

BACHELOR OF SCIENCE (Honors)
B.Sc. (Honors)
AIRCRAFT MAINTENANCE

General Information for Students

1. The course of study of Bachelor of Science (Honors) Aircraft Maintenance shall extend over six semesters in a period of three years. On satisfactory completion of the course and after passing the examinations, a candidate will be awarded the B.Sc. (Honors) Aircraft Maintenance degree.
2. To get admission in this course, the candidate must pass (10+2) from science stream at school level with at least 45% marks in aggregate (40% marks in case of SC/ST and OBC candidates.)
3. The term of regular course of study means that a candidate shall have attended 75% of total number of lectures and course work (Tutorial) in each written paper and 75% of the course work (Practical and Sessional) as per teaching and examination scheme in each semester. The attendance requirement scheme be as per Ordinance of the University which is reproduced below :-

O. 78-A (1): For all regular candidates in the faculties of Arts, Education and Social Sciences, Science, Law, Commerce and Engineering the minimum attendance requirement shall be that a candidate should have attended at least 75% of the lectures delivered and the tutorials held taken together as well as 75% of the practicals and session from date of her/his admission.

(2) Condonation of shortage of attendance: The shortage of attendance upto the limits specified below may be condoned on valid reasons:

 - (i) Upto 6% in each subject plus 5 attendance in all aggregate of subject/papers may be condoned by the Vice-Chancellor on the recommendation of the Dean/Director/Principal for undergraduate students and on the recommendation of the Head of the Department for the Post-graduate classes.
 - (ii) The NCC/NSS cadets sent out to parades and camps and such students who are deputed by the University to take part in games, athletics or cultural activities may for purposes of attendance be treated as present for the days of these absence in connection with the aforesaid activities and that period shall be added to their subject wise attendance.
4. For a pass, a candidate must obtain at least 36% marks in each theory paper and 40% marks in each practical and sessional. Overall in aggregate a candidate must score 40% marks.
5. (a) If a candidate fails in not more than three papers in first year (both I & II semesters) examination and obtains 40% marks in aggregate, he/she shall be allowed to be a regular candidate in the second year. For the purpose of this clause each theory paper and each practical shall be counted as a separate paper.

- (b) If a candidate, fails in not more than three papers inclusive of first year (I & II semesters) and second year (III & IV semesters), he/she shall be allowed to be a regular candidate in the third year.
- (c) If a candidate has cleared all the papers of first & second year, and has failed in not more than three papers of third year he/she shall be eligible for supplementary examination that will be held after declaration of result of third year.
- (d) All those candidates who are unable to clear their back papers from first year & second year with third year regular examination shall not be eligible for supplementary examination. Such candidate will have to wait for an year & he/she will have to appear for these back papers along with the regular examination of first (I & II semesters) & second years (III & IV semesters) along with all papers of third year respectively.

6. Ex- students:

- (a) If a student fails in more than three papers of theory in any semester examination, but pass in all the practicals, he/she shall be allowed to appear as ex-student only in theory examination. The marks secured in the practicals and course work, laboratory sessionals of the last year shall be carried over to the next examination.
- (b) If a candidate fails in more than three papers of theory and practical at the annual examination. He/she shall appear as an ex-student at the next year examination in all theory papers, practicals and sessionals

7. The actual marks obtained in due paper examination will be considered for awarding division but name will not be included in the merit list.

8. Award of Division: The division given below shall be awarded on the basis of the total marks obtained from first to third year all semesters (all taken together) by the candidate for the degree of B.Sc. (Honors) Aircraft Maintenance degree.

- (i) Honors 75% and above
- (ii) First Division 60% and above
- (iii) Second Division 45% and above
- (iv) Pass Division 40% and above

9. A candidate shall be allowed to appear as an ex-student for a maximum of two consecutive years. If the candidate is unable to pass the examination in two consecutive years, he/she will neither be allowed to continue his studies in the course nor to re-appear at the same examination.

**Teaching and examination scheme of
Bachelor of Science (Honors) Aircraft Maintenance: I Semester**

Theory

S. No.	Course			Credits			Examination		Contact Hours per week
	Code	Titles	Paper Category	Theory	Practical/Tutorial	Total Credits	Exam. Hrs.	Max. Marks	L
1	C1	Aircraft Structure & Associated Systems	Core Course	4	0	4	3	80	4
2	C2	Aerodynamics	Core Course	4	0	4	3	80	4
3	GE-1	General Elective - 1	General Elective	4/5	0	4/5	3	80/120	4/5
4	AECC1	English Communications	Ability Enhancement 1	4	0	4	3	80	4
TOTAL MAX. MARKS								320/360	

Practical / Tutorial

S. No.	Course			Credits			Examination		Contact Hours per week
	Code	Titles	Paper Category	Theory	Practical/Tutorial	Total Credits	Exam. Hrs.	Max. Marks	T/P
1	CP1	Aircraft Structure Lab	Core Course Lab	0	2	2	3	40	4
2	CP2	Aerodynamics Lab	Core Course Lab	0	2	2	3	40	4
3	GE-1 P/T	General Elective – 1 Lab/Tutorial	General Elective Lab / Tutorial	0	2/1	2/1	3/0	40/0	4/1
TOTAL MAX. MARKS								120/80	

Total Credits in I semester = 22
Total max. marks in I semester = 440

Bachelor of Science (Honors) Aircraft Maintenance: II Semester

Theory

S. No.	Course			Credits			Examination		Contact Hours per week
	Code	Titles	Paper Category	Theory	Practical/Tutorial	Total Credits	Exam. Hrs.	Max. Marks	L
1	C3	Electrical Fundamental 1	Core Course	4	0	4	3	80	4
2	C4	Electronic Fundamentals & Digital Tech 1	Core Course	4	0	4	3	80	4
3	GE-2	General Elective - 2	General Elective	4/5	0	4/5	3	80/120	4/5
4	AECC2	Environmental Science	Ability Enhancement 2	4	0	4	3	80	4
TOTAL MAX. MARKS								320/360	

Practical / Tutorial

S. No.	Course			Credits			Examination		Contact Hours per week
	Code	Titles	Paper Category	Theory	Practical/Tutorial	Total Credits	Exam. Hrs.	Max. Marks	T/P
1	CP3	Electrical 1 Lab	Core Course Lab	0	2	2	3	40	4
2	CP2	Electronics 1 Lab	Core Course Lab	0	2	2	3	40	4
3	GE-2 P/T	General Elective – 2 Lab/Tutorial	General Elective Lab / Tutorial	0	2/1	2/1	3/0	40/0	4/1
TOTAL MAX. MARKS								120/80	

Total Credits in II semester = 22

Total max. marks in II semester = 440

Total Credits in first year (inclusive both I & II semesters) = 44

Total max. marks in first year (inclusive Both I & II semesters) = 880

Bachelor of Science (Honors) Aircraft Maintenance: III Semester

Theory

S. No.	Course			Credits			Examination		Contact Hours per week
	Code	Titles	Paper Category	Theory	Practical/Tutorial	Total Credits	Exam. Hrs.	Max. Marks	L
1	C5	Aircraft Materials & Hardware	Core Course	4	0	4	3	80	4
2	C6	Electrical Fundamentals 2	Core Course	4	0	4	3	80	4
3	C7	Gas Turbine Engine	Core Course	4	0	4	3	80	4
4	GE-3	General Elective - 3	General Elective	4/5	0	4/5	3	80/120	4/5
5	DSE-1	Discipline Specific Elective - 1	Discipline Specific Elective	4/5	0	4/5	3	80/120	4/5
TOTAL MAX. MARKS								400/440/480	

Practical / Tutorial

S. No.	Course			Credits			Examination		Contact Hours per week
	Code	Titles	Paper Category	Theory	Practical/Tutorial	Total Credits	Exam. Hrs.	Max. Marks	T/P
1	CP5	Aircraft Materials Lab	Core Course Lab	0	2	2	3	40	4
2	CP6	Electrical 2 Lab	Core Course Lab	0	2	2	3	40	4
3	CP7	Gas Turbine Engine Lab	Core Course Lab	0	2	2	3	40	4
4	GE-3 P/T	General Elective – 3 Lab/Tutorial	General Elective Lab / Tutorial	0	2/1	2/1	3/0	40/0	4
5	DSE-1 P/T	Discipline Specific Elective – 1 Lab/Tutorial	Discipline Specific Elective Lab/Tutorial	0	2/1	2/1	3/0	40/0	4/1
TOTAL MAX. MARKS								200/160/120	

Total Credits in III semester = 30

Total max. marks in III semester = 600

Bachelor of Science (Honors) Aircraft Maintenance: IV Semester

Theory

S. No.	Course			Credits			Examination		Contact Hours per week
	Code	Titles	Paper Category	Theory	Practical/Tutorial	Total Credits	Exam. Hrs.	Max. Marks	L
1	C8	Electronic Fundamental & Digital Tech 2	Core Course	4	0	4	3	80	4
2	C9	Aircraft Maintenance Practises	Core Course	4	0	4	3	80	4
3	C10	Aircraft Systems 1	Core Course	4	0	4	3	80	4
4	GE-4	General Elective - 4	General Elective	4/5	0	4/5	3	80/120	4/5
5	DSE-2	Discipline Specific Elective - 2	Discipline Specific Elective	4/5	0	4/5	3	80/120	4/5
TOTAL MAX. MARKS								400/440/480	

Practical / Tutorial

S. No.	Course			Credits			Examination		Contact Hours per week
	Code	Titles	Paper Category	Theory	Practical/Tutorial	Total Credits	Exam. Hrs.	Max. Marks	T/P
1	CP8	Electronic 2 Lab	Core Course Lab	0	2	2	3	40	4
2	CP9	Maintenance Lab	Core Course Lab	0	2	2	3	40	4
3	CP10	Aircraft Systems 1 Lab	Core Course Lab	0	2	2	3	40	4
4	GE-4 P/T	General Elective – 3 Lab/Tutorial	General Elective Lab / Tutorial	0	2/1	2/1	3/0	40/0	4/1
5	DSE-2 P/T	Discipline Specific Elective – 2 Lab/Tutorial	Discipline Specific Elective Lab/Tutorial	0	2/1	2/1	3/0	40/0	4/1
TOTAL MAX. MARKS								200/160/120	

Total Credits in IV semester = 30

Total max. marks in IV semester = 600

Total Credits in second year (inclusive both III & IV semesters) = 60

Total max. marks in second year (inclusive Both III & IV semesters) = 1200

Bachelor of Science (Honors) Aircraft Maintenance: V Semester

Theory

S. No.	Course			Credits			Examination		Contact Hours per week
	Code	Titles	Paper Category	Theory	Practical/Tutorial	Total Credits	Exam. Hrs.	Max. Marks	L
1	C11	Workshop Practices	Core Course	4	0	4	3	80	4
2	C12	Aircraft system 2	Core Course	4	0	4	3	80	4
3	C13	Avionics	Core Course	4	0	4	3	80	4
4	DSE-3	Discipline Specific Elective - 3	Discipline Specific Elective	4/5	0	4/5	3	80/120	4/5
TOTAL MAX. MARKS								320/360	

Practical / Tutorial

S. No.	Course			Credits			Examination		Contact Hours per week
	Code	Titles	Paper Category	Theory	Practical/Tutorial	Total Credits	Exam. Hrs.	Max. Marks	T/P
1	CP11	Workshop Practices Lab	Core Course Lab	0	2	2	3	40	4
2	CP12	Aircraft system 2 Lab	Core Course Lab	0	2	2	3	40	4
3	CP13	Avionics Lab	Core Course Lab	0	2	2	3	40	4
4	DSE-3 P/T	Discipline Specific Elective – 3 Lab/Tutorial	Discipline Specific Elective Lab/Tutorial	0	2/1	2/1	3/0	40/0	4/1
TOTAL MAX. MARKS								160/120	

Total Credits in V semester = 24

Total max. marks in V semester = 480

Bachelor of Science (Honors) Aircraft Maintenance: VI Semester

Theory

S. No.	Course			Credits			Examination		Contact Hours per week
	Code	Titles	Paper Category	Theory	Practical/Tutorial	Total Credits	Exam. Hrs.	Max. Marks	L
1	C14	Ground Handling & Support System	Core Course	4	0	4	3	80	4
2	DSE-4	Discipline Specific Elective - 4	Discipline Specific Elective	4/5	0	4/5	3	80/120	4/5
3	SEC-1	Skill Enhancement Course - 1	Skill Enhancement Course	4	0	4	3	80	4
4	SEC-2	Skill Enhancement Course-2	Skill Enhancement Course	4	0	4	3	80	4
TOTAL MAX. MARKS								320/360	

Practical / Tutorial

S. No.	Course			Credits			Examination		Contact Hours per week
	Code	Titles	Paper Category	Theory	Practical/Tutorial	Total Credits	Exam. Hrs.	Max. Marks	T/P
1	CP14	Ground Handling & Support System Lab	Core Course Lab	0	2	2	3	40	4
2	DSE-4 P/T	Discipline Specific Elective – 4 Lab/Tutorial	Discipline Specific Elective Lab/Tutorial	0	2/1	2/1	3/0	40/0	4/1
TOTAL MAX. MARKS								80/40	

Total Credits in VI semester = 20

Total max. marks in VI semester = 400

Total Credits in first year (inclusive both V & VI semesters) = 44

CHOICE BASED CREDIT SYSTEM

B.Sc. Honors (AIRCRAFT MAINTENANCE)

Course Structure (Aircraft Maintenance)

Details of courses under B.Sc. (Honors)

Course	Credits	
	Theory+ Practical	Theory + Tutorial
I Core Course (14 papers)		
Core Course (14 Papers)	14X4= 56	14X5=70
Core Course Practical / Tutorial* (14 Papers)	14X2=28	14X1=14
II Elective Course (8 Papers)		
A.1 Discipline Specific Elective (4 Theory Papers)	4X4=16	4X5=20
A.2 Discipline Specific Elective Practical/Tutorial (4 Practical Papers)	4 X 2=8	4X1=4
B.1 General Elective/Interdisciplinary (4 Theory Papers)	4X4=16	4X5=20
B.2 General Elective Practical/ Tutorial (4 Practical Papers)	4 X 2=8	4X1=4
Optional Dissertation or project work in place of one Discipline Specific Elective paper (6 credits) in 6th Semester		
III Ability Enhancement Courses		
1 Ability Enhancement Compulsory (2 p a p e r s)	2 X 4=8	2 X 4=8
2 Ability Enhancement Elective (Skill Based) (Minimum 2)	2 X 4=8	2 X 4=8
Total credit	148	148

Institute should evolve a system/ policy about ECA/ General Interest/ Hobby/ Sports/ NCC/ NSS/ related courses on its own.

wherever there is a practical there will be no tutorial and vice-versa

Course Structure (Aircraft Maintenance)

Details of courses under B.Sc. (Honors)

Subject Code	Course
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I Core Course

Core Papers (C): (Credit: 06 each) (1(or 2) periods/week for tutorials or 4 periods/week for practical)

- C1 Aircraft structure and associated systems
- C2 Aerodynamics
- C3 Electrical fundamentals 1
- C4 Electronic fundamentals and digital techniques 1
- C5 Aircraft materials and hardware
- C6 Electrical fundamentals 2
- C7 Gas turbine engine
- C8 Electronic fundamentals and digital techniques 2
- C9 Aircraft maintenance practices
- C10 Aircraft systems 1
- C11 Workshop Practices
- C12 Aircraft system 2
- C13 Avionics
- C14 Ground handling, safety and support system

Core Course Practical / Tutorial* (14 Papers)

- CP1 Aircraft structure and associated systems
- CP2 Aerodynamics
- CP3 Electrical fundamentals 1

Course Structure (Aircraft Maintenance)

Details of courses under B.Sc. (Honors)

Subject Code	Course
CP4	Electronic fundamentals and digital techniques 1
CP5	Aircraft materials and hardware
CP6	Electrical fundamentals 2
CP7	Gas turbine engine
CP8	Electronic fundamentals and digital techniques 2
CP9	Aircraft maintenance practices
CP10	Aircraft systems 1
CP11	Workshop Practices
CP12	Aircraft system 2
CT13	Avionics
CP14	Ground handling, safety and support system

II Elective Course (8 Papers)

A.1 Discipline Specific Elective (4 Theory Papers)

Discipline Specific Elective (DSE) Papers: (Credit: 06 each) (4 papers to be selected)-

DSE1	Piston engines and Propellers
DSE2	Rotorcraft and rotorcraft autopilot
DSE3	Human factors
DSE4	Transducers and sensors
DSE5	Aviation legislation
DSE6	Flight Navigation and guidance

Course Structure (Aircraft Maintenance)

Details of courses under B.Sc. (Honors)

Subject Code	Course
DSE7	Topics recommended for dissertation / University recommended subjects
A.2	Discipline Specific Elective Practical/Tutorial (4 Practical Papers)
DSEP1	Piston engines and Propellers
DSEP2	Rotorcraft including rotorcraft autopilot
DSET3	Human factors
DSEP4	Transducers and sensors
DSEP5	Aviation legislation
DSEP6	Flight Navigation and guidance
	Dissertation - University recommended subjects : Optional Dissertation (obtain organization approval) or project work (Perform aircraft maintenance in an Aircraft Maintenance Organization) in place of one Discipline Specific Elective paper (6 credits) in 6th Semester
DSED7.1	Approval of Maintenance Organization
DSED7.2	Approval of Continuing Airworthiness Management Organization
DSED7.3	Aircraft Line Maintenance
DSED7.4	Aircraft Maintenance – Planning and Logistics
DSED7.5	Aircraft Stores
	General Elective/Interdisciplinary (4 Theory Papers)
GE1	Mathematics
GE2	Physics

Course Structure (Aircraft Maintenance)

Details of courses under B.Sc. (Honors)

Subject Code	Course
GE3	Chemistry
GE4	Corrosion and NDI Techniques
GE5	Composites and fibers
GE6	Quality Management System
B.2	General Elective Practical/ Tutorial (4 Practical Papers)
GET1	Mathematics
GEP2	Physics
GEP3	Chemistry
GEP4	Corrosion and NDI Techniques
GEP5	Composites and fibers
GET6	Quality Management System
III	Ability Enhancement Courses
1	Ability Enhancement Compulsory (2 Papers of 2 credit each)
AECC1	Environmental Science
AECC2	English Communication
2	Ability Enhancement Elective* (Skill Based) (Minimum 2 Papers of 2 credit each)
AEEC1	Typical Aircraft Maintenance - Fixed Wing Heavy / Complex Aircraft
AEEC2	Typical Aircraft Maintenance - Fixed Wing Light / Composite Aircraft

Course Structure (Aircraft Maintenance)

Details of courses under B.Sc. (Honors)

Subject Code	Course
AEEC3	Typical Aircraft maintenance – Single Engine Helicopters
AEEC4	Typical Aircraft maintenance – Multi Engine Helicopters
AEEC5	Typical Aircraft Maintenance – Avionics (Fixed / Rotor Wing Complex Aircraft - Glass Cockpit) Typical Aircraft Maintenance – Avionics (Fixed / Rotor Wing Light Aircraft - Glass Cockpit)
AEEC6	Typical Aircraft Maintenance – Avionics (Fixed/ Rotor Wing Light Aircraft - Analog System)
AEEC7	Typical Piston Engine maintenance
AEEC8	Typical Gas Turbine Engine Maintenance
AEEC9	Aircraft (Hydraulic) Component Maintenance
AEEC10	Aircraft (landing gear) Component Maintenance
AEEC11	Aircraft (Pneumatic) Component Maintenance
AEEC12	Aircraft wheels and Brakes - Component Maintenance
AEEC13	Aircraft Electrical Component Maintenance
AEEc14	Aircraft Instruments Maintenance
AEEC15	Aircraft communication and navigation system component maintenance
AEEC16	Typical Aircraft Maintenance – Avionics (Fixed Wing Aircraft - Fly by wire)
AEEC17	Typical Aircraft Maintenance - Fixed Wing Heavy / Complex Aircraft

CHOICE BASED CREDIT SYSTEM
PROPOSED SCHEME FOR CHOICE BASED CREDIT SYSTEM IN
B.Sc HONORS (AIRCRAFT MAINTENANCE)

SEM.	CORE COURSE (14)	Ability Enhancement Compulsory Course (AECC) (2)	Ability Enhancement Elective Course (AEEC)	Elective: Discipline Specific DSE (4)	Elective: General (GE) (4)
I	Aircraft Structure & Associated Systems (4+4), Aerodynamics (4 + 4)	(English Communication /Environmental Science)			GE-1
II	Electrical Fundamentals1 (4+4) Electronic Fundamentals And Digital Techniques (4+4) 1	Environmental Science/ (English Communication)			GE-2
III	Aircraft Materials And Hardware(4+4) Electrical Fundamentals 2 (4+4) Gas turbine engine (4+4)			DSE-1	GE-3
IV	Electronic Fundamentals And Digital Techniques (4+4) Aircraft maintenance practices (4+4) Aircraft Systems 1 (4+4)			DSE-2	GE-4
V	Workshop Practices(4+4) Aircraft Systems 2(4+4)) Avionics (4+4)			DSE-3	
VI	Ground Handling Safety and Support System(4+4)		SEC 1 SEC 2	DSE-4	

SEMESTER	COURSE OPTED	COURSE NAME	Credits
I	Core course-1	Aircraft Structure & Associated Systems	4
	Core Course-1 Practical/Tutorial	Aircraft Structure Lab	2
	Core course-2	Aerodynamics	4
	Core Course-2 Practical/Tutorial	Aerodynamics Lab	2
	Generic Elective -1	GE-1	4/5
	Generic Elective -1 Practical/Tutorial	Lab	2/1
	Ability Enhancement 1	English communications	4
II	Core course-3	Electrical Fundamentals 1	4
	Core Course-3 Practical/Tutorial	Electrical 1 Lab	2
	Core course-4	Electronic Fundamentals & Digital Tech 1	4
	Core Course-4 Practical/Tutorial	Electronic Lab	2
	Generic Elective -2	GE-2	4/5
	Generic Elective -2 Practical/Tutorial	Lab	2/1
	Ability Enhancement 2 Compulsory	Environmental Science	4
III	Core course-5	Aircraft Materials And Hardware	4
	Core Course-5 Practical/Tutorial	Aircraft Materials Lab	2
	Core course-6	Electrical Fundamentals 2	4
	Core Course-6 Practical/Tutorial	Electrical 2 Lab	2
	Core course-7	Gas turbine engine	4
	Core Course-7 Practical/Tutorial	Gas turbine Engine Lab	2
	Discipline Specific Elective -1	DSE-1	4/5
	Discipline Specific Elective -1 Practical/Tutorial	DSE-1 Practical/Tutorial	2/1
	Generic Elective -3	GE-3	4/5
	Generic Elective -3 Practical/Tutorial	Lab	2/1
IV	Core course-8	Electronic Funda. & Digital Tech 2	4
	Course-8 Practical/Tutorial	Electronic Lab	2
	Core course-9	Aircraft maintenance practices	4
	Course-9 Practical/Tutorial	Maintenance Lab	2
	Core course-10	Aircraft Systems 1	4
	Course- 10 Practical/Tutorial	Aircraft Systems 1 Lab	2
	Discipline Specific Elective -2	DSE -2	4/5
	Practical/Tutorial		
	Discipline Specific Elective -2	DSE -2 Practical/Tutorial	2/1
	Generic Elective -4	GE-4	4/5
Generic Elective -4 Practical	Lab	2/1	
V	Core course-11	Workshop practices	4
	Core Course-11 Practical/Tutorial	Workshop practices lab	2
	Core course-12	Aircraft System 2	4

	Core Course-13 Practical/Tutorial	Aircraft System 2 Lab	2
	Discipline Specific Elective -3	DSE-3	4
	Discipline Specific Elective -3	DSE-3 Lab	2
	Practical/Tutorial		
	Core course-13	Avionics	4
Practical/Tutorial	Core Course- 13	Avionics Lab	2
	Practical/Tutorial		
VI	Core course-14	Ground handling and support system	4
	Core Course-14 Practical/Tutorial	Ground handling and support sys lab	2
	Discipline Specific Elective -4	DSE-4	4
	Discipline Specific Elective- 4	DSE-4 Lab	2
	Practical		
	Skill Enhancement Course -1	SEC-1	4
	Skill Enhancement Course -2	SEC-2	4
Total Credits			148

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: Aircraft Structure and Associated Systems

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C1

Lecture 60

Hours

C1.1 Introduction to General term and vocabulary used in Aeronautical science	4
<p>Introduction to aircraft technical literature.</p> <p>Introduction to ATA system</p>	
C1.2 Introduction to aircraft, major aircraft components, aircraft systems and their functions, reference lines, station and zone identification systems	4
C1.3 Airframe Structures — General Concepts	20
<p>Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage tolerance concepts; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Lightning strike protection provision.</p> <p>Drains and ventilation provisions, System installation provisions</p> <p>Aircraft bonding and continuity.</p> <p>Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning, anti-corrosive protection, wing, empennage and engine attachments;</p> <p>Describe current practice in aircraft design related to load transfer, load path continuity and reduction of stress raisers in pressurized fuselages.</p>	
C1.4 Fasteners used on aircraft	4
<p>Fasteners, Screw threads</p> <p>Screw nomenclature; Thread forms, dimensions and tolerances for standard threads used in aircraft; measuring screw threads;</p> <p>Bolts, studs and screws</p> <p>Bolt types: specification, identification and marking of aircraft bolts, international standards;</p> <p>Nuts: self-locking, anchor, standard types; Machine screws: aircraft specifications;</p> <p>Studs: types and uses, insertion and removal; Self tapping screws, dowels.</p>	

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: Aircraft Structure and Associated Systems

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C1

Lecture 60

Hours

Aircraft rivets

Types of solid and blind rivets: specifications and identification, heat treatment.

Riveting

Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.

C1.5	Structural Assembly	4
	Structural assembly techniques: riveting, bolting, bonding methods of surface protection, such as chromating, anodising, painting; Surface cleaning. Airframe symmetry: methods of alignment and symmetry checks. Complete airframe for symmetry fuselage for twist and bending, vertical stabiliser for alignment wings and horizontal stabilisers for dihedral and incidence	
C1.6	Airframe Structures — Aeroplane	10
	Fuselage (ATA 52/53/56) :Construction and pressurisation sealing; Wing, stabiliser, pylon and undercarriage attachments; Seat installation and cargo loading system; Doors and emergency exits: construction, mechanisms, operation and safety devices; Windows and windscreen construction and mechanisms.	
C1.7	Wings (ATA 57)	4
	Anhedral, dihedral incidence angle interplane struts longitudinal dihedral rigging position, stagger, wash in, washout Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments.	
C1.8	Stabilizers	4
	Construction; Control surface attachment.	
C1.9	Flight Control Surfaces (ATA 55/57)	4
	Construction and attachment; Balancing — mass and aerodynamic.	
C1.10	Nacelles/Pylons (ATA 54)	2
	Construction; Firewalls; Engine mounts.	
	Reference Books:	
	Dictionary of Aeronautical terms (Dale Crane)	

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: Aircraft Structure and Associated Systems

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C1

Lecture 60

Hours

Aircraft handbook FAA (AC 65-15 A)

Aircraft structure Ch. 01 (FAA)

Aircraft Construction Repair and Inspection-By Joe Christy

Aviation Maintenance Technician Hand book by FAA

Aircraft Maintenance and Repair- Delp/Bent/McKinley,

AC 43.1B

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: Aircraft Structure and Associated Systems
Credits - Theory-04, Practicals-02
Practical

Subject
Code: CP1
Lecture 60
Hours

1	Identifying aircraft reference lines, station and zone numbers	4
2	Identification of major structural members of fixed wing aircraft. Loads on major structural members.	4
3	Identification of detail structural members of aircraft and loads acting on these structural members	4
4	Aircraft structure construction	4
5	Aircraft structural assembly, joints and lightning protection	4
6	Identification of components of flight control surfaces and methods of mass balancing.	4
7	Control surface, landing gear and engine attachment	4
8	Identification of type of Fuselage and method of pressure sealing. Identification of Pressure bulkheads and unpressurised bulkheads	4
9	Common structural defects, simple inspection technique and recording	8
10	Types of rivets, defects. Inspection of riveted joints and structure	8
11	Construction (Modelling) of various types structural joints	8
12	Check aircraft symmetry	4

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: Aerodynamics

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C2

Lecture 60

Hours

C2.1	Physics of the Atmosphere	2
	International Standard Atmosphere (ISA), application to aerodynamics.	
C2.2	Aerodynamics	12
	Airflow around a body; Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, upwash and downwash, vortices, stagnation; The terms: camber, chord, mean aerodynamic chord, aerodynamic centre, centre of pressure, stagnation point, profile (parasite) drag, induced drag, angle of attack, wash in and wash out, fineness ratio, wing shape and aspect ratio; Thrust, Weight, Aerodynamic Resultant; Generation of Lift and Drag: Angle of Attack, Lift coefficient, Drag coefficient, polar curve, stall; Aerofoil contamination including ice, snow, frost.	
C2.3	Theory of Flight	10
	Relationship between lift, weight, thrust and drag; Glide ratio; Steady state flights, performance; Theory of the turn; Influence of load factor: stall, flight envelope and structural limitations; Lift augmentation.	
C2.4	Flight Stability and Dynamics	3
	Longitudinal, lateral and directional stability (active and passive	
C2.5	Theory of Flight - Aeroplane Aerodynamics and Flight Controls	16
	Operation and effect of: — roll control: ailerons and spoilers; — pitch control: elevators, stabilators, variable incidence stabilisers and canards; — yaw control, rudder limiters; Control using elevons, ruddervators; High lift devices, slots, slats, flaps, flaperons; Drag inducing devices, spoilers, lift dumpers, speed brakes; Effects of wing fences, saw tooth leading edges; Boundary layer control using, vortex generators, stall wedges or leading edge devices; Operation and effect of trim tabs, balance and antibalance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels;	
C2.6	Basic Instrument Systems	5

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: Aerodynamics

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C2

Lecture 60

Hours

Classification; Atmosphere; Terminology; Pressure measuring devices and systems; Pitot static systems; Altimeters; Vertical speed indicators; Airspeed indicators; Machmeter; Altitude reporting/alerting systems; Air data computers; rate of climb / vertical speed indicator, cabin pressure indicator, pneumatic systems instruments;

C2.7 High Speed Flight

8

Speed of sound, subsonic flight, transonic flight, supersonic flight, Mach number, critical Mach number, compressibility effect, buffet, shock wave, aerodynamic heating, area rule;

Factors affecting airflow in engine intakes of high speed aircraft; Effects of sweepback on critical Mach number.

C2.8 Rotary Wing Aerodynamics

4

Elementary rotary wing and aerodynamic Terminology;

Basic operation and effect of cyclic, collective and anti-torque controls.

Reference Books:

Aerodynamics - By Clancey

Mechanics of Flight By - A.C.Kermode

Force measurement on symmetric airfoil.

Force measurement on cambered airfoil.

Aircraft Instruments-by E.H.J.Pallett

Aircraft Instruments-by C.A.Williams

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: Aerodynamics

Credits - Theory-04, Practicals-02

Practical

Subject

Code: CP2

Lecture 60

Hours

1	Flow around various objects in a 'Water Channel' - Square, Cylinder, Aerofoil - Understanding laminar flow, turbulent flow, stagnation point, flow separation, boundary layer,	4
2	Fabricate Aerofoil Model - Understanding associated terms	4
3	Water Channel - Effect of vortex generator on boundary layer control	4
4	Effect of angle of attack and airflow velocity on lift and Stalling	4
5	Study of flow over streamlined bodies with different angle of attack by flow visualization technique	4
6	Identification of flight control surfaces and their effect on flight control - Aircraft Model	4
7	Identifying High lift devices and practical understanding of their effect on lift with respect to aircraft speed (Air flow)	4
8	Practical understanding of lift spoiling devices.	4
9	Removal / installation of Pitot Static Instruments.	4
10	Calibration of a Pitot Static System using a Pitot Static Leak tester.	4
11	Fabrication of model - high speed flight	4
12	Practical study of various factors affecting lift and drag on an aerofoil.	4
13	Factors affecting flow of fluid over an aerofoil surface and demonstrate the venturi effect	4
14	Identify various type of flap surfaces and their effect on high lift and high drag characteristic	4
15	Identification of various parts of Rotary wing	4

Core Course – B.Sc Honors (Aircraft Maintenance)

	Subject: Electrical Fundamentals 1	Subject
	Credits - Theory-04, Practicals-02	Code: C3
	Theory	Lecture 60
		Hours
C3.1	Electron Theory Structure and distribution of electrical charges within: atoms, molecules, ions, compounds Molecular structure of conductors, semiconductors and insulators.	3
C3.2	Static Electricity and Conduction Static electricity and distribution of electrostatic charges; Electrostatic laws of attraction and repulsion; Units of charge, Coulomb's Law; Conduction of electricity in solids, liquids, gases and a vacuum.	3
C3.3	Electrical Terminology The following terms, their units and factors affecting them: potential difference, electromotive force, voltage, current, resistance, conductance, charge, conventional current flow, electron flow.	2
C3.4	DC Circuits Ohms Law, Kirchhoff's Voltage and Current Laws; Calculations using the above laws to find resistance, voltage and current; Significance of the internal resistance of a supply.	4
C3.5	Resistance/Resistor	5
(a)	Resistance and affecting factors; Specific resistance; Resistor colour code, values and tolerances, preferred values, wattage ratings; Resistors in series and parallel; Calculation of total resistance using series, parallel and series parallel combinations; Operation and use of potentiometers and rheostats; Operation of Wheatstone Bridge.	
(b)	Positive and negative temperature coefficient conductance; Fixed resistors, stability, tolerance and limitations, methods of construction; Variable resistors, thermistors, voltage dependent resistors; Construction of potentiometers and rheostats; Construction of Wheatstone Bridge;	
C3.6	Capacitance/Capacitor Operation and function of a capacitor; Factors affecting capacitance area of plates,	4

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: Electrical Fundamentals 1

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C3

Lecture 60

Hours

distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating; Capacitor types, construction and function; Capacitor colour coding;

Calculations of capacitance and voltage in series and parallel circuits; Exponential charge and discharge of a capacitor, time constants; Testing of capacitors.

C3.7 Magnetism **5**

Theory of magnetism; Properties of a magnet Action of a magnet suspended in the Earth's magnetic field; Magnetisation and demagnetisation; Magnetic shielding; Various types of magnetic material; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor.

Magneto motive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.

C3.8 Inductance/Inductor **6**

Faraday's Law; Action of inducing a voltage in a conductor moving in a magnetic field;

Induction principles; Effects of the following on the magnitude of an induced voltage: magnetic field strength, rate of change of flux, number of conductor turns; Mutual induction; The effect the rate of change of primary current and mutual inductance has on induced voltage; Factors affecting mutual inductance: number of turns in coil, physical size of coil, permeability of coil, position of coils with respect to each other; Lenz's Law and polarity determining rules; Back emf, self-induction; Saturation point; Principle uses of inductors;

C3.9 AC Theory **8**

Sinusoidal waveform: phase, period, frequency, cycle; Instantaneous, average, root mean square, peak, peak to peak current values and calculations of these values, in

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: Electrical Fundamentals 1

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C3

Lecture 60

Hours

relation to voltage, current and power Triangular/Square waves; Single/3 phase principles.

C3. 10 Resistive (R), Capacitive (C) and Inductive (L) Circuits **8**

Phase relationship of voltage and current in L, C and R circuits, parallel, series and series parallel; Power dissipation in L, C and R circuits; Impedance, phase angle, power factor and current calculations; True power, apparent power and reactive power calculations.

C3.11 Transformers **6**

Transformer construction principles and operation; Transformer losses and methods for overcoming them; Transformer action under load and no-load conditions;

Power transfer, efficiency, polarity markings; Calculation of line and phase voltages and currents; Calculation of power in a three phase system; Primary and Secondary current, voltage, turns ratio, power, efficiency; Auto transformers.

C3.12 Filters **6**

Operation, application and uses of the following filters: low pass, high pass, band pass, band stop.

Reference Books:

Electrical Technology- by B.L.Theraja

Aircraft Electrical System- by E.H.J.Pallett

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: Electrical Fundamentals 1

Credits - Theory-04, Practicals-02

Practical

Subject

Code: CP3

Lecture 60

Hours

1	Simple experiments with static electricity and the coulomb's law		4
2	Application of Electromotive forces and Potential difference Galvanometer: (i) Measurement of charge and current sensitivity	Ballistic	4
3	Measuring (a) Resistances, (b) AC and DC Voltages, (c) DC Current, and (d) checking electrical fuses and connection		4
4	Use of a range of test meters to measure volts, amps and resistance.		4
5	Resistor colour codes - Calculation of resistance value using colour codes		4
6	Potentiometer , rheostat and wheat stone bridges and determine unknown resistance		4
7	Use a Multimeter for measuring Resistances, checking electrical fuses Identify various types of resistance		4
8	Identify various types of capacitances		4
9	Measurement of magnetic field strength. Magnetic field density and permeability using flux meter.		4
10	Production of electricity by inductance methods		4
11	Single phase and three phase power supply distribution using star and delta connection		4
12	Construct series LCR circuit and determine its (a) Resonant Frequency, (b) Quality Factor,		4
13	Construct parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor Q		4
14	Use of transformer in power distribution and measurements.		4
15	Make filters circuit to study function of low pass, high pass, band pass and band stop.		4

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: Electronic Fundamentals And Digital Techniques

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C4

Lecture 60

Hours

C4.1 Semiconductors

8

Diode symbols; Diode characteristics and properties; Diodes in series and parallel; Main characteristics and use of silicon controlled rectifiers (thyristors), light emitting diode, photo conductive diode, varistor, rectifier diodes; Functional testing of diodes.

Materials, electron configuration, electrical properties; P and N type materials: effects of impurities on conduction, majority and minority characters; PN junction in a semiconductor, development of a potential across a PN junction in unbiased, forward biased and reverse biased conditions; Operation and function of diodes in the following circuits: clippers, clampers, full and half wave rectifiers, bridge rectifiers, voltage doublers and triplers; Detailed operation and characteristics of the following devices: silicon controlled rectifier (thyristor), light emitting diode, Schottky diode, photo conductive diode, varactor diode, varistor, rectifier diodes, Zener diode.

C4.2 Transistors

8

Transistor symbols; Component description and orientation; Transistor characteristics and properties.

Construction and operation of PNP and NPN transistors; Base, collector and emitter configurations; Testing of transistors. Basic appreciation of other transistor types and their uses. Application of transistors: classes of amplifier (A, B, C);

Simple circuits including: bias, decoupling, feedback and stabilization;

Multistage circuit principles: cascades, push-pull, oscillators, multi-vibrators, flip-flop circuits.

C4.3 Integrated Circuits

8

Description and operation of logic circuits and linear circuits/operational amplifiers.

Description and operation of logic circuits and linear circuits; Introduction to operation and function of an operational amplifier used as: integrator,

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: Electronic Fundamentals And Digital Techniques

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C4

Lecture 60

Hours

differentiator, voltage follower, comparator; Operation and amplifier stages connecting methods: resistive capacitive, inductive (transformer), inductive resistive (IR), direct;

Advantages and disadvantages of positive and negative feedback

Operation and use of encoders and decoders. , functions of encoders type. Uses of medium, large and very large scale integration.

C4.4 Printed Circuit Boards

4

Description and use of printed circuit boards.

C4.5 Servomechanisms

10

Understanding of the following terms: Open and closed loop systems, feedback, follow up, analogue transducers; Principles of operation and use of the following synchro system components/features: resolvers, differential, control and torque, transformers, inductance and capacitance transmitters.

Understanding of the following terms: Open and closed loop, follow up, servomechanism, analogue, transducer, null, damping, feedback, dead band; Construction operation and use of the following synchro system components: resolvers, differential, control and torque, E and I transformers, inductance transmitters, capacitance transmitters, synchronous transmitters; Servomechanism defects, reversal of synchro leads, hunting.

C4.6 Numbering Systems

3

Numbering systems: binary, octal and hexadecimal; Demonstration of conversions between the decimal and binary, octal and hexadecimal systems and vice versa.

C4.7 Data Conversion

3

Analogue Data, Digital Data; Operation and application of analogue to digital, and digital to analogue converters, inputs and outputs, limitations of various types.

C4.8 Data Buses

3

Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications.

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: Electronic Fundamentals And Digital Techniques

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C4

Lecture 60

Hours

C4.9 Logic Circuits

3

(a) Identification of common logic gate symbols, tables and equivalent circuits;

Applications used for aircraft systems, schematic diagrams.

(b) Interpretation of logic diagrams.

C4.10 Microprocessors

6

Functions performed and overall operation of a microprocessor;

Basic operation of each of the following microprocessor elements: control and processing unit, clock, register, arithmetic logic unit.

C4.11 Fiber Optics

4

Advantages and disadvantages of fiber optic data transmission over electrical wire propagation; Fibre optic data bus; Fiber optic related terms; Terminations; Couplers, control terminals, remote terminals; Application of fiber optics in aircraft systems.

Reference Books

Basic Electronics-Bernard Grob

Digital Fundamentals by Malvino and Leech

Principles of Electronics by V K Mehta

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: Electronic Fundamentals And Digital Techniques

Credits - Theory-04, Practicals-02

Practical

Subject

Code: CP4

Lecture 60

Hours

1	Identification of basic electronic components (diodes, transistors),digital Multimeter, Function Generator and Oscilloscope	4
2	Practical on I-V Characteristics of (a) p-n junction Diode, and (b) Zener diode.	4
3	Study of Clipping and Clamping circuits	4
4	Conversion of A C Voltage using (a) Half wave rectifier and (b) Full wave rectifier (FWR).	4
5	Uses of basic electronic components (diodes, transistors),digital Multimeter, Function Generator and Oscilloscope	4
6	Construct a model to study fixed Bias and Voltage divider bias configuration for CE transistor.	4
7	Construct a model to study Single Stage CE amplifier of given gain.	4
8	Construct a model to study correlation between different numbering systems.	4
9	Construct a model to study digital to analogue converters	4
10	Construct a model to study typical data buses used in aircraft system.	4
11	Functions performed and overall operation of a microprocessor;	4
12	Demonstrate fiber optic data transmission over electrical wire propagation;	4
13	Construct a Universal Gates and test	4
14	Construct a flip flop circuit using elementary gates	4
15	Construct a seven segment display driver	4

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: AIRCRAFT MATERIALS AND HARDWARE

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C5

Lecture 60

Hours

C5.1	AIRCRAFT MATERIALS AND HARDWARE	12
	Aircraft Materials — Ferrous	
	(a) Characteristics, properties and identification of common alloy steels used in aircraft; Heat treatment and application of alloy steels;	
	(b) Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.	
C5.2	Aircraft Material — Non-Ferrous	12
	(a) Characteristics, properties and identification of common non-ferrous materials used in aircraft; Heat treatment and application of non-ferrous materials;	
	(b) Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.	
C5.3	Aircraft Materials - Composite and Non- Metallic	10
	(a) Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft; Sealant and bonding agents.	
	(b) The detection of defects/deterioration in composite and non-metallic material. Repair of composite and non-metallic material.	
C5.4	Wooden structures	8
	Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in airplanes; Preservation and maintenance of wooden structure; Types of defects in wood material and wooden structures; The detection of defects in wooden structure; Repair of wooden structure.	
C5.5	Fabric covering & Non Metals	4
	Characteristics, properties and types of fabrics used in aeroplane; Inspections methods for fabric; Types of defects in fabric; Repair of fabric covering. Composite and non-metallic Bonding practices; Environmental conditions	
	Inspection methods	
C5.6	Fasteners, Screw threads	2
	Screw nomenclature; Thread forms, dimensions and tolerances for standard	

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: AIRCRAFT MATERIALS AND HARDWARE

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C5

Lecture 60

Hours

threads used in aircraft; measuring screw threads;

C5.7 Bolts, studs and screws

2

Bolt types: specification, identification and marking of aircraft bolts, international standards;

Nuts: self-locking, anchor, standard types; Machine screws: aircraft specifications;

Studs: types and uses, insertion and removal; Self tapping screws, dowels.

C5.8 Locking devices

2

Tab and spring washers, locking plates, split pins, palnuts, wire locking, quick release fasteners, keys, circlips, and cotter pins and techniques.

C5.9 Aircraft rivets

4

Types of solid and blind rivets: specifications and identification, heat treatment.

C5.10 Riveting

4

Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.

Reference Books:

Aircraft handbook FAA (AC 65-15 A)

Civil Aircraft Inspection Procedures (CAIP 459-Part I, Basic)

Airframe & Powerplant Mechanics (General Handbook EA-AC 65-9A) FAA

Aircraft Materials & Processes by Titterton

Machine Drawing by AC Parkinson

Advanced Composites (EA-358) by Cindy Foreman Electricity,

CAIP 562

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: AIRCRAFT MATERIALS AND HARDWARE

Credits - Theory-04, Practicals-02

Practical

Subject

Code: CP5

Lecture 60

Hours

1	Testing of Non -Ferrous materials for hardness, tensile , Fatigue strength	4
2	Testing of ferrous materials for hardness, tensile , Fatigue strength	4
3	Identification of the characteristics and properties of common composite and non-metallic materials other than wood, used in aircraft.	4
4	Detection of defects/deterioration in composite and nonmetallic material.	4
5	Identification of the characteristics and properties of common types of wood and glue used in aircraft.	4
6	Identification and detection of defects in wood material and wooden structures.	4
7	Simple repair of composite and non-metallic materials and structures	4
8	Inspection and Repair of wooden structures.	4
9	Identification of the characteristics and properties of common fabrics and adhesives used in wooden structure aircraft.	4
10	Identification of defects and Repair of fabric covering.	4
11	Use of basic tools and equipment for: cutting, forming and joining commonly used materials.	4
12	Identification of Aircraft metallic materials	4
13	Identification of aircraft non-materials used on aircraft	4
14	Identification of various rivets and use of any one riveting technique	4
15	Identification of various fasteners and locking devices used in aircraft.	4

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: Electrical Fundamentals 2

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C6

Lecture 60

Hours

Theory

C6.1	Generation of Electricity	4
	Elementary knowledge on generation of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion	
C6.2	DC Sources of Electricity	4
	Construction and basic chemical action of: primary cells, secondary cells, lead acid cells, nickel cadmium cells, other alkaline cells; Cells connected in series and parallel; internal resistance and its effect on a battery; Construction, materials and operation of thermocouples; Operation of photo-cells.	
C6.3	DC Motor/Generator Theory	9
	Basic motor and generator theory; Construction and purpose of components in DC generator; Operation of, and factors affecting output and direction of current flow in DC generators; Operation of, and factors affecting output power, torque, speed and direction of rotation of DC motors; Series wound, shunt wound and compound motors; Starter Generator construction.	
C6.4	AC Generators	9
	Rotation of loop in a magnetic field and waveform produced; Operation and construction of revolving armature and revolving field type AC generators; Single phase, two phase and three phase alternators; Three phase star and delta connections advantages and uses; Permanent Magnet Generators.	
C6.5	AC Motors	8
	Construction, principles of operation and characteristics of: AC synchronous and induction motors both single and polyphase; Methods of speed control and direction of rotation; Methods of producing a rotating field: capacitor, inductor, shaded or split pole.	
C6.6	Power	8
	Power, work and energy (kinetic and potential); Dissipation of power by a resistor;	

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: Electrical Fundamentals 2

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C6

Lecture 60

Hours

Theory

Power formula; Calculations involving power, work and energy

C6.7 Aircraft Electrical Cables and Connectors 8

a). Cable types, construction and characteristics; High tension and co-axial cables; Crimping; Connector types, pins, plugs, sockets, insulators, current and voltage rating, coupling, identification codes. .

B). Electrical Wiring Interconnection System (EWIS) Continuity, insulation and bonding techniques and

Testing; Use of crimp tools: hand and hydraulic operated; testing of crimp joints;

Connector pin removal and insertion; Co-axial cables: testing and installation

Precautions; Identification of wire types, their inspection criteria and damage tolerance

Wiring protection techniques: Cable looming and loom support, cable clamps, and protective

Sleeving techniques including heat shrink wrapping, shielding. EWIS installations, Inspection, repair, maintenance and cleanliness standards

C6.8 Electromagnetic Environment 6

Influence of the following phenomena on maintenance practices for electronic system:

EMC-Electromagnetic Compatibility; EMI-Electromagnetic Interference; HIRF-High Intensity Radiated Field; Lightning/lightning protection

C6.9 Electro sensitive Devices 4

Special handling of components sensitive to electrostatic discharges;

Awareness of risks and possible damage, component and personnel anti-static protection devices.

Reference Books:

Electrical Technology- by B.L.Theraja

Aircraft Electrical System- by E.H.J.Pallett

Aircraft Electricity and electronics-by Bent McKinley and also by Eismin/Bent McKinley

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: Electrical Fundamentals 2

Credits - Theory-04, Practicals-02

Practical

Subject

Code: CP6

Lecture 60

Hours

1	Generation of electricity by light , heat, chemical action, magnetism, and motion	4
2	Construct power sources using primary and secondary cells	4
3	Construct a model to study usage of thermo-cell and photo-cell	4
4	Construct a model to generate DC power using different method of coil arrangements (Series, shunt) to understand their Usage.	4
5	Construct a model of DC motor using different method of coil arrangements (Series, shunt) to understand their Usage.	4
6	Construct a model to generate single/Poly-phase AC power to understand their Usage.	4
7	Construct a model of AC motor using single/ Poly-phase I arrangements to understand their Usage.	4
8	Measure amount of power dissipated by various resistors; calculation of power	4
9	Using at least two crimping systems, select appropriate cable crimping tools and crimp cables to prepare cable ends or plug / socket terminals.	4
10	Check an aircraft electrical circuit for continuity in conjunction with an electrical wiring diagram.	4
11	Identify cables and cables values by reference to the maintenance manuals. Identify a range of electrical component symbols.	4
12	Inspection of electrical cable looms / bundles and cable trunking.	4
13	Select and use appropriate cable stripping tools and solder cables to single and multipin connectors / tag boards	4
14	Prepare, and install a simple loom, using at least two binding methods	4
15	Identification of various fasteners and locking devices used in aircraft.	4

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: GAS TURBINE ENGINE

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C7

Lecture 60

Hours

Theory		
C7.1	Fundamentals	3
	Potential energy, kinetic energy, Newton's laws of motion, Brayton cycle; The relationship between force, work, power, energy, velocity, acceleration; Constructional arrangement and operation of turbojet, turbofan, turbo shaft, turboprop.	
C7.2	Engine Performance	3
	Gross thrust, net thrust, choked nozzle thrust, thrust distribution, resultant thrust, thrust horsepower, equivalent shaft horsepower, specific fuel consumption; Engine efficiencies; By-pass ratio and engine pressure ratio; Pressure, temperature and velocity of the gas flow; Engine ratings, static thrust, influence of speed, altitude and hot climate, flat rating, limitations.	
C7.3	Inlet	2
	Compressor inlet ducts; Effects of various inlet configurations; Ice protection.	
C7.4	Compressors	4
	Axial and centrifugal types; Constructional features and operating principles and applications; Fan balancing; Operation: Causes and effects of compressor stall and surge; Methods of air flow control: bleed valves, variable inlet guide vanes, variable stator vanes, rotating stator blades; Compressor ratio.	
C7.5	Combustion Section	2
	Constructional features and principles of operation	
C7.6	Turbine Section	3
	Operation and characteristics of different turbine blade types; Blade to disk attachment; Nozzle guide vanes; Causes and effects of turbine blade stress and creep.	
C7.7	Exhaust	2
	Constructional features and principles of operation; Convergent, divergent and variable area nozzles; Engine noise reduction; Thrust reversers.	

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: GAS TURBINE ENGINE

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C7

Lecture 60

Hours

C7.8	Bearings and Seals Constructional features and principles of operation and handling .	2
C7.9	Lubricants and Fuels Properties and specifications; Fuel additives; Safety precautions	1
C7.10	Lubrication Systems System operation/lay-out and components.	2
C7.11	Fuel Systems Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.	3
C7.12	Air Systems Operation of engine air distribution and anti-ice control systems, including internal cooling, sealing and external air services.	3
C7.13	Starting and Ignition Systems Operation of engine start systems and components; Ignition systems and components; Maintenance safety requirements.	3
C7.14	Engine Indication Systems Exhaust Gas Temperature/ Inter-stage Turbine Temperature; Engine Thrust Indication: Engine Pressure Ratio, engine turbine discharge pressure or jet pipe pressure systems; Oil pressure and temperature; Fuel pressure and flow; Engine speed, Propeller Speed; Vibration measurement and indication; Torque; Power.	4
C7.15	Power Augmentation Systems Operation and applications; Water injection, water methanol; Afterburner systems.	2
C7.16	Turbo-prop Engines Gas coupled/free turbine and gear coupled turbines; Reduction gears; Integrated engine and propeller controls; Over-speed safety devices.	3
C7.17	Turbo-shaft engines	3

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: GAS TURBINE ENGINE

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C7

Lecture 60

Hours

Arrangements, drive systems, reduction gearing, couplings, control systems.

C7.18 Auxiliary Power Units (APUs) 3

Purpose, operation, protective systems.

C7.19 Powerplant Installation 3

Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.

C7.20 Fire Protection Systems 2

Operation of detection and extinguishing systems.

C7.21 Engine Monitoring and Ground Operation 4

Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Trend (including oil analysis, vibration and boroscope) monitoring;

Inspection of engine and components to criteria, tolerances and data specified by engine manufacturer; Compressor washing/cleaning; Foreign Object Damage.

C7.22 Engine Storage and Preservation 3

Preservation and depreservation for the engine and accessories/ systems.

Reference Books:

Aircraft Gas Turbine Technology by IRWINE TREAGER

The Jet Engine' by ROLLS ROYCE

Power plant Section Text book- (EA-ITP-P)

Aviation Maintenance Technician Series by Dale Crane

Jet Aircraft power Systems' by JACK V. CASAMASSA and RALPH D.BENT

Gas Turbine Engines' by Turbomeca, Bordes,France.

Hydraulic Servo Systems' by M.GUILLON

Introduction to Flight by JOHN ANDERSON:

Civil Aircraft Inspection Procedure (CAP459) Part- II Aircraft

Aircraft Power Plants by M.J.KROES, T.W.Wild, R.D.Bent and J.L.McKINLEY;

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject : GAS TURBINE ENGINE

Credits - Theory-04, Practicals-02

Practical

Subject

Code: CP7

Lecture 60

Hours

1	Identify engine types, modules and subassemblies and components of turbine engines .	2
2	Identify various parts of thrust management and bypass system of turbine engine.	2
3	Identification and inspection of compressors stages.	2
4	Engine compressor surge and stall management components and control.	2
5	Identification various components of combustion systems and methods of cooling's.	2
6	Identification of exhaust system and methods of noise reduction	2
7	Identification and inspection of components of thrust reversal system.	2
8	Identify normal & electronic fuel control, monitoring and indication system	6
9	Familiarization with methods of engine starting and ignition systems.	4
10	Operation check of Engine indicating systems.	4
11	Familiarization of APU starting and shutdown procedure	4
12	Familiarization with power plant removal & installation	8
13	Visual Inspection of engines	4
14	Typical engine control rigging.	6
15	Familiarization with engines and airframe interface.	4
16	Testing of engine fire monitoring and extinguishing operation	4
17	Study engine storage and preservation.	2

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: ELECTRONIC FUNDAMENTALS AND DIGITAL TECHNIQUE 2

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C8

Lecture 60

Hours

C8.1	Basic Computer Structure	9
	(a) Computer terminology (including bit, byte, software, hardware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems).	
	(b) Computer related terminology; Operation, layout and interface of the major components in a microcomputer including their associated bus systems; Information contained in single and multi-address instruction words; Memory associated terms;	
	Operation of typical memory devices; Operation, advantages and disadvantages of the various data storage systems.	
C8.2	Multiplexing	3
	Operation, application and identification in logic diagrams of multiplexers and demultiplexers.	
C8.3	Electronic Displays and Instrument Systems	18
	Principles of operation of common types of displays used in modern aircraft, including	
	Cathode Ray Tubes, Light Emitting Diodes and Liquid Crystal Display. Electronic Flight Instrument Systems;	
	Typical systems arrangements and cockpit layout of electronic instrument systems	
	ECAM-Electronic Centralized Aircraft Monitoring; EFIS-Electronic Flight Instrument System; EICAS-Engine Indication and Crew Alerting System Instrument warning systems including master warning systems and centralized warning panels;	
C8.4	Typical Electronic/Digital Aircraft Systems	10
	General arrangement of typical electronic/digital aircraft systems and associated BITE(Built in Test Equipment) testing such as: ACARS-ARINC Communication and Addressing and Reporting System; Integrated modular Avionics;	
C8.5	Integrated Modular Avionics (ATA 42)	12
	Functions that may be typically integrated in the Integrated Modular Avionic (IMA)	

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: ELECTRONIC FUNDAMENTALS AND DIGITAL TECHNIQUE 2

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C8

Lecture 60

Hours

modules are, among others: Bleed Management, Air Pressure Control, Air Ventilation and Control, Avionics and Cockpit Ventilation Control, Temperature Control, Air Traffic Communication, Avionics Communication Router, Electrical Load Management, Circuit Breaker Monitoring, Electrical System BITE, Fuel Management, Braking Control, Steering Control, Landing Gear Extension and Retraction, Tyre Pressure Indication, Oleo Pressure Indication, Brake Temperature Monitoring, etc.; Core System; Network Components.

C8.6 Cabin Systems (ATA 44)

8

The units and components which furnish a means of entertaining the passengers and providing communication within the aircraft (Cabin Intercommunication Data System) and between the aircraft cabin and ground stations (Cabin Network Service) - Includes voice, data, music and video transmissions; The Cabin Intercommunication Data System provides an interface between cockpit/ cabin crew and cabin systems. These systems support data exchange of the different related LRU's and they are typically operated via Flight Attendant Panels.

The Cabin Network Service typically consists on a server, typically interfacing with, among others, the following systems: Data/Radio Communication; In-Flight Entertainment System;

The Cabin Network Service may host functions such as:

— Access to pre-departure/departure reports; E-mail/intranet/Internet access; Passenger database; Cabin Core System; In-flight Entertainment System; External Communication System; Cabin Mass Memory System; Cabin Monitoring System; Miscellaneous Cabin System.

Reference Books

Basic Electronics-Bernard Grob

Digital Fundamentals by Malvino and Leech

Principles of Electronics by V K Mehta

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: ELECTRONIC FUNDAMENTALS AND DIGITAL TECHNIQUE 2

Credits - Theory-04, Practicals-02

Practical

Subject

Code: CP8

Lecture 60

Hours

1	Familiarization with computer architecture and its components	4
2	Identification of components of Display systems	4
3	Operation check of Display system.	4
4	Familiarization with CRT and various components associated with EFIS	4
5	Identification of components in engine display systems	4
6	Bite / self-test of EFIS system.	4
7	BITE on different aircraft systems.	4
8	Familiarization with components of system associated with Integral modular avionics systems such Air Pressure Control, Air Ventilation and Control, Avionics and Cockpit Ventilation Control, Temperature Control, Air Traffic Communication.	4
9	Operation check of ventilation control system.	4
10	Operation check of IFE system.	4
11	Operation check of intercom system .	4
12	Operation check of cabin systems.	4
13	Inspection of IFE system, intercom system and other cabin systems.	4
14	Operation of temperature control system	4
15	Identify ECAM system components and carry out test	4

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: AIRCRAFT MAINTENANCE PRACTICES

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C9

Lecture 60

Hours

C9.1	Safety Precautions-Aircraft and Workshop Aspects of safe working practices including precautions to take when working with electricity, gases especially oxygen, oils and chemicals; Instructions on the remedial action to be taken in the event of a fire or another accident with one or more of these hazards including knowledge on extinguishing agents.	4
C9.2	Workshop Practices Care of tools, control of tools, use of workshop materials; Dimensions, allowances and tolerances, standards of workmanship; Calibration of tools and equipment, calibration standards.	4
C9.3	Tools Common hand tool types; Common power tool types; Operation and use of precision measuring tools; Lubrication equipment and methods. Operation, function and use of electrical general test equipment;	4
C9.4	Engineering Drawings, Diagrams and Standards Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying title block information; Microfilm, microfiche and computerized presentations; Specification 100 of the Air Transport Association (ATA) of America; Aeronautical and other applicable standards including ISO, AN, MS, NAS and MIL; Wiring diagrams and schematic diagrams.	4
C9.5	Fits and Clearances Drill sizes for bolt holes, classes of fits; Common system of fits and clearances; Schedule of fits and clearances for aircraft and engines; Limits for bow, twist and wear; Standard methods for checking shafts, bearings and other parts.	4
C9.6	Corrosion a) Chemical fundamentals; Formation by, galvanic action process, microbiological,	6

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: AIRCRAFT MAINTENANCE PRACTICES

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C9

Lecture 60

Hours

stress;

(b) Types of corrosion and their identification; Causes of corrosion;

Material types, susceptibility to corrosion.

C9.7 Welding, Brazing, Soldering and Bonding

5

(a) Soldering methods; inspection of soldered joints.

(b) Welding and brazing methods; Inspection of welded and brazed joints; Bonding methods and inspection of bonded joints.

C9.8 Disassembly, Inspection, Repair and Assembly Techniques

9

(a) Types of defects and visual inspection techniques. Corrosion removal, assessment and re-protection.

(b) General repair methods, Structural Repair Manual; Ageing, fatigue and corrosion control programs;

(c) Non-destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and borescope methods.

(d) Disassembly and re-assembly techniques.

(e) Trouble shooting techniques

C9.9 Maintenance Procedures

3

Maintenance planning; Modification procedures; Stores procedures; Certification/release procedures; Interface with aircraft operation; Maintenance Inspection/Quality Control/Quality Assurance; Additional maintenance procedures; Control of life limited components

C9.10 Bearings

3

Purpose of bearings, loads, material, construction; Types of bearings and their application. Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.

C9.11 Transmissions

3

Gear types and their application; Gear ratios, reduction and multiplication gear systems, driven and driving gears, idler gears, mesh patterns; Belts and pulleys,

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: AIRCRAFT MAINTENANCE PRACTICES

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C9

Lecture 60

Hours

chains and sprockets. Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets; Inspection of screw jacks, lever devices, push-pull rod systems.

C9.12 Control Cables

3

Types of cables; End fittings, turnbuckles and compensation devices; Pulleys and cable system components; Bowden cables; Aircraft flexible control systems.

Swaging of end fittings; Inspection and testing of control cables; Bowden cables; aircraft flexible control systems.

C9.13 Pipes and Unions

3

(a) Identification of, and types of rigid and flexible pipes and their connectors used in aircraft;

(b) Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.

C9.14 Pipes and Hoses

3

Bending and belling/flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.

C9.15 Springs

2

Types of springs, materials, characteristics and applications. Inspection and testing of springs.

Reference Books:

Airframe and Powerplant Mechanics (AC 65-15A)-Airframe Hand Book FAA

Civil Aircraft Inspection Procedure (CAP 459) Part II Aircraft

Aircraft Maintenance and Repair By Kroes, Watkin and Delph

Acceptable Methods, Techniques and practices (FAA)-EA-AC 43.13-1 A&2A

Aviation Maintenance Technician Hand book by FAA

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject : AIRCRAFT MAINTENANCE PRACTICES

Credits - Theory-04, Practicals-02

Practical

Subject

Code: CP9

Lecture 60

Hours

1	Draw different projections of a given object – Three View Diagram simple object, structural member, and joints	12
2	Fit and remove thread inserts.	4
3	Use of precision measuring instruments, selection, handling of instruments and marking	6
4	Removal and installation of hydraulic system pressurized / unpressurized components – safety, handling precautions, selection of appropriate tools and manuals. Use zonal numbers to record location. Use parts catalog & component location manual to locate components. Identify pipes and hoses	6
5	Removal and installation of pneumatic system pressurized / unpressurized components – safety, handling precautions, selection of appropriate tools and manuals. Use zonal numbers to record location. Use parts catalog & component location manual to locate components. Identify pipes and hoses	6
6	Removal and installation of oxygen system components – safety, handling precautions, selection of appropriate tools and manuals. Use zonal numbers to record location. Use parts catalog & component location manual to locate components. Identify pipes and hoses	4
7	Visual inspection of various types of surface defects of aircraft structure using simple aids like magnifying glass, light and mirror. Use zonal and station numbers to record defect location	8
8	Visual inspection of various types of surface defects of aircraft structure and system components like bearings, gears, chain, pulley, spring and cables using simple aids like magnifying glass, light and mirror and record defects.	8
10	Selection and use of lubrication technique of bearings, flight / engine / propeller controls and undercarriages. Identifying lubricants.	2

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: AIRCRAFT SYSTEMS 1

Credits - Theory-04, Practicals-02

Theory

**Subject
Code: C10
Lecture 60
Hours**

C10.1	Aircraft Weight and Balance (a) Centre of Gravity/Balance limits calculation: use of relevant documents; (b) Preparation of aircraft for weighing; Aircraft weighing;	4
C10.2	Aircraft Handling and Storage Aircraft taxiing/towing and associated safety precautions; Aircraft jacking, chocking, securing and associated safety precautions; Aircraft storage methods; Refuelling /defueling procedures; De-icing/anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies. Effects of environmental conditions on aircraft handling and operation.	5
C10.3	Pneumatic/Vacuum (ATA 36) System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.	8
C10.4	Air Conditioning and Cabin Pressurization (ATA 21) Air supply- Sources of air supply including engine bleed, APU and ground cart; Air Conditioning- Air conditioning systems; Air cycle and vapour cycle machines Distribution systems; Flow, temperature and humidity control system. Pressurization - Pressurization systems; Control and indication including control and safety valves; Cabin pressure controllers. Safety and warning devices; Protection and warning devices.	8
C10.5	Equipment and Furnishings (ATA 25) Emergency equipment requirements; Seats, harnesses and belts, electronic emergency equipment requirements Cabin lay-out, cargo retention; Equipment lay-out; Cabin Furnishing Installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs. Lifting system; Emergency flotation systems;	6
C10.6	Flight Controls (ATA 27) Primary controls: aileron, elevator, rudder, spoiler; Trim control; Active load control; High lift devices; Lift dump, speed brakes; System operation: manual, hydraulic, pneumatic, electrical, fly-by-wire; Artificial feel, Yaw damper, Mach trim, rudder limiter, gust locks systems; Balancing and rigging; Stall protection/warning system.	8
C10.7	Fuel Systems (ATA 28) System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defueling; Longitudinal balance fuel systems.	8

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: AIRCRAFT SYSTEMS 1
Credits - Theory-04, Practicals-02
Theory

**Subject
Code: C10
Lecture 60
Hours**

C10.8	Hydraulic Power (ATA 29) System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical, pneumatic; Emergency pressure generation; Filters; Pressure Control; Power distribution; Indication and warning systems; Interface with other systems.	5
C10.9	Ice and Rain Protection (ATA 30) Ice formation, classification and detection; Anti-icing systems: electrical, hot air and chemical; De-icing systems: electrical, hot air, pneumatic and chemical; Rain repellent; Probe and drain heating; Wiper systems	3
C10.10	Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and auto-braking; Tyres; Steering; Air-ground sensing; Skids, floats	3
C10.11	Abnormal Events (ATA 05) (a) Inspections following lightning strikes and HIRF penetration. (b) Inspections following abnormal events such as heavy landings and flight through turbulence.	2

Reference Books:

Airframe and Powerplant Mechanics (AC 65-15A) -Airframe Hand Book FAA
Civil Aircraft Inspection Procedure (CAP 459) Part II Aircraft
A & P technician Air Frame Text Book by Jeppesen
Aircraft Repair Manual (FAA-AC-43.13)-By Larry Reithmaier
Aviation Maintenance Technician Hand book by FAA
Hydraulic Servo Systems by M. GUILLON:
Aircraft Instruments-by E.H.J.Pallett
Aircraft Electrical System-by E.H.J.Pallett

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: : AIRCRAFT SYSTEMS 1

Credits - Theory-04, Practicals-02

Practical

Subject

Code: CP10

Lecture 60

Hours

1	Jacking and leveling of an aircraft. Record caution, warnings and procedure	6
2	Locate and inspect Bleed components installed on aircraft and use maintenance manual	4
3	Locate and inspect components of air-conditioning system and indications and use maintenance manual.	4
4	Locate and inspect components of aircraft pressurization system and safety devices and use maintenance manual	4
5	Replace passenger seats and Check seat belts for serviceability.	4
6	Identification and inspection of flight control system	4
7	Rigging and operational check flight control systems	8
8	Identification and inspection of landing gear systems. Wheel and Brake removal / installation.	12
9	Identification and inspection of Fuel system	4
10	Quantity Indicating systems functional testing.	4
11	Inspection of aircraft hydraulic system and servicing	6
12	Inspection for lightning strike protection.	2

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: WORKSHOP PRACTICES

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C11

Lecture 60

Hours

C11.1	Safety & Precautions to be taken while working in the Machine shop. Various type of aids to be used while working on machines. Basic Machining	4
C11.2	Material handling - Sheet Metal Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.	6
C11.3	Various types of gears and usage and inspection Various Hand tools for working on bench	8
C11.4	Drills and drilling procedures. Simple Turning and Taper turning. Various types of measuring and layout tools	6
C11.5	Welding Techniques: Preparation of arc welding of butt joints, lap joints and tee joints. Gas welding practice; Metric Measurement	8
C11.6	Various forms of Surface Finish and Surface measurement Various forms of Heat Treatment & Testing of Materials Various forms of Taps & Dies	16
C11.7	(a) Smithy operations, upsetting, swaging, setting down and bending (b) Foundry operations like mould preparation for gear and step cone pulley	8
C11.8	Hoses and Pipes Pneumatic, Hydraulic pipes and end fitting identification, pipe bending and flaring, pipe inspection. Types of hoses, identification, hose end fittings, hose routing and inspection	4

Reference Books

Workshop technology By: K.P. Roy , A.K. HAJRA CHOWDHARY 2000 edition;

Shop Theory By: James Anderson

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject : WORKSHOP PRACTICES

Credits - Theory-04, Practicals-02

Practical

Subject

Code: CP11

Lecture 60

Hours

1	Sheet metal marking, cutting, sheet metal structural defects	4
2	Practice of 1st model. Butt Joint and inspect	4
3	Practice of 2nd model. Lap Joint and inspect	4
4	Practice of 3rd model. V-Joint and inspect	4
5	Practice of 3rd model. T-Joint and inspect	4
6	Demonstration of 1st model - Dovetail	4
7	Demonstration of 2nd model- Radius Gauge	4
8	Inspection of various welded samples with / without defects and record observation	4
9	Soldering Exercises, inspection and defects	4
10	Cable splicing and swaging	4
11	Pipe bending and inspection of pipe assembly	4
12	Taps and Dies, thread cutting and inspection	4

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: AIRCRAFT SYSTEMS 2		Subject
Credits - Theory-04, Practicals-02		Code: C12
Theory		Lecture 60
		Hours
C12.1	Aircraft Electrical Power System (ATA 24) Batteries Installation and Operation; DC power generation; AC power generation; Emergency power generation; Voltage regulation; Power distribution; Inverters, transformers, rectifiers; Circuit protection; External/Ground power;	8
C12.2	Aircraft Lights System (ATA 33) External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency Lights.	4
C12.3	Instrument System (ATA 34) Direct reading pressure and temperature gauges; Temperature indicating systems; Fuel quantity indicating systems; Gyroscopic principles; Artificial horizons; Attitude director, direction indicator, horizontal situation indicator, turn and slip indicators, turn coordinator; Directional gyros; Ground Proximity Warning Systems; Compass systems: direct reading, remote reading; Flight Data Recording systems; Stall warning systems and angle of attack indicating systems; Vibration measurement and indication; Glass cockpit.	15
C12.4	Oxygen System (ATA 35) System lay-out: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings;	8
C12.5	Fire Protection (ATA 26) (a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests. (b) Portable fire extinguisher.	6
C12.6	Water/Waste (ATA 38) Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing; Corrosion aspects.	4
C12.7	Integrated Modular Avionics (ATA42)	10

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: AIRCRAFT SYSTEMS 2

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C12

Lecture 60

Hours

Functions that may be typically integrated in the Integrated Modular Avionic (IMA) modules are, among others: Bleed Management, Air Pressure Control, Air Ventilation and Control, Avionics and Cockpit Ventilation Control, Temperature Control, Air Traffic Communication, Avionics Communication Router, Electrical Load Management, Circuit Breaker Monitoring, Electrical System BITE, Fuel Management, Braking Control, Steering Control, Landing Gear Extension and Retraction, Tyre Pressure Indication, Oleo Pressure Indication, Brake Temperature Monitoring, etc.; Core System; Network Components

C12.8 Door and Door Warning

5

Type of Doors. Sensors, Escape Slides, Door warning systems, Inspections techniques

Reference Books:

Aviation Electronics by Keith W Bose

Aircraft Instruments-by E.H.J.Pallett

Aircraft Instruments-by C.A.Williams

Avionics Systems operation & Maintenance by James W Wasson

Principles of Servo mechanism-by A Typers & R.B.Miles

Aircraft Electricity and electronics-by Bent McKinley and also by Eismen/Bent McKinley

Civil Aircraft Inspection Procedure(CAP 459) -Part II Aircraft

The Mechanism of Inertial Position and Heading Indication by Winston Merkey
John Hovorka

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject : AIRCRAFT SYSTEMS 2

Credits - Theory-04, Practicals-02

Practical

Subject

Code: CP12

Lecture 60

Hours

1	Reading and interpretation of electrical schematic and wiring diagrams and Identification of components of electrical power supply system.	4
2	Replacement of switches and circuit breakers and system check	4
3	Installation and operation check of Batteries in aircraft	4
4	Generator power check / voltage adjustment.	4
5	Internal lighting, replace bulb and filament.	4
6	Operational check of GPWS	4
7	Operational checkup of stall warning system and angle of attack indicating system	4
8	Operational check of temperature indicating system	4
9	Gyroscopic Instrument component replacements and functional tests.	4
10	Inspection and operation check of fuel quantity indication	4
11	Functional check of RR compass	4
12	Removal and Installation of Crew O2 system component	4
13	Identification of FDR system components	4
14	Check operation of fire / smoke detection and warning system.	4
15	Identification of components of door warning system and its operation check	4

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: AVIONICS

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C13

Lecture 60

Hours

C13.1 Communication (ATA 23)

8

Fundamentals of radio wave propagation, antennas, transmission lines, communication, receiver and transmitter; Working principles of following systems: Very High Frequency (VHF) communication; High Frequency (HF) communication; Audio; Emergency Locator Transmitters; Cockpit Voice Recorder; ARINC communication and reporting;

C13.2 Navigation (ATA 34)

18

Very High Frequency omnidirectional range (VOR); Automatic Direction Finding (ADF); Instrument Landing System (ILS); Microwave Landing System (MLS); Distance Measuring Equipment (DME); Very Low Frequency and hyperbolic navigation(VLF/Omega); Doppler navigation; Area navigation, RNAV systems; Flight Management Systems; Global Positioning System (GPS), Global Navigation Satellite Systems (GNSS); Inertial Navigation System; Air Traffic Control transponder, secondary surveillance radar; Traffic Alert and Collision Avoidance System(TCAS);
Weather avoidance radar; Radio altimeter; IRS-Inertial reference system; TCAS-Traffic Collision Avoidance system;

C13.3 Auto-flight (ATA 22)

15

Fundamentals of automatic flight control including working principles and current terminology;
Flight Director System; Command signal processing; Modes of operation: roll, pitch and yaw channels; Yaw dampers; Auto-throttle systems; Automatic Landing Systems: principles and categories, modes of operation, Approach, glideslope, land, go-around, system monitors and failure conditions. FBW-Fly by Wire

C13.4 On board Maintenance Systems (ATA 45)

5

Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).
Software management control: Awareness of restrictions, airworthiness

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: AVIONICS

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C13

Lecture 60

Hours

requirements and possible catastrophic effects of unapproved changes to software programmes.

C13.5 Information Systems (ATA46)

10

The units and components which furnish a means of storing, updating and retrieving digital information traditionally provided on paper, microfilm or microfiche. Includes units that are dedicated to the information storage and retrieval function such as the electronic library mass storage and controller. Does not include units or components installed for other uses and shared with other systems, such as flight deck printer or general use display; Typical examples include Air Traffic and Information Management Systems and Network Server Systems; Aircraft General Information System; Flight Deck Information System; Maintenance Information System; Passenger Cabin Information System; Miscellaneous Information System.

C13.6 Avionic General Test Equipment

4

Operation, function and use of avionic general test equipment. Cabin System; Information system.

Reference Books:

Micro Electronics Aircraft System- by E.H.J.Pallett

Avionics Systems operation & Maintenance by James W Wasson

Aircraft Electricity and electronics-by Bent McKinley and also by Eismir/Bent McKinley

Civil Aircraft Inspection Procedure(CAP 459) -Part II Aircraft

Integrated Electronics-Millman and Halkias

Aircraft Radio System-by J. Powell

Electronic Communication System by George Kennedy

Avionics navigation systems By kayton & Fried

Radio navigation system by Borje forsell

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: : AVIONICS

Credits - Theory-04, Practicals-02

Practical

Subject

Code: CP13

Lecture 60

Hours

1	VHF / HF Communications LRU replacement and Communication Check.	4
2	Use of various test equipment for avionics system maintenance.	2
3	VHF Navigation LRU replacement and system tests.	4
4	Inspection / testing of ELT	2
5	CVR switching and recording	2
6	Antenna replacement and system testing	4
7	Radio Standing Wave ratio Measurement Tests.	4
8	Function Testing of ATC / TCAS system components.	4
9	Operation test of Weather Radar system.	2
10	Intercommunication / Passenger Address Component function testing.	4
11	ILS / VOR Systems function testing using appropriate test equipment e.g. Nav 401/402.	4
12	Radio Altimeter system test utilizing appropriate (555) test set.	4
13	DME / VOR Functional Testing utilizing appropriate test set.	4
14	ADF component functions and tests.	4
15	Functional check of inertial navigation system	
16	Operational testing of Flight Director System's and auto pilot system.	4
17	Locate Autothrottle systems components and bite test.	2
18	Perform BITE on Central Maintenance system.	4

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: GROUND HANDLING SAFETY AND SUPPORT SYSTEM

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C14

Lecture 60

Hours

		Hours
C14.1	Part-I General knowledge of ground handling of Aircraft, Aircraft Safety; Mooring, Jacking, Levelling, Hoisting of aircraft, Towing, Mooring of an a/c during adverse conditions. Aircraft cleaning and maintaining. Ground signalling/marshalling of aircraft in day & night time.	5
C14.2	Part-II Brief knowledge of airport and its procedures. Control tower, Dispersal areas, Aprons, Tarmac, Taxi track, Runway and its ends. Approach and clear zone layout. Brief knowledge of the signals given by the control tower. Knowledge of Airfield lighting system, Aircraft Rescue & Fire Fighting.	10
C14.3	Part-III Maintenance and handling of ground equipment's used in maintenance of aircraft. Compressors, Portable hydraulic test stands, Electrical power supply equipment, charging trolley. Air-conditioning and Heating unit, Ground support air start unit. Pressure oil unit, Fire extinguishers, jacks, Hoisting cranes/gantry, Ladders, Platforms, Trestles, and Chocks.	15
C14.4	Part-IV Knowledge of safety and fire precautions to be observed during maintenance including refuelling, defueling & engine start. Maintenance of hydraulic accumulators, reservoirs and filters:	10
C14.5	Part-V Rigging of flight control surfaces and duplicate inspection; Rigging checks-Angular alignment checks and symmetry checks, Knowledge and use of Tensiometers, Protractors etc. Rigging of engine and propeller control	10
C14.6	Part-VI Maintenance of landing gear (L/G), Shock strut charging and bleeding, Maintenance of L/G brakes i.e., Dragging, Grabbing, Fading, Brakes and excessive brake pedal travel. Maintenance on wheels, tyres and tubes i.e., dismantling,	10

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject: GROUND HANDLING SAFETY AND SUPPORT SYSTEM

Credits - Theory-04, Practicals-02

Theory

Subject

Code: C14

Lecture 60

Hours

inspection, assembling, inflating, inspection and installation
Storage of Rotables.

Reference books

General Handbook AC65-9A

Airframe Handbook AC 65-15A

Core Course – B.Sc Honors (Aircraft Maintenance)

Subject : GROUND HANDLING SAFETY AND SUPPORT SYSTEM

Credits - Theory-04, Practicals-02

Practical

Subject

Code: CP14

Lecture 60

Hours

1	Hydraulic system bleeding, replenish fluid reservoir and handling precautions	6
2	Hydraulic accumulator charging	6
3	Use of ground power unit and checks	4
4	Identification and control of various types of fires, practicing fire extinguishing	4
5	Practical on headset communication during arrival and departure of aircraft & Identification of aircraft hazard zones	4
6	Fuel sample check and refueling	6
7	Flight control system lubrication	6
8	Landing gear system lubrication	6
9	Landing gear oleo charging	6
10	Tyre pressure check	4
11	Aircraft parking and mooring	8

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Piston Engine and Propeller

Credits - Theory-04, Practicals-02

Theory

Subject

Code: DSE1

Lecture 60

Hours

DSE1.1	Fundamentals Mechanical, thermal and volumetric efficiencies operating principles — 2 stroke, 4 stroke, Otto and Diesel, Piston displacement and compression ratio; Engine configuration and firing order.	2
DSE1.2	Engine Performance Power calculation and measurement; Factors affecting engine power; Mixtures/leaning, pre-ignition.	2
DSE1.3	Engine Construction Crank case, crank shaft, cam shafts, sumps; Accessory gearbox; Cylinder and piston assemblies; Connecting rods, inlet and exhaust manifolds; Valve mechanisms; Propeller reduction gearboxes.	3
DSE1.4	Engine Fuel Systems Carburettors Types, construction and principles of operation; Icing and heating	2
DSE1.5	Fuel injection systems Types, construction and principles of operation.	2
DSE1.6	Electronic engine control Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components	4
DSE1.7	Starting and Ignition Systems Starting systems, pre-heat systems; Magneto types, construction and principles of operation; Ignition harnesses, spark plugs; Low and high tension systems	3
DSE1.8	Induction, Exhaust and Cooling Systems Construction and operation of: induction systems including alternate air systems; Exhaust systems, engine cooling systems — air and liquid.	2
DSE1.9	Supercharging/Turbocharging Principles and purpose of supercharging and its effects on engine parameters.	3

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Piston Engine and Propeller

Credits - Theory-04, Practicals-02

Theory

**Subject
Code: DSE1
Lecture 60
Hours**

Construction and operation of supercharging/ turbocharging systems; System terminology; Control systems; System protection.

DSE1.10	Lubricants and Fuels	2
	Properties and specifications; Fuel additives; Safety precautions	
DSE1.11	Lubrication Systems	2
	System operation/lay-out and components.	
DSE1.12	Engine Indication Systems	3
	Engine speed; Cylinder head temperature; Coolant temperature; Oil pressure and temperature; Exhaust Gas Temperature; Fuel pressure and flow; Manifold pressure.	
DSE1.13	Powerplant Installation	3
	Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains	
DSE1.14	Engine Monitoring and Ground Operation	5
	Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Inspection of engine and components: criteria, tolerances, and data specified by engine manufacturer.	
DSE1.15	Engine Storage and Preservation	2
	Preservation and de-preservation for the engine and accessories/ systems	
DSE1.16	Aircraft Propeller	4
	Fundamentals; Blade element theory; High/low blade angle, reverse angle, angle of attack, rotational speed; Propeller slip; Aerodynamic, centrifugal, and thrust forces;	
	Torque; Relative airflow on blade angle of attack; Vibration and resonance.	
DSE1.17	Propeller Construction	3
	Construction methods and materials used in wooden, composite and metal propellers;	

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Piston Engine and Propeller

Credits - Theory-04, Practicals-02

Theory

**Subject
Code: DSE1
Lecture 60
Hours**

Blade station, blade face, blade shank, blade back and hub assembly; fixed pitch, controllable pitch, constant speed propeller; Propeller/spinner installation.

DSE1.18 Propeller Pitch Control	3
Speed control and pitch change methods, mechanical and electrical/electronic; Feathering and reverse pitch; Over speed protection.	
DSE1.19 Propeller Synchronising	2
Synchronising and synchrophasing equipment.	
DSE1.20 Propeller Ice Protection	2
Fluid and electrical de-icing equipment.	
DSE1.21 Propeller Maintenance	3
Static and dynamic balancing; Blade tracking; Assessment of blade damage, erosion, corrosion, impact damage, delamination; Propeller treatment/repair schemes; Propeller engine running.	
DSE1.22 Propeller Storage and Preservation	3
Propeller preservation and de-preservation.	

Reference Books:

Airframe and Power plant Mechanics (EA-AC 65- 12A) -Power Plant Hand FAA

Power Plant-By Bent and McKinley

Civil Aircraft Inspection Procedure (CAP 459) Part II Aircraft

Aircraft Propeller and Controls-by Frank Delph

Powerplant Section Text book- (EA-ITP-P)

Aircraft Piston Engines-By Herschel Smith

Aviation Maintenance Technician Series by Dale Crane

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Piston Engine and Propeller

Credits - Theory-04, Practicals-02

Subject

Code:

DSEP1

Lecture 60

Hours

Practical

1	Familiarise with constructions and functions of piston engines	3
2	Identification and inspection of various subassemblies of piston engines	3
3	Identification and inspection of cylinder and piston assemblies.	3
4	Inspection of accessory gear box valve mechanism.	3
5	Identification and inspection of various components of piston engines.	3
6	Identification and inspection of engine fuel system and function of carburetor.	3
7	Identification and inspection of engine fuel injection system and electronic fuel control.	3
8	Function check of magneto.	3
9	Various methods of engine starting and ignition systems and Engine indicating systems	3
10	Identification and inspection of components and function of lubrication system.	3
11	Engine control system and rigging	4
12	Familiarization with engines and airframe interface.	3
13	Testing of engine fire warning and extinguishing operation	3
14	Preparation for engine/ propeller storage and preservation.	3
15	Familiarise with propeller construction	3
16	Methods of propeller pitch control and its effect on engine power. Feathering and reverse pitch control. Propeller synchrophasing system	4
17	Check Propeller track.	3
18	Engine monitoring and ground operation	4
19	Spark plug cleaning and testing	3

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Rotorcraft And Rotorcraft Autopilot

Credits - Theory-04, Practicals-02

Theory

Subject

Code: DSE2

Lecture 60

Hours

DSE2.1	Introduction	04
	Helicopter as an aircraft, Basic features, Layout, Generation of lift, Gearbox, tail rotor, power plant, drive to main tail rotor, considerations on blade, feathering and flapping, Rotor controls, various types of rotor, Geometry of the rotor, Blade loading, Effects of solidity, Profile drag, compressibility etc., blade area required, Number of blades, blade form, power losses, rotor efficiency.	
DSE2.2	Aerodynamics of Rotor Blades	04
	Aerofoil characteristics in forward flight, hovering and state vortex ring, Blade stall, Maximum lift of the helicopter, calculation on induced power high speed limitations; parasite drag, power leading, tip speed ratio on performance Ground effect. Elementary rotary wing and aerodynamic Terminology; Effects of gyroscopic precession, torque reaction and directional control, dissymmetry of lift, blade tip stall; translating tendency and its correction; coriolis effect and compensation; power settling, overpitching;	
DSE2.3	Flight control Systems	06
	Cyclic Control; Collective Control, Swashplate; Yaw control: Anti-Torque Control, effect of cyclic, collective and anti-torque controls Tail rotor, bleed air; Main Rotor Head: Design and Operation features; Blade Dampers: Function and construction; Rotor Blades: Main and tail rotor blade construction and attachment; Trim control, fixed and adjustable stabilisers; System operation: manual, hydraulic, electrical and flyby-wire; Artificial feel; Balancing and Rigging.	
DSE2.4	Power Units and Flight Performance	08
	Piston engines, Gas turbines, Ramjet principle, gross weight of a jet helicopter, Comparative performance, and Horse power required, Range and Endurance,	

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Rotorcraft And Rotorcraft Autopilot

Credits - Theory-04, Practicals-02

Theory

Subject

Code: DSE2

Lecture 60

Hours

rate of climb, best climbing speed, Ceiling in vertical climb, Autorotation.

DSE2.5	Dynamic Stability and Control	08
	Physical description of effects of disturbances, longitudinal dynamic stability, Stick fixed dynamic stability, longitudinal stability characteristics, lateral dynamic stability, lateral stability characteristics, control response.	
DSE2.6	Rotor Vibrations	06
	Dynamic model of the rotor, motion of the rigid blades, flapping motion, lagging motion, feathering motion, properties of vibrating systems, phenomenon of vibrations, fuselage response, Vibration absorbers, Measurement of vibration in flight, Vibration indicating systems — HUMS	
DSE2.7	Blade Tracking and Vibration Analysis	06
	Rotor alignment; Main and tail rotor tracking; Static and dynamic balancing; Vibration types, vibration reduction methods; Ground resonance	
DSE2.8	Rotor Blade Design	05
	General considerations, Airfoil selection, blade constructions, materials, factors affecting weight and cost, Design conditions, stress analysis.	
DSE2.9	Transmissions	08
	Gear boxes, main and tail rotors; Clutches, free wheel units and rotor brake. Tail rotor drive shafts, flexible couplings, bearings, vibration dampers and bearing hangers	
DSE2.10	Rotorcraft Autopilot	05
	Helicopter AFCS, autopilots/yaw dampers, flight director systems and stability augmentation system (SAS), Sensors (raw data) Computer, Controller (mode selector), Loads (command bars and autopilot), and Functioning	

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Rotorcraft And Rotorcraft Autopilot

Credits - Theory-04, Practicals-02

Theory

Subject

Code: DSE2

Lecture 60

Hours

Reference books:

Young R.A, "Helicopter Engineering".

Bramwell, A.R.S, "Helicopter Dynamics".

Jacob Shapiro, "Principles of Helicopter Engineering".

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Rotorcraft And Rotorcraft Autopilot

Credits - Theory-04, Practicals-02

Practical

Subject

Code: DSEP2

Lecture 60

Hours

1	Identify various components of rotor and transmission system and controls	6
2	Inspect rotor blades and record defects and remedial action	4
3	Inspection of components of helicopter control system	6
4	Rigging of cyclic and collective system	8
5	Lubrication of components of helicopter control systems.	4
6	Inspection and maintenance of main rotor, gear box and balance (Helicopter only).	6
7	Inspection and maintenance of components of tail rotor systems.	4
8	Identification and inspection of helicopter landing gear and skid system	4
9	Helicopter vibration measurement and track check	8
10	Static balancing of rotor blades	6
11	Inspection and testing of autopilot system of helicopter	4

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Human Factors

Credits - Theory-05, Tutorial-01

Theory

**Subject
Code: DSE3
Lecture 75
Hours**

DSE3.1	General The need to take human factors into account; Incidents attributable to human factors/human error; 'Murphy's' law.	5
DSE3.2	Human Performance and Limitations Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.	5
DSE3.3	Social Psychology Responsibility: individual and group; Motivation and de-motivation; Peer pressure; 'Culture' issues; Team working; Management, supervision and leadership	5
DSE3.4	Factors Affecting Performance Fitness/health; Stress: domestic and work related; Time pressure and deadlines; Workload: overload and under-load; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.	5
DSE3.5	Physical Environment Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.	5
DSE3.6	Tasks Physical work; Repetitive tasks; Visual inspection; Complex systems.	5
DSE3.7	Communication Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information.	5
DSE3.8	Human Error Error models and theories; Types of error in maintenance tasks; Implications of errors (i.e. accidents); Avoiding and managing errors.	5
DSE3.9	Hazards in the Workplace	5

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Human Factors

Credits - Theory-05, Tutorial-01

Theory

Subject

Code: DSE3

Lecture 75

Hours

Recognising and avoiding hazards; Dealing with emergencies.

DSE3.10	Human Factors in Aircraft Maintenance and Inspection	5
	Human Factors — Aircraft Maintenance and Inspection; Contemporary Maintenance Problems; the SHELL Model; the Reason Model; Human Error	
DSE3.11	Human Error in Aircraft Maintenance and Inspection (an organizational perspective)	5
DSE3.12	Human Error in the Maintenance Environment	5
	Human Factors Issues Affecting Aircraft Maintenance and Dirty Dozen; Information Exchange and Communication; Training; Aircraft Maintenance Technician Facilities and Work Environment	
DSE3.13	Teams and Organizational Issues in Aircraft Maintenance	5
	Team Work; Job Design; Reward Systems; Selection and Staffing; Training	
DSE3.14	Automation and Advanced Technology System	5
	Automation and Computerization; Advanced Job Aid Tools	
DSE3.15	Error Prevention, Considerations and Strategies	5

Reference Books:

CAP 715 - An Introduction to Aircraft Maintenance Engineering Human Factors for JAR 66, Civil Aviation Authority, UK.

CAP 718 - Human Factors in Aircraft Maintenance and Inspection, Civil Aviation Authority, UK.

FAA-H-8083-30 - Aircraft Maintenance Technician Handbook - General, US Department of Transportation, Federal Aviation Administration

ICAO Doc 9806

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Human Factors

Credits - Theory-04, Practicals-02

Tutorial

Subject

Code: DSEP3

15

Hours

- 1** Application of Human Factors in development of Aircraft Maintenance Programme and Inspection Schedule
- 2** Application of Human Factors in Aircraft Maintenance Planning and Execution
- 3** Application of Human Factors in Aircraft Maintenance
- 4** Detail study of Murphy's' law.
- 5** To study Shel Model
- 6** Study of Dirty Dozen
- 7** Stress Management in Aircraft Maintenance environment
- 8** To study human behavior in performing aircraft inspection in adverse weather conditions.
- 9** Develop procedure and environment for aircraft inspection for error prevention, considerations and strategies.
- 10** Study of social impact on aircraft maintenance engineer

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Transducers And Sensors

Credits - Theory-04, Practicals-02

Theory

**Subject
Code: DSE4
Lecture 60
Hours**

DSE4.1	Introduction Classification of transducers, Transducer descriptions, parameters, definitions and terminology, Introduction to Microsensors, history and technology of Microsensors, reasons for miniaturization, scaling laws,	5
DSE4.2	Optical Energy Domain Physics, Photoeffects in silicon and other materials, Photoconductive sensors, Photovoltaic sensors, Photoemissive sensors, Microsensors in the optical energy domain, semiconductor physics, Photodiodes and –transistors, Fiberoptic sensors, Chemical sensors	15
DSE4.3	Mechanical energy Domain Physics, Surface acoustic waves, variable resistance sensors, strain gauges, piezoelectric sensors, capacitive sensors, micromechanical sensors, sensor mechanisms, strain gauges, accelerometers and gyroscopes, pressure sensors, microphones and tactile sensors	15
DSE4.4	Thermal energy domain Seebeck effect, Peltier effect, Thomson effect, Thermoresistance, Thermoresistive sensors, Thermo-mechanical, Thermoresistive micro sensors, Bolometers and Thermopiles	15
DSE4.5	Magnetic energy Domain Superconductivity, Hall Effect, Magnetoresistivity, variable inductance sensors, variable reluctance sensors, Hall Effect sensors, summary	10

Reference Books:

T.A. Kovacs, Micromachined Transducers Sourcebook, WCB/McGraw-Hill, 1998

J. R. Carstens, Electrical Sensors and Transducers, Regents/Prentice Hall, 1993

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Transducers And Sensors

Credits - Theory-04, Practicals-02

Practical

Subject

Code: DSEP4

Lecture 60

Hours

1	Measurement of pressure, strain and torque using strain gauge.	6
2	Measurement of speed using Electromagnetic transducer.	6
3	Measurement of speed using photoelectric transducers	6
4	Measurement of angular displacement using Potentiometer.	6
5	Measurement of displacement using LVDT.	6
6	Measurement using load cells.	5
7	Measurement using capacitive transducer.	5
8	Measurement using inductive transducer.	5
9	Measurement of Temperature using Temperature Sensors/RTD.	5
10	Characteristics of Hall effect sensor.	5
11	Measuring change in resistance using LDR.	5

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Aviation Legislation

Credits - Theory-05, Tutorial-01

Theory

Subject

Code: DSE5

Lecture 75

Hours

DSE5.1	Regulatory Framework Role of International Civil Aviation Organization; Introduction to Chicago Convention, 1944; Introduction to ICAO, Convention, Standards and Recommended Practices; The Aircraft Act, 1934; The Aircraft Rules, 1937 - Part I, II, III, IV, VI, VII, IX, XIIA, XIIB, XIIC, XIII, XIV Role of the DGCA; Relationship between CAR-21, CAR-M, CAR-145, CAR-66, CAR 147; Aeronautical Information Circulars (Applicable to Aircraft Maintenance and Release); CAR - Sections 1 and 2	6
DSE5.2	CAR-M Detail understanding of CAR M provisions related to Continuing Airworthiness; Detailed understanding of CAR-M.	15
DSE5.3	CAR-145 — Approved Maintenance Organisations Detailed understanding of CAR-145 and CAR M Subpart F	15
DSE5.4	CAR-66 Certifying Staff - Maintenance Detailed understanding of CAR-66.	5
DSE5.5	CAR-147 Approved Maintenance Training Organization Detailed understanding of CAR-147.	5
DSE5.6	Aircraft Operations Commercial Air Transport/Commercial Operations; Air Operators Certificates; Operators Responsibilities, in particular regarding continuing airworthiness and maintenance; Documents to be carried on board; Aircraft Placarding (Markings);	5
DSE5.7	Aircraft Certification (a) General - Certification rules: such as FAA & EACS 23/25/27/29; Type Certification Supplemental Type Certification; Type Approval; CAR-21 Sub-Part F, G, H, I, M, P & Q Aircraft Modifications and repairs approval and certification; permit to fly	10

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Aviation Legislation

Credits - Theory-05, Tutorial-01

Theory

Subject

Code: DSE5

Lecture 75

Hours

requirements

(b) Documents - Certificate of Airworthiness; Certificate of Registration; Noise Certificate; Weight Schedule; Radio Station Licence and Approval.

DSE5.8 Applicable National and International Requirements 5

Introduction to ICAO, FAR, EASA Regulations - Aircraft Maintenance and certification

(a) Maintenance Programme, Maintenance checks and inspections; Master Minimum Equipment Lists, Minimum Equipment List; Dispatch Deviation Lists; Airworthiness Directives; Service Bulletins, manufacturers service information; Modifications and repairs;

Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc.;

(b) Continuing airworthiness; Test flights; ETOPS /EDTO, maintenance and dispatch requirements; RVSM, maintenance and dispatch requirements; RNP, MNPS Operations

All Weather Operations; Category 2/3 operations and minimum equipment, maintenance, training and certification requirements.

DSE5.9 Safety Management System 10

State Safety Programme; Basic Safety Concepts; Hazards & Safety Risks; SMS Operation; SMS Safety performance; Safety Assurance.

DSE5.10 Fuel Tank Safety 4

Special Federal Aviation Regulations (SFARs) from 14 CFR SFAR 88 of the FAA and of JAA TGL 47; Concept of CDCCL, Airworthiness Limitations Items (ALI).

Reference Books:

The Aircraft Act, 1934

The Aircraft Rules, 1937 VOL 1

The Aircraft Rules, 1937 VOL 3

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Aviation Legislation

Credits - Theory-05, Tutorial-01

Theory

Subject

Code: DSE5

Lecture 75

Hours

Aeronautical Information Circular

CAR - Section - 1, 2, & 8 SMS

CAR - 21, M, 145, 66 & 147

Special Federal Aviation Regulations (SFARs) - 14 CFR, SFAR 88 & JAA TGL 47

Airworthiness Procedure Manual

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Aviation Legislation

Credits - Theory-04, Practicals-02

Tutorial

Subject

Code: DSEP5

15

Hours

- 1 AME licencing procedure in various categories
- 2 Approval of a typical continuing airworthiness management organisation
- 3 Approval of a typical maintenance organisation
- 4 Registration of an Aircraft
- 5 Obtaining C of A for a new aircraft
- 6 Renewal of ARC
- 7 Approval of Aircraft Maintenance programme
- 8 Approval of MEL
- 9 Aircraft defect recording, reporting, rectification and certification

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Flight Navigation And Guidance

Credits - Theory-05, Tutorial-01

Theory

**Subject
Code: DSE6
Lecture 75
Hours**

DSE6.1	GENERAL Review of flight mechanics, Dynamic of an aircraft relative to the reference co-ordinate located on the aircraft centre of gravity. Forces and moments acting on the aircraft Equilibrium of the forces and moments acting on the aircraft, aircraft equation of motion and aircraft static stability.	12
DSE6.2	NAVIGATION Basic concepts of navigation process with guidance circumference related to control Circumference, Determination of position and motion of an aircraft through measurements of a respective geometric configuration relative to reference.	15
DSE6.3	CONTROL Basic linear system and classical control theory. Mathematical model representation of dynamic system. Understanding of open and closed loop system, feedback application, Stability analysis, dynamic analysis at frequency domain and time domain. Feedback gain design with root locus method and application of flight control systems.	15
DSE6.4	GUIDANCE Primary functions in flight attitude control (auto pilot), Stability augmentation system (SAS), and Control Augmentation system (CAS) longitudinal and lateral directional modes of flight. Satellite based navigation concept such as GPS application and the basic concept of inertial navigation, Required Navigation Procedure	18
DSE6.5	FLIGHT MANAGEMENT Calculation of weight and balance, familiarization with navigation of modern aircraft using flight management and guidance system, performance of aircraft, optimization of fuel consumption using flight management system.	15

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Flight Navigation And Guidance

Credits - Theory-05, Tutorial-01

Theory

Subject

Code: DSE6

Lecture 75

Hours

Reference Books:

Avionics Navigation Systems, M.Kayton, W. Fried

Aircraft Radio System-by J. Powell

Electronic Communication System by George Kennedy

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Flight Navigation And Guidance

Credits - Theory-01, Tutorial-01

Tutorial

Subject

Code: DSEP6

15

Hours

- 1** Familiarize with concept of navigational process, guidance circumference related to control circumference
- 2** Familiarize with Position and motion of an aircraft through measurements of a respective geometric configuration relative to reference.
- 3** Study on auto-pilot
- 4** Study on GPS navigation
- 5** Study on aircraft performance
- 6** Familiarize with the aircraft components related to aircraft navigation
- 7** Study on auto land systems on modern aircrafts
- 8** To familiarize with the flight navigation and guidance systems on aircraft

Discipline Specific Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Airworthiness Management / Aircraft Maintenance Organisation

Subject

UNIVERSITY RECOMMENDED TOPICS

Code: DSE7

Credits (1 x 8)

***Dissertation**

Hours

DSED7.1 Approval of Maintenance Organization

DSED7.2 Approval of Continuing Airworthiness Management Organisation

DSED7.3 Aircraft Line Maintenance

DSED7.4 Aircraft Maintenance – Planning and Logistics

DSED7.5 Aircraft Stores

*** Choose any one topic from the above**

General Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Mathematics 1

Credits - Theory-05, Tutorial-1

Theory

Subject

Code: GE1

Lecture 75

Hours

GE1.1	Linear Algebra: Elementary Row Transformation, Reduction of a Matrix to Row Echelon Form, Rank of a Matrix, Consistency of Linear Simultaneous Equations, Gauss Elimination Method, Gauss-Jordan Method, Eigen Values and Eigen Vectors of a Matrix, Caley-Hamilton Theorem, Diagonalization of a Matrix,	10
GE1.2	Trigonometry Functions: Elementary trigonometry, sine, cosine and tan functions, reciprocals of trig functions, angle values of trig functions, geometrical problems, trigonometric inverse functions	5
GE1.3	Multivariable Differential calculus Functions of 2 Variables, Limits and continuity, Partial differentiation, Euler's Theorem, Maxima and Minima of two variables, Method of Lagrange Multipliers, Taylor Series and Maclaurin Series of two variables, Jacobian.	20
GE1.4	Multivariable Integral calculus Multiple Integrals-Double integrals, Change of order, Applications to areas, volumes, Triple Integral.	20
GE1.5	Vector Calculus Gradient, Divergence, Curl, Evaluation of Line Integral, Green's Theorem in Plane (without proof), Stoke's Theorem (without proof), Gauss Divergence Theorem (without proof).	20

References:

Differential Calculus by Shanti Narain

Integral Calculus by Shanti Narain

Linear Algebra- Schaum Outline Series.

Engineering Mathematics by B.S. Grewal

General Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Physics

Credits - Theory-04, Practicals-02

Theory

Subject

Code: GE2

Lecture 60

Hours

GE2.1	PART 1 Vector algebra. Scalar and vector products. Derivatives of a vector with respect to a parameter."	4
GE2.2	PART 2 Elasticity: Hooke's law - Stress-strain diagram - Elastic moduli-Relation between elastic constants - Poisson's Ratio-Expression for Poisson's ratio in terms of elastic constants - Work done in stretching and work done in twisting a wire - Twisting couple on a cylinder - Determination of Rigidity modulus by static torsion - Torsional pendulum- Determination of Rigidity modulus and moment of inertia - q , η and sby Searle's method	14
GE2.3	PART 3 Momentum and Energy: Conservation of momentum. Work and energy. Conservation of energy. Motion of rockets. Rotational Motion: Angular velocity and angular momentum. Torque. Conservation of angular momentum. Laws of Motion: Frames of reference. Newton's Laws of motion. Dynamics of a System of particles. Centre of Mass."	12
GE2.4	PART 4 "Gravitation: Newton's Law of Gravitation. Motion of a particle in a central force field (motion is in a plane, angular momentum is conserved, areal velocity is constant). Kepler's Laws (statement only). Satellite in circular orbit and applications. Geosynchronous orbits. Weightlessness. Basic idea of global positioning system (GPS).	10
GE2.5	PART 5 Oscillations: Simple harmonica motion. Differential equation of SHM and its solutions. Kinetic and Potential Energy, Total Energy and their time averages. Damped	10

General Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Physics

Credits - Theory-04, Practicals-02

Theory

Subject

Code: GE2

Lecture 60

Hours

Oscillations.

GE2.6

PART 6

10

Special Theory of Relativity: Constancy of speed of light. Postulates of Special Theory of Relativity. Length contraction. Time dilation. Relativistic addition of Velocities. "

Reference Books

University Physics. FW Sears, MW Zemansky and HD Young13/e, 1986. Addison Wesley

Mechanics Berkeley Physics course,v.1: Charles Kittel, et. Al. 2007, Tata McGraw-Hill

General Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Physics		Subject
Credits - Theory-04, Practicals-02		Code: GE2
Practical		Lecture 60
		Hours
1	Measurements of length (or diameter) using Vernier caliper, screw gauge and	6
2	Travelling microscope.	6
3	To determine the Height of a Building using a Sextant.	6
4	To determine the Moment of Inertia of a Flywheel.	6
5	To determine the Young's Modulus of a Wire by Optical Lever Method.	6
6	To determine the Modulus of Rigidity of a Wire by Maxwell's needle.	6
7	To determine the Elastic Constants of a Wire by Searle's method.	6
8	To determine g by Bar Pendulum.	6
9	To determine g by Kater's Pendulum.	6
10	To determine g and velocity for a freely falling body using Digital Timing technique	6

General Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Chemistry

Credits - Theory-04, Practicals-02

Theory

Subject

Code: GE3

Lecture 60

Hours

GE3.1 MODULE I: WATER TECHNOLOGY

12

Introduction and specifications of water, Hardness and its determination (EDTA method only), Alkalinity, Boiler feed water, boiler problems – scale, sludge, priming & foaming: causes & prevention, Boiler problems – caustic embrittlement & corrosion: causes & prevention, Carbonate & phosphate conditioning, colloidal conditioning & calgon treatment, Water softening processes: Lime – soda process, Ion exchange method, Water for domestic use.

GE3.2 MODULE II: FUELS

12

Classification, calorific value of fuel, (gross and net), Determination of calorific value of fuels, bomb calorimeter, Solid fuels - Proximate and ultimate analysis, Octane & Cetane No. and its significance. Numerical on combustion.

GE3.3 MODULE III: INSTRUMENTAL METHODS OF ANALYSIS

12

Introduction; Principles of spectroscopy; Laws of absorbance

IR : Principle, Instrumentation, Application

UV : Principle, Instrumentation, Application

NMR : Principle, Instrumentation, Application

GE3.4 MODULE IV: LUBRICANTS

12

Introduction; Mechanism of Lubrication;

Types of Lubricants; Chemical structure related to Lubrication;

Properties of lubricants; Viscosity and Viscosity Index; Iodine Value; Aniline Point;

Emulsion number; Flash Point; Fire Point; Drop Point; Cloud Point; Pour Point.

Selection of Lubricants.

GE3.5 MODULE V: CORROSION

12

Introduction, Mechanism of dry and wet corrosion, Types of corrosion-Galvanic, Concentration cell, soil, pitting, intergranular, waterline. Passivity. Factors influencing corrosion. Corrosion control

Reference Books

Engineering Chemistry- Jain and Jain, Engineering Chemistry- Sunita Rattan

General Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Chemistry		Subject
Credits - Theory-04, Practicals-02		Code: GE4
Practical		Lecture 60
		Hours
1	To determine the ion exchange capacity of a given cation exchanger.	6
2	To determine the temporary, permanent and total hardness of a sample of water by complexometric titration method.	6
3	To determine the type and extent of alkalinity of given water sample.	6
4	Determination of amount of oxalic acid and H ₂ SO ₄ in 1 L of solution using N/10 NaOH and N/10 KMnO ₄ solution.	6
5	To prepare and describe a titration curve for phosphoric acid – sodium hydroxide titration using pH-meter. (a) To find the cell constant of conductivity cell. (b) Determine the strength of hydrochloric acid solution by titrating it against standard sodium hydroxide solution conductometrically	6
6	Determination of Dissolved oxygen in the given water sample	6
7	To determine the total residual chlorine in water.	6
8	Determination of viscosity of given oil by means of Redwood viscometer I.	6
9	To determine flash point and fire point of an oil by Pensky Martin's Apparatus	6
10	Final Lab	6

General Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Corrosion and NDT Techniques

Credits - Theory-04, Practicals-02

Theory

Subject

Code: GE4

Lecture 60

Hours

GE4.1	PART 1	6
	Type of Corrosion, Corrosion Theory; General Development: Development of Corrosion, Factors influencing corrosion Forms of Corrosion, Corrosion and Mechanical Factors, Common Corrosive Agents Metallic Mercury Corrosion on Aluminum Alloys, Micro Organisms.	
GE4.2	PART 2	10
	Importance of NDT in quality assurance; Different types of non-destructive techniques to obtain information regarding size, location and orientation of damage or cracks. Visual inspection techniques coin tapping technique for composite structures and adhesive bonds. Ultrasonic testing (UT Level 1, 2), Radiography Inspection (RT Level 1, 2), Magnetic particle testing (MT Level 1, 2), Microwave testing, Pulse echo technique, pitch-catch technique, through transmission technique, A-scan, B-Scan, C-scan. Acoustic emission: Sources of acoustic emission in composites, peak amplitude, rise time during events, ring-down counts duration of events. X-ray radiography: Absorption spectra, short wave length, X-ray for detection of voids. Die penetration technique	
GE4.3	PART 3	10
	Liquid/Dye penetrant test (PT level 1, 2), Visual testing (VT-level 1, 2), Eddy current testing (ET level 1, 2), Guided wave testing	
GE4.4	PART 4	8
	TKY joints ultrasonic inspection, Basics of NDT, Metallurgy for non-metallurgists.	
GE4.5	PART 5	6
	Effects of Corrosion on Metals, Corrosion Prone Areas and Preventative Maintenance Battery Compartments and battery vent openings, Lavatories, Buffets and	

General Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Corrosion and NDT Techniques

Credits - Theory-04, Practicals-02

Theory

Subject

Code: GE4

Lecture 60

Hours

Galleys, Bilge Areas, Wheel wells and landing gear, External skin areas, Water entrapment areas, Engine Frontal Areas and cooling air vents, Electronic package compartments.

GE4.6	PART 6	8
	Factors in corrosion control, preventative maintenance, frequency of inspection, recommended depth of inspection, non-destructive inspection (NDI), Corrosion removal techniques, Standard methods, Preparations for rework, Paint removal, special techniques, fairing or blending reworked areas, chemical testing, chemical spot analysis of magnetic metals, surface treatment testing, chemical spot testing of non-magnetic metals, post identification cleaning and refinishing, mechanical corrosion removal by blasting.	
GE4.7	PART 7	8
	Corrosion Damage and Rework Limits On Aluminum and Aluminum Alloys, Treatment, Processing Of Aluminum Surfaces, Repair, Corrosion Removal Corrosion damage and rework limits on Magnesium and Alloy treatment, Processing of Aluminum surfaces, repair, corrosion removal Corrosion damage and rework limits on Ferrous CORROSION DAMAGE AND REWORK	
GE4.8	PART 8	3
	Limits on Ferrous & Alloy Treatment, Processing of Aluminum Surfaces, Repair, Corrosion Removal; Corrosion damages on composite material Mercury spills/corrosion damage. Corrosion protection for agricultural aircraft Reference Books – corrosion and NDT AC-43-4A AC-43-1B Non-Destructive Test and Evaluation of Materials, Prasad J and C.G Krishnadas Nair	

General Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Corrosion and NDT Techniques

Credits - Theory-04, Practicals-02

Theory

Subject

Code: GE4

Lecture 60

Hours

Non-Destructive Testing Handbook, Vol 1. Aerospace NDT – The American Society for Non-destructive Testing

General Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Corrosion and NDT Techniques

Credits - Theory-04, Practicals-02

Practical

Subject

Code: GE4

Lecture 60

Hours

- 1** Identify different types of corrosion, factors contribute to corrosion, areas prone for corrosion, corrosive agents avoidance of corrosion
- 2** Detection of corrosion, defects and recording
- 3** Various Corrosion preventive technique - practice
- 4** Surface cleaning, rework and protection technique of ferrous and non-ferrous (Magnesium and Aluminum alloys) metallic surface
- 5** Accidental spillage of corrosive agents, cleaning and restoration
- 6** Ultrasonic Thickness testing
- 7** Liquid Penetrant testing
- 8** Eddy current
- 9** Magnetic Particle
- 10** Visual Inspection
- 11** Radiography testing
- 12** Guided wave testing

General Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Composites Materials

Credits - Theory-04, Practicals-02

Theory

Subject

Code: GE5

Lecture 60

Hours

GE 5.1	PART 1 Introduction to Composite Materials; Classification of composites, particulate composites, fibrous composites. Use of fiber reinforced composites;	5
GE 5.2	PART 2 Fiber, matrices and manufacture of composites; properties of various type of fibres like glass, Kevlar, Carbon and Graphite, methods of manufacture, surface treatment of fiber, various forms of fibers, matrix materials, polymers: Thermosetting and thermoplastic polymers, properties of polymers like epoxies, phenolic, polyester peek etc.	10
GE 5.3	PART 3 Manufacture techniques of composites: hand lay-up technique, pressure bag and vacuum bag moulding techniques, puftrusion, resin-transfer moulding, injection moulding, Bulk moulding compound, sheet moulding compound.	10
GE 5.4	PART 4 Behaviour of unidirectional composites : volume traction, weight traction, density of composites, Micromechanics approach, longitudinal strength and stiffness, factors affecting longitudinal strength and stiffness, transverse strength and stiffness, sheer modulus and strength, Poisson's ratio, effect of fiber dimension and distribution on strength and stiffness, Halpin-Tsai equations.	10
GE 5.5	PART 5 Analysis and strength of an orthotropic lamina : strain relations and engineering constants, relation between engineering constants and stiffness coefficients, strength of an orthotropic lamina, failure theories, Analysis of laminated composites, laminate orientation code, stress and strain variation in a laminate, properties of symmetric, cross ply angle-ply and quasi isotropic analysis of laminate after initial failure, hygrothermal behaviour of laminates.	10
GE 5.6	PART 6	5

General Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Composites Materials

Credits - Theory-04, Practicals-02

Theory

Subject

Code: GE5

Lecture 60

Hours

Thermal and moisture expansion coefficients, transport properties, mass diffusion. Short fiber composites: approximate analysis of stress transfer, average fiber stress, modulus and strength of short fiber composites.

GE 5.7

PART 7

10

Inspection techniques and interpretation of results : ultrasonic techniques, Acoustic emission techniques, X - ray radiography, CT Scan

Reference Books:

R.M. Jones, Mechanics of Composite Materials, Technomic Publication.

B.D. Agarwal and L.J. Broutman, Analysis and Performance of Fibre Composites, John Wiley & Sons.

Non-Destructive Test and Evaluation of Materials, Prasad J and C.G Krishnadas Nair

Non-Destructive Testing Handbook, Vol 1. Aerospace NDT – The American Society for Non-destructive Testing

General Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Composites Materials

Credits - Theory-04, Practicals-02

Practical

Subject

Code: GE5

Lecture 60

Hours

- 1 Identify various composite material - glass, Kevlar, Carbon, Graphite, fibers and matrices and their application in aircraft
- 2 Identify various types of defects in composite structure
- 3 Inspection – simple and common technique, identification and analysis of common defects in composite structures
- 4 Ultrasonic techniques in detecting defects in composite structure
- 5 Radiography technique in detecting defects in composite structure
- 6 CT Scan technique in detecting defects in composite structure
- 7 Tools and consumables, including repair material for composite workshops.
- 8 General layout and environmental requirements of composite workshop. Safety precaution. Material storage, life control and handling
- 9 Workshop Techniques of basic composites repair

General Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Quality Management System

Credits - Theory-05, Tutorial-01

Theory

Subject

Code: GE6

Lecture 75

Hours

GE 6.1 MODULE I: INTRODUCTION 12

Descriptors/Topics Meaning of Quality and quality improvement, need of automobile & Aviation Quality, Introduction to Statistical methods for quality control, Process Capability for aerospace applications.

GE 6.2 MODULE II: QUALITY CONTROL 14

Statistical Quality Control, Ishikawa diagram, control charts, Control charts for attributes & variables, Moving average chart for aviation Quality systems.

GE 6.3 MODULE III : PRODUCTION CONTROL 12

Acceptance Sampling, OC curve, Sampling Plan, Producer's risk, Consumer's risk, Average Quality Level, AOQL, Design of Single & double sampling plan.

GE 6.4 MODULE IV: QUALITY ASSURANCE 12

Need of Aerospace Quality Assurance, Quality Audit, total quality management, Concept of Zero defect, ISO-9001 quality systems, IAQG, AS-9100 Aerospace Standards.

GE 6.5 MODULE V : AEROSPACE CERTIFICATION 6

DGCA, FAA, EASA and IATA Requirements and Standards Aerospace Quality manuals, aircraft airworthiness, documentation, Safety practices & standards. Quality Policy, Objective, Quality Requirements, Quality procedures and evidence retention

GE 6.6 Module VI: Regulatory Compliance 2

Quality Standards / Regulatory Compliance – Compliance Records.

GE 6.7 Audit and Surveillance 10

Auditing techniques, recording findings, communication, assessing compliance action and monitoring compliance. Statistical analysis and risk assessment. Risk based surveillance.

Reference Books

EL Grant & RS Leavenworth, "Statistical Quality Control", McGraw Hill Co. M. Mahajan, "Statistical Quality Control", Dhanpat Rai & Co.

General Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Quality Management System

Credits - Theory-05, Tutorial-01

Theory

Subject

Code: GE6

Lecture 75

Hours

Kanishka Bedi “Quality Management”, Oxford University Press

ISO 9001

AS 9100

DGCA – Civil Aviation Requirements

IATA – IOSA Standards Manual

General Electives – B. Sc. Honors (Aircraft Maintenance)

Subject: Quality Management System

Credits - Theory-04, Tutorial-01

Tutorial

Subject

Code: GE6

Tutorial 15

Hours

- 1 Develop Typical Quality System for five specific activities of aircraft maintenance industry**
- 2 Carryout audit of five specific activities of aircraft maintenance industry establish regulatory compliance and record recommendation.**
- 3 Carryout audit of five specific activities of aircraft maintenance industry record findings, document evidence, communicate findings, verify action taken and root cause assessment and carryout risk assessment.**

**Ability Enhancement Elective Course
(Compulsary 2 papers of 4 credits each)**

B. Sc. Honors (Aircraft Maintenance)

Subject: English Communication

Credits - 04

Theory

Subject

Code: AEEC1

Lecture 60

Hours

Preamble

The purpose of this course is to introduce students to the theory, fundamentals and tools of communication and to develop in them vital communication skills which should be integral to personal, social and professional interactions. One of the critical links among human beings and an important thread that binds society together is the ability to share thoughts, emotions and ideas through various means of communication: both verbal and non-verbal. In the context of rapid globalization and increasing recognition of social and cultural pluralities, the significance of clear and effective communication has substantially enhanced.

The present course hopes to address some of these aspects through an interactive mode of teaching-learning process and by focusing on various dimensions of communication skills. Some of these are: Language of communication, various speaking skills such as personal communication, social interactions and communication in professional situations such as interviews, group discussions and office environments, important reading skills as well as writing skills such as report writing, note-taking etc.

While, to an extent, the art of communication is natural to all living beings, in today's world of complexities, it has also acquired some elements of science. It is hoped that after studying this course, students will find a difference in their personal and professional interactions.

The recommended readings given at the end are only suggestive; the students and teachers have the freedom to consult other materials on

Ability Enhancement Elective Course
B. Sc. Honors (Aircraft Maintenance)

Subject: English Communication

Credits - 4

Theory

Subject
Code: AECC1
Lecture 60
Hours

various units/topics given below. Similarly, the questions in the examination will be aimed towards assessing the skills learnt by the students rather than the textual content of the recommended books.

AECC 1.1	Introduction Theory of Communication, Types and modes of Communication	5
AECC 1.2	Language of Communication Verbal and Non-verbal (Spoken and Written), Personal, Social and Business Barriers and Strategies Intra-personal, Inter personal and Group communication	15
AECC 1.3	Speaking Skills Monologue, Dialogue, Group Discussion, Effective Communication/ Mis-Communication, Interview, Public Speech	20
AECC 1.4	Reading and Understanding Close Reading, Comprehension, Summary Paraphrasing, Analysis and Interpretation, Translation (from Indian language to English and vice-versa), Literary/Knowledge Texts	15
AECC 1.5	Writing Skills Documenting, Report Writing, Making notes, Letter writing	15

Reference Books

Fluency in English - Part II, Oxford University Press, 2006

V.R. Narayanaswami, Strengthen Your Writing, 3rd Edition, Orient Longman, 2005.

Andrea J. Rutherford, Basic Communication Skills for Technology, 1st Edition, Pearson

Business English, Pearson, 2008

Language, Literature and Creativity, Orient Blackswan, 2013

Ability Enhancement Elective Course
B. Sc. Honors (Aircraft Maintenance)

Subject: English Communication

Credits - 4

Theory

Subject

Code: AEEC1

Lecture 60

Hours

Education Asia (Singapore) Pvt. Ltd., Bangalore, 2001.

4. Language through Literature (forthcoming) ed. Dr. Gauri Mishra, Dr. Ranjana Kaul, Dr. Brati Biswas

Nell Ann Pickett, Ann A. Laster, Katherine E. Staples, Technical English (Writing, Reading and Speaking), 8th Edition, Pearson Education, USA, Addison Wesley Longman Inc., 2001

Ability Enhancement Elective Course
B. Sc. Honors (Aircraft Maintenance)

Subject: Environmental Science

Credits - 4

Theory

Subject

Code: AECC2

Lecture 60

Hours

AECC 2.1	Introduction to environmental studies Multidisciplinary nature of environmental studies Scope and importance; Concept of sustainability and sustainable development	2
AECC 2.2	Ecosystems What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	6
AECC 2.3	Natural Resources : Renewable and Non-renewable Resources <ul style="list-style-type: none">• Land resources and land use change; Land degradation, soil erosion and desertification• Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.• Water: Use and over--exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter--state).• Energy resources : Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.	8
AECC 2.4	Biodiversity and Conservation <ul style="list-style-type: none">• Levels of biological diversity : genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots.• India as a mega--biodiversity nation; Endangered and endemic species of India• Threats to biodiversity : Habitat loss, poaching of wildlife, man--wildlife	8

Ability Enhancement Elective Course
B. Sc. Honors (Aircraft Maintenance)

Subject: Environmental Science

Credits - 4

Theory

Subject
Code: AECC2
Lecture 60
Hours

conflicts, biological invasions; Conservation of biodiversity : In--situ and Ex--
-situ conservation of biodiversity.

- Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value

AECC 2.5

Environmental Pollution

8

- Environmental pollution : types, causes, effects and controls; Air, water, soil and noise pollution.
- Nuclear hazards and human health risks
- Solid waste management : Control measures of urban and industrial waste.
- Pollution case studies

AECC 2.6

Environmental Policies & Practices

7

- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture
- Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).
- Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context

AECC 2.7

Human Communities and the Environment

6

- Human population growth: Impacts on environment, human health and welfare.
- Resettlement and rehabilitation of project affected persons; case studies.
- Disaster management : floods, earthquake, cyclones and landslides.
- Environmental movements : Chipko, Silent valley, Bishnois of Rajasthan.
- Environmental ethics: Role of Indian and other religions and cultures in

Ability Enhancement Elective Course

B. Sc. Honors (Aircraft Maintenance)

Subject: Environmental Science

Credits - 4

Theory

Subject

Code: AECC2

Lecture 60

Hours

environmental conservation.

- Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

AECC 2.8

Field work

15

- Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc.
- Visit to a local polluted site--Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds and basic principles of identification.
- Study of simple ecosystems--pond, river etc

Reference Books

- 1 Gadgil, M., & Guha, R.1993. This Fissured Land: An Ecological History of India. Univ. of California Press
- 2 Gilbert M.Masters, "Introduction to Environmental Engineering and Science", Pearson education Pvt., Ltd., second edition, ISBN 81-297-0277-0, 2004.
- 3 Miller T.G. JR., "Environmental Science", Wadsworth publishing co.
- 4 Odum, E.P., Odum, H.T. & Andrews, J. 1971.Fundamentals of Ecology. Philadelphia: Saunders.
- 5 Sengupta, R. 2003. Ecology and economics: An approach to sustainable development. OUP.
- 6 Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi
- 7 Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. Conservation Biology: Voices from the Tropics. John Wiley & Sons.
- 8 Thapar, V. 1998. Land of the Tiger: A Natural History of the Indian Subcontinent
- 9 Rao, M.N. & Datta, A.K. 1987. Waste Water Treatment. Oxford and IBH Publishing Co. Pvt. Ltd.

**Ability Enhancement Elective Course
(elective 2 papers of 4 credits each)**

– B. Sc. Honors (Aircraft Maintenance)

**Subject: Ability Enhancement Elective Course (Skill Enhancement Courses)
(SEC) (02 papers) (Credit: 04 each)**

**Subject
Code: SEC**

Theory and Practical – Select Two Topics

- 1 Typical Aircraft Maintenance - Fixed Wing Heavy / Complex Aircraft
- 2 Typical Aircraft Maintenance - Fixed Wing Light / Composite Aircraft
- 3 Typical Aircraft maintenance – Single Engine Helicopters
- 4 Typical Aircraft maintenance – Multi Engine Helicopters
- 5 Typical Aircraft Maintenance – Avionics (Fixed / Rotor Wing Complex Aircraft - Glass Cockpit)
- 6 Typical Aircraft Maintenance – Avionics (Fixed / Rotor Wing Light Aircraft - Glass Cockpit)
- 7 Typical Aircraft Maintenance – Avionics (Fixed/ Rotor Wing Light Aircraft - Analog System)
- 8 Typical Piston Engine maintenance
- 9 Typical Gas Turbine Engine Maintenance
- 10 Aircraft (Hydraulic) Component Maintenance
- 11 Aircraft (landing gear) Component Maintenance
- 12 Aircraft (Pneumatic) Component Maintenance
- 13 Aircraft wheels and Breaks - Component Maintenance
- 14 Aircraft Electrical Component Maintenance
- 15 Aircraft Instruments Maintenance
- 16 Aircraft communication and navigation system component maintenance
- 17 Typical Aircraft Maintenance – Avionics (Fixed Wing Aircraft - Fly by wire)

The theoretical aspect of study shall be oriented towards cleaning, inspection, recording, testing, operation, component removal & fitment, adjustment, functional test, recording of defects, rectification and routine servicing of associated structure and components. Note: The theoretical aspect of the subject could be taught in the field combined with the practical classes.

The objective of practical training is to gain the required competence in performing safe maintenance, inspections and routine work according to the maintenance manual and other relevant instructions and tasks as appropriate for the type of aircraft, for example troubleshooting, repairs, adjustments, replacements, rigging and functional checks. It includes the awareness of the

use of all technical literature and documentation for the aircraft, the use of specialist/special tooling and test equipment for performing removal and replacement of components and modules unique to type, including any on-wing maintenance activity.

Sample Aircraft Maintenance Tasks

Note: Depending on the available facility, choose tasks from the following list in the respective areas.

- | | |
|---|--|
| <p>I Time limits/Maintenance checks</p> <p>100 hour check (general aviation aircraft).</p> <p>“A” check (transport category aircraft).</p> <p>Review records for compliance with airworthiness directives.</p> <p>Review records for compliance with component life limits.</p> <p>Procedure for Inspection following heavy landing.</p> <p>Procedure for Inspection following lightning strike.</p> | <p>V Towing and Taxiing</p> <p>Tow aircraft.</p> <p>Be part of aircraft towing team.</p> |
| <p>II Dimensions/Areas</p> <p>Locate component(s) by station number.</p> <p>Perform symmetry check.</p> | <p>VI Parking and mooring</p> <p>Tie down aircraft.</p> <p>Park, secure and cover aircraft.</p> <p>Position aircraft in dock.</p> <p>Secure rotor blades.</p> |
| <p>III Lifting and Shoring</p> <p>Assist in :</p> <p>Jack aircraft nose or tail wheel.</p> <p>Jack complete aircraft.</p> <p>Sling or trestle major component.</p> | <p>VII Placards and Markings</p> <p>Check aircraft for correct placards.</p> <p>Check aircraft for correct markings.</p> |
| <p>IV Leveling /Weighing</p> <p>Level aircraft.</p> <p>Weigh aircraft.</p> <p>Prepare weight and balance amendment.</p> <p>Check aircraft against equipment list.</p> | <p>VIII Servicing</p> <p>Refuel aircraft.</p> <p>Defuel aircraft.</p> <p>Check tire pressures.</p> <p>Check oil level.</p> <p>Check hydraulic fluid level.</p> <p>Check accumulator pressure.</p> <p>Charge pneumatic system.</p> <p>Grease aircraft.</p> <p>Connect ground power.</p> <p>Service toilet/water system</p> <p>Perform pre-flight/daily check</p> |
| | <p>IX Vibration and Noise Analysis</p> <p>Analyze helicopter vibration problem.</p> <p>Analyze noise spectrum.</p> |
| | <p>X Air Conditioning</p> |

- Replace combustion heater.
- Replace outflow valve.
- Replace vapour cycle unit.
- Replace air cycle unit.
- Replace cabin blower.
- Replace heat exchanger.
- Replace pressurization controller.
- Clean outflow valves.
- Check operation of air conditioning/heating system
- Check operation of pressurization system
- Troubleshoot faulty system
- XI Auto flight**
- Install servos.
- Rig bridle cables
- Replace controller.
- Replace amplifier.
- Check operation of auto-pilot.
- Check operation of auto-throttle.
- Check operation of yaw damper.
- Check and adjust servo clutch.
- Perform autopilot gain adjustments.
- Perform mach trim functional check.
- Troubleshoot faulty system.
- Check auto land system
- Check flight management systems
- Check stability augmentation system
- XII Communications**
- Replace VHF com unit.
- Replace HF com unit.
- Replace existing antenna.
- Replace static discharge wicks.
- Check operation of radios.
- Perform antenna VSWR check.
- Perform Selcal operational check.
- Perform operational check of passenger address system.
- Functionally check audio integrating system.
- Repair co-axial cable.
- Troubleshoot faulty system.
- XIII Electrical Power**
- Charge lead/acid battery.
- Charge ni-cad battery.
- Check battery capacity.
- Deep-cycle ni-cad battery.
- Replace generator/alternator.
- Replace switches.
- Replace circuit breakers.
- Adjust voltage regulator.
- Amend electrical load analysis report.
- Repair/replace electrical feeder cable.
- Troubleshoot faulty system
- XIV Equipment/Furnishings**
- Replace pets
- Replace crew seats.
- Replace passenger seats.
- Check inertia reels.
- Check seats/belts for security.
- Check emergency equipment.
- Check ELT for compliance with regulations.
- Repair toilet waste container.
- Repair upholstery.
- Change cabin configuration.
- XV Fire protection**
- Check fire bottle contents.

Check operation of warning system.
Check cabin fire extinguisher contents.
Check lavatory smoke detector system.
Install new fire bottle.
Replace fire bottle squib.
Troubleshoot faulty system.
Inspect engine fire wire detection

systems

XVI **Flight Controls**

Replace horizontal stabilizer.
Replace elevator.
Replace aileron.
Replace rudder.
Replace trim tabs.
Install control cable and fittings.
Replace flaps.
Replace powered flying control unit
Replace flat actuator
Adjust trim tab.
Adjust control cable tension.
Check control range and sense of

movement.

Check for correct assembly and locking.
Troubleshoot faulty system.

XVII **Fuel**

Replace booster pump.
Replace fuel selector.
Replace fuel tank cells.
Check filters.
Flow check system.
Check calibration of fuel quantity

gauges.

Check operation feed/selectors
Troubleshoot faulty system.

XVIII **Hydraulics**

Replace engine driven pump.
Replace standby pump.
Replace accumulator.
Check operation of shut off valve.
Check filters.
Check indicating systems.
Perform functional checks.
Troubleshoot faulty system.

XIX **Ice and rain protection**

Replace pump.
Replace timer.
Install wiper motor.
Check operation of systems.
Troubleshoot faulty system.

XX **Indicating/recording systems**

Replace flight data recorder.
Replace cockpit voice recorder.
Replace clock.
Replace master caution unit.
Replace FDR.
Perform FDR data retrieval.
Troubleshoot faulty system.
Implement ESDS procedures
Inspect for HIRF requirements

XXI **Landing Gear**

Build up wheel.
Replace main wheel.
Replace nose wheel.
Replace shimmy damper.
Rig nose wheel steering.
Replace shock strut seals.
Replace brake unit.
Replace brake control valve.

Bleed brakes.
Test anti skid unit.
Test gear retraction.
Change bungees.
Adjust micro switches.
Charge struts.
Troubleshoot faulty system.
Test out brake system

XXII **Lights**

Repair/replace rotating beacon.
Repair/replace landing lights.
Repair/replace navigation lights.
Repair/replace interior lights.
Repair/replace emergency lighting system.
Perform emergency lighting system checks.

Troubleshoot faulty system

XXIII **Navigation**

Calibrate magnetic direction indicator.
Replace airspeed indicator.
Replace altimeter.
Replace air data computer.
Replace VOR unit.
Replace ADI.
Replace HSI.
Check pitot static system for leaks.
Check operation of directional gyro.
Functional check weather radar.
Functional check Doppler.
Functional check TCAS.
Functional check DME
Functional check ATC Transponder
Functional check flight director system.

Functional check inertial nav system.
Complete quadrantal error correction of ADF system.

Update flight management system database.

Check calibration of pitot static instruments.

Check calibration of pressure altitude reporting system.

Troubleshoot faulty system

Check marker systems

Compass replacement direct/indirect

Check Satcom

Check GPS

Test AVM

XXIV **Oxygen**

Inspect on board oxygen equipment.

Purge and recharge oxygen system.

Replace regulator.

Replace oxygen generator.

Test crew oxygen system.

Perform auto oxygen system deployment check.

Troubleshoot faulty system.

XXV **Pneumatic systems**

Replace filter.

Replace compressor.

Recharge desiccators.

Adjust regulator.

Check for leaks.

Troubleshoot faulty system.

XXVI **Vacuum systems**

Replace vacuum pump.

Check/replace filters.

Adjust regulator.

Troubleshoot faulty system.

XXVII Water/Waste

Replace water pump.

Replace tap.

Replace toilet pump.

Troubleshoot faulty system.

XXVIII Central Maintenance System

Retrieve data from CMU.

Replace CMU.

Perform Bite check.

Troubleshoot faulty system.

XXIX Airborne Auxiliary power

Install APU.

Inspect hot section.

Troubleshoot faulty system.

XXX Structures

Sheet metal repair.

Fibre glass repair.

Wooden repair.

XXXI Fabric repair.

Recover fabric control surface.

Treat corrosion.

Apply protective treatment.

XXXI Doors

Rig/adjust locking mechanism.

Adjust air stair system.

Check operation of emergency exits.

Test door warning system.

Troubleshoot faulty system.

XXXII Windows

Replace windshield.

Replace window.

Repair transparency.

XXXIII Wings

Skin repair.

Recover fabric wing.

Replace tip.

Replace rib.

Check incidence/rig.

XXXIV Propeller

Assemble prop after transportation.

Replace propeller.

Replace governor.

Adjust governor.

Perform static functional checks.

Check operation during ground run.

Check track.

Check setting of micro switches.

Dress out blade damage.

Dynamically balance prop.

Troubleshoot faulty system.

XXXV Main Rotors

Install rotor assembly.

Replace blades.

Replace damper assembly.

Check track.

Check static balance.

Check dynamic balance.

Troubleshoot.

XXXVI Rotor Drive

Replace mast.

Replace drive coupling.

Replace clutch/freewheel unit

Replace drive belt.

Install main gearbox.

Overhaul main gearbox.

Check gearbox chip detectors.

XXXVII Tail Rotors

- Install rotor assembly.
- Replace blades.
- Troubleshoot.

XXXVIII Tail Rotor Drive

- Replace bevel gearbox.
- Replace universal joints.
- Overhaul bevel gearbox.
- Install drive assembly.
- Check chip detectors.

XXXIX Rotorcraft flight controls

- Install swash plate.
- Install mixing box.
- Adjust pitch links.
- Rig collective system.
- Rig cyclic system.
- Rig anti-torque system.
- Check controls for assembly and locking.
- Check controls for operation and sense.
- Troubleshoot faulty system.

XL Power Plant

- Build up ECU.
- Replace engine.
- Repair cooling baffles.
- Repair cowling.
- Adjust cowl flaps.
- Repair faulty wiring.
- Troubleshoot.

XLI Piston Engines

- Remove/install reduction gear.
- Check crankshaft run-out.
- Check tappet clearance.

- Check compression.
- Extract broken stud.
- Install helicoil.
- Perform ground run.
- Establish/check reference RPM.
- Troubleshoot.

XLII Turbine Engines

- Replace module.
- Hot section inspection.
- Engine ground run.
- Establish reference power.
- Trend monitoring/gas path analysis.
- Troubleshoot.

XLIII Fuel and control, piston

- Replace engine driven pump.
- Adjust AMC.
- Adjust ABC.
- Install carburetor/injector.
- Adjust carburetor/injector.
- Clean injector nozzles.
- Replace primer line.
- Check carburetor float setting.
- Troubleshoot faulty system.

XLIV Fuel and control, turbine

- Replace FCU.
- Replace engine driven pump.
- Clean/test fuel nozzles.
- Clean/replace filters.
- Adjust FCU.
- Troubleshoot faulty system.

XLV Ignition systems, piston

- Change magneto.
- Change ignition vibrator.
- Change plugs.

- Test plugs.
- Check H.T. leads.
- Install new leads.
- Check timing.
- Check system bonding.
- Troubleshoot faulty system.
- XLVI Ignition systems, turbine**
 - Check glow plugs/ ignitors.
 - Check H.T. leads.
 - Check ignition unit.
 - Replace ignition unit.
 - Troubleshoot faulty system.
- XLVII Engine Controls**
 - Rig thrust lever.
 - Rig RPM control.
 - Rig mixture HP cock lever.
 - Rig power lever.
 - Check control sync (multi-eng).
 - Check controls for correct assembly and locking.
 - Check controls for range and sense of operation.
 - Adjust pedestal micro-switches.
 - Troubleshoot faulty system.
- XLVIII Engine Indicating**
 - Replace engine instruments(s).
 - Replace oil temperature bulb.
 - Replace thermocouples.
 - Check calibration.
 - Troubleshoot faulty system.
- XLIX Exhaust, piston**
 - Replace exhaust gasket.
 - Inspect welded repair.
 - Pressure check cabin heater muff.
- Troubleshoot faulty system.
- L Exhaust, turbine**
 - Change jet pipe.
 - Change shroud assembly.
 - Install trimmers.
- LI Oil**
 - Change oil.
 - Check filter(s).
 - Adjust pressure relief valve.
 - Replace oil tank.
 - Replace oil pump.
 - Replace oil cooler.
 - Replace firewall shut off valve.
 - Perform oil dilution.
 - Troubleshoot faulty system.
- LII Starting**
 - Replace starter.
 - Replace start relay.
 - Replace start control valve.
 - Check cranking speed.
 - Troubleshoot faulty system.
- LIII Turbines, piston engines**
 - Replace PRT.
 - Replace turbo-blower.
 - Replace heat shields.
 - Replace waste gate.
 - Adjust density controller.
- LIV Engine water injection**
 - Replace water/methanol pump.
 - Flow check water/methanol system.
 - Adjust water/methanol control unit.
 - Check fluid for quality.
 - Troubleshoot faulty system
- LV Accessory gear boxes**

Replace gearbox.

Replace drive shaft.

Check Chip detector
