness, Vision and Speed, Monocular and Binocular Vision

UNIT III FLYING & HEALTH

Flying and Health, Acceleration, G-Forces, Long Duration Negative G, Short Duration G-Force, Summary of G Tolerances, Barotrauma, Toxic Hazards, Body Mass Index, Obesity, Losing Weight, Exercise, Nutrition and Food Hygiene, Fits, Faints, Alcohol and Flying, Drugs and Flying, Personal Hygiene, Stroboscopic Effect, Common Ailments and Fitness to Fly, Stress, Cognition in Aviation, Visual Illusions, Illusions when Taxiing, Take off, Cruise, Landingground Proximity Judgement, Protective Measures Against Illusion, Collision and Retinal Image,Sleep and Fatigue, Biological Rhythms and Clocks, Body Temperature, Time of Day and Performance, Naps andMicro sleeps, Time Zone Crossing, Fatigue, Vigilance and Hypovigilance

UNIT IV HUMAN PSYCHOLOGY

Basic Information Processing, Stimuli, Attention, Perception, Short Term Memory, Central Decision Maker and Response Selection, Actions, Response and Feedback, Behaviour and Motivation, Categories of Behaviour, Situational Awareness, Motivation, Individual Difference and Interpersonal Relationship, Personality, Interactive Style, Cohesion, Group Decision Making, The Authority Gradient and Leadership Styles, Communication and Cooperation, Communication Model, Communication Concepts, Cockpit Communications, Metacommunications, Synchronization, Barriers to Crew Cooperation and Teamwork

UNIT V ERGONOMICS

Man and Machine, The SHELL Model, Hardware, Design of Flight Decks, Displays, Engine Instruments, Controls, Software, Intelligent Flight Decks, Colour Displays, System Active and Latent Failures, System Tolerance, Design Induced Errors, The Mechanics of Decision Making, Standard Operating Procedures, Errors, Sources and Limits in the Decision Making Process, Personality Traits and Effective Crew Decision Making

Text books:

1. *Human Performance and Limitations for Professional Pilots*. Airlife Publications.
2. Wiley Blackwell. (2001). *Human Performance and Limitations in Aviation*. 1st Edition.
3. *Flight Stress*. Ashgate.
4. *Human Performance and Limitations*. Nordian Series.
5. *Human Factors and Pilot Performance*. Air pilot's Manual Series.
6. *Human Performance & Limitations*. Jeppesen Series.

SUGGESTED E-LEARNING RESOURCES:

1. Computer Based Trainer, "Human Performance and Limitations", Oxford 2016 Edition'

AVS 323 Navigation – IV (Auto Flights Warning and Recordings)

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

Upon the successful completion of the course, student will be able to:

- Explain the functions of the different operating modes of a flight director system.
- Explain the operating requirements, working, modes and limitations of an autopilot system.
- Explain the operating requirements, working, modes and limitations of an auto landing and auto throttle system.
- Explain the requirement and working of aircraft stability argumentation and flight protection system.
- Explain the various aircraft warning systems and flight data recording system.

UNIT I FLIGHT DIRECTOR SYSTEMS

Introduction, Flight Director System, Components, Flight Director Mode, Navigation Mode, Dual Flight Director

UNIT II AUTOPILOT

Introduction, Autopilot System– Failsafe Autopilot, Control Loop,Types of Autopilot, Operational Requirements, Actuators, Engagement Criteria, Trim, Mode Annunciator, Sensors, Operation, Features, Limitations and Restrictions, Flight Management System

UNIT III AUTOLAND AND AUTOTHROTTLE SYSTEM

Introduction, Automatic Landing Sequence, Weather Minima, Alert Height, AutoThrottle System, Thrust Computation, FADEC

UNIT IV YAW DAMPERS AND CONTROL LAWS

Dutch Roll, Functions, Dutch Roll Filter, Rudder Control Computing Authority, Operating Mode, Flight Envelope, Protection on Angle of Attack Speed Pitch Attitude Bank Angle Load Factor , Autopilot Gain Adaptation/ Gain Scheduling

UNIT V WARNING AND RECORDING SYSTEM

Introduction,Levels of Alerts, Methods ofWarning, Flight Warning System, Components, Aerodynamic Warming, Altitude Alerting, Over Speed Warning, Stall Warning,GPWS, Definitions, Modes of Operations, Actions to be Taken, EGPWS, Terrain Awareness System, ACAS, Principle, Operation, Types, System Interconnection, Traffic Advisory, Resolution Advisory, Display, Flight Data Recorder, Design, Components, Aircraft Integrated Data System, Parameters Recorded, Cockpit Voice Recorder, Setup, Control Unit

Text books:

1. *Flight Instrument & Automatic Flight Control System*. 6th Edition. GSP Series
2. *Instrumentation*. Oxford OAA series CAE Aviation Academy
3. (2017). *Instrumentation*. Nordian Series.
4. (2018). *Instrumentation*. 2nd Edition. Oxford OAA series CAE Aviation Academy.
5. Nagabhushana S. & Sudha L.K. *Aircraft Instrumentation and Systems*.
6. Williams CA. *Aircraft Instruments.*

SUGGESTED E-LEARNING RESOURCES:

1. Computer Based Trainer, “Instrumentation”, Oxford 2016 Edition

AVS 307 Dangerous Goods

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

Upon the successful completion of the course, student will be able to:

- Explain the importance and the various procedures involved in transporting dangerous goods by air.
- Describe the various packaging requirements and methods.
- Describe the securities and security plan associated with transporting dangerous goods by air.
- List the different documentation and handling procedures involved in transporting dangerous goods.
- Explain the various regulations in air cargo operations undergarments and requirements.

UNIT I INTRODUCTION

Purpose of the dangerous goods regulations, general philosophy, dangerous goods regulations, types of Dangerous goods,dangerous goods carried by passengers or crew, list of dangerous goods

UNIT II PACKAGING

Packing instructions, packing specifications and performance Tests, Requirements for Aerosol dispensers and small receptacles containing gas (gas cartridges)

UNIT III DANGEROUS GOODS SECURITY

Dangerous goods security, security plans, elements of a security plan, list of high consequence dangerous goods

UNIT IV HANDELING

Classification of dangerous goods, documentation handling, loading and offloading of dangerous goods, storage of dangerous goods, radioactive material

UNIT V AIR CARGO

History of air cargo, regulation governing transport of air cargo, international air transport regulations, IATA regulations regarding carriage of dangerous goods

TEXT BOOKS

1. Dangerous Goods Regulation by IATA2010
2. ICAO DOC9481

Suggested Online Resources:

1. Online Course Link:"https://www.iata.org/traning/diploma_ program/Pagesdangerous-goods-regulations-(acceptance). aspx"
2. Online Course Link:"https://www.kershalaviation.com/dg-dangerous-goods"
3. Online Course Link:"https://www.onlinedangerousgoodstraining. com"

AVS 305 Crew Resource Management

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

Upon the successful completion of the course, student will be able to:

- Discuss the scope and concept of crew Resource Management.
- Explain the different elements affecting the human behaviour with the given environment.
- Demonstrate the various levels of interpersonal skills.
- Describe the different method of training and performance assessment.
- Explain the various practices adopted for effective crew Resource Management.

UNIT I INTRODUCTION

Definitions,Scope, Objectives, Concept of CRM, History of CRM

UNIT II HUMAN BEHAVIOUR

Importance of safety, behaviour of human being, environmental human error, Cabin crew role in CRM

UNIT III INTERPERSONNEL

Communication, leadership, situational awareness,briefing and De briefing

UNIT IV TRAINING

Training method, activity, success and failure of CRM training

UNIT V FUTURE

Future of CRM, cockpit culture, prevention of crew related incident and accident, introduction to aviation

Text Book:

1. Richard S. Jensen. *Pilot judgement and crew resource management*.
2. CRM developer Handbook
3. Helmreich, R. L., & Foushee, H. C. (1993). *Why crew resource management?*

Suggested Online Resources:

1. Online Course Link:"https://www.aircrewacademy.com/human-factors-crew-resource-management-crm_185"
2. Online Course Link:"https://www.kingschools.com/aviation-courses/professional/crew-resource-management-CRM"
3. Online Course Link:"https://www.globalairtraining.com/crew-resource-management.php"

Discipline Electives

AVS 317 Airline Management

	L	T	P	C
Max. Marks: 100				
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

Upon the successful completion of the course, student will be able to:

- Describe and discuss the various functions in airline operation.
- Explain the logistical procedure and flight operational management.
- Describe the various departments and functions in an airline industry.
- Explain in detail about the various aircraft operations department and its functions.
- Discuss the various level of computerization and its impact in airline business

UNIT I INTRODUCTION TO THE AIRLINE INDUSTRY

History of airline industry, growth of airline in USA, Europe and India, Various important landmark events that shaped the industry, Advent of legacy carriers in India, low cost carriers and their history

Airline functional overview: Processes in the creation of an airline, Regulatory requirements, airline financing, aircraft procurement, route planning and marketing, sales, the advent of the internet and its relevance to the airline sales

UNIT II AIRLINE PROCESSES

Airline logistics: The commercial flight in transit process, Ground handling Security, catering, and the commercial operations of an aircraft in a transit flights, The Hub, the hub control centre

Integrated operations control centre: Its function and relevance in large fleet aircraft, Structure of IOCC, Role of controllers, Event, management, crisis centre

UNIT III IMPORTANT DEPARTMENTS IN AIRLINE INDUSTRY

Introduction to the functioning, role and structure of various departments in the airline industry.

Commercial: Planning, sales, and after sales, airport operations, revenue management, special operations

Engineering: Maintenance, Line and Base, overhaul shops, quality control, production planning, maintenance control

Finance: Fleet acquisition, sales consolidation, revenue and expenditure management, payroll allowances etc.

Human Resources and their special relevance to the industry, Pilot and engineering recruitment

UNIT IV THE OPERATIONS DEPARTMENT AND ITS FUNCTIONS

Licensing cabin and flight deck crew planning, scheduling and rostering, crew induction and training process, simulator section, flight safety, Flight dispatch functions in an airline: Flight dispatchers and their need, Requirements to become an FD, Flight Dispatch process, Normal flight, abnormal flight situations

UNIT V COMPUTERIZATION AND ITS IMPACT ON AIRLINE BUSINESS

The introduction of various IT systems that are used in an airline, Various airline reservation systems, Various crew scheduling system, ACARS and airline efficiency, Flight tracking system, Maintenance and inventory control system, Scheduling and planning tools, Airport Slot management tool

TEXT BOOKS

1. Singh Ratandeep. *Aviation Management*.

2. Bazargan & Massoud. (2016). *Airline operations and scheduling*. Routledge.
3. Teodorovic D. (2017). *Airline operations research*. Routledge.

SUGGESTED E-LEARNING RESOURCES:

1. IATA Aviation Management Certificate: Stanford University
2. Psychology at Work by Coursera

AVS 325 Remotely Piloted Aircraft System

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

Upon the successful completion of the course students will be able to:

- Describe the rules and weather constrains associated with RPS operation.
- Design and develop a RPS for a required configuration.
- Identify the faults in the RPS and describe the remedies.
- Identify types of payload required for a mission.
- Operate an RPS within its limits.

UNIT I RPS REGULATION & METEOROLOGY

Regulations of DGCA, Civil Aviation Requirements - Classification - Basic Air Regulations - Do's and Don'ts - ATC procedures & Radio Telephony - Understanding ATC operations - Airspace Structure and Airspace Restrictions with knowledge of No Drone Zones - Communicating with ATC including Position and Altitude Reporting - Flight Planning Procedures - Collision avoidance - Radio Telephony (RT) techniques - Standard radio terminology and RT Phraseology - Practice Session in Radio Communication - The standard atmosphere - Measuring air pressure - Heat and temperature - Wind - Moisture, cloud formation - Met Terminal Aviation Routine Weather Report (METAR)

UNIT II FUNDAMENTALS OF RPS

Fundamentals of flight - Aerodynamics - Take-off, flight, and landing - Manoeuvres, turns and circuit pattern - Types of fixed wing drones, make, parts and terminology - Operation and

manoeuvres of fixed wing drones - Applications and operations - Advantages/disadvantages over multi rotor drones - Multi rotor introduction - Basic drone terminology - Types of drones, material used and size of drones - Motors and propellers - Electronic Speed Controller (ESC), flight controllers - Operation and Applications of drones - Advantages/disadvantages over multi rotor drones

UNIT III MAINTENANCE & EMERGENCY HANDLING

Drone equipment maintenance - Emergency identification and handling – Maintenance of drone, flight control box, ground station - Maintenance of ground equipment, batteries and payloads - Scheduled servicing - Repair of equipment - Fault finding and rectification - In flight emergencies - Loss of link - Fly-away(Straying) - Loss of power - Control surface failures

UNIT IV PAYLOADS

Payload, installation and utilization - Types of payloads - Parts of payloads - Installation - Features of payloads - Utilization - Image and video interpretation - Principles of observation - Interpretation of image/video - Analysis

UNIT V FLIGHT SIMULATOR & PRACTICAL FLYING

Basic operating features of simulator - How to select different aircrafts and aerodromes - Demo flight - Pre-flight checks and start-up - Preparation cum coordination for flight - Take-off and flight stage - Approach and landing - After flight checks - Pre-flight checks and start-up - Preparation cum coordination for flight - Take-off and flight stage - Approach and landing - After flight checks

TEXT BOOKS

1. "Introduction to UAV Systems" by Paul Fahistrom, Thomas Gleason.
2. "Small Unmanned Aircraft: Theory and Practice" by Randal W. Beard, Timothy W. McLain.
3. "Unmanned Aerial Vehicles: Embedded Control" edited by Rogolio Lozano.

Suggested E-Learning Resources:

1. Online Course Link:"https://www.coursera.org/courses?query=aerial%20robotics"
2. Online Course Link:"https://www.onlinelearning.seas.upenn.edu/offerings/robotics-aerial-robotics"
3. Online Course Link:"https://www.kostasalexis.com/introduction-to-aerial-robotics.html"

AVS 324 Pilot Theory

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

Upon the successful completion of the course students will be able to:

- Describe the fundamental rules and regulations of flying an aircraft.
- Describe the various navigation techniques and flight instruments
- Explain the various weather phenomena and aviation hazard.
- Explain the principles of aircraft mechanics and define various factors involved.
- Explain the various aircraft systems and working of aircraft engines.

UNIT I AIR REGULATIONS

Knowledge of Terms Used in Aviation Such as Aircraft, Aeroplane, Aerodrome, Balloon, Co-Pilot, Director General, Flight Time, Solo Time, Dual Flight Time, Log Book, Flight Crew Member, Helicopter, Prohibited Area, Take off, Landing, Air Traffic Control, Mayday, PAN, etc. - The Different Categories of Pilots' Licenses - Student Pilot Licence, Requirements for Issue, Renewal, Validity and Privileges - Visual Flight Rules - Ground Markings, Visual and Light Signals with Specific Reference to Visual Flights and Circuit Flying, Elementary Knowledge of - Certificate of Airworthiness, Certificate of Registration, Certificate of Release to Service, Airworthiness Review Certificate

UNIT II AIR NAVIGATION

Basic Knowledge of Form of Earth and The Method of Representing Sphere (Earth) on a Flat Surface Mapping, Basic Knowledge of Various Units of Measure Such as - Nautical Miles, Kilometre, Statute Mile, Fahrenheit and Celsius, Milibars (Hectopascal), Lbs., Kilogram, US and Imperial Gallons, Litre and Conversion From One to Other, Elementary Knowledge of Some Navigation Instruments such as Magnetic Compass, Air Speed Indicator, Altimeter and Basic Knowledge of Magnetism, Use of Radio Telephony, VHF etc. Elementary Understanding of Radio Navigational Aids Such as NDB, VOR, and their Uses in Aviation (Appreciation Only)

UNIT III AVIATION METEOROLOGY

Elementary Knowledge of Atmosphere and Its Properties, Basic Knowledge of Temperature, Pressure and Its Density and Their Relationship, Elementary Knowledge of Relationship Between Pressure & Wind, Elementary Knowledge of Variation of Wind With Height, Sea Breeze and Land Breeze, Elementary Knowledge of Different Types of Clouds and Precipitation, Basic Understanding of Hazards Associated With Certain Types of Clouds, Elementary Knowledge of The Terms – Visibility, Fog, Mist andHaze, Elementary Knowledge of Variation of Pressure With Height, and The Q Codes – QNH, QFE and QNE, Etc., Basic Understanding ofMETAR, SPECI and Aerodrome Warnings and Their Importance in Aviation, Elementary Knowledge of The Uses ofAnemometer, Aneroid Barometer, Wind Stock Etc.

UNIT IV AIRCRAFT

Elementary Knowledge of – Density, Pressure, Temperature, Humidity andThe Relationship Between Them, Understanding of The Terms – Thrust, Drag, Lift, Weight, Aerofoil, Angle of Attack, Centre of Lift, Stalling, Range, Endurance Etc., Elementary Knowledge of The Forces Acting on an Aerofoil in Level Flight; Understanding ofBernoulli's Theorem - Elementary Knowledge of The Primary Controls, Understanding of The Uses of Aileron, Rudder, Elevator, Stabilizer, Trimming Devices, Flaps, Landing Gear etc., General Knowledge of The Principle of Operation of a Piston Engine an Associated Systems. - Elementary Knowledge of The Principle of a Fixed

Pitch Propeller, Elementary Knowledge of Weight and Balance, Basic Knowledge of First-Aid, The Use of Generally Available First-Aid-Kits

UNIT V ENGINES AND SYSTEMS

Basic Knowledge of The Systems of The Type of Aircraft: Flying Controls And Flaps, Landing Gear, Electrical System, Heating And Ventilating System, Flight Instruments, Type of Propellers - Adequate Knowledge of The Instrumentation and Radio Navigation Aids Pertaining to The Aircraft - Basic Handling and Care of Aircraft

TEXT BOOKS

1. "Pilot's Handbook for Aeronautical Knowledge", FAA Publication
2. "Aviation Meteorology", Group Capt. I C Joshi
3. "Air Regulations", Wg.Cdr. R K Bali
4. "General Navigation", Oxford 2016 Edition
5. "Instrumentation", Oxford 2016 Edition
6. "Radio Navigation", Oxford 2016 Edition

Suggested E-Learning Resources:

1. Computer Based Trainer, "General Navigation", Oxford 2016 Edition
2. Computer Based Trainer, "Instrumentation", Oxford 2016 Edition
3. Computer Based Trainer, "Radio Navigation", Oxford 2016 Edition
4. Computer Based Trainer, "Air Law", Oxford 2016 Edition
5. Computer Based Trainer, "Meteorology", Oxford 2016 Edition

AVS 316 Advanced Human Factors

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Outcomes:

- Explain the Human Physiology and human physiological limitations in flying.
- Explain the vision problems and illusion involved in flying.

- Explain the various factors painting affecting human psychomotor performances.
- Explain the Dynamics of group behaviour and elements of interpersonal skill development.
- Explain the man and machine interaction on the advantages and disadvantages associated with that.

UNIT I HUMAN PHYSIOLOGY I

The Circulation System, Blood Circulation, Composition of Blood, The Heart, The Circulation System, Carbon Monoxide, Smoking, Blood Pressure, Pressoreceptors and Their Function Maintaining Blood Pressure, Pulmonary Embolism, Oxygen and Respiration, Oxygen Intake, Composition of Standard Atmosphere, Hypoxia, Types, Time of Useful Consciousness, Effective Performance, Hyperventilation, Cabin Decompression, Decompression Sickness

UNIT II HUMAN PHYSIOLOGY II

The Nervous System, The Sense Organs, Audible Range, Hearing Impairment, The Ear Imbalance and Disorientation, Somatogyral and Somatogravic Illusion, Motion Sickness , The Eye, Function and Structure, Light and Dark Adaptation, Night Vision, The Blind Spot, Stereopsis, Empty Visual Field Myopia, High Light Levels, Sunglasses, Visual Defects, Colour Vision, Colour Blindness, Vision and Speed, Monocular and Binocular Vision

UNIT III FLYING and HEALTH

Flying and Health, Acceleration, G-Forces, Long Duration Negative G, Short Duration G-Force, Summary of G Tolerances, Barotrauma, Toxic Hazards, Body Mass Index, Obesity, Losing Weight, Exercise, Nutrition and Food Hygiene, Fits, Faints, Alcohol and Flying, Drugs and Flying, Personal Hygiene, Stroboscopic Effect, Common Ailments and Fitness to Fly, Stress, Cognition in Aviation, Visual Illusions, Illusions when Taxiing, Take off, Cruise, Landingground Proximity Judgement, Protective Measures Against Illusion, Collision and Retinal Image,Sleep and Fatigue, Biological Rhythms and

Clocks, Body Temperature, Time of Day and Performance, Naps andMicro sleeps, Time Zone Crossing, Fatigue, Vigilance and Hypovigilance

UNIT IV HUMAN PSYCHOLOGY

Basic Information Processing, Stimuli, Attention, Perception, Short Term Memory, Central Decision Maker and Response Selection, Actions, Response and Feedback, Behaviour and Motivation, Categories of Behaviour, Situational Awareness, Motivation, Individual Difference and Interpersonal Relationship, Personality, Interactive Style, Cohesion, Group Decision Making, The Authority Gradient and Leadership Styles, Communication and Cooperation, Communication Model, Communication Concepts, Cockpit Communications, Metacommunications, Synchronization, Barriers to Crew Cooperation and Teamwork

UNIT V ERGONOMICS

Man and Machine, The SHELL Model, Hardware, Design of Flight Decks, Displays, Engine Instruments, Controls, Software, Intelligent Flight Decks, Colour Displays, System Active and Latent Failures, System Tolerance, Design Induced Errors, The Mechanics of Decision Making, Standard Operating Procedures, Errors, Sources and Limits in the Decision Making Process, Personality Traits and Effective Crew Decision Making

TEXT BOOKS

1. Human Performance and Limitations, Oxford 2016 Edition

SUGGESTED ONLINE RESOURCES:

1. “Advanced Human Factors”, https://www.swinburne.edu.au/study/courses/units/Advanced-Human-Factors-AVA80008/local
2. “Human Factors”, https://www.ainonline.com/aviation-news/business-aviation/2016-05-31/free-online-human-factors-mx-course-available

AVS 318 Aviation Operation Management

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Outcomes:

- Explain the different functions of operations management.
- Explain the different steps in product design and manufacturing.
- Explain the various techniques in production planning and control.
- Explain the departments in material management.
- Explain the various tools of total quality management.

UNIT I OPERATIONS MANAGEMENT

Operations Management – Meaning – Importance – historical contributions – System view of OM - Operation strategy and competitiveness - Functions of OM – types of production systems

UNIT II PRODUCT DESIGN AND PROCESS SELECTION

Product design and process selection – Evaluation and Selection of appropriate Production and Operations technology. Product Design and process selection. Types of layout – analysis and selection of layout – Product and / or Process layout, Cellular, Lean and Agile manufacturing systems – Computer Integrated Manufacturing Systems - Assembly line balancing.

UNIT III PRODUCTION PLANNING AND CONTROL

Production planning and control – meaning – functions – aggregate planning – master production schedule (MPS) – Material requirement planning (MRP) – BOM – Capacity requirement planning (CRP) – Techniques – problems in MRP and CRP – an introduction to MRP II and ERP – Business Process Re-engineering - Total Productive Maintenance (TPM)

UNIT IV MATERIALS MANAGEMENT

Materials management – functions – material planning and budgeting – Value Analysis - purchase functions and procedure - inventory control – types of inventory – safety stock – order point – service level – inventory control systems – perpetual – periodic – JIT – KANBAN.

UNIT V TOTAL QUALITY MANAGEMENT

Total Quality Management Concept - Statistical Quality Control for Acceptance Sampling and Process Control – Concepts of O.C.C. Curve – Use of the O.C. Curve – Concept of Type I and Type II error – Quality movement – Quality circles — ISO Quality Certifications and types – Quality assurance – Six Sigma concept.

TOTAL 45 HRS

TEXT BOOKS

1. Production and Operations Management – Everest E Adam & Ebert – PHI – publication forth edition.
2. Operations Management (Theory and Problems) – Joseph G Monks – McGraw Hill Intl.
3. Production and Operations Management – S N Chary – TMH Publications
4. Production and Operations Management – Pannerselvam, PHI

SUGGESTED ONLINE RESOURCES:

1. "Operations Management:, https://www.iata.org/training/courses/Pages/aviation-management-taph95.aspx

AVS 319 Aviation Safety Management

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

Upon the successful completion of the course, student will be able to:

- Explain how safety management systems are structured and their benefits for the aviation industry;
- Implement a Safety Management System adapted to the organisational and operational context of service providers;
- Explain the six step risk management process and its benefits;
- Compare the different safety cultures and explain how they contribute to a safety management system;

- Identify and apply key tools to assist on the implementation of a SMS (e.g. interviews/data collection, accident causation models, risk matrices, etc.)

UNIT I SAFTEY MANAGEMENT FUNDAMENTALS

Objective and Contents, Concept of Safety, Accident Causation — The Reason Model, The SHEL Model, Errors and Violations, Organizational Culture, Management Dilemma, Need For Safety Management, Strategies For Safety Management, Safety Management — Eight Building Blocks, Four Responsibilities for Managing Safety, Hazard- Understanding, Identification, Analysis, Documentation. Safety Risk- Management, Probability, Severity, Tolerability, Control/Mitigation.

UNIT II ICAO SAFETY MANAGEMENT SARPs

General, State Safety Programme, Acceptable Level of Safety, Safety Management System, SMS Safety Performance, Management Accountability, Relationship Between An SSP and An SSM, Compliance and Conformance

UNIT III SAFTEY MANAGEMENT SYSTEM

SMS Features, Gap Analysis, SMS and QMS, SSP/SMS and The Accident Investigation Process, Integration of Management Systems, The Difference Between Safety Slogans And Safety Principles, Components and Elements of An SMS, ICAO SMS Framework, Safety Accountabilities, Appointment of Key Safety Personnel, SMS Documentation and Implementation Plan

UNIT IV SMS OPERATION AND IMPLEMENTATION

Safety Risk Management, Hazard Identification, Risk Assessment and Mitigation, Safety Assurance, Safety Performance Monitoring and Measurement, Protection of Sources of Safety Information, Management of Change, Continuous Improvement of The SMS, Relationship Between Safety Risk Management (SRM) and Safety Assurance (SA), Safety Promotion, Planning SMS Implementation, Reactive Safety Management Processes, Proactive and Predictive Safety Management Processes, Operational Safety Assurance

UNIT V CASE STUDY

TEXT BOOKS

1. *ICAO DOC 9859*. 2nd edition. 2018

2. Stolzer, Alan J. (2017). *Safety management systems in aviation*. Routledge.
3. Stolzer, Alan J., Carl D. Halford, & John Joseph Goglia (2011). *Implementing safety management systems in aviation*. Ashgate Publishing, Ltd.

ENGL 307 English - V (ICAO Level – 6)

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes

- After the completion of the course, the students will be able to:
- identify punctuation marks and discourse markers in all kinds of oral and written communication situations.
- use previously learned grammatical strategies to draw meaning from familiar/unfamiliar communication situations .
- ssk and answer questions in all tenses and moods related to the targeted issues.
- use appropriate strategies to scan oral and written discourse for general and specific information.
- read and write on a variety of topics related to day-to day communication.

Unit I Punctuation

Unit II Discourse Markers

Unit III Summarizing and Precis Writing

Unit IV Asking for and giving information, Expressing opinion, command, advise, order, threat, willingness, likelihood, probability, agreement, disagreement and emotions.

Unit V Formation of short texts: oral and written, Paragraph Writing

Recommended Reading:

1. Corder, Pitt.*(2009) An Intermediate English Practice Book*. London: Orient Longman
2. Greenbaum, Sidney (2005). *English Grammar*. OUP.
3. Hornby, A.S, *A Guide to Patterns and Usage in English*. Delhi: Oxford University Press, 1954. Print

4. Leech, Geoffery N and Jan Svartvik.(2016) *A Communicative Grammar of English.* London: Routledge
5. Leech, Geoffery N.*(1982) English Grammar for Today.* London: Palgrave Macmillan,
6. Murphy and Reynold.(2008) *Essentials of English Grammar*. Cambridge University Press.
7. Quirk, Randolph and Sydney Greenbaum.(1976) *University Grammar of English*. Longman Publications.
8. Swain, Michael. *Practical English Usage*.(2016) London: OUP.
9. Wren and Martin(2010). *English Grammar and Composition*, Delhi: S. Chand and Company.

Suggested E-Learning Resources:

1. http://www.macmillanenglish.com/courses/aviation-english/
2. https://www.ejo.co.uk/aviation-english
3. http://pilotaviationenglish.com/
4. https://www.iata.org/training/courses/Pages/aviation-english-berlitz-taph19.aspx

   Punctuation:
5. https://www.niu.edu/writingtutorial/punctuation/index.shtml

   Discourse Markers:
6. http://www.bbc.co.uk/worldservice/learningenglish/grammar/learnit/learnitv316.shtml