



School of Aeronautics (Neemrana)

**Scheme
of
Aircraft Maintenance Engineering
Category B1.1-Mechanical Stream
Semester I –IV
(DGCA-CAR 66)**

2.5.5.2 Total Time Duration of Various Subjects Semester Wise

2.5.5.2.1 Mechanical Stream (B1.1)

SEMESTER: FIRST

TOTAL NUMBER OF HOURS: 600

S.NO.	NAME OF SUBJECT	MODULE NO.	TOTAL (Hours)	THEORY (Hours)	PRACTICAL (Hours)		
					LAB/CR	ON SOAA/C	AIR INDIA
1.	Maintenance Practices	7A	370	177	193	0	0
2.	Basic Aerodynamic	8	70	50	0	20	0
3.	Aviation Legislation I	10	132	112	0	20	0
4.	Human Factor	9A	28	21	7	0	0
	TOTAL HOURS		600	360	200	40	0

2.5.5.2 Total Time Duration of Various Subjects Semester Wise

2.5.5.2.1 Mechanical Stream (B1.1)

SEMESTER: SECOND

TOTAL NUMBER OF HOURS: 600

S.NO.	NAME OF SUBJECT	MODULE NO.	TOTAL (Hours)	THEORY (Hours)	PRACTICAL (Hours)		
					LAB/CR	ON SOAA/C	AIR INDIA
1.	Electrical Fundamental	3	210	126	84	0	0
2.	Digital Tech. Instrument System	5	150	90	48	0	12
3.	Electronics Fundamental	4	60	36	24	0	0
4.	Turbine Aeroplane, Aerodynamics Structures & System - I	11 A	180	98	40	0	42
	TOTAL HOURS		600	350	196	0	54

2.5.5.2 Total Time Duration of Various Subjects Semester Wise

2.5.5.2.1 Mechanical Stream (B1.1)

SEMESTER: THIRD

TOTAL NUMBER OF HOURS: 600

S.NO.	NAME OF SUBJECT	MODULE NO.	TOTAL (Hours)	THEORY (Hours)	PRACTICAL (Hours)		
					LAB/CR	ON SOAA/C	AIR INDIA
1.	Turbine Aeroplane, Aerodynamics Structures & System - II	11A	450	268	80	0	102
2.	Material & Hardware	6	150	90	22	0	38
	TOTAL HOURS		600	358	102	0	140

2.5.5.2 Total Time Duration of Various Subjects Semester Wise

2.5.5.2.1 Mechanical Stream (B1.1)

SEMESTER: FOURTH

TOTAL NUMBER OF HOURS: 600

S.NO.	NAME OF SUBJECT	MODULE NO.	TOTAL (Hours)	THEORY (Hours)	PRACTICAL (Hours)		
					LAB/CR	ON SOAA/C	AIR INDIA
1.	Gas Turbine Engines	15	444	260	76	0	108
2.	Propellers	17A	156	84	14	0	58
	TOTAL HOURS		600	344	90	0	166



School of Aeronautics (Neemrana)

Syllabus
of
Aircraft Maintenance Engineering
Category B1.1-Mechanical Stream
Semester I –IV
(DGCA-CAR 66)

MODULE - 7A : MAINTENANCE PRACTICES**SEMESTER : FIRST****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	[7.1] Safety Precautions : Aircraft & Workshop				3					
	* Aspects of safe working practices including precautions to take when working with electricity, gases especially oxygen, oils & chemicals.	General & safety precautions while working with								
		a. Electricity	1	SOA/M7/S/1		2	1.	To acquaint with safe working in the workshops		LAB
		b. Various gases like oxygen	1	SOA/M7/S/2				a. Oxygen workshops	1	
		c. Oils & various chemicals	1	SOA/M7/S/3				b. Oil workshops c. Chemical workshops	1 1	
	* Also, instruction in 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.	Remedial measures to be taken in case of	1							
		a. Fire or		SOA/M7/S/4-5						
		b. Accident								
		Types of fire extinguishers & knowledge of extinguishing agents		SOA/M7/S/6-7						
2.	[7.2] Workshop practices				3					
	* Care of tools, control of tools, use of workshop materials	Care to be taken when handling with	2							
		a. Tools		SOA/M7/S/8-10		2	2.	Care and maintenance of workshop tools and material	2	LAB
		b. Workshop materials		SOA/M7/S/11-12						
	* Dimensions, allowances & tolerances, standards of workmanship	Understanding terms : Allowances, Dimensions, workmanship standards.	1							
	* Calibration of tools & equipments, calibration standards	Calibration of various tools & equipments, calibration standards	1							

MODULE - 7A : MAINTENANCE PRACTICES **SEMESTER : FIRST**

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
3.	[7.3] Tools				3					
	* Common hand tool types	1. Marking & Measuring Tools	05			3	3.	To learn and practice the use of marking and measuring tools	12	LAB
	* Common power tool types	i. Steel Rule		SOA/M7/S/13				i. Steel Rule		
	* Operation & use of precision measuring tools	ii. Combination set		SOA/M7/S/13				ii. Combination set		
		iii. Calipers (Inside and outside)		SOA/M7/S/14				iii. Calipers (Inside and outside)		
		iv. Scribes		SOA/M7/S/15				iv. Scribes		
		v. Surface Gauge		SOA/M7/S/16				v. Surface Gauge		
		vi. Divider		SOA/M7/S/17				vi. Divider		
		vii. Trammel		SOA/M7/S/18				vii. Trammel		
		viii. Bevel Protector		SOA/M7/S/13				viii. Bevel Protector		
		ix. Punches		SOA/M7/S/19				ix. Punches		
		x. Angle plate		SOA/M7/S/20				x. Angle plate		
		xi. Try square		SOA/M7/S/21				xi. Try square		
		2. Cutting Tools	04			3	4.	To learn and practice the use of cutting tools	4	LAB
		i. Saws		SOA/M7/S/22				i. Saws		
		ii. Chisel		SOA/M7/S/23				ii. Chisel		
		iii. Files		SOA/M7/S/24-26				iii. Files		
		iv. Scrapers		SOA/M7/S/27				iv. Scrapers		
		v. Snipes		SOA/M7/S/28				v. Snipes		
		3. Striking, Benchwork and Fitting Tools	04			3	5.	To learn and practice the use of striking, benchwork and fitting tools.	10	LAB
		i. Hammers		SOA/M7/S/29				i. Hammers		
		ii. Screw Drivers		SOA/M7/S/30-33				ii. Screw Drivers		
		iii. Spanners		SOA/M7/S/34-37				iii. Spanners		
		iv. Pliers		SOA/M7/S/38-39				iv. Pliers		

MODULE - 7A : MAINTENANCE PRACTICES

SEMESTER : FIRST

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		4. Work Holding Tools	01			3	6.	To learn and practice the use of work holding tools.	02	LAB
		i. Vices		SOA/M7/S/40-41				i. Vices		
		ii. Vee Blocks		SOA/M7/S/42				ii. Vee Blocks		
		iii. 'C' Clamps / 'U' Clamps		SOA/M7/S/43				iii. 'C' Clamps / 'U' Clamps		
		5. Precision Measurement Tools & Gauges	17			3	7.	To learn and practice the use of precision tools & measuring instruments	20	LAB
		i. Micrometers						i. Micrometers		
		a. Screw Thread Micrometer		SOA/M7/S/44				a. Screw Thread Micrometer		
		b. Depth Micrometer		SOA/M7/S/45				b. Depth Micrometer		
		c. Inside and outside Micrometer		SOA/M7/S/46-47				c. Inside and outside Micrometer		
		d. Vernier Micrometer		SOA/M7/S/48				d. Vernier Micrometer		
		ii. Vernier Calipers, Vernier Height Gauge, Vernier Depth Gauge		SOA/M7/S/49-50				ii. Vernier Calipers, Vernier Height Gauge, Vernier Depth Gauge		
		iii. Plug Gauge		SOA/M7/S/45				iii. Plug Gauge		
		iv. Filler Gauge		SOA/M7/S/50				iv. Filler Gauge		
		v. Slip Gauges (Gauge Block)		SOA/M7/S/51				v. Slip Gauges (Gauge Block)		
		vi. Radius Gauge		SOA/M7/S/52				vi. Radius Gauge		
		vii. Wire Gauge		SOA/M7/S/52				vii. Wire Gauge		
		viii. Dial Test Indicator		SOA/M7/S/53				viii. Dial Test Indicator		
		ix. Sine Bar		SOA/M7/S/54				ix. Sine Bar		
		x. Screw Pitch Gauge		SOA/M7/S/55				x. Screw Pitch Gauge		
		xi. Ring Gauge		SOA/M7/S/45				xi. Ring Gauge		
		xii. Snap Gauge		SOA/M7/S/56				xii. Snap Gauge		

MODULE - 7A : MAINTENANCE PRACTICES**SEMESTER : FIRST****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		6. Thread Cutting Tools	02			3	8.	To learn and practice the use of thread cutting tools.	02	LAB
		i. Dies		SOA/M7/S/57				i. Dies		
		ii. Taps		SOA/M7/S/58				ii. Taps		
		7. Reamers & Drills	02	SOA/M7/S/59-60		3	9.	To learn and practice the use of reamers and drills.	02	LAB
		i. Twist Drill		SOA/M7/S/60-61				i. Twist Drill		
		8. Power Hacksaw	01	SOA/M7/S/62		3	10.	To learn and practice the use of power hack saw	01	LAB
		9. Lathe, Types of lathe and Milling Machine	06	SOA/M7/S/63		3	11.	To learn and practice the use of lathe and Milling machine	05	LAB
		i. Parts of Lathe Machine		SOA/M7/S/64				i. Principal parts of lathe machine		
		ii. Principal Lathe Operations						ii. Operation of lathe machine		
		a. Facing		SOA/M7/S/65				a. Facing		
		b. Turning		SOA/M7/S/66-67				b. Turning		
		c. Step Facing		SOA/M7/S/68				c. Step Facing		
		d. Grooving		SOA/M7/S/69				d. Grooving		
		e. Knurling		SOA/M7/S/70				e. Knurling		
		iii. Milling Maching		SOA/M7/S/71-72				iii. Milling Machine		
	* Lubrication equipment & methods	Concept of lubrication lubricants	02							LAB
		1. Lubrication methods				3	12.	To demonstrate the operation of lubricant	02	
		a. By hand		SOA/M7/S/73				a. By hand		
		b. By grease gun		SOA/M7/S/74				b. By grease gun		
		2. Periodicity								
		a. Daily & periodic oiling								
		b. Maintaining the stored parts by grease/oil		SOA/M7/S/75						

MODULE - 7A : MAINTENANCE PRACTICES

SEMESTER : FIRST

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Operation, function & use of electrical general test equipment	Operation, function & use of electrical general test equipment	03							
		1. DC measuring instruments								
		a. Multimeter		SOA/M7/S/76						
		b. Voltmeter		SOA/M7/S/77						
		c. Ammeter		SOA/M7/S/78						
		2. AC measuring instruments								
		a. Frequency meter		SOA/M7/S/79						
4.	[7.4] Avionic General Test Equipment				2					
	* Operation, function and use of Avionic general test equipment	Multimeter	02			2	13.	To learn the use of multimeter	1	LAB
		1. Analog multimeter		SOA/M7/S/80						
		2. Digital multimeter		SOA/M7/S/81						
		Insulation Tester (Megger)	1	SOA/M7/S/82		2	14.	To learn the use of insulation tester	1	LAB
						2	15.	Cable tracing practice, continuity and insulation check on cable runs continuity and insulation test on aircraft circuit use of megger testers (#).	1	LAB
		Bonding Tester	½	SOA/M7/S/83		2	16.	To learn the use of Bonding Tester	1	LAB
							17.	To perform Milivolt drop check at cable joints & terminal ends.	1	LAB
		Clamp Meter	½	SOA/M7/S/84		2	18.	To learn the use of Clamp meter	1	LAB
		CRO (Cathode Ray Oscilloscope)	02	SOA/M7/S/85		2	19.	To learn the use of CRO	2	[ELECTRONIC LAB]

MODULE - 7A : MAINTENANCE PRACTICES**SEMESTER : FIRST****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
5.	[7.5] Engineering Drawings, Diagrams & Standards	1. Introduction, importance of engineering drawing in aviation	½		2					
		2. Care and use of drawing instruments	½							
	Drawing types and diagrams	1. Types of Engineering Drawings	2							
		a. Production Drawing		SOA/M7/S/86						
		b. Assembly Drawing		SOA/M7/S/87						
		c. Exploded view assembly Drawing		SOA/M7/S/88						
		d. Installation Drawing		SOA/M7/S/89						
		2. Letter writing	½	SOA/M7/S/90		2	20.	Letter writing	1	DRAWING LAB
	Conventions + symbols used in Engineering Drawing	1. Fitting on aircrafts	½			2	21.	Aircraft plumbing fittings	1	DRAWING LAB
		2. Convention for electrical components	½	SOA/M7/S/91		2	22.	Electrical symbols	1	DRAWING LAB
		3. Standard material and shape symbols	½	SOA/M7/S/92		2	23.	Material and shape symbols	1	DRAWING LAB
		4. Theoretical circuit and wiring diagrams	½			2	24.	Circuits and wiring diagrams	2	DRAWING LAB
	Dimensions	Rules, types and methods	½			2	25.	Dimensioning rules, methods & systems	1	DRAWING LAB
	Tolerances	Limits, fits and tolerances	1	SOA/M7/S/93		2	26.	Illustrating tolances. Demonstration of following fits :	2	DRAWING LAB
		a. Types of fits		SOA/M7/S/94				a. Clearance fits		
								b. Transition fits		
								c. Interference fits		

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SEMESTER : FIRST

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	Projections	1. Projections - types of projections	3			2	27.	Types of projections to explain the types of projections by drawing the projections of A cuboid.	1	DRAWING LAB
		a. Orthographic		SOA/M7/S/94						
		b. Isometric		SOA/M7/S/95						
		c. Oblique		SOA/M7/S/96						
		d. Perspective		SOA/M7/S/97						
		2. Theory of Orthographic projections	3			2	28.	a. Projection planes		
		a. Projection planes		SOA/M7/S/98				b. Difference between 1 st and 3 rd angle system	1	DRAWING LAB
		b. 1 st angle & 3 rd angle systems		SOA/M7/S/99						
		c. Conversion of pictorial drawings to orthographic in 1 st & 3 rd angle systems				2	29.	Conversion of pictorial view to orthographic views	2	DRAWING LAB
	Identifying title block information	1. General sheet layout margins, title block, revision block, bill of materials, grid system	1	SOA/M7/S/100		2	29.	General sheet layout, margins, title block, revision blocks and grid system	1	DRAWING LAB
		2. Types of lines used in Engineering Drawing	½	SOA/M7/S/101		2	31.	Types of lines	1	DRAWING LAB
	Microfilm, microfiche & computerised presentations	Presentation methods	1							
		a. Microfilms		SOA/M7/S/102						
		b. Microfiches		SOA/M7/S/103						
		Uses, advantages and disadvantages								
	Specification 100 of Air Transport Association (ATA) of America	1. Familiarisation with ATA - 100	½	SOA/M7/S/104						
		2. What is ATA - 100	½							
		3. How to refer it	½							

MODULE - 7A : MAINTENANCE PRACTICES

SEMESTER : FIRST

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	Aeronautical & other applicable standards including ISO, AN, MS, NAS & MIL	15. Introduction to the following standard system related to aviation	1			2	32.	Drawing of the various aircraft hardware using following standards ISO, MS, AN, NAS, MIL	3	DRAWING LAB
		a. ISO								
		b. AN								
		c. MS								
		d. NAS								
		e. MIL								
		Aeronautical publications, manufacturers series bulletins manuals, catalogues, aircraft logs, airworthiness directives, type certification datasheet.								
	Schematic diagrams & wiring diagrams	e. Schematic diagrams	1	SOA/M7/S/92						
		f. Wiring diagrams	1							
6.	[7.6] Fits and Clearances				2					
	Drill sizes for bolt holes, classes of fits	Classes of Fits	1			2	33.	To acquaint with different classes of fits.	1	LAB
		a. Class 1								
		b. Class 2								
		c. Class 3								
		d. Class 4								
		Drill Sizes	1			2	34.	2. To acquaint with the different types of drill sizes	1	LAB
		a. Letter series		SOA/M7/S/105						
		b. Number series		SOA/M7/S/106						
		c. Fractional series		SOA/M7/S/107						

MODULE - 7A : MAINTENANCE PRACTICES**SEMESTER : FIRST****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	Schedule of fits and clearances for aircraft and engines	Schedule of fits & clearance	1							
		a. Aircraft								
		b. Engines								
	Limits for bow, twist and wear	a. Limits for bow	1							
		b. Twist								
		c. Wear								
	Standard methods for checking shafts, bearings and other parts	Lubrication	1							
		Inspection								
7.	[7.7] Electrical wiring inter connection system (EWIS)				3					
	* Continuity, insulation and bonding techniques and testing.	Continuity test	1	SOA/M7/S/108		3	35.	To carry out continuity test	1	LAB
		Insulation test	1	SOA/M7/S/109		3	36.	To carry out insulation test	1	LAB
		Bonding technique and test	1	SOA/M7/S/110		3	37.	Bonding checks, use of bonding tester (#)	2	LAB
	* Use of crimping tools : Hand and hydraulic operated	Use of hand and hydraulic operated crimping tool	1	SOA/M7/S/111		3	38.	To learn use of hand operated crimping tool	2	LAB
						3	39.	To learn use of hydraulic operated crimping tool	2	LAB
	* Testing of crimp joints	Testing (inspection) of crimp joints	1							
	* Connector pin removal and insertion	Connector pin removal and insertion	1	SOA/M7/S/112		3	40.	To learn connector pin removal and insertion technique	1	LAB
	* Co-axial cables : Testing and installation precautions	Co-axial cables	1	SOA/M7/S/113		3	41.	To acquaint with testing of co-axial cable	2	
		1. Testing								
		2. Precautions								

MODULE - 7A : MAINTENANCE PRACTICES**SEMESTER : FIRST**

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Wiring protection technique : Cable looming and loom support, cable clamps, protective sleeving techniques including heat shrink wrapping, shielding.	Wiring protection technique	1							
		1. Cable looming		SOA/M7/S/114						
		2. Loom support		SOA/M7/S/115						
		3. Cable clamps		SOA/M7/S/116						
		Protective sleeving technique	1			2	42.	To learn protective sleeving technique	2	LAB
		1. Heat shrink wrapping								
		2. Shielding								
	EWS Installation	i. inspection	1		2					
		ii. Repair								
		iii. Maintenance & cleanliness standard								
8.	[7.8] Riveting	a. Riveted joints, rivet spacing and pitch :	1							
		b. Tools used for riveting and dimpling:								
		c. Inspection of riveted joints								
9.	[7.9] Pipes and Hoses	a. Bending and belling/flaring aircraft pipes:	1		2		43.	To know about different types of pipes used in aircraft..	2	LAB
		b. Inspection and testing of aircraft pipes and hoses								
		c. Installation and clamping of pipes								

MODULE - 7A : MAINTENANCE PRACTICES **SEMESTER : FIRST**

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
10.	[7.10] Springs	a. Inspection and testing of springs	½		2					
11.	[7.11] Bearings	a. Testing, cleaning and inspection of bearings;	1		2		44.	To know different bearings used in aircraft	1	LAB
		b. Lubrication requirements of bearings :								
		c. Defects in bearing and their causes								
12.	[7.12] Transmissions	a. Inspection of gears, backlash;	1		2		45.	To acquaint with aircraft push-pull rod system	2	LAB
		b. Inspection of belts and pulleys, chains and sprockets;								
		c. Inspection of screw jacks, lever devices , push-pull rod systems								
13.	[7.13] Control Cables	a. Swaging of endfitting	1		2		46.	To acquaint with cables used in aircraft	2	LAB
		b. Inspection and testing of control cables								
		c. Bowden cables; aircraft flexible control systems								
14.	[7.14] Material handling									
	7.14.1 Sheet Metal	a. Marking out and calculation of bend allowance;	1		2		47.	To know about the sheet metal forming	2	LAB
		b. Sheet metal working, including bending and forming								
		c. Inspection of sheet metal work								

MODULE - 7A : MAINTENANCE PRACTICES

SEMESTER : FIRST

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	7.14.2 Composite and non-metallic	a. Bonding practices;	1		2					
		b. Environmental conditions;								
		c. Inspection methods								
15.	[7.15] Welding, Brazing, Soldering & Bonding									
a.	Soldering methods, inspection of soldered joints	1. Soldering	1		2	2	48.	To learn and practice the use of the following welding operations (#)		LAB
		a. Soft soldering		SOA/M7/S/117				a. Soft soldering	2	
		b. Hard soldering		SOA/M7/S/118				b. Hard soldering	2	
		c. Flux etc.						c. Flux etc.	1	
		d. Testing of soldered joints						d. Testing of soldered joints	2	
b.	Welding & Brazing method	2. Welding methods, types of welding	2	SOA/M7/S/119-121	2	2	49.	To learn and practice the use of the following welding operations		LAB
		a. Gas welding		SOA/M7/S/122				a. Gas welding	2	
		b. Electric arc welding		SOA/M7/S/123				b. Electric arc welding	2	
		c. Resistance welding-seam welding		SOA/M7/S/124				c. Resistance welding	2	
		d. Submerged arc welding		SOA/M7/S/125				d. Submerged arc welding	1	
		e. TIG & MIG welding		SOA/M7/S/125-126				e. TIG & MIG welding	4	
		3. Brazing methods	1			2	50.	To learn and practice the use of the Brazing.	2	LAB
	* Inspection of welded & brazed joints	Inspection of welded & brazed joints	½	SOA/M7/S/127-128						
	* Bonding methods & inspection of bonded joints	Bonding methods & inspection carried out relating various bonded joints	½							

MODULE - 7A : MAINTENANCE PRACTICES**SEMESTER : FIRST****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
16.	[7.16] Aircraft Weight and Balance									
	(a) Centre of gravity /balance limit calculation : use of relevant documents	1. Purpose	½		2					
		2. Need for weighing	½							
		3. Theory of weight & balance	1	SOA/M7/S/129						
		4. Datum location and centre of gravity	1	SOA/M7/S/130						
	(b) Preparation of aircraft for weighing	1. Weighing procedure	½	SOA/M7/S/131	2	2	51.	To know and understand weighing procedure on aircraft	5	LAB
	Aircraft weighing	2. Preparation of aircraft for weighing	½	SOA/M7/S/132						
		3. Jacking & levelling	1	SOA/M7/S/133						
		4. Weighing	1							
		5. Documentation	½							
17.	[7.17] Aircraft Handling and Storage	1. Equipments used for towing	½	SOA/M7/S/134	2					
	* Aircraft towing/taxing and associated safety precautions	2. Procedure of towing	½	SOA/M7/S/135						
		3. Precautions observed while towing	½							
		4. Procedure of taxiing	½							
		5. WHO is authorised for towing/taxing	½							
		6. Precautions observed while taxiing.	½			2	52.	To demonstrate towing / taxiing of aircraft	4	LAB
	* Aircraft Jacking, chocking, securing and associated safety precautions	1. Knowledge of different types of jacks	½	SOA/M7/S/136			53.	To know about different types of jacks	2	LAB
		2. Jacking and lowering	½	SOA/M7/S/137						
		3. Precautions observed while jacking and lowering.	½	SOA/M7/S/138-139		2	54.	To acquaint with the procedures of chocking, picketing jacking levelling on aircraft	5	LAB

MODULE - 7A : MAINTENANCE PRACTICES**SEMESTER : FIRST****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Aircraft Storage methods	Discussion over storage	1							
		1. Short term storage	1							
		2. Long term storage & precautions	1							
		3. Documentation	1							
	* Refuelling/Defuelling procedures	1. Identification & knowledge of fuel/grade/octane	½							
		2. Discussion about refueller and sampling of fuel	½							
		3. Pressure/underwing refuelling	½							
		4. Manual/overwing refueling	½	SOA/M7/S/140						
		5. Precautions observed while refueling/defuelling.	½	SOA/M7/S/141		2	55.	To know and understand refueling & defueling procedure on aircraft.	4	LAB
		6. Documentation	½							
	* Deicing/Anti-icing procedures	Icing	½							
		1. Types of icing	½	SOA/M7/S/142						
		2. Different methods of anti-icing	½	SOA/M7/S/143						
		3. Pneumatic anti-icing	½	SOA/M7/S/144						
		4. Electrical anti-icing	½	SOA/M7/S/144A						
		5. Alcohol spray	½	SOA/M7/S/145						
		6. Pneumatic De-icing system boots/shoes	½	SOA/M7/S/146						
	* Electrical, hydraulic & pneumatic ground supplies	1. Source of electrical supply	½	SOA/M7/S/147						
		2. Source of hydraulic supply	½	SOA/M7/S/148						
		3. Source of pneumatic supply	½	SOA/M7/S/149						
		4. Knowledge of above system	½							

MODULE - 7A : MAINTENANCE PRACTICES**SEMESTER : FIRST****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		5. Precautions observed while handling above equipment	½	SOA/M7/S/150		2	56.	To demonstrate the operation of electrical(GPU), Pneumatic (Jetstarter) & Hydraulic power test rig.	5	LAB
		6. Maintenance of above equipment	½							
	* Effects of environmental condition on aircraft handling & operation	Effects of icing and turbulence	½							
		Effects of altitude	½							
		Effects of humidity, temperature, pressure & density	½							
18.	[7.18] Disassembly, inspection, repair and assembly techniques									
	a. Corrosion removal, assessment and re-protection	1. Inspection	½		3					
		2. Treatment of structural parts.	½							
		3. Removal of corrosion products	½			2	57.	To learn various corrosion control methods		LAB
		4. Treatment of components	½					a. Treatment of aluminium alloy corrosion	2	
		5. Assessment of corrosion damage	½					b. Treatment of alloy steel corrosion	2	
		6. Methods of protection						c. Treatment of magnesium alloy corrosion	2	
		a. Prevention of corrosion	½					d. Treatment of galvanic corrosion.	2	
		b. Treatment of aircraft parts	1							
		c. The control of corrosion	1							
	Types of defects and visual inspection techniques	a. Types of defects and visual inspection	1							
	b. General repair methods, structural repair manual;				2					
	Ageing, fatigue and corrosion control programmes									
	c. Non-destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods	1. Oil and chalk processes	1		2	2	58.	To learn various types of NDT methods		LAB
		2. Penetrant dye process	1	SOA/M7/S/151				a. Oil and chalk method	3	
								b. Dye penetrant and flourescent method	3	

MODULE - 7A : MAINTENANCE PRACTICES**SEMESTER : FIRST****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		3. Magnetic flaw detection	1	SOA/M7/S/152-154				c. Magnetic flaw detection	2	
		4. Fluorescent penetrant	1							
		5. Endoscope inspections	1	SOA/M7/S/155		1	59.	To learn various types of NDT methods		LAB
		6. Ultrasonic flaw detection and thickness measurement	1	SOA/M7/S/156				a. Ultrasonic method	2	
		7. Radiological examination of aircraft structure.	1	SOA/M7/S/157				b. Radiology method	2	
		8. Eddy current method	1	SOA/M7/S/158-160				c. Eddy current method	2	
	d. Disassembly and re-assembly techniques	c. Assembly procedures of disassemblies & trouble shooting	½	SOA/M7/S/161-162	2					
	e. Trouble shooting techniques	d. Theory and practice	½		2					
19.	[7.19] Abnormal Events				2					
	* Inspections following lightning strike & H.I.R.F. penetration	1. Structural inspection	½							
		a. Wings, Fuselage	½							
		b. Empenage	½							
		c. Landing gear	½							
		d. Engine nacell	½			2	60.	To acquaint with structural inspection procedures carried out on aircraft parts (a) wings (b) empenage (c) landing gear (d) engine nacelle	5	LAB
	* Inspections following abnormal events such as heavy landings & flight through turbulence.	1. Airframe structural Insp.	½							
		2. Upper & lower wing surface of wing	½							
		3. Fuel leak	½							
		4. Bulk head	½							
		5. Top and bottom fuselage	½							

MODULE - 7A : MAINTENANCE PRACTICES**SEMESTER : FIRST****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
20.	[7.20] Maintenance procedure				2					
	* Maintenance planning	1. Reliability monitoring	½			2	61.	To become acquaint with Engineering Statistics report reliability monitoring etc.	3	LAB
		2. Deffect monitoring	½							
		3. Remedial measures	½							
		4. Inspection	½							
		5. Repair	½							
		6. Minor repair/major repair	½							
		7. Hard time, ontime, condition monitoring	½							
		8. Stagging the aircraft operation	½							
	* Modification Procedures	1. Discussion about modification	½							
		2. What is a modification and why it is needed	½							
		3. Procedures of documentation	½							
		4. To meet operational requirements	½							
		5. To remove existings defects in manufacturing design	½							
		6. Completion & recording	½							
	* Stores procedures	1. General requirement & condition	½							
		2. Temperature & relative humidity	½							
		3. Protective material for storage	½							
		4. Use of desicant	½							
		5. Raks & bins	½							
		6. Rotation of issue of storage items/components	½							

MODULE - 7A : MAINTENANCE PRACTICES **SEMESTER : FIRST**

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Certification/Release procedures	Issuance of certificate of release	½							
		1. Form (Page - F - 88)	½							
		2. Method	½							
		3. Certificate of maintenance and release	½							
	* Interface with aircraft operation	Discussion on the subject	½							
		How to deal with operational requirement and trouble shooting	½							
	* Maintenance, inspection/quality controle/quality assurance	1. Quality controle & its manual	½			2	62.	To become acquaint with different manuals like Quality Control Manual, Maintenance System Manual	3	LAB
		2. Quality assurance & its manual	½							
		3. Practices & methods	½							
		4. Quality controle manager/Dy. manager	½							
		5. Quality system/Quality controle cell	½							
		6. Quality assurance	½							
		7. Quality controle cum assurance manual	½							
		8. Quality controle Assurance manual (Appendix G)	½							
		9. Quality controle system procedure	½							
		10. On the spot check by quality contol team	½							

MODULE - 7A : MAINTENANCE PRACTICES**SEMESTER : FIRST****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Additional Maintenance Procedures	Procedure								
		1. Service bulletins requiring additional structural inspection of specific areas at certain intervals	½							
		2. Suplimental structural inspection	½							
		3. Repair & modification	½							
		4. Corrosion precaution and control	½							
		5. Repair assesment program	½							
	* Control of life limited components	1. Control by reliability method	½							
		a. Unschedule removal	½							
		b. Confirmed failure	½							
		c. Reported failure per 1000 hr.	½							
								TOTAL NO. OF PRACTICAL HRS. AT LAB	193	
								TOTAL NO. OF PRACTICAL HRS. ON AIRCRAFT	00	
								TOTAL NO. OF PRACTICAL HRS. AT CLASS ROOM	00	
								TOTAL NO. OF PRACTICAL HRS. AT AIRINDIA	00	
		TOTAL NO. OF HRS. (T)	177					TOTAL NO. OF HRS. (P)	193	

MODULE - 8 : BASIC AERODYNAMICS**SEMESTER : FIRST****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	[8.1] Physics of atmosphere				2					
	* International standard atmosphere	(ISA) Mesosphere, Ionosphere, Exosphere	3	SOA/M8/S/1						
	* Application to aerodynamics	a. Temperature		SOA/M8/S/2						
		b. Pressure								
		c. Density								
		d. Viscosity		SOA/M8/S/3						
		e. Humidity								
2.	[8.2] Aerodynamics				2					
	* Airflow around a body	a. Bernoulli's Principle	3	SOA/M8/S/4						
		b. Motion								
		c. Velocity & acceleration								
		d. Newton's law of motion								
		e. Aerofoils		SOA/M8/S/5						
		f. Lifting surfaces		SOA/M8/S/6-7		2	1.	To acquaint with lifting surfaces	4	ON AIRCRAFT
		g. Lift		SOA/M8/S/8						
		h. Airflow & pressure over aerofoil		SOA/M8/S/9						
	* Boundary layer, laminar & turbulent flow, free stream flow, relative airflow, upwash & downwash, vortices, stagnation induced drag.									
	* The terms : Camber, Chord, Mean Aerodynamic Chord, Profile Drag, Centre of Pressure, Angle of Attack, Wash in & Wash out, Fineness Ratio, Wing Shape & Aspect Ratio	a. Plan Form	10	SOA/M8/S/10						
		b. Sectional Form		SOA/M8/S/11						
		c. Chord Line		SOA/M8/S/12						

MODULE - 8 : BASIC AERODYNAMICS**SEMESTER : FIRST****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		d. Mean Camber Line		SOA/M8/S/13						
		e. Trailing Edge Angle		SOA/M8/S/14-15						
		f. Wing Area		SOA/M8/S/16		2	2.	To acquaint with Aerofoil Terminology	6	ON AIRCRAFT
		g. Wing Span		SOA/M8/S/17						
		h. Average Chord		SOA/M8/S/17						
		i. Aspect Ratio		SOA/M8/S/17						
		j. Sweep Back Angle		SOA/M8/S/17						
		k. Mean Aerodynamic Chord		SOA/M8/S/17						
		l. Dihedral Angle		SOA/M8/S/18						
		m. Camber		SOA/M8/S/19						
		n. Chord Line & Angle of Attack		SOA/M8/S/20						
		o. Centre of Pressure		SOA/M8/S/21-22						
		p. Movement of Centre of Pressure								
		q. Angle of Incidence		SOA/M8/S/23						
		r. Parts of an Airplane		SOA/M8/S/24-26						
		s. Wings		SOA/M8/S/27						
		t. Aspect Ratio		SOA/M8/S/28						
		u. Fineness Ratio		SOA/M8/S/29						
		v. Profile Drag		SOA/M8/S/30						
		w. Parasite Drag		SOA/M8/S/31						
		x. Induced Drag		SOA/M8/S/32						

MODULE - 8 : BASIC AERODYNAMICS**SEMESTER : FIRST****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Thrust, weight, aerodynamic resultant	a. Four forces	2	SOA/M8/S/43						
		b. Condition of equilibrium		SOA/M8/S/44						
		c. Difficulties in balancing the four forces		SOA/M8/S/45-46						
		d. For tail plane aeroplane		SOA/M8/S/47						
		e. For tail-less aeroplane		SOA/M8/S/48						
	* Generation of lift & drag : Angle of attack, lift coeff. , drag coeff, polar curve, stall	a. Lift coefficient	2	SOA/M8/S/49		2				
		b. Drag coefficient		SOA/M8/S/50						
		c. Lift/drag ratio curve		SOA/M8/S/51						
		d. Stalling of aerofoil		SOA/M8/S/52						
		e. Pitching moment of aerofoil		SOA/M8/S/53						
	* Aerofoil contamination including ice, snow first	a. General	2	SOA/M8/S/54		2	3.	To acquaint with Pneumatic de-icing system.	4	ON AIRCRAFT
		b. Icing effects								
		c. Thermal anti-icing system		SOA/M8/S/55						
		d. Anti-icing using engine bleed air		SOA/M8/S/56						
3.	[8.3] Theory of flight				2					
	* Relationship between lift, weight, drag & thrust	a. Thrust/drag/centre of gravity.	2	SOA/M8/S/57-58						
		b. Power available & required curves		SOA/M8/S/59						
		c. Maximum level flight speed		SOA/M8/S/60						
		d. Minimum level flight speed								

MODULE - 8 : BASIC AERODYNAMICS**SEMESTER : FIRST****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Steady state flights performance	a. Steady level flight	3	SOA/M8/S/61						
		b. Pitching moment		SOA/M8/S/62						
		c. Variation of speed in level flight		SOA/M8/S/63						
		d. Attitude in level flight		SOA/M8/S/64						
		e. Effect of weight on level flight		SOA/M8/S/65						
	* Glide ratio	a. Climbing	5	SOA/M8/S/66		2				
		b. Forces in the climb		SOA/M8/S/67						
		c. Angle of climb		SOA/M8/S/68-69						
		c. Various climb speed		SOA/M8/S/70-72						
		e. Effects of a steady wind on climb								
		f. Gliding		SOA/M8/S/73						
		g. Wrong airspeed steepens the glide		SOA/M8/S/74						
		h. Flaps steepens the glide		SOA/M8/S/75						
		i. Reduced weight doesnot change glide angle		SOA/M8/S/76-78						
		j. Gliding distance over ground								
		k. Estimation of gliding distance in still air.								
		l. Flatten the descent by increasing power		SOA/M8/S/79-80						
		m. Effect of wind on glide		SOA/M8/S/81						
		n. Effect of weight on glide		SOA/M8/S/82						
		o. Effect of weight on endurance								
		p. Gliding angle		SOA/M8/S/82						

MODULE - 8 : BASIC AERODYNAMICS**SEMESTER : FIRST****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Theory of the turn	a. Equation of co-ordinated turn	2	SOA/M8/S/83						
		b. Skidding								
	* Influence of load factor : Stall, flight envelope & structural limitations	a. Lift formula & the stall	3							
		b. Effect of weight on the stall		SOA/M8/S/84						
		c. Wing tip stalling		SOA/M8/S/85						
		d. Methods of preventing tip stalling								
		e. Trailing-edge vortices		SOA/M8/S/86-87						
		f. Wing tip vortices		SOA/M8/S/88-89						
	* Lift Augmentation	a. Introduction	5							
		b. Principal method in use		SOA/M8/S/90						
		c. Slats		SOA/M8/S/91						
		d. Automatic slats								
		e. Use of slats		SOA/M8/S/92						
		f. Aircraft slat				2	4.	To acquaint with lift augmentation devices	6	ON AIRCRAFT
		g. Stalling with slat								
		h. Variable wing area								
		i. Variable camber								
		j. Flaps		SOA/M8/S/93-97						
		k. Action of flaps		SOA/M8/S/98						
		l. Types of flaps		SOA/M8/S/99						
		m. Effect of flap on L/D ratio								
		n. Use of flap for take-off		SOA/M8/S/100						

MODULE - 8 : BASIC AERODYNAMICS**SEMESTER : FIRST****STREAM : MECHANICAL**

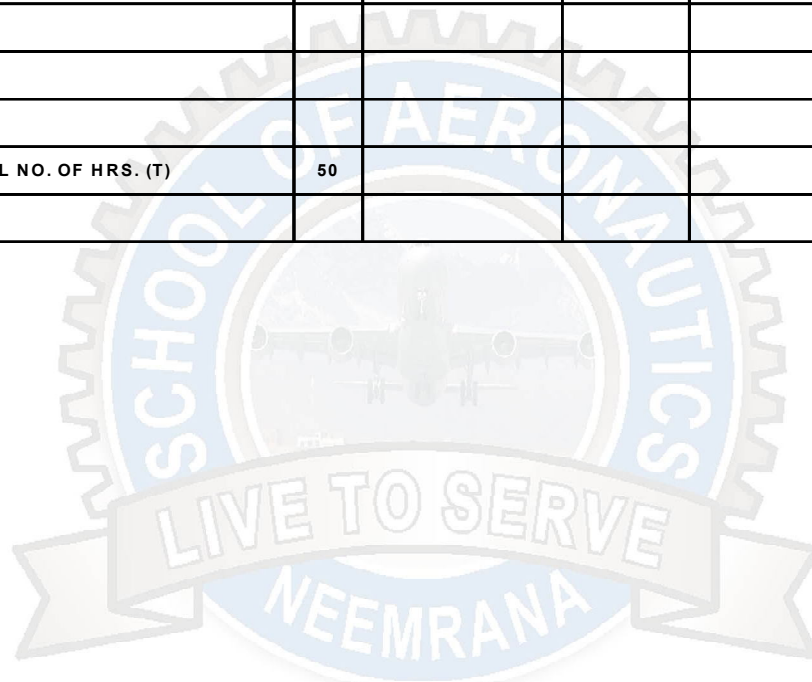
S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		o. Raising the flap in flight		SOA/M8/S/101						
		p. Advantages of flaps								
		q. Disadvantage of flaps								
		r. Slotted aerofoils		SOA/M8/S/102						
		s. Theory		SOA/M8/S/103						
		t. Types of slot		SOA/M8/S/104						
		u. Fixed slot		SOA/M8/S/105						
		v. Use of slot		SOA/M8/S/106						
4.	[8.4] Flight stability & dynamics	a. Static stability	08	SOA/M8/S/107	2					
	* Longitudinal, lateral & directional stability	b. Longitudinal stability		SOA/M8/S/108						
		c. Lateral stability		SOA/M8/S/109						
		d. Directional stability		SOA/M8/S/110						
		e. Factors affecting longitudinal stability		SOA/M8/S/111						
		f. Static margin & neutral point		SOA/M8/S/112						
		g. Factors affecting lateral stability		SOA/M8/S/113-115						
		h. Factors affecting directional stability		SOA/M8/S/116-122						
		i. Spiral divergence		SOA/M8/S/123						
		j. Directional divergence		SOA/M8/S/124						
		k. Dutch roll		SOA/M8/S/125						

MODULE - 8 : BASIC AERODYNAMICS

SEMESTER : FIRST

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		l. Aerodynamic balancing		SOA/M8/S/126-130						
		m. Aero-elastic effects		SOA/M8/S/131-132						
		n. Adverse yaw		SOA/M8/S/133-135						
								TOTAL NO. OF PRACTICAL HRS. AT LAB	00	
								TOTAL NO. OF PRACTICAL HRS. ON AIRCRAFT	20	
								TOTAL NO. OF PRACTICAL HRS. AT CLASS ROOM	00	
								TOTAL NO. OF PRACTICAL HRS. IN AIR INDIA	00	
		TOTAL NO. OF HRS. (T)	50					TOTAL NO. OF HRS. (P)	20	



MODULE - 10 : AVIATION LEGISLATION**SEMESTER : FIRST****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	Air Law	1. Aircraft Acts & Rules	8	SOA/M10/S/1-15	2					
2.	Airworthiness Requirements	1. Introduction to Civil Aviation Requirements	1		2					
		2. CAR Section - 2, Series - B, Part - I	3	SOA/M10/S/26-27	3	2	1.	To become acquaint with minimum equipment list, emergency checklists etc.	3	ON AIRCRAFT
		3. CAR Section - 2, Series - C, Part - I	3	SOA/M10/S/30-33	3					
		4. CAR 145	7							
		5. CAR M	6							
		6. CAR Section - 2, Series - E, Part - I	2	SOA/M10/S/52-62	4	2	2.	To become acquaint with different manuals like Quality Control Manual, Maintenance System Manual etc.	3	ON AIRCRAFT
		7. CAR 21	8							
		8. CAR Section - 2, Series E, Part - VI	1	SOA/M10/S/68-69	2		3.	To become acquaint with engineering statistics report, Reliability reports etc	3	ON AIRCRAFT
		9. CAR Section - 2, Series E, Part - VIII	1	SOA/M10/S/68-69	2					
		10. CAR Section - 2, Series - E, Part - XI	2	SOA/M10/S/72-74	2					
		11. CAR Section - 2, Series - E, Part - XII	3	SOA/M10/S/75-76	2					
		12. CAR - 147	7	SOA/M10/S/77-81	2					
		13. CAR- 147 (Basic)	5							
3.	Airworthiness Requirements - II	1. CAR Section - 2, Series - F, Part - I	2	SOA/M10/S/1-3	2	2	4.	To understand the placement of registration & nationality marking on aircraft	2	ON AIRCRAFT
		2. CAR Section - 2, Series - F, Part - III	2	SOA/M10/S/13-20	2					
		3. CAR Section - 2, Series - F, Part - VII	1	SOA/M10/S/22	2					
		4. CAR Section - 2, Series - F, Part - XIII	1	SOA/M10/S/38-42	2					
		5. CAR Section - 2, Series - F, Part - XIV	1		2					
		6. CAR Section - 2, Series - F, Part - XV	1	SOA/M10/S/47-50	2	2	5.	To become acquaint with aircraft flight manual	2	ON AIRCRAFT
		7. CAR Section - 2, Series - F, Part - XX	1	SOA/M10/S/60-64	2					
		8. CAR Section - 2, Series - F, Part - XXII	1	SOA/M10/S/66-71	2					

MODULE - 10 : AVIATION LEGISLATION**SEMESTER : FIRST****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		9. CAR Section - 2, Series - F, Part - XXIII	1		2					
		10. CAR Section - 2, Series - H, Part - II	1		2					
		11. CAR Section - 2, Series - H, Part - III	1		2					
		12. CAR Section - 2, Series - I, Part - II	2	SOA/M10/S/76-94	2		6.	To acquaint with the placement of various instruments fitted on aircraft.	1	ON AIRCRAFT
		13. CAR Section - 2, Series - I, Part - V	2	SOA/M10/S/96-99	2					
		14. CAR Section - 2, Series - I, Part - VI	1	SOA/M10/S/103-104	2					
		15. CAR Section - 2, Series - I, Part - VII	1	SOA/M10/S/105-111	2					
		16. CAR Section - 2, Series - I, Part - VIII	1	SOA/M10/S/112-116	2					
		17. CAR 66	9		2					
		18. CAR Section - 2, Series - L, Part - VII	1	SOA/M10/S/126	2					
		19. CAR Section - 2, Series - L, Part - IX	1		2					
		20. CAR Section - 2, Series - L, Part - XI	1	SOA/M10/S/134	2					
		21. CAR Section - 2, Series - L, Part - XV	2	SOA/M10/S/136	2					
		22. CAR Section - 2, Series - L, Part - XVI	1	SOA/M10/S/145-146	2					
		23. CAR 66 Section - 2, Series - M, Part - I	1	SOA/M10/S/147-151	2					
		24. CAR Section - 2, Series - O, Part - VI	1	SOA/M10/S/214-219	2		7.	To acquaint with operation manual	2	ON AIRCRAFT
		25. CAR Section - 2, Series - O, Part - XIV	1	SOA/M10/S/228-229	2					
		26. CAR Section - 2, Series - R, Part - II	1	SOA/M10/S/232-233	2					
		27. CAR Section - 2, Series - R, Part - IV	2	SOA/M10/S/235-236	2					
		28. CAR Section - 2, Series - T, Part - II	2	SOA/M10/S/249-253	2					
		29. CAR Section - 2, Series - X, Part - II	1	SOA/M10/S/254-258	2					
		30. CAR Section - 2, Series - X, Part - III	1	SOA/M10/S/259-264	2					
		31. CAR Section - 2, Series - X Part - IV	1	SOA/M10/S/265-274	2					
		32. CAR Section - 2, Series - X, Part - VI	2	SOA/M10/S/276-281	2	2	8.	To acquaint with various log books	2	ON AIRCRAFT

MODULE - 10 : AVIATION LEGISLATION**SEMESTER : FIRST****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		33. CAR Section - 2, Series - X, Part - VII	1	SOA/M10/S/282-304	2	2	9.	To acquaint with various documents to be carried on board	2	ON AIRCRAFT
		34. CAR Section - 2, Series - X, Part - VIII	1	SOA/M10/S/305-309	2					
		35. Airworthiness Advisory Circulars (AAC) & Aeronautical Information Circulars (AIC).	5	SOA/M10/S/88-89	2	2				
								TOTAL NO. OF PRACTICAL HRS. AT LAB	0	
								TOTAL NO. OF PRACTICAL HRS. ON AIRCRAFT/SOA	20	
								TOTAL NO. OF PRACTICAL HRS. AT CLASS ROOM	0	
								TOTAL NO. OF PRACTICAL HRS. AT AIRINDIA	0	
		TOTAL NO. OF HRS. (T)	112					TOTAL NO. OF HRS. (P)	20	

MODULE - 9 : HUMAN FACTORS

SEMESTER : FIRST

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	[9.1] General	Introduction	1		2					
		Murphy's law								
		Meaning of human factor								
		Disciples of human factor								
		Conceptual model of human factor								
		a. Shell model		SOA/M9/S/1		2	1.	Demonstrate the different angles of shell model.	1	CLASS ROOM
		b. Incidents attributable to human factor								
2.	[9.2] Human performance and limitations	* Vision	1	SOA/M9/S/2	2					
		a. Light		SOA/M9/S/3		2	2.	To understand factors effecting safety of a/c operation which depends on light	1	CLASS ROOM
		i. Characteristics & management								
		ii. Colour								
		* Eye								
		a. Physiology		SOA/M9/S/4						
		b. Farsightedness & shortsightedness		SOA/M9/S/5						
		* Hearing								
		a. Voice & the speech mechanism		SOA/M9/S/6		2	3.	To understand factors effecting safety of a/c operation which depends on human ability to produce & hear sound	1	CLASS ROOM
		b. Hearing deficiencies		SOA/M9/S/7						
		* Information Processing								
		a. Sensing								
		b. Perception								
		c. Model of the human information processing system		SOA/M9/S/8						
		d. Attention & Perception								
		* Memory	½							
		a. Short term memory		SOA/M9/S/9						

MODULE - 9 : HUMAN FACTORS
SEMESTER : FIRST

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		b. Long term memory								
		c. Memory enhancement								
		d. Effect of sleep & age								
		e. Continuous and serial activities								
		* Claustrophobia	½							
		a. Environment tolerances								
		b. Physical access								
3.	[9.3] Social Psychology	* Responsibility	½	SOA/M9/S/10	1	1	4.	Various factors of social psychology effecting the airworthiness of aircraft	1	CLASS ROOM
		a. Individual to organisation								
		* Motivaton and de-motivation	½							
		a. Approach to motivation		SOA/M9/S/11						
		b. Complacency, professionalism & discipline								
		c. Influcny motivation at work								
		* Peer pressure	½							
		Cultural issues								
		* Team working	½							
		* Management and supervision	½							
		a. Management contribution to safety								
		b. Four Ps		SOA/M9/S/12						
		c. Risk management		SOA/M9/S/13						
		* Leadership	1							
		a. Meaning of leadership								
		b. Characteristics of a leader								
		c. Task and problems of a leader								

MODULE - 9 : HUMAN FACTORS

SEMESTER : FIRST

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
4.	[9.4] Factors Affecting Performance	* Fitness/Health	½	SOA/HF/S14	2					
		a. Definition of fitness				2	5.	Various factors of health, stress, workload, sleep, alcohol etc. affecting the aviation personnel	1	CLASS ROOM
		b. Factors affecting fitness								
		* Stress	½							
		a. In aviation								
		b. Domestic influences								
		* Sleep and fatigue, shiftwork	1							
		a. Fatigue								
		b. Body rhythm disturbance								
		c. Sleep								
		* Alcohol, medication, drug abuse	½							
		a. Alcohol								
		i. Performance								
		ii. Metabolism								
		iii. Safety								
		* Workload	½							
		a. Overload								
		b. Underload								
		* Time pressure & deadlines								
5.	[9.5] Physical Environment	* Noise & fumes	1	SOA/M9/S/15	1					
		a. Definition of noise								
		b. Sources								
		c. Effects								

MODULE - 9 : HUMAN FACTORS
SEMESTER : FIRST

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		* Illumination	½							
		a. Nature of quantity								
		b. Glare				2	6.	Factors of environmental conditions effecting the aviation personnel.	1	
		* Climate and temperature	2							
		a. Controlling or temperature								
		b. Human generate heat								
		c. Physicological effects of temp.								
		d. Cold temp.								
		e. Humidity								
		* Motion and Vibration	½							
		a. Definition of vibration								
		b. Operational significance								
		c. Protection								
		* Working environment	½							
		a. Stress								
6.	[9.6] Tasks	a. Physical work	1	SOA/M9/S/16	1					
		b. Repetitive tasks								
		c. Visual inspection								
		d. Complex systems	½							
7.	[9.7] Communication	* Within and between teams	1	SOA/M9/S/17	2					
		a. Types of communicaiton								

MODULE - 9 : HUMAN FACTORS
SEMESTER : FIRST

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		b. Verbal communication				2	7.	a. Acquaint with need of clear & precise communication methods. b. Demonstration of proper communication skills.	1	CLASS ROOM
		c. Body language								
		d. Word intelligibility								
		* Work logging and according	½							
		a. Documentation								
		b. Manuals, handbooks and technical papers								
		c. Questionnaires and forms		SOA/M9/S/18						
		* Keeping up to date, currency	½							
		Dissemination of information								
8.	[9.8] Human Error	* Error model and theories	1	SOA/M9/S/19	2					
		a. Error rates								
		b. Accident proneness		SOA/M9/S/20						
		* Types of errors in maintenance tasks	½							
		a. Random, systematic and sporadic		SOA/M9/S/21						
		b. Omission, commission and substitution								
		c. Reversible and Irreversible								
		* Implication of errors	½							
		a. Errors and their consequences								
		* Avoiding and managing errors	½							
		a. Two pronged attack								
9.	[9.9] Hazards in the workplace	* Recognising and avoiding hazards	½	SOA/M9/S/22	2					
		a. Conduct or investigation								

[illegible][illegible][illegible][illegible]

MODULE - 3 : ELECTRICAL FUNDAMENTALS

SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	[3.1] Electron theory	1. Electron theory	1½	SOA/M3/S/1	1					
	* Structure & distribution of electrical charges withing atoms, molecules, ions, compounds.	2. Structure & distribution of electrical charges within	1½	SOA/M3/S/2						
		a. Atoms								
		b. Molecules								
		c. Ions								
		d. Compounds								
	* Molecular structure of conductors, semi-conductors & insulators	3. Molecular structures of	1½	SOA/M3/S/3						
		a. Conductors	1½							
		b. Semiconductors								
		c. Insulators								
2.	[3.2] Static electricity & conduction									
	* Static electricity & distribution of electrostatic charges	1. Static electricity	½	SOA/M3/S/4	2					
		2. Distribution of electrostatic charges.	½	SOA/M3/S/4						
	* Electrostatic laws of attraction & repulsion	3. Electrostatic laws	1½	SOA/M3/S/5						
		a. Attraction								
		b. Repulsion								
	* Unit of charge, and coulomb's law	4. Units of charge	½							
		5. Coulomb's law	½							
	* Conduction of electricity in solids, liquids, gases & a vacuum.	6. Conduction of electricity in	1½							

MODULE - 3 : ELECTRICAL FUNDAMENTALS

SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		a. Solids								
		b. Liquids								
		c. Gases								
		d. Vacuum								
3.	[3.3] Electrical terminology	Electrical Terminology			2	2	1.	To understand the feasibility of Electrical terminology and components in (AC/DC) circuits.	1	LAB
	* The following terms, their units & factors affecting them:- potential difference, electromotive force, voltage current, resistance, charge, conductance, conventional current flow, electron flow.	1. Introduction of the following terms, units & factors affecting them				2	2.	To know and understand the basic electrical circuit	1	LAB
		a. Potential difference	½	SOA/M3/S/6						
		b. Electromotive force	½	SOA/M3/S/6						
		c. Voltage, current, resistance, conductance and charge	½							
		d. Conventional current flow & electron flow	½	SOA/M3/S/7						
4.	[3.4] Generation of electricity				1					
	* Production of electricity by the following methods : light, heat, friction, pressure, chemical action, magnetism & motion	1. Production of electricity by the following methods	2							
		a. Light, heat								
		b. Friction, pressure								
		c. Chemical action								
		d. Magnetism, motion								

MOLDULE -3 : ELECTRICAL FUNDAMENTALS **SEMESTER : SECOND**

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
5.	[3.5] DC sources of electricity				2	2	3.	To become acquaint with	2	LAB
	* Construction & basic chemical action of primary cells	1. Construction & basic chemical action of	2					a. Lead acid battery		
		a. Primary cell and secondary cell		SOA/M3/S/8				b. Alkaline battery		
	* Secondary cells, lead acid cells, nickel cadmium cells	b. Lead acid cells		SOA/M3/S/9		2	4.	To perform charging and discharging of	2	LAB
		c. Nickel cadmium cell		SOA/M3/S/10				a. Lead acid cell		
								b. Nickel cadmium cell		
	* Alkaline cells	d. Alkaline cells		SOA/M3/S/10						
	* Internal resistance & its effect on a battery	2. Internal resistance and its effect on a battery	½	SOA/M3/S/11		2	5.	To find the internal resistance of a battery.	1	LAB
	* Cell connected in series & parallel	3. Cells connection in	1	SOA/M3/S/12						
		a. Series								
		b. Parallel				2	6.	To perform the series and parallel arrangement of cell.	1	LAB
	* Construction, materials & operation of thermocouple	4. Construction, materials & operation of thermocouples	1							
	* Operation of photocells	5. Operation of photocells	½							
6.	[3.6] DC circuits									
	* Ohms law, Kirchoff's Voltage & Current laws	1. Ohm's law	½	SOA/M3/S/13	2	2	7.	To verify ohm's law	1	LAB
		2. Kirchoff's law's	1	SOA/M3/S/14						
		a. Voltage law				2	8.	To verify Kirchoff's voltage law	1	LAB
		b. Current law				2	9.	To verify Kirchoff's current law	2	LAB
	* Calculations using the above laws to find resistance voltage & current.	3. Calculation using the above laws to find resistance, voltage & current.	1½							
	* Significance of the internal resistance of a supply.	4. Significance of the internal resistance of a supply	1							

MODULE - 3 : ELECTRICAL FUNDAMENTALS

SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
7.	[3.7] Resistance / Resistor									
a.	* Resistance & affecting factor	1. Resistance & affecting factors	1½		2					
	* Specific resistance	2. Specific resistance								
	* Resistors colour code, values & tolerances, preferred values, wattage ratings	3. Resistance colour coding	1½	SOA/M3/S/15		2	10.	Using multimeter for measuring & comparing value of resistance with those written in colour code	1	LAB
		a. Values & tolerances								
		b. Preferred values, wattage ratings								
	* Resistors in series & parallel	4. Resistors in series & parallel	1	SOA/M3/S/16		2	11.	To perform different arrangement of resistors, voltage and current.	1	LAB
	* Calculation of total resistance using series, parallel & series parallel combinations	5. Calculation of total resistance using	1							
		a. Series								
		b. Parallel								
		c. Series & parallel								
	* Operation & use of Potentiometers & Rheostats	6. Operation and use of potentiometers & rheostats	1	SOA/M3/S/17		2	12.	a. To compare the emf of two given primary cells using a potentiometer.	1	LAB
						2		b. To determine the internal resistance of a primary cell using potentiometer	1	
	* Operation of Wheatstone Bridge	7. Operation of wheatstone bridge	1	SOA/M3/S/18		2	13.	To find the unknown resistance using Wheatstone Bridge	1	LAB
b.	* Positive & negative temperature coefficient conductance. Fixed resistors, stability tolerance & limitation, methods of construction	1. Positive & negative temperature coefficient of conductance	1	SOA/M3/S/19	1					
		2. Fixed resistors	1½	SOA/M3/S/19		1	14.	To identify the different types of resistors and to classify by their color codes.	1	LAB
		a. Stability								
		b. Tolerance								
		c. Limitations								
		d. Methods of construction		SOA/M3/S/20						

MODULE - 3 : ELECTRICAL FUNDAMENTALS

SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Variable resistors, thermistors, voltage dependent resistors	3. Variable resistor thermistors, voltage dependent resistors	1½	SOA/M3/S/21-22		2	15.	To identify different types of thermistor	1	LAB
						2	16.	To perform voltage regulation using variable resistor.	1	
	* Construction of potentiometer & rheostat	4. Construction of potentiometers & rheostat	1½			2	17.	To perform rheostat used as a potential divider	1	LAB
	* Construction of Wheatstone Bridge	5. Construction of Wheatstone Bridge								
8.	[3.8] Power	1a. Power	1½		2	2	18.	To measure the single phase AC power by using wattmeter	1	LAB
	* Power, work & energy (Kinetic & Potential)	b. Work								
		c. Energy (Kinetic & Potential)								
	* Dissipation of power by a resistor	2. Dissipation of power by a resistor	½			2	19.	To measure the dissipation of power across a known resistor	1	LAB
	* Power formula	3. Power formula	½							
	* Calculations involving power, work & energy	4. Calculations involving power, work & energy	½							
9.	[3.9] Capacitance /Capacitor									
	* Operation & function of capacitor	1. Operation & function of a capacitor	½	SOA/M3/S/23	2	2	20.	To identify various types of capacitors	2	LAB
	* Factor affecting capacitance, area of plates, distance between plates, no. of plates, dielectric	2. Factor affecting capacitance	1							
		a. Area of plates								
		b. Distance between plates								
		c. Number of plates								
		d. Dielectric								
	* Dielectric constant, working voltage, voltage rating	3. Dielectric constant working voltage, voltage rating	1½							
	* Capacitor types, construction & function	4. Capacitors types	1	SOA/M3/S/24-25						
		a. Constructions								
		b. Functions								

MODULE - 3: ELECTRICAL FUNDAMENTALS

SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Capacitor colour coding	5. Capacitor colour coding	0.75	SOA/M3/S/26		2	21.	To classify capacitors with their colour coding	2	LAB
	* Calculations of capacitance and voltage in series & parallel circuits	6. Calculations of capacitance & voltage	0.75	SOA/M3/S/27						
		a. In series circuit								
		b. In parallel circuit								
	* Exponential charge & discharge of a capacitor & time constants	7. Exponential charge and discharge of a capacitor, time constants	1	SOA/M3/S/28		2	22.	To perform charging and discharging of a capacitor	2	LAB
	* Testing of capacitors	8. Testing of capacitors	½							
10.	[3.10] Magnetism									
a.	* Theory of magnetism	a. Faraday's law	2		2					
		b. Permeability								
		c. Magnetic flux		SOA/M3/S/29			23.	To perform induced emf & current by using magnetic flux variation	1	LAB
		d. Magnetic field intensity								
	* Properties of a magnet	Characteristics of lines of magnetic flux	1							
	* Action of magnet suspended in the Earth's magnetic field	a. Magnetic axis and geographic axis	1							
		b. Cause of earth's magnetism		SOA/M3/S/30			24.	To perform magnetisation and demagnetisation in conductors	1	LAB
		c. Magnetism of earth's magnetic field								
	* Magnetisation and demagnetisation	a. Magnetisation	1							
		b. Magnetisation curves								
		c. Demagnetisation								
	* Magnetic shielding	a. Shielding principle	1							
		b. EM/RFI gasket design								
		c. EM/RFI Pressure gasket design								
	* Various types of magnetic material	a. Magnetic moment of atoms	1½			2	25.	To classify magnetic materials	1	LAB
		b. Diamagnetic material		SOA/M3/S/31						
		c. Paramagnetic material		SOA/M3/S/32						
		d. Ferromagnetic material		SOA/M3/S/33						

MODULE - 3 : ELECTRICAL FUNDAMENTALS
SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Electromagnets construction and principles of operation	a. Solenoid	1							
		b. Relays								
	Hand clasp rules to determine: magnetic field around current carrying conductor	a. Left hand rules	1			2	26.	To determine magnetic field around current carry conductors	1	LAB
		b. Right hand rules		SOA/M3/S/34						
b.	* Magnetomotive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents	a. Magnetomotive force	2		2					
		b. Field strength,								
		c. Magnetic flux density								
		d. Permeability								
		e. Hysteresis loop								
		f. Retentivity		SOA/M3/S/35						
		g. Coercive force reluctance								
		h. Saturation point								
		i. Eddy currents								
	Precautions for care and storage of magnets	Precautions for care and storage of magnets	½							
11.	[3.11]Inductance/Inductor				2					
	* Faraday's Law	a. First law	½							
		b. Second law								
	* Action of inducing a voltage in a conductor moving in a magnetic field	Dynamically induced e.m.f.	½			2	27.	To perform induced voltage in a conductor moving in a magnetic field	1	LAB
	* Induction principles	a. Relation between magnetism & electricity	½	SOA/M3/S/36						
		b. Production of induced e.m.f. & current		SOA/M3/S/37						
	* Effects of the following on the magnitude of an induced voltage: magnetic field strength, rate of change of flux, number of conductor turns	a. Induced voltage	2			2	28.	To determine induced voltage by using different number of conductor turns	1	LAB
		b. Magnetic field strength								
		c. Rate of change of flux								
		d. number of conductor turn								

MODULE - 3 : ELECTRICAL FUNDAMENTALS**SEMESTER : SECOND****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Mutual induction	Mutual induction	½	SOA/M3/S/38						
	* The effect the rate of change of primary current and mutual inductance has on induced voltage	Mutually induced e.m.f.	½			2	29.	To perform mutual induction by variation of current in two coils	1	LAB
	* Factors affecting mutual inductance: number of turns in coil, physical size of coil, permeability of coil, position of coils with respect to each other	a. Coefficient of mutual inductance	1							
		b. Number of turns in coil								
		c. Physical size of coil								
		d. Permeability of coil								
	* Lenz's Law and polarity determining rules	a. Lenz's law	½	SOA/M3/S/39						
		b. Polarity determining rules								
	* Back emf, self induction	a. Back emf	½							
		b. Self induction		SOA/M3/S/40		2	30.	To perform self induction by emf induced in a coil	1	LAB
	* Saturation point	Saturation point	½							
	* Principle uses of inductors	Uses of inductors	½			2	31.	To acquaint with uses of inductors	1	LAB
12.	[3.12] DC motor/generator				2					
	* Basic motor & generator theory	1. Basic motor & generator theory	1½	SOA/M3/S/41						
	* Construction & purpose of components in DC generator	2. DC generator	1½	SOA/M3/S/42						
		a. Construction				2	32.	To become familiar with constructional & operational details of DC genrator.	1	LAB
		b. Purpose of its components								
		c. Types of armature winding(Lap and wave winding)								
		d. Types of DC generator		SOA/M3/S/43						
		i. Separately excited				2	33.	To determine & draw the characteristics of separately excited generator.	2	LAB
		ii. Self excited				2	34.	To determine & draw the characteristics of self excited generator.	2	LAB
	* Operation & factors affecting output & direction of current flow in DC generators	3a. Operation of DC shunt generator	2	SOA/M3/S/44		1	35.	To find the magnetization characteristics of DC shunt generator	1	LAB
		b. Factors affecting								
		i. Output power				2	36.	To perform load test on shunt generator	1	LAB

MODULE - 3 : ELECTRICAL FUNDAMENTALS

SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		ii. Direction of current flow in DC generator								
	* Operation of factors affecting output power, torque, speed & direction of rotation of DC motors	4. DC motor	2½	SOA/M3/S/45						
		a. Operation								
		b. Factor affecting								
		i. Output power								
		ii. Torque speed		SOA/M3/S/46-47						
		iii. Direction of rotation								
	* Series wound, shunt wound & compound motors	5. Types of DC motors	2½	SOA/M3/S/48		2	37.	To become familiar with various type of D.C. Motor.	2	LAB
		a. Series wound								
		b. Shunt wound				2	38.	To determine & draw the characteristics of shunt wound motor	2	LAB
		c. Compound wound				2	39.	To determine & draw the characteristics of compound wound motor	2	LAB
	* Starter generator construction									
13.	[3.13] AC Theory				2					
	* Sinusoidal wave forms, phase, period, frequency cycle	1. Sinusoidal waveform	2½	SOA/M3/S/49		2	40.	To see an sinusoidal wave form on CRO and find the	2	LAB
		a. Phase						a. Phase		
		b. Period						b. Voltage		
		c. Frequency						c. Frequency		
		d. Cycle								
	* Instantaneous, average, RMS, peak, peak to peak current values & calculation of these values in relation to voltage, current & power	2a. Instantaneous value	2½	SOA/M3/S/50						
		b. Average value		SOA/M3/S/51						
		c. Root mean square		SOA/M3/S/52						
		d. Peak to peak current								
		e. Calculations of these value in relation to voltage, current & power								
	* Triangular/square waves	3. Triangular/square waves	2	SOA/M3/S/53		2	41.	To trace the Square wave form and triangular wave form on CRO.	1	LAB

MODULE - 3 : ELECTRICAL FUNDAMENTALS

SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Single and three-phase principle	4. Single and three phase principles	1	SOA/M3/S/54-55						
14.	[3.14] Resistive (R), Capacitive (C), Inductive (L), circuits.				2					
	* Phase relationship of voltage & current in L, C & R	1. Phase relationship of voltage & current in	2½	SOA/M3/S/56-57						
		a. Inductive circuit								
		b. Capacitive circuit								
		c. Resistive circuit								
	* R, L, C circuits parallel, series & series parallel	2. Circuit of LCR	2½	SOA/M3/S/58						
		a. Series								
		b. Parallel								
		c. Series & parallel								
	* Power dissipation in L, C & R circuit	3. Power dissipation in L, C & R circuit.	1							
	* Impedance, phase angle, power factor & current calculations	4a. Impedance	2½	SOA/M3/S/59-60						
		b. Phase angle								
		c. Power factor								
		d. Current calculation in L, C & R circuit								
	* True power, apparent power & reactive power calculations	5. Different power in an ac circuit	2½	SOA/M3/S/61		1	42.	To find the value of an AC circuit	3	LAB
		a. True power						1. True power		
		b. Apparent power						2. Apparent power		
		c. Reactive power						3. Reactive power		
		d. Their calculations								

MODULE - 3 : ELECTRICAL FUNDAMENTALS

SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
15.	[3.15] Transformer				2					
	* Transformer construction principles & operation	1a. Transformers construction	2	SOA/M3/S/62-63		2	43.	To become familiar with construction of transformer	2	A/C ELECT. LAB
		b. Operation principles								
	* Transformer losses & methods for overcoming.	2. Transformer losses & methods for overcoming them.	2							
	* Transformer action under load & no load condition	3. Transformer action	2	SOA/M3/S/64		2	44.	To perform transformer verification of transformation ratio	2	LAB
		a. No load				2	45.	To perform no load test on a transformer	1	LAB
		b. Short Circuit				2	46.	To perform short circuit test on a transformer	1	LAB
		c. Load				2	47.	To perform load test on a transformer	1	LAB
	* Power transfer, efficiency, polarity markings	4a. Power transformer	2							
		b. Efficiency								
		c. Polarity markings				2	48.	To perform polarity test of single phase transformer	1	A/C ELECT. LAB
	* Calculation of line & phase voltage & current	5. Calculation of	2							
		a. Line voltage & current								
		b. Phase voltage & current								
	* Calculation of power in a three phase system	6. Calculation of power in three phase system	2	SOA/M3/S/65-66						
	* Primary & secondary current, voltage, turns ratio	7. Primary & secondary current, voltage turns ratio.	½							
	* Power efficiency	8. Power efficiency	½							
	* Auto transformer	9. Auto transformer	½	SOA/M3/S/67						
16.	[3.16] Filters				1					
	* Operation, application & uses of the following filters.	1. Operation, application & uses of following filters	2½	SOA/M3/S/68-69		1	49.	To perform the test on a	2	LAB
	* Low pass, high pass, band pass, band stop	a. Low pass						a. Low pass filter		
		b. High pass						b. High pass filter		

MODULE - 3 : ELECTRICAL FUNDAMENTALS

SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		c. Band pass						c. Band pass filter	1	
		d. Band stop						d. Band stop filter	1	
17.	[3.17] AC generators				2					
	* Rotation of loop in a magnetic field & waveform produced	1. Rotation of loop in a magnetic field & waveform produced	2½							
	* Operation & construction of revolving armature & revolving field type AC generator	2. Operation & construction of revolving armature & revolving field type generator	2½	SOA/M3/S/70		2	50.	To become familiar with an alternator.	1	LAB
	* Single phase, two phase & three phase alternator	3. Types of alternator	2	SOA/M3/S/71		2	51.	To draw the characteristics of an AC generator	1	LAB
		a. Single phase								
		b. Three phase				2	52.	To draw the SCC of an alternator	2	LAB
						2	53.	To draw the OCC of an alternator	1	
	* Three phase star & delta connections advantages & uses	4. Three phase connections its advantage & uses	1½	SOA/M3/S/72		2	54.	Determine the characteristic of an alternator on three phase load	2	LAB
		a. Star connection								
		b. Delta connection and uses								
	* Permanent magnet generators.	5. Permanent magnet generators	½							
18.	[3.18] AC Motors				2					
	* Construction, principles of operation & characteristics of AC synchronous & induction motors both single & poly phase	1a. Construction, principles of operation								
		i. AC synchronous motor (single phase & three phase)	½	SOA/M3/S/73						
		ii. AC induction motor (single & three phase)	½							
		b. Characteristics of	½							
		i. AC synchronous motor	½							
		ii. AC induction motor	½	SOA/M3/S/74-75		2	55.	Draw the characteristics of single phase induction motor.	2	LAB
						2	56.	Draw the characters of 3-phase induction motor	2	

MODULE - 3 : ELECTRICAL FUNDAMENTALS

SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Methods of speed control & direction of rotation	2. Methods of speed control & direction of rotation	1½							
		a. Change of slip								
		b. Change of frequency								
		c. Cascade method of speed control		SOA/M3/S/76						
		d. Change of poles								
	* Methods of producing a rotating field : capacitor, inductor, shaded or split pole	3. Methods of producing a rotating field	1½	SOA/M3/S/77-78						
		a. Capacitor								
		b. Inductor								
		c. Shaded of split pole								
								TOTAL NO. OF PRACTICAL HRS. AT SOA (N) LAB	84	
								TOTAL NO. OF PRACTICAL HRS. ON AIRCRAFT/ SOA	00	
								TOTAL NO. OF PRACTICAL HRS. AT CLASS ROOM	00	
								TOTAL NO. OF PRACTICAL HRS. AT AIR INDIA	00	
		TOTAL NO. OF HRS.(T)	126					TOTAL NO. OF HRS.(P)	84	

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS**SEMESTER : SECOND****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	[5.2] Numbering systems				1	1	1	To know the testing of electronics instrument system cockpit display.	2	LAB
	* Numbering systems: Binary, Octal and Hexadecimal	1. Commonly used number systems	2	SOA/M5B1/S/01						
		a. Binary								
		b. Decimal								
		c. Octal								
		d. Hexadecimal								
	* Demonstration of conversion between the decimal and binary, octal and hexadecimal systems and vice-versa	1. Conversion from decimal to binary & vice-versa	2			1	2.	To perform decimal to binary conversion using BCD display	2	LAB
		2. Conversion from decimal to octal and vice-versa								
		3. Conversion from decimal to hexadecimal and vice-versa								
		4. Conversion from binary to octal and vice-versa								
		5. Conversion from binary to hexadecimal and vice-versa								
2.	[5.3] Data conversion				1					
	* Analogue data, digital data	1. Analogue data and its application	2							
		2. Digital data and its applications								
	* Operation and application of analogue to digital and digital to analogue convertors, inputs and outputs, limitations of various types	1. Data conversion								
		1. Analogue to digital convertor(A/D) : input and output, operation, applications and limitations of	4			2	3.	To perform analogue to digital conversion using following convertors	4	LAB
		a. Ramp type A/D convertor		SOA/M5B1/S/2				a. Ramp type		
		b. Successive approximation A/D convertor		SOA/M5B1/S/3-4				b. Successive approximation		

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS**SEMESTER : SECOND****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		c. Integration type A/D convertor		SOA/M5B1/S/5				c. Integration type		
		d. Dual slope A/D convertor		SOA/M5B1/S/6				d. Dual slope		
		2. Digital to analogue convertors (D/A) : input and output, operation, applications and limitations of	2			2	4.	To perform digital to analogue conversion using following convertors :-	4	LAB
		a. Weighted resistor D/A convertor		SOA/M5B1/S/7				a. Weighted resistor		
		b. R-2R ladder D/A convertor		SOA/M5B1/S/8				b. R-2R ladder		
3.	[5.4] Data buses				2		5.	To know the operation Data Buses in Aircraft Systems	1	LAB
	* Operation of data buses in aircraft systems including knowledge of ARINC and other specifications	1. Digital computer fundamentals	1							
		2. Transfer of digital data ARINC 429	½							
		3. Other specifications of ARINC	½							
		4. Aircraft network / ethernet	1							
4.	[5.5] Logic Circuits									
a.	* Identification of common logic gate symbols, tables and equivalent circuits	1. Types of logic gates : symbol and truth table of	4	SOA/M5B1/S/9-10	2	2	6.	To verify truth table of following gates	5	LAB
		a. NOT gate						a. NOT gate		
		b. AND gate						b. AND gate		
		c. OR gate						c. OR gate		
		d. NAND gate						d. NAND gate		
		e. NOR gate						e. NOR gate		
		f. Ex-OR gate						f. Ex - OR gate		
		g. Ex - NOR gate						g. Ex - NOR gate		
		2. Equivalent circuit of logic gates								
	* Applications used for aircraft systems schematic diagram	Application used for aircraft systems	1							

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS**SEMESTER : SECOND****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
5.	[5.6] Basic computer structure				2					
a.	Computer terminology (including bit, byte, software, hardware, CPU, IC and various memory devices such as RAM, ROM, PROM)	1. Data representation	1			2	7.	To identify major components of computer	2	LAB
		a. Bit								
		b. Byte								
		c. Nibble								
		2. Computer terminology	1							
		a. Software				2	8.	To know the operation of computers used in aircraft system	1	LAB
		b. Hardware								
		3. Block diagram of computer and its elements	1	SOA/M5B1/S/15						
		4. Central processing unit	1	SOA/M5B1/S/16						
		5. IC	1							
		6. Various memory devices	1							
		a. RAM				2	9.	To know the operation of softwares used in aircraft (CVR & FDR)	1	LAB
		b. ROM								
		c. PROM								
		d. EPROM								
		e. EEPROM.								
	* Computer technology (as applied in aircraft systems)	* Storage of data in various software system	1							
		* Availability of back-up realted to softwares								

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS

SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
6.	[5.1]Electronic Instrument Systems				2					
	Typical systems arrangements and cockpit layout of electronic instrument systems	a. Panels and layout	5	SOA/M5B1/S/01						
		b. Display units	5			2	10.	To acquaint with the layout of panels & display units	3	LAB
7.	[5.10] Fibre optics									
	* Advantages and disadvantages of fibre optic data transmission over electrical wire propagation	1. Advantages of fibre optic data transmission	1		1	1	11.	To perform data transmission using fibre optical cable in aircraft	4	LAB
		2. Disadvantages of fibre optic data transmission	1							
	* Fibre optic data bus	1. Optic fibre and fibre cables	1½	SOA/M5B1/S/2						
		2. Fibre characteristic and classification								
	* Fibre optic related terms	1. Refraction, reflection	1½	SOA/M5B1/S/3						
		2. Dispersion, diffraction, absorption, scattering		SOA/M5B1/S/4						
	* Terminations	1. Fibre optic components and system	1							
		a. Source		SOA/M5B1/S/5						
		b. Noise								
		c. Response time								
		d. Optical link								
		e. System		SOA/M5B1/S/6						
	* Couplers, control terminals remote terminals	1. Couplers	4							
		a. Fused tapered								

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS

SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		b. Splitting								
		c. Reflective star								
		2. Control terminals								
		3. Remote terminals								
	* Application of fibre optics in aircraft system	Application of fibre optics in aircraft system	1½							
8.	[5.11] Electronic displays				2		12.	To know the inspection of types of display in aircraft	1	LAB
	* Principles of operation of common types of displays used in modern aircraft, including Cathode Ray Tube, light emitting diodes and liquid crystal display	Cathode Ray Tube	2	SOA/M5B1/S/7		2	13.	To analyse the waveform, amplitude and frequency in CRO	6	LAB
		1. Introduction to CRT								
		2. Block diagram of CRT								
		3. Main parts of CRT	2							
		a. Glass plates								
		b. The electron gun								
		c. The deflection system								
		d. The fluorescent screen								
		4. Working of CRT								
		Light Emitting Diode	3			2	14.	To observe forward biasing effect on LED	2	LAB
		1. Principle of LED								
		2. Construction of LED		SOA/M5B1/S/8						
		3. Type of radiation mechanism in LED								

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS-II**SEMESTER : SECOND****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		a. Direct recombination								
		b. Indirect recombination								
		4. Material used for LED								
		a. GaAsP								
		b. GaAs								
		5. Operation of LED								
		6. Advantage of LED								
		Liquid Crystal Display	3			2	15.	To demonstrate LCD display	2	LAB
		1. Introduction to LCD								
		2. Construction of LCD		SOA/M5B1/S/9						
		3. Types of LCD								
		a. Dynamic scattering type								
		b. Field effect type								
		4. Advantage and disadvantage of LCD								
		5. Uses of LCD								
9.	[5.12] Electrostatic sensitive devices	1. Operation of the electrostatic sensitive devices	2		2	2	16.	To verify operation of ESD	3	LAB
	* Special handling of components sensitive to electrostatic discharges	2. Different types of electrostatic devices								
		3. Application of ESD								
		4. Handling of components								
	* Awareness of risks and possible damage, component and personnel anti-static protection devices	1. Safety measures	2							
		a. Awareness of risks and possible damage								
		b. Anti-static protection devices.								

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS**SEMESTER : SECOND****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
10.	[5.13] Software management control	1. Determination of quality of computer software	0.5		2					
	* Awareness of restriction airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.	2. Quality assurance program								
		3. Restrictions & other limitations including strict control over incorporation of changes in the data								
11.	[5.14] Electromagnetic environment				2					
	* Influence of the following phenomena on maintenance practices for electronic system	1. EMC	1			2	17.	To know the servicing & testing of lighting protection & electromagnetic compatibility devices.	1	LAB
		a. Principle of EMC								
		b. Influence of EMC on maintenance practices for electronic system								
	* EMC - Electromagnetic compatibility.	2. EMI	0.5							
	EMI - Electromagnetic interference.	a. Principle of EMI				2	18.	Simulating and practically observing various types of interferences in radio equipments	2	LAB
	HIRF - High intensity radiated field lightning/lightening protection	b. Influence of EMI on maintenance practices for electronic system								
		3. HIRF	2							
		a. Principle of HIRF								
		b. Influence of HIRF on maintenance practices for electronic system								
		c. Influence of lightening								
		d. Lightning protection				2	19.	Safety precaution associated with electrostatic discharge, radio frequency emission and microwave emission.	2	LAB
12.	[5.15] Typical Electronic/Digital Aircraft System				2					
	* General arrangements of typical electronic /digital aircraft system and associated BITE (Built in Test Equipment) testing such as									
	* ACARS - ARINC Communication and addressing and reporting system	General description of	2	SOA/M5B1/S/10		2	20.	To understand BITE testing of ACARS system of aircraft.	2	IN AIR INDIA
		1. AIRCOM System								

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS
SEMESTER : SECOND
STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		2. ACARS		SOA/M5B1/S/11						
		3. Satellite communication		SOA/M5B1/S/12						
	* ECAM (Electronic Centralised Aircraft Monitoring)	1. Introduction	2	SOA/M5B1/S/13		2	23	To understand the BITE testing of EFIS system in aircraft.	2	IN AIR INDIA
		2. General description of								
		a. Display units								
		b. Display modes		SOA/M5B1/S/14						
		c. Control panel		SOA/M5B1/S/15						
		d. System testing		SOA/M5B1/S/16						
	* EICAS (Engine Indicating and crew alerting system)	1. Introduction	2							
		2. General description of								
		a. Display unit		SOA/M5B1/S/17						
		b. Symbol generator		SOA/M5B1/S/18						
		c. Control panel		SOA/M5B1/S/19						
		d. Remote light sensor								
		2. Display presentations		SOA/M5B1/S/20-21						
		3. Failure annunciations								
		4. Data source selection								
		5. Display of air data								
	* FMS Flight Management System	General description of	2			2	22.	To understand BITE testing the FMS system used in aircraft	2	IN AIR INDIA
		1. Introduction								
		2. Typical systems		SOA/M5B1/S/22						
		3. Flight management system		SOA/M5B1/S/23						
		a. Flight management computer								
		b. Control and display unit								

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS
SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		c. Data pages and flight plan control		SOA/M5B1/S/24						
		d. System Configuration		SOA/M5B1/S/25						
	* FBW -Fly-By-Wire System	1. Introduction	5	SOA/M5B1/S/26						
		2. General description of								
		a. Advanced FBW concept								
		b. Architecture								
		c. Control laws								
		d. Pitch control		SOA/M5B1/S/27						
		e. Roll control		SOA/M5B1/S/28						
		f. Control interceptor								
	* GPS - Global Positioning System	1. Introduction	2½	SOA/M5B1/S/28-29		2	23.	To understand BITE testing of GPS system in aircraft.	2	IN AIR INDIA
		2. General description of								
		a. Space segment								
		b. Control segment								
		c. User segment								
	* IRS - Inertial Reference System	1. Introduction	3			2	24.	To understand BITE testing of IRS system in aircraft.	2	IN AIR INDIA
		2. General description of								
		a. Navigation fundamentals								
		b. Fundamental principle of a system								
		c. Ring laser gyroscope (RLG)		SOA/M5B1/S/30						
		d. Strapdown configuration								
		e. System malfunctions								
		f. Malfunction code								
	* TCAS - Traffic Alert Collision Avoidance System	1. Introduction	1			2	25.	To understand BITE testing of TCAS system in aircraft.	2	IN AIR INDIA
		2. TCAS Theory of operation	1	SOA/M5B1/S/31						
		* EFIS - Electronic centralized aircraft monitoring	1							
		* Integrated modular avionics	1							
		* Cabin system	½							
		* Information Systems	½							
								TOTAL NO. OF PRACTICAL HRS. AT CLASS ROOM	00	
								TOTAL NO. OF PRACTICAL HRS. AT SOA LAB	48	
								TOTAL NO. OF PRACTICAL HRS. IN AIRCRAFT/SOA	00	
								TOTAL NO. OF PRACTICAL HRS. AT AIR INDIA	12	
		TOTAL NO. OF HRS. (T)	90					TOTAL NO. OF HRS. (P)	60	

MODULE - 4 : ELECTRONIC FUNDAMENTALS **SEMESTER : SECOND**

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	[4.1] Semiconductors	Atomic structure	1	SOA/M4B1/S/1-3		2	1.	To acquaint with different types of semiconductors	1	LAB
2.	[4.1.1] Diodes	a. pn junction diode	1	SOA/M4B1/S/4	2	2	2.	To acquaint with P-N junction diode characteristics	2	LAB
		b. Depletion zone		SOA/M4B1/S/5						
		c. Biasing		SOA/M4B1/S/6						
		d. Leakage current				2	3.	To become familiar with diode testing	1	LAB
a.	Diode symbols	Diode symbols	1							
	Diode characteristics and properties	a. Volt.-amp. characteristics		SOA/M4B1/S/7						
		b. Breakdown voltage				2	4.	To acquaint with voltage amp. characteristics of the diode	2	LAB
	Diodes in series and parallel	Diodes in series and parallel	1			2	5.	Finding the internal resistance of diode	2	LAB
	Main characteristics and use of silicon controlled rectifiers *thyristors, light emitting diode, photo conductive diode, varistor, rectifier diodes	a. LED (To be discussed in s.no. 1-b)	1	SOA/M4B1/S/8		2	6.	a. Testing of LED b. Calculation of LED resistor value	0.5	LAB
		i. Characteristics		SOA/M4B1/S/9		2		c. LED characteristics	0.5	LAB
		ii. Breakdown voltage								
		b. SCR (To be discussed in s.no. 1-b)		SOA/M4B1/S/10		2	7.	SCR characteristics	1	LAB
		i. Characteristics		SOA/M4B1/S/11				i. Saturation characteristics		
		ii. Breakdown voltage rating						ii. No load iii. Full load		
		iii. Applications								
		c. Varistors (To be discussed in s.no. 1-b)	1			2	8.	Different types of varistors	1	LAB
		d. Rectifiers (To be discussed in s.no. 1-b)	1							
		i. Half wave rectifier		SOA/M4B1/S/12		2	9.	a. To acquaint with halfwave rectifier	0.5	LAB
		ii. Full wave rectifier		SOA/M4B1/S/13				b. To acquaint with fullwave rectifier	0.5	LAB
		iii. Photo conductive diode (To be discussed in s.no. 1-b)		SOA/M4B1/S/14						

MODULE - 4 : ELECTRONIC FUNDAMENTALS
SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	Functional testing of diodes	a. Ohmmeter	1			2	10.	To acquaint with functional testing of diodes	0.5	LAB
		b. DMM test (digital multimeter)								
3.	[4.1.2] Transistors	Transistors								
a.	* Transistor symbols	1. Transistor symbols	3	SOA/M4B1/S/37	1					
		a. NPN transistor symbol								
		b. PNP transistor symbol								
	* Component description and orientation	1. Introduction to BJT	3	SOA/M4B1/S/38						
		2. Types of BJT								
		a. NPN								
		b. PNP								
		3. Components of BJT	1	SOA/M4B1/S/39						
		a. Emitter								
		b. Base								
		c. Collector								
		4. Transistor connection	1							
		a. Common base		SOA/M4B1/S/40						
		b. common emitter		SOA/M4B1/S/41						
		c. Common collector		SOA/M4B1/S/42						
	* Transistor characteristics and properties	1. Characteristics of transistor : Input and Output characteristics of -	3							
		a. Common base characteristics		SOA/M4B1/S/43		1	11.	To obtain input and output characteristics in common base connection	2	LAB
		b. Common emitter characteristic		SOA/M4B1/S/44		1	12.	To obtain input and output characteristics in common emitter connection	2	LAB
		c. Common collector characterisitc		SOA/M4B1/S/45		1	13.	To obtain input and output characteristics in common collector connection	2	LAB

MODULE - 4 : ELECTRONIC FUNDAMENTALS**SEMESTER : SECOND****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		2. Properties of transistor	3							
		a. Input resistance property		SOA/M4B1/S/46						
		b. Output resistance		SOA/M4B1/S/47						
		c. Effective collector load		SOA/M4B1/S/48						
		d. Current gain								
		e. Voltage gain								
		f. Power gain								
4.	[4.1.3] Integrated circuits									
	* Description and operation of logic circuits and linear circuits/operational amplifiers	1. Introduction to integrated circuits	2	SOA/M4B1/S/89	1		14.	To Verify operational amplifier as	3.5	LAB
		2. Advantages of IC's						a) Integrator		
		3. Drawbacks of IC's						b) Differentiator		
		4. Scale of integration						c) Voltage Follower		
								d) Comparator		
5.	[4.2] Printed circuit boards.				1					
	* Description and use of printed circuit boards	1. Introduction to printed circuit boards	2	SOA/M4B1/S/101		1	15.	Construction details of PCB circuit	2	LAB
		2. Construction and designing of PCB								
		3. Uses of PCB								
6.	[4.3] Servomechanisms				1					
	* Understanding of the following terms : open and closed loop, follow up, servomechanism, analogue, transducer, null, damping, feedback, deadband;	1. Open loop systems	2	SOA/M4B1/S/102						

MODULE - 4 : ELECTRONIC FUNDAMENTALS

SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		2. Closed loop systems		SOA/M4B1/S/103						
		3. Feedback		SOA/M4B1/S/104						
		4. Follow-up		SOA/M4B1/S/105						
		5. Analogue transducers		SOA/M4B1/S/106						
		1. Servomechanism	2							
		a. Construction of servomotor and rate generator		SOA/M4B1/S/107						
		b. Position control servomechanism		SOA/M4B1/S/108						
		c. Speed control servomechanism		SOA/M4B1/S/109						
		i. Mechanical coupling								
		d. Response of servomechanism		SOA/M4B1/S/110						
		1. Damping	2							
		a. Viscous damping		SOA/M4B1/S/111						
		b. Velocity feedback damping		SOA/M4B1/S/112						
		c. Error rate damping		SOA/M4B1/S/113						
		d. Transient velocity damping		SOA/M4B1/S/114						
		e. Phase advance damping		SOA/M4B1/S/115						
	* Principles of operation and use of the following synchro system components : resolvers, differential, control and torque, E and I transformers, inductances transmitters.	1. Integral control	3							
		2. Trouble shooting of servomotor								
		3. Study of various synchros		SOA/M4B1/S/116						
		a. Resolver synchro		SOA/M4B1/S/117						
		b. Control synchro		SOA/M4B1/S/118						
		c. Torque synchro		SOA/M4B1/S/119						
		d. Differential synchro		SOA/M4B1/S/120						

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-I**SEMESTER : SECOND****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	[11.1] Theory of Flight									
	(a) Aeroplanes Aerodynamics and				1					
	Flight Controls									
	* Operation and effect of	A. Roll control	1	SOA/M-11A/S/1		1	1.	To acquaint with aircraft roll control	1	IN AIRINDIA
	– Roll control : aileron & spoilers	i. Aileron		SOA/M-11A/S/2						
		ii. Spoiler		SOA/M-11A/S/3						
	Pitch Control : Elevators, Stabilizers,	B. Pitch control	1			1	2	To acquaint with aircraft pitch control	1	IN AIRINDIA
	variable incidence stabilizers and	(i) Elevators		SOA/M-11A/S/4						
	canards	(ii) Stabilizers		SOA/M-11A/S/5						
		(iii) Variable incidence stabilizers and canards		SOA/M-11A/S/6						
	Yaw control, Rudder limiter	C. Yaw Control	1	SOA/M-11A/S/7		1				
		i) Rudder limiter		SOA/M-11A/S/8						
		ii) Elevons, Flapons		SOA/M-11A/S/9						
		iii) Ruddervators		SOA/M-11A/S/10						
	Control Using elevons ruddervators	Control using	1	SOA/M-11A/S/11						
		a) Elevons, Flapons		SOA/M-11A/S/12						
		b) Ruddervators		SOA/M-11A/S/13						
	High lift devices : slots, slats flaps	High lift devices	1	SOA/M-11A/S/14						
		(i) Slots		SOA/M-11A/S/15						
		(ii) Slats		SOA/M-11A/S/16						
		(iii) Flaps		SOA/M-11A/S/17						

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-I

SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	*Drag inducing devices spoiler, speed breaks, lift dumpers	Drag inducing devices	1	SOA/M-11A/S/18						
		a) Spoilers (Lift dumper)		SOA/M-11A/S/19						
		b) Speed brakes		SOA/M-11A/S/20						
		c) Lift dumpers		SOA/M-11A/S/21						
	*Effects of wing fences	(ii) Effect of wing fences	2	SOA/M-11A/S/22						
		(iii) Saw tooth leading edges		SOA/M-11A/S/23						
	*Boundary layer controls	(i) Using Vortex Generators	2	SOA/M-11A/S/24						
		(ii) Stall wedges		SOA/M-11A/S/25						
		(iii) Leading edge devices		SOA/M-11A/S/26						
	*Operations and Effect of Trim Tabs, Servo Tabs, Control Surfaces bias	Operation effect of	2	SOA/M-11A/S/27						
		a) Trim Tabs		SOA/M-11A/S/28						
		b) Servo Tabs		SOA/M-11A/S/29						
		c) Balancing the control surface		SOA/M-11A/S/30						
	[11.1.2] HIGH SPEED FLIGHT	High Speed Flight	1	SOA/M-11A/S/31	2					
	*Speed of sound, subsonic flight, transonic flight, supersonic flight	(i) Speed of sound								
		(ii) Subsonic Flight		SOA/M-11A/S/32						
		(iii) Transonic Flight		SOA/M-11A/S/33						
		(iv) Super Sonic Flight		SOA/M-11A/S/34						
	*MACH NUMBER, CRITICAL MACH NUMBER	(i) Mach Number	1	SOA/M-11A/S/35						
		(ii) Critical Mach Number		SOA/M-11A/S/36						

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-I
SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		(iii) Compressibility Buffet		SOA/M-11A/S/37						
		(iv) Shock Wave		SOA/M-11A/S/38						
		(v) Aerodynamic Heating		SOA/M-11A/S/39						
		(vi) Area Rule		SOA/M-11A/S/40						
	*Factors affecting airflow in engine intakes of high speed aircraft	Factor affecting airflow in engine intakes of high speed aircraft	1	SOA/M-11A/S/41						
	*Effect of sweep back on critical mach number	Effects of	1							
		a) Sweep back on critical mach number		SOA/M-11A/S/42						
	[11.2] AIRFRAME STRUCTURES-GENERAL CONCEPTS									
	a) Airworthiness requirement for structural strength	Airworthiness requirement for structural strength	1	SOA/M-11A/S/43		2	3.	To acquaint with Inspection of aircraft using ultrasonic, eddy current and radiography inspection methods.	6	IN AIR INDIA
	*STRUCTURAL CLASSIFICATION	Structural Classification	2							
		(i) Primary		SOA/M-11A/S/44						
		(ii) Secondary		SOA/M-11A/S/45						
		(iii) Tertiary		SOA/M-11A/S/46						
	*Fail safe, safe life damage tolerance concept	a) Fail safe	1	SOA/M-11A/S/47						
		b) Safe life		SOA/M-11A/S/48						
		c) Damage tolerance concept		SOA/M-11A/S/49						
	*Zonal and station identification system	a) Aircraft station numbers, fuselage station number, wing station numbers, component station number	1	SOA/M-11A/S/50						
		b) Zoning	1	SOA/M-11A/S/51						

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-I

SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		c) Nomendature and defintions	1	SOA/M-11A/S/52						
	*Stress, Strain, Bending	a) Stress	2	SOA/M-11A/S/53		2	4	a) To know the stress strain	2	LAB
		b) Strain		SOA/M-11A/S/54				b) Bending, compression		LAB
		c) bending compression		SOA/M-11A/S/55				c) Shear force		LAB
		d) Shear		SOA/M-11A/S/56				d) Torsion		LAB
		e) Torsion	1	SOA/M-11A/S/57						
		f) Loop Stress		SOA/M-11A/S/58						
		g) Fatigue		SOA/M-11A/S/59						
	*Drains and ventilation provisions	a) Drains	1	SOA/M-11A/S/60			5	To understand the	1	LAB
		b) Ventilation provisions		SOA/M-11A/S/61				a) Drains		
								b) Ventilation Provisions		
	*System Installation Provisions	System installation provision	1	SOA/M-11A/S/62						
	*Electrical Bonding	Electrical Bonding	1	SOA/M-11A/S/63						
	*Lighting Strike Protection Provision	Lighting Strike Protection Provision	1	SOA/M-11A/S/64	2	2	6.	To acquaint with inspection a aircraft after having landing and lighting strike	3	IN AIRINDIA
	Construction methods	Construction methods of	1	SOA/M-11A/S/65						
		a) Stressed string fuselage		SOA/M-11A/S/66						
		b) Formers		SOA/M-11A/S/67						
		c) Stringers		SOA/M-11A/S/68						
		d) Longerons		SOA/M-11A/S/69						
		e) Bulk heads		SOA/M-11A/S/70						

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-I
SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		f) Frames		SOA/M-11A/S/71						
		g) Doublers, struts, ties		SOA/M-11A/S/72						
		h) Beams, Floor Structures		SOA/M-11A/S/73						
		i) Reinforcement, methods of skinning		SOA/M-11A/S/74						
		j) Anti-corrosive protection, wing, empennage		SOA/M-11A/S/75						
		k) Engine attachments		SOA/M-11A/S/76						
	*Structure assembly techniques	Structure assembly techniques	2	SOA/M-11A/S/77						
		a) Riveting		SOA/M-11A/S/78						
		b) Bolting		SOA/M-11A/S/79						
		c) Bonding		SOA/M-11A/S/80						
	*Methods of surface protection	Methods of surface protection such as	2	SOA/M-11A/S/81		2	7.	To acquaint with inspection of aircraft using boroscopic inspection and magnetic particle inspection	3	IN AIR INDIA
		a) Chromating		SOA/M-11A/S/82						
		b) Anodising		SOA/M-11A/S/83						
		c) Painting	1	SOA/M-11A/S/84						
		d) Surface Cleaning		SOA/M-11A/S/85						
	*AIRFRAME SYMMETRY	AIRFRAME SYMMETRY	2			2	8.	To acquaint with aircraft symmetry checks.	1	ON LAB
		a) Methods of alignment		SOA/M-11A/S/86						
		b) Symmetry checks		SOA/M-11A/S/87						
	[11.3] AIRFRAM STRUCTURES AEROPLANES									

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-I

SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
5.	[11.3.13] Fuselage (ATA 52/53/56)				2					
	*Construction & Pressurisation Sealing	(i) Construction	½	SOA/M-11A/S/88						
		(ii) Pressurisation Sealing	½	SOA/M-11A/S/89		2	9.	To understand the Pressurisation Sealing in aircraft	1	LAB
	*Wing, Stabiliser, Pylon and Undercarriage	(i) Wing	½	SOA/M-11A/S/90						
		(ii) Stabiliser	½	SOA/M-11A/S/91						
		(iii) Pylon	½	SOA/M-11A/S/92						
		(iv) Undercarriage attachments	½	SOA/M-11A/S/93						
	*Seat installation and Cargo Loading System	(i) Seat installation	½	SOA/M-11A/S/94		2	10.	To acquaint with aircraft seat installation	2	LAB
		(ii) Cargo Loading System	½	SOA/M-11A/S/95						
	*Doors and Emergency Exits	(i) Construction	2	SOA/M-11A/S/96		2	11.	To know about the door and emergency units	2	LAB
		(ii) Mechanism								
		(iii) Operation and Safety devicer				2	12.	To understand the inspection of cargo door and its mechanism, indications	3	IN AIRINDIA
	*Windows and Windscreen Construction & Mechanism	(i) Construction		SOA/M-11A/S/97		2	13.	To acquaint with windows & windscreen	2	LAB
		(ii) Mechanism	½	SOA/M-11A/S/98						
6.	[11.3.2] Wings (ATA 57)	(i) Construction	½	SOA/M-11A/S/99	2					
		(ii) Fuel Storage	½	SOA/M-11A/S/100						
		(iii) Landing Gear	1	SOA/M-11A/S/101						
		(iv) Pylon	1	SOA/M-11A/S/102						
		(v) Control Surface	1	SOA/M-11A/S/103						
		(vi) High Lift / drag attachments	1	SOA/M-11A/S/104						

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-I

SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	[11.3.3] Stabilisers (ATA 55)	(i) Construction	½	SOA/M-11A/S/105	2					
		(ii) Control Surface attachments	½	SOA/M-11A/S/106						
8.	[11.3.4] Flight Control Surface (ATA 55/57)	(i) Construction	½	SOA/M-11A/S/107	2					
		(ii) Attachment	½	SOA/M-11A/S/108						
		(iii) Mass balancing	½	SOA/M-11A/S/109						
		(iv) Aerodynamic balancing	½	SOA/M-11A/S/110						
	[11.3.5] Nacelles/ Pylons (ATA 54)	(i) Constructions	2	SOA/M-11A/S/111	2					
		(ii) Firewalls		SOA/M-11A/S/112						
		(iii) Engine Mounts		SOA/M-11A/S/113						
	[11.4] Air Conditioning & Cabin pressurisation (ATA 21)	(i) Air Conditioning	½	SOA/M-11A/S/114						
		(ii) Cabin pressurisation	½	SOA/M-11A/S/115						
	[11.4.1] Air Supply	(i) Sources of air supply	½	SOA/M-11A/S/116	2					
		(ii) Engine bleed	½	SOA/M-11A/S/117		2	14.	To acquaint with aircraft Engine bleed system	3LAB	
		(iii) APU	1	SOA/M-11A/S/118		2	15.	To acquaint with aircraft APU	2	LAB
		(iv) Ground Cart	1	SOA/M-11A/S/119						
					3					
		(i) Air Conditioning System	1	SOA/M-11A/S/120		3	16.	To acquaint with Air Conditioning System	3	LAB
		(ii) Air Cycle Machines	1	SOA/M-11A/S/121						
		(iii) Vapour Cycle Machine	1	SOA/M-11A/S/122						
		(iv) Distribution Systems	1	SOA/M-11A/S/123						

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-I

SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		(v) Flow Control System	1	SOA/M-11A/S/124						
		(vi) Temperature Control System	1	SOA/M-11A/S/125		2				
		(vii) Humidity Control System	½	SOA/M-11A/S/126						
	Pressurisation Control and Indication	(i) Pressurisation System	½	SOA/M-11A/S/127	3	3	17.	To acquaint with a/c Pressurisation System	3	IN AIRINDIA
		(ii) Control Valves	½	SOA/M-11A/S/128						
		(iii) Safety Valves	½	SOA/M-11A/S/129						
		(iv) Cabin Pressure Controllers		SOA/M-11A/S/130						
	Safety and Warning Devices	(i) Protection Devices	1	SOA/M-11A/S/131	3	3	18.	To acquaint with aircraft Safety and Warning Devices		ON AIRCRAFT
		(ii) Warning Devices	1	SOA/M-11A/S/132						
	[11.5] Instruments / Avionics Systems									
	Instrument System (ATA 31)	A. Pitot Static	1	SOA/M-11A/S/133	2	2	19.	To acquaint with leak test on pitot static system		IN AIRINDIA
		(ii) Altimeter		SOA/M-11A/S/134						
		(iii) Air Speed Indicator		SOA/M-11A/S/135						
		(iv) Vertical Speed Indicator	½	SOA/M-11A/S/136						
		B. Gyroscopic				2	20.	To study the calibration and working of Gyroscopic instruments	3	LAB
		(i) Artificial Horizon	½	SOA/M-11A/S/137						
		(ii) Attitude Director	½	SOA/M-11A/S/138						
		(iii) Direction Indicator	½	SOA/M-11A/S/139		2	21.	To know about the inspection for HIRF requirement	3	IN AIRINDIA
		(iv) Horizontal Situation Indicator	½	SOA/M-11A/S/140						
		(v) Turn and Slip Indicator	½	SOA/M-11A/S/141						

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-I

SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		(vi) Turn Coordinator	½	SOA/M-11A/S/142						
		C. Compasses				2	22.	To know about the compasses [compass swinging of DR and RR compasses]	3	IN AIRINDIA
		(i) Direct Reading	½	SOA/M-11A/S/143						
		(ii) Remote Reading	½	SOA/M-11A/S/144						
		D. Angle of attack indication	1	SOA/M-11A/S/145						
		E. Stall Warning System	1	SOA/M-11A/S/146		2	23.	To acquaint with aircraft Stall Warning System & angle of attack indication system.	3	IN AIRINDIA
		F. Glass Cockpit	1	SOA/M-11A/S/147						
		G. Other Aircraft System Indication	1	SOA/M-11A/S/148						
	[11.5.2] Avionic Systems									
	* Fundamental of System logout and operation of	(i) Auto Flight (ATA 22)	1	SOA/M-11A/S/149		2	24.	To acquaint with the operation details about communication & navigation sys.	3	LAB
		(ii) Communications (ATA 23)	1	SOA/M-11A/S/150						
		(iii) Navigation System (ATA 34)	1	SOA/M-11A/S/151						
	[11.6] Electrical Power	(i) Battery Installation and Operation		SOA/M-11A/S/152		2	25.	To acquaint with the constructional and operational details of inverters, transformers & Rectifiers	3	LAB
		(ii) DC Power Generation	1	SOA/M-11A/S/153						
		(iii) AC Power Generation	1	SOA/M-11A/S/154						
		(iv) Emergency Power Generation	1	SOA/M-11A/S/155						
		(v) Voltage Regulation	½	SOA/M-11A/S/156		2	26.	To acquaint with the frictional check of voltage regulator	4	LAB
		(vi) Power Distribution	½	SOA/M-11A/S/157						
		(vii) Inverters, Transformers and Rectifiers	½	SOA/M-11A/S/158						
		a. Inverters	½	SOA/M-11A/S/159		2	27.	To know about the replacement of 1 DG	4	IN AIRINDIA
		b. Transformers	½	SOA/M-11A/S/160						

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-I
SEMESTER : SECOND

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		c. Rectifiers	½	SOA/M-11A/S/161						
		(viii) Circuit Protection	½	SOA/M-11A/S/162		2	28.	To acquaint with the working details of circuit protection system	2	LAB
		(ix) External Power	½	SOA/M-11A/S/163						
		(x) Ground Power	½	SOA/M-11A/S/164						
	[11.7] Equipment & Furnishing (ATA 25)									
		(i) Emergency equipment requirement	1	SOA/M-11A/S/165		2	29.	To acquaint with aircraft emergency equipment requirement	2	LAB
		(ii) Seats, harnesses and belts		SOA/M-11A/S/166						
b.		(i) Cabin Layout	½	SOA/M-11A/S/167		1	30.	To acquaint with the details of cabin layout, different cabin instruments and their installation	2	LAB
		(ii) Equipment Layout	½	SOA/M-11A/S/168						
		(iii) Cabin Furnishing Installation	½	SOA/M-11A/S/169						
		(iv) Cabin Entertainment Equipments	½	SOA/M-11A/S/170						
		(v) Gallery Installation	½	SOA/M-11A/S/171						
		(vi) Cargo handling and retention equipments	½	SOA/M-11A/S/172						
		(vii) Airstairs	1	SOA/M-11A/S/173						
	[11.8] Fire Protection (ATA 26)									
a.	Fire, smoke detection	(i) Fire Smoke Detection System	1	SOA/M-11A/S/174	3	2	31.	To acquaint with the operational details of Fire Protection System	2	LAB
		(ii) Warning System	1	SOA/M-11A/S/175						
		(iii) Fire extinguishing System	1	SOA/M-11A/S/176		2	32.	To know about the removal & installation of halon & water fire extinguisher.	4	IN AIR INDIA
		(iv) System Tests	1	SOA/M-11A/S/177						
b.	Fire extinguisher	(i) Portable Fire Extinguisher	1	SOA/M-11A/S/178						
								TOTAL NO. OF PRACTICAL HRS. IN AIRCRAFT/SOA	00	
								TOTAL NO. OF PRACTICAL HRS. AT CLASS ROOM	00	
								TOTAL NO. OF PRACTICAL HRS. AT SOA LAB	40	
								TOTAL NO. OF PRACTICAL HRS. AT AIR INDIA	42	
		TOTAL NO. OF HRS. (T)	98					TOTAL NO. OF HRS. (P)	82	

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-II**SEMESTER : THIRD****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	[11.9] Flight Controls									
	Primary controls : Aileron, Elevator, Rudder, Spoiler	a) Introduction	0.5	SOA/M-11A/S/179						
		b) Aileron	1	SOA/M-11A/S/180	3	1	1.	To acquaint with Primary Control System	1	SOA(N) LAB
		c) Elevator	1	SOA/M-11A/S/181						
		d) Rudder	1	SOA/M-11A/S/182			2.	To acquaint with Functional Check of auto pilot	4	IN AIR INDIA
		e) Spoiler	1	SOA/M-11A/S/183						
	Trim Control	a) Tabs	1	SOA/M-11A/S/184		1	3.	To acquaint with various types of tabs	1	SOA(N) LAB
		b) Trim Tabs	1	SOA/M-11A/S/185			4.	To acquaint with Functional Check of automatic Trim	3	IN AIR INDIA
		c) Servo Tabs	1	SOA/M-11A/S/186						
		d) Balance Tabs	1	SOA/M-11A/S/187						
	Active Load Control	a) Aircraft Loads	2	SOA/M-11A/S/188						
		b) V - N Diagram	2	SOA/M-11A/S/189						
	Flight Lift Devices	a) Introduction of Slots	1	SOA/M-11A/S/190						
		b) Types of Slots	1	SOA/M-11A/S/191						
		c) Flaps	1	SOA/M-11A/S/192						
		d) Types of Flaps	1	SOA/M-11A/S/193						
	Lift dump, Speed brakes	a) Lift dumpers	1	SOA/M-11A/S/194						
		b) Speed brakes	1	SOA/M-11A/S/195						
	System operation	a) Chains	1	SOA/M-11A/S/196		1	5.	To acquaint with manual system operation of control surface	3	SOA(N) LAB
	(i) Manual System	b) Pulleys	0.5	SOA/M-11A/S/197						

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-II**SEMESTER : THIRD****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	(ii) Hydraulic System	a) Introduction	1	SOA/M-11A/S/198		1		To acquaint with removal & installation of an pressure gauge of hydraulic system	3	IN AIR INDIA
		b) Pascal law and mechanical advantage	2	SOA/M-11A/S/199						
		c) Aileron/ working	2	SOA/M-11A/S/200						
		d) Elevator/ working	2	SOA/M-11A/S/201						
		(i) Fixed volume pump	1	SOA/M-11A/S/202						
		(ii) Variable volume pump	1	SOA/M-11A/S/203						
		(iii) Hand pump	1	SOA/M-11A/S/204						
		e) Hydraulic components	1	SOA/M-11A/S/205		1		To acquaint with aircraft Hydraulic components	3	SOA(N) LAB
		(i) Non return valves	0.5	SOA/M-11A/S/206						
		(ii) Relief valves	0.5	SOA/N-11A/S/207						
		(iii) Cut out valves	0.5	SOA/M-11A/S/208		2	8.	To demonstrate the removal and installation of heat exchanger and EMDP of hydraulic system	4	IN AIR INDIA
		(iv) Reducing valve	0.5	SOA/M-11A/S/209						
		(v) Pressure maintaining valve	0.5	SOA/M-11A/S/210						
		(vi) Selector valve	0.5	SOA/M-11A/S/211						
		(vii) Shuttle valve	0.5	SOA/M-11A/S/212						
		(viii) Sequence valve	0.5	SOA/M-11A/S/213						
		(ix) Hydraulic accumulator	0.5	SOA/M-11A/S/214		1	9.	To acquaint with removal & installation of system A, B2 stand by various of hydraulic system	5	IN AIR INDIA
		(x) Hydraulic reservoir	0.5	SOA/M-11A/S/215						
		(xi) Hydraulic filler & seal	0.5	SOA/M-11A/S/216						
		(xii) Hydraulic actuator	0.5	SOA/M-11A/S/217		1		To acquaint with removal & installation of PTU of hydraulic system	3	SOA(N) LAB
		f) Layout of basic hydraulic system	3	SOA/M-11A/S/218						
		g) Layout of typical hydraulic system	3	SOA/M-11A/S/219						
		h) Power pack system	2	SOA/M-11A/S/220						
		i) Power flying control/ working	2	SOA/M-11A/S/221		2		To acquaint with operation and maintenance of ground power trolley and ground hydraulic trolley	3	IN AIR INDIA
	(iii) Pneumatic System	(i) Introduction	0.5	SOA/M-11A/S/222						

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-II**SEMESTER : THIRD****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		(ii) Advantages & disadvantages	1	SOA/M-11A/S/223						
		(iii) Typical layout of high pressure pneumatic system	2	SOA/M-11A/S/224						
		(iv) Pneumatic components		SOA/M-11A/S/225		1	12.	To acquaint with the components such as compressor, regulator etc. and their working	2	SOA(N) LAB
		a) Compressor	1	SOA/M-11A/S/226						
		b) Pressure regulators	0.5	SOA/M-11A/S/227						
		c) Oil and water trap	0.5	SOA/M-11A/S/228						
		d) Storage bottle	0.5	SOA/M-11A/S/229						
		e) Pressure reducing valve	0.5	SOA/M-11A/S/230						
		f) Pressure maintaining valve	1	SOA/M-11A/S/231						
		g) Control valve	1	SOA/M-11A/S/232						
		h) Actuator	1	SOA/M-11A/S/233						
	(iv) Electrical	(i) Introduction	0.5	SOA/M-11A/S/234		2	13.	To acquaint with aircraft Electrical component charging battery circuit testing of aircraft electrical system	7	SOA(N) LAB
		(ii) Layout and components	3	SOA/M-11A/S/235						
		(iii) Advantages & Disadvantages	1	SOA/M-11A/S/236						
	(v) Fly - by - wire	(i) Introduction	0.5	SOA/M-11A/S/237		2	14.	To acquaint with aircraft fly - by - wire	4	LAB
		(ii) Operation and layout	3	SOA/M-11A/S/238						
		(iii) Advantages & Disadvantages	1	SOA/M-11A/S/239						
	Artificial feel, Yaw dampers, Mach trim, Rudder limiter and Gust lock	(i) Artificial feel	0.5	SOA/M-11A/S/240						
		(ii) Yaw damper system	1	SOA/M-11A/S/241		2	15.	To acquaint with servicing and maintenance of yaw damper and mach trim	4	IN AIR INDIA
		(iii) Mach trim	0.5	SOA/M-11A/S/242						
		(iv) Rudder limiter	1	SOA/M-11A/S/243						
		(v) Gust lock	2	SOA/M-11A/S/244						
		(vi) Balancing and rigging	3	SOA/M-11A/S/245						

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-II

SEMESTER : THIRD

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	Stall Protection System	(i) Introduction	0.5	SOA/M-11A/S/246		1		To acquaint with Stall protection system	2	IN AIR INDIA
		(ii) Stick pusher (Nudger)	1	SOA/M-11A/S/247						
		(iii) Mach warning system	1	SOA/M-11A/S/248						
		(iv) Take off warning/ layout	1	SOA/M-11A/S/249						
2.	[11.10] Fuel systems	(i) System layout	2	SOA/M-11A/S/250	3					
		(ii) Fuel tank	1	SOA/M-11A/S/251						
		(iii) Supply system	0.5	SOA/M-11A/S/252						
		(iv) Dumping, venting and draining	1	SOA/M-11A/S/253						
		(v) Cross feed and transfer	1	SOA/M-11A/S/254						
		(vi) Indication and warning/ layout	1	SOA/M-11A/S/255						
		(vii) Refuelling	2	SOA/M-11A/S/256		2	17.	To acquaint with aircraft Refuelling	2	IN
		(viii) Defuelling	2	SOA/M-11A/S/257		2	18.	To acquaint with aircraft Defuelling	2	IN AIR INDIA
		(ix) Longitudinal balance fuel system	1	SOA/M-11A/S/258						
3.	[11.11] Hydraulic Power				3					
	System	(i) Layout	1	SOA/M-11A/S/259						
		(ii) Operation	2	SOA/M-11A/S/260						
	Hydraulic fluids	(i) Types of Hydraulic fluids	2	SOA/M-11A/S/261						
		(ii) Safety	1	SOA/M-11A/S/262						
	Hydraulic reservoirs and accumulators	(i) Hydraulic reservoirs	2	SOA/M-11A/S/263						
		(ii) Layout of a reservoir	1	SOA/M-11A/S/264						
		(iii) Hydraulic accumulators/types	1	SOA/M-11A/S/265						

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-II**SEMESTER : SECOND****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		(iv) Types	0.5	SOA/M-11A/S/266						
	Pressure generation	(i) Electric / component & working	2	SOA/M-11A/S/267		2	19.	To acquaint with Pressure generation instrument [out flow valve & cabin pressure controller]	3	IN AIR INDIA
		(ii) Mechanical/ component & working	2	SOA/M-11A/S/268						
		(iii) Pneumatic/ component & working	2	SOA/M-11A/S/269						
		(iv) Emergency pressure generation/ component & working	2	SOA/M-11A/S/270						
	Filters	(i) Types of filters	2	SOA/M-11A/S/271		1	20.	To know about different filters in aircraft Hydraulic system	2	SOA(N) LAB
	Pressure control	(i) Introduction	1	SOA/M-11A/S/272						
		(ii) Importance of pressure regulation	1	SOA/M-11A/S/273						
	Power distribution	(i) Power unit design	1	SOA/M-11A/S/274		2	21.	To Acquaint with operation and maintenance ground power supply cast	3	IN AIR INDIA
		(ii) Operation/ components	2	SOA/M-11A/S/275						
	Indication and warning system	(i) Introduction	2	SOA/M-11A/S/276		1	22.	To acquaint with indication and warning system	2	SOA(N) LAB
		(ii) Importance of a warning system	0.5	SOA/M-11A/S/277						
		(iii) Types of warning system	1	SOA/M-11A/S/278						
	Interface with other system	Interfare with other system	2	SOA/M-11A/S/279						
4.	[11.12] Ice and Rain protection					2	23.	To acquaint with aircraft Ice and Rain protection system	3	IN AIR INDIA
	Ice formation	(i) Introduction	0.5	SOA/M-11A/S/280						
		(ii) Types of Ice (Ice classification)	0.5	SOA/M-11A/S/281		1	24.	To acquaint with boof of aircraft to remove icing using compressed air	1	IN AIR INDIA
		(iii) Weather conditions for Ice formation while on ground and in air	1	SOA/M-11A/S/282						

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-II**SEMESTER : THIRD****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		(iv) Detection of Ice	0.5	SOA/M-11A/S/283						
	Anti Icing System	(i) Introduction	0.5	SOA/M-11A/S/284						
		(ii) Types of anti-icing system	2	SOA/M-11A/S/285						
		(iii) Electrical anti-icing system/ components & working	2	SOA/M-11A/S/286		1	25.	To acquaint with Electrical anti-icing system	1	IN AIR INDIA
		(iv) Hot air anti-icing system/ components & working	2	SOA/M-11A/S/287						
		(v) Chemical anti-icing system/ components & working	2	SOA/M-11A/S/288						
	Deicing System	(i) Introduction	0.5	SOA/M-11A/S/289						
		(ii) Difference between anti-icing and de-icing	0.5	SOA/M-11A/S/290						
		(iii) Electrical system/ components & working	2	SOA/M-11A/S/291						
		(iv) Hot air system/ components & working	2	SOA/M-11A/S/292		1	26.	To acquaint with prevention of ice formation using component air	1	IN AIR INDIA
		(v) Pneumatic system/ components & working	2	SOA/M-11A/S/293						
		(vi) Chemical system/ components & working	2	SOA/M-11A/S/294						
	Rain Repellant	(i) Introduction	0.5	SOA/M-11A/S/295		1	27.	To know about the aircraft rain repellant system	2	SOA(N) LAB
		(ii) Classification		SOA/M-11A/S/296						
		(iii) Components & Working	2	SOA/M-11A/S/297						
	Probe and Drain Heating	(i) Introduction	0.5	SOA/M-11A/S/298						
		(ii) Probe heating	1	SOA/M-11A/S/299						
		(iii) Drain heating	1	SOA/M-11A/S/300						
	Wiper System	(i) Introduction to wiper system	0.5	SOA/M-11A/S/301		2	28.	To acquaint with aircraft wiper system	3	SOA(N) LAB
		(ii) Types	1	SOA/M-11A/S/302		2	29.	To acquaint with removal & installation of wiper motor convertor assembly	3	IN AIR INDIA
		(iii) Operation	1	SOA/M-11A/S/303						

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-II

SEMESTER : THIRD

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
5.	[11.13] Landing Gear	(i) Introduction	1	SOA/M-11A/S/304	3	1	30.	To know about the aircraft landing gear	2	SOA(N) LAB
	Construction	(i) Basic layout	2	SOA/M-11A/S/305						
		(ii) Types	3	SOA/M-11A/S/306						
	Shock absorbing system	(i) Types of absorb system	2	SOA/M-11A/S/307		1	31.	To acquaint with shock absorbing system in landing gear	2	SOA(N) LAB
		(ii) Operation	1	SOA/M-11A/S/308		2	32.	To acquaint with removal & installation of LIG down lock pins, inspection of LIG	3	IN AIR INDIA
		(iii) Importance	1	SOA/M-11A/S/309						
	Extension and retraction system	(i) Extension system layout/ working	2	SOA/M-11A/S/310						
		(ii) Retraction system layout /working	2	SOA/M-11A/S/311		3	33.	To know about the surface cleaning of MLG retract actuator piston	3	IN AIR INDIA
		(iii) Normal system	1	SOA/M-11A/S/312						
		(iv) Emergency system/ working	2	SOA/M-11A/S/313						
	Indication and Warning	(i) System used for warning	1	SOA/M-11A/S/314		2	34.	To know about the aircraft indication & warning system	2	SOA(N) LAB
		(ii) Audio and viral aid	0.5	SOA/M-11A/S/315						
	Wheels, Brakes, Anti Skid & Autobraking	(ii) Wheels	1	SOA/M-11A/S/316		3	35.	To understand the corrosion prevention for MLG	3	SOA(N) LAB
		(ii) Brakes/Types & working	2	SOA/M-11A/S/317						
		(iii) Anti Skid	1	SOA/M-11A/S/318						
		(iv) Autobraking, components & working	2	SOA/M-11A/S/319						
	Tyres	(i) Introduction	1	SOA/M-11A/S/320						
		(ii) Requirements/ specifications	2	SOA/M-11A/S/321						
g.	Steering	(i) Nose Wheel steering	1	SOA/M-11A/S/322		3	36.	To acquaint with surface cleaning of NLG steering actuator	3	IN AIR INDIA

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-II**SEMESTER : THIRD****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		(ii) Layout	0.5	SOA/M-11A/S/323						
	Air ground Swinging	(i) Introduction	0.5	SOA/M-11A/S/324		2	37.	To know about the removal & installatio of ground sensor of MLG & NLG	3	IN AIR INDIA
		(ii) System used and layout	1	SOA/M-11A/S/325						
6.	[11.14] Lights				3					
	External Light	(i) Navigation lights	0.5	SOA/M-11A/S/326		1	38.	To acquaint with navigation lights	2	SOA(N) LAB
		(ii) Anti-collision lights	0.5	SOA/M-11A/S/327		1	39.	To acquaint with Anti-collision lights	1	SOA(N) LAB
		(iii) Landing lights	0.5	SOA/M-11A/S/328		1	40.	To know about Landing lights in aircraft	1	SOA(N) LAB
		(iv) Taxiing lights	0.5	SOA/M-11A/S/329		1	41.	To know about Taxiing lights in aircraft	1	SOA(N) LAB
		(v) Ice detection lights	0.5	SOA/M-11A/S/330		1	42.	To know about Ice detection light in aircraft	1	SOA(N) LAB
	Internal Light	(i) Cabin lights	2	SOA/M-11A/S/331		1	43.	To know about the cabin lighting	1	SOA(N) LAB
		(ii) Cockpit lights		SOA/M-11A/S/332		1	44.	To know about the cockpit lights in aircraft	ON ₁	SOA(N) LAB
		(iii) Cargo lights		SOA/M-11A/S/333		1	45.	To learn about cargo lights in aircraft	1	
7.	[11.15] Oxygen				3					
	System Layout	(i) Cockpit oxygen system, layout and operation	2	SOA/M-11A/S/334						
		(ii) Cabin oxygen system, layout and operation	2	SOA/M-11A/S/335						
		(iii) Source	1	SOA/M-11A/S/336		2	46.	To acquaint with removal & installation of garper air out let	3	IN AIR INDIA
		(iv) Storage	1/2	SOA/M-11A/S/337						
		(v) Changing	1/2	SOA/M-11A/S/338		2	47.	To acquaint with removal of oil contamination from air condition system	3	IN AIR INDIA
		(vi) Distribution	1	SOA/M-11A/S/339						
		(vii) Supply regulation	1	SOA/M-11A/S/340						
		(viii) Indications and warning systems	1/2	SOA/M-11A/S/341		2	48.	To learn about precautions to be taken for safe supply of oxygen	2	SOA(N) LAB

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-II**SEMESTER : THIRD****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
16.	[11.16] Pneumatic / Vacuum				3	3	49.	To acquaint with inspection of the vacuum system		IN AIR INDIA
	Pneumatic/Vacuum System	(i) Layout of system	1	SOA/M-11A/S/342						
		(i) Operation & components	2	SOA/M-11A/S/343						
	Sources	(i) Engine / APU, working	2	SOA/M-11A/S/344						
		(ii) Compressors	1/2	SOA/M-11A/S/345						
		(iii) Reservoirs	1/2	SOA/M-11A/S/346						
		(iv) Ground supply	1	SOA/M-11A/S/347						
						3	50.	To acquaint with procedures of external and internal power sources to aircraft	2	SOA(N) LAB
	Pressure Control	(i) System operation	1	SOA/M-11A/S/348						
	Distribution	(i) Distribution System	1	SOA/M-11A/S/349						
		(ii) Types	1	SOA/M-11A/S/350						
	Indication and Warning	(i) Indication and warning system	1	SOA/M-11A/S/351						
		(ii) Operation	1	SOA/M-11A/S/352		3	51.	To acquaint with ground scanning of central warning system	4	IN AIR INDIA
	Interfaces with other system	(i) Layout and operation	2	SOA/M-11A/S/353						
	[11.17] Water / Waste									
	Water System	(i) Layout	1	SOA/M-11A/S/354						
		(ii) Supply	1/2	SOA/M-11A/S/355		3	52.	To acquaint with the water system in aircraft [removal and installation of water tank & water heater]	3	IN AIR INDIA
		(iii) Distribution	1/2	SOA/M-11A/S/356			53.	To acquaint with leak test of portable water system	3	IN AIR INDIA
		(iv) Servicing	1/2	SOA/M-11A/S/357						
		(v) Drawing	1/2	SOA/M-11A/S/358						

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-II**SEMESTER : THIRD****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	Toilet System	(i) Layout	2	SOA/M-11A/S/359		1	54.	To acquaint with servicing of water & toilet system	2	IN AIR INDIA
		(ii) Flushing system		SOA/M-11A/S/360		1	55.	To acquaint with repair on toilet assembly component	2	IN AIR INDIA
		(iii) Servicing		SOA/M-11A/S/361		1	56.	To acquaint with removal & installation of laboratory smoke detector	3	IN AIR INDIA
	Corrosion Aspects	(i) Problems	2	SOA/M-11A/S/362		1	57.	To learn about reasons and prevention of corrosion	2	SOA(N) LAB
		(ii) Advantages and disadvantages	1	SOA/M-11A/S/363						
18.	[11.18] On Board Maintenance Systems				3					
	Central Maintenance Computer	(i) System layout	2	SOA/M-11A/S/364		2	58.	To learn about central maintenance computer in aircraft	2	SOA(N) LAB
		(ii) Operation	1	SOA/M-11A/S/365						
	Data Loading System	(i) Introduction	1	SOA/M-11A/S/366		2	59.	To acquaint with DLS in aircraft	2	SOA(N) LAB
		(ii) Layout of devices used	2	SOA/M-11A/S/367						
	Electronic Library System	(i) Introduction	1	SOA/M-11A/S/368						
		(ii) Requirement of ECS	1	SOA/M-11A/S/369		1	60.	To acquaint with aircraft ECS	1	IN AIR INDIA
		(iii) Advantages and disadvantages of ELS	1	SOA/M-11A/S/370						
d.	Printing									
	Structure Monitoring	(i) Introduction	0.5	SOA/M-11A/S/371		3	61.	To acquaint with visual inspection of relevant system parts	2	IN AIR INDIA
		(ii) Damage tolerance monitoring	1	SOA/M-11A/S/372						
		(iii) Requirement and usage	1	SOA/M-11A/S/373						
19.	[11.19] Integrated Modular Avionics				2					

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S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	Avionics	(i) Introduction to Avionics	2	SOA/M-11A/S/374						
		(ii) Basics of Avionics	2	SOA/M-11A/S/375		2	62.	To know about basic instruments of avionics in cockpit	3	SOA(N) LAB
	Integrated Modular Avionics	(i) Introduction to IMA	1	SOA/M-11A/S/376						
		(i) Bleed Management	1	SOA/M-11A/S/377						
		(iii) Air Pressure control	1	SOA/M-11A/S/378		1	63.	To acquaint with testing of aircraft VOR & ADF system	1	SOA(N) LAB
		(iv) Air ventilation and control	1	SOA/M-11A/S/379						
		(v) Avionics and cockpit ventilation control		SOA/M-11A/S/380		1	64.	To work on ventilation system of aircraft	2	SOA(N) LAB
		(vi) Temperature control	1	SOA/M-11A/S/381						
		(vii) Air traffic communication	1	SOA/M-11A/S/382		2	65.	To know about the aircraft communication		SOA(N) LAB
		(viii) Avionics communication router	1	SOA/M-11A/S/383		2	66.	To know testing of aircraft audio integration system	2	IN AIR INDIA
		(ix) Electrical load management	1	SOA/M-11A/S/384						
		(x) Circuit breaking monitoring	1	SOA/M-11A/S/385						
		(xi) Electrical system BITE	1	SOA/M-11A/S/386		3	67.	To acquaint with aircraft testing of aircraft instrument landing system		IN AIR INDIA
		(xii) Fuel management	1/2	SOA/M-11A/S/387						
		(xiii) Braking control	1/2	SOA/M-11A/S/388						
		(ixv) Steering control	1	SOA/M-11A/S/389						
		(xv) Landing gear, tension and retraction	1	SOA/M-11A/S/390						
		(xvi) Tyre pressure indication	1/2	SOA/M-11A/S/391		3	68.	To know about the testing of aircraft DME and radio altimeter system	2	SOA(N) LAB
		(xvii) Oil pressure indicaton	1	SOA/M-11A/S/392						
		(xviii) Brake temperature montionring	1	SOA/M-11A/S/393						
						1	69.	To acquaint with testing of aircraft weather radar system	2	IN AIR INDIA
20.	[11.20] Cabin System									
	Cabin System	(i) Introduction to systems present in cabin	1	SOA/M-11A/S/394	2	1	70.	To acquaint with different systems present in cabin		SOA(N) LAB

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S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	Cabin Intercommunication Data System	(i) Introduction to CIDS	1	SOA/M-11A/S/395		2	71.	To learn about cabin intercommuni - cation data system	1	SOA(N) LAB
		(ii) System layout	1	SOA/M-11A/S/396						
		(iii) Working	2	SOA/M-11A/S/397						
	Cabin Network Service	(i) Introduction	1	SOA/M-11A/S/398		2	72.	To learn about cabin network service	2	SOA(N) LAB
		(ii) System layout	1	SOA/M-11A/S/399						
		(iii) Working	1	SOA/M-11A/S/400						
		(iv) Data/ Radio communication	1	SOA/M-11A/S/401		2	73.	To work with Radio communications in aircraft	2	SOA(N) LAB
		(v) In-flight entertainment system	1	SOA/M-11A/S/402		2	74.	To know about all the in flight entertainment system	1	SOA(N) LAB
	Cabin Core System	(i) In-flight entertainment system	1	SOA/M-11A/S/403						
		(ii) External communication system	1	SOA/M-11A/S/404		2	75.	To acquaint with FDR data retrieval	3	IN AIR INDIA
		(iii) Cabin mass memory system	0.5	SOA/M-11A/S/405						
		(iv) Cabin monitoring system	1	SOA/M-11A/S/406						
		(v) Miscellaneous cabin system	1	SOA/M-11A/S/407						
21.	[11.21] Information Systems									
	Information Systems	(i) Introduction to information systems	1	SOA/M-11A/S/408						
		(ii) Layout and working	1	SOA/M-11A/S/409		2	76.	To acquaint with familiarization with the on board maintenance system	3	IN AIR INDIA
		(iii) Air traffic and information management systems	1	SOA/M-11A/S/410						
		(iv) Network server systems	1	SOA/M-11A/S/411						
		(v) Aircraft general information system	1	SOA/M-11A/S/412						
		(vi) Flight deck information system	1	SOA/M-11A/S/413						
		(vii) Maintenance information system	1	SOA/M-11A/S/414		2	77.	To acquaint with documentation procedure [Aircraft maintenance shedule IPC, wiring diagram manual and structural repair manual]	3	IN AIR INDIA
		(viii) Passenger cabin information system	1	SOA/M-11A/S/415						
		(ix) Miscellaneous information system	1	SOA/M-11A/S/416						

MODULE - 11A : TURBINE AEROPLANE, AERODYNAMICS STRUCTURES & SYSTEM-II

SEMESTER : THIRD

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[illegible]

MODULE - 6 : MATERIALS AND HARDWARE**SEMESTER : THIRD****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	[6.1] Aircraft material : ferrous									
	[6.1(a)] Characteristics, properties of common alloy steels	1. Terms and definition	1	SOA/M6/S/1-6	2					
		2. Steel production method	1							
		3. Application of plain carbon steels, classification based on the degree of de-oxidation.	½							
		4. Influence of other materials in carbon steels.	1							
		5. Alloy steels, effect of alloying elements	1							
		6. Classification of steels & special alloy steels	½	SOA/M6/S/7-9						
	Heat treatment of alloy steels	1. Critical range and internal structure of steel. Theory of heat treatment.	½	SOA/M6/S/10-12						
		2. Annealing and normalising	1							
		3. Hardening, tempering and refining	1	SOA/M6/S/13-16						
		4. Practical heat treatment.	1							
		5. Cycle annealing austempering	½							
		6. Martempering and hardenability	1							
		7. Case hardening	1							
		a. Solid & liquid carburising	1							
		b. Cyaniding and nitriding	1							
		c. Induction hardening and shot-peening	1							
2.	[6.2] Aircraft materials. Non-ferrous									
	[6.2 (a)] Characteristics, properties of non-ferrous materials	1. Non-ferrous metals and their properties and uses	1		2					
		2. Non-ferrous alloys :								
		a. Brasses	½							
		b. Bronzes	½							

MODULE - 6 : MATERIALS AND HARDWARE **SEMESTER : THIRD**

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		c. Aluminium and magnesium alloys	1							
		d. Nickle alloys	½							
		e. Bearing materials and other alloys	1							
	Heat treatment of non-ferrous materials	1. Solution heat treatment	½							
		2. Precipitation heat treatment	1							
		3. Heat treatment of aluminium alloy	½							
		4. Heat treatment of magnesium alloy	½							
		5. Heat treatment of titanium alloys	1							
	[6.1 (a) & 6.2 (a)] Identification of ferrous & non-ferrous materials used in aircraft.	1. Identification of ferrous and non-ferrous metals	1		1					
		2. Selection of materials	1		1					
	[6.1 (b) & 6.2 (b)] Testing of ferrous & non-ferrous materials for hardness, tensile strength, fatigue strength and impact resistance	1. Stress and strain	1		1	1	1.	To find the tensile, stress & strain of materials used in aircraft.	2	ON LAB
		2. Principal mechanical properties	1							
		3. Tensile and compression tests	1	SOA/M6/S/17-20						
		4. Hardness testing	1							
		a. Brinell and rockwell hardness tests	2	SOA/M6/S/21-24						
		b. Vickers hardness, micro hardness, scratch and rebound hardness tests	1	SOA/M6/S/25						
		5. Impact Tests				1	2.	To know about the testing of materials in aircraft, Izod, Charpy impact.	2	ON LAB
		a. Izod impact test	1	SOA/M6/S/26						
		b. Charpy impact test	1	SOA/M6/S/27						
		6. Fatigue and creep tests	1							
3.	[6.3.] Aircraft materials : Composite and non metallic	1. Plastics : Introduction and classification	½	SOA/M6/S/28-30						
	[6.3.1(a)] Composite & non-metallic other than wood & fabric. Characteristics properties and identification of common composite and non-metallic materials other than wood used in aircraft, sealant & bonding agents.	2. Physical and working properties of plastics	1		2					
	[6.3.1(b)] The detection of defects / deterioration on composite and non-metallic materials.	3. Transparent materials								

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SEMESTER : THIRD

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	Repair of composite and non-metallic materials	a. Laminated glasses	1		2	2	3.	To know about the composite material repair.	2	LAB
		b. Non-scatterable and tampered glass	1							
		c. Transparent plastics	1							
		4. Natural and synthetic rubbers								
		a. Types of rubbers	½							
		b. Properties of rubbers	½							
		c. Manufacturing processes	1							
		5. Advance composites		SOA/M6/S/31-33						
		a. General characteristics of composites	1							
		b. Re-enforcing material for composites	1	SOA/M6/S/34-37						
		c. Composite matrices	1	SOA/M6/S/38-40						
		d. Core materials	½	SOA/M6/S/41-44						
		e. Fabrication techniques	1	SOA/M6/S/45-46						
		f. Methods of curing the composites	½	SOA/M6/S/47-54						
		g. Types of damages and methods of inspection	1	SOA/M6/S/55						
		h. Repairing composites	1	SOA/M6/S/56-59						
		i. Hot patch bonding repair	1	SOA/M6/S/60		2	4.	To know about the patch wire in aircraft components.	3	IN AIRINDIA
	(6.3.2) Wooden Structures				2					
	(a) Construction methods of wooden airframe structures;	(i) General uses of wood in A/c construction	1							
		(ii) Aircraft woods and their uses								
		(iii) Molded airplane parts								
		(iv) Plywood & its type and use in Aircraft structure								
	(b) Characteristics, properties and types of wood and glue used in aeroplanes;	(i) Classification of trees and woods	2							
		(ii) Structure of wood								
		(iii) Sawing wood								
		(iv) Grain of wood								
		(v) Aircraft woods and their uses								
		(vi) Glue, their types and uses								
		(vii) Gluing wood					5.	To know about the wood gluing in aircraft.	1	LAB

MODULE - 6 : MATERIALS AND HARDWARE

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STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	(c) Preservation and maintenance of wooden structure;	(i) Season of wood	0.5							
		(a) Air seasoning of wood								
		(b) Kiln Drying of wood								
		(ii) Bonding of wood								
	(d) Types of defects in wood material and wooden structures;	(i) Specific gravity v/s strength	1							
		(ii) Locality of growth v/s strength								
		(iii) Rate of growth Vs strength								
		(iv) Moisture content Vs strength								
		(v) Defects Vs Strength								
	(e) The detection of defects in wooden structure;	Visual Checks	½			2	6.	To know the different checks performed in aircraft material inspection.	3	IN AIRINDIA
	(f) Repair of wooden structure	(a) Removal of the Damaged/ defective Parts	1							
		(b) Design of repair as per SRM								
		(c) Execution of repair as per SRM standard								
		(d) Certification and entry in log book of Airframe of Aircraft								
	(6.3.3) Fabric Covering				2					
	(a) Characteristics, properties and types of fabrics used in aeroplanes;	(i) Term & Definition used in Fabric Covering	1							
		(ii) Types of Fabric used in Aircraft								
		(iii) Properties and Grades of fabric used in Aircraft								
		(iv) Types of tapes used on structure of Aircraft before fabrics								

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SEMESTER : THIRD

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	(b) Inspections methods for fabric;	(i) Methods of checking the surface of cloth for fabric use in Aircraft	1			2	7.	To understand the methods of checking the surface of cloth fabric used in aircraft	3	IN AIRINDIA
		(ii) Checking of Sewing thread used for fabric								
		(iii) Purpose of using tapes on hand sewing & lacing cord								
	(c) Types of defects in fabric;	Types of defect on fabric covering	0.5							
	(d) Repair of fabric covering	Repair of fabric covering	0.5							
4.	[6.4] Corrosion					2	8.	To identify the correction and verification in aircraft materials.	3	IN AIRINDIA
	a. Chemical fundamentals, formation by galvanic action process, microbiological, stress.	1. Introduction of corrosion	1	SOA/M6/S/61	1					
	b. Types of corrosion and their identification	2. Types of corrosion	1		3					
	Causes of corrosion	3. Conditions causing corrosion	1							
	Materials types : susceptibility to corrosion	4. Order of corrodibility in metals	1							
5.	[6.5] Fasteners									
	[6.5.1] Screw threads				2					
	1. Screw Nomenclature	Different form of screw threads :	1			2	9.	To identify and to know the uses of different types of screw thread used in aircraft	4	LAB
		a. BA, BSW, BSP		SOA/M6/S/62						
		b. British standard and fine threads		SOA/M6/S/63						
		c. American sellers		SOA/M6/S/64						
		d. Metric threads		SOA/M6/S/65						
		e. Unified thread		SOA/M6/S/66						
		f. Square thread/ACME		SOA/M6/S/67						
		g. Butteress thread		SOA/M6/S/68						
		h. Knuckle thread		SOA/M6/S/69						

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STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	2. Thread forms, dimensions and tolerances for standard threads used in aircraft.	a. Thread forms	1	SOA/M6/S/70						
		b. Dimensions		SOA/M6/S/71						
		c. Tolerances		SOA/M6/S/72						
	3. Measuring screw threads	Measuring screw threads	1	SOA/M6/S/73						
	[6.5.2] Bolts, studs and a screws				2					
	* Bolt types: specification, identification and marking of aircraft bolts, international standards.	1. Aircraft Bolts								
		i. Bolt types, specification and identification	03	SOA/M6/S/74		2	10.	To identify and to know the uses of different types of bolts.	3	LAB
		a. Hexagonal headed bolt		SOA/M6/S/74						
		b. Clevis bolt		SOA/M6/S/74						
		c. Eye bolt		SOA/M6/S/74						
		d. DR Hd engine bolt		SOA/M6/S/74						
		e. Countersunk head bolt		SOA/M6/S/74						
		f. Drilled hex head bolt		SOA/M6/S/74						
		g. Internal hex head bolt		SOA/M6/S/74						
		h. AN standard steel bolt		SOA/M6/S/74						
		i. Special bolt		SOA/M6/S/74						
		j. Drilled head bolt		SOA/M6/S/74						
		k. NAS close tolerance bolt		SOA/M6/S/74						
		l. Al alloy bolt		SOA/M6/S/74						
		m. Magnetically inspected bolt		SOA/M6/S/74						
		n. Orange dyed		SOA/M6/S/74						
		o. reworked bolt		SOA/M6/S/74						
		p. Low strength material bolt		SOA/M6/S/74						

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STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		ii. Lock bolt types	½	SOA/M6/S/75						
		iii. Lock bolt numbering system	1	SOA/M6/S/76						
	* Nuts : Self locking, anchor, standard types	i. Non- self locking nuts :	1	SOA/M6/S/77		2	11.	To identify and know the uses of various types of Non-self locking nuts.	2	LAB
		a. AN 310								
		b. AN 315								
		c. AN 320								
		d. AN 335								
		e. AN 340								
		f. AN315								
		g. AN 350								
		ii. Self-locking & anchor types of nuts	1	SOA/M6/S/78		2	12.	To identify and know the uses of various types self-locking nuts.	2	LAB
		a. Hexagonal		SOA/M6/S/78						
		b. Castle		SOA/M6/S/79						
		c. Ring		SOA/M6/S/80						
		d. Flanged		SOA/M6/S/81						
		e. Slotted		SOA/M6/S/82						
		f. Pal								
		g. Check								
		h. Wing								
		i. Dome nuts								
	* Machine screws : aircraft specifications	Types of screws & specification	1	SOA/M6/S/82A		2	13.	To identify and know the uses of aircraft screws	4	ON AIRCRAFT
		a. Structural								

MODULE - 6 : MATERIALS AND HARDWARE

SEMESTER : THIRD

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		b. Self tapping								
		c. Drive								
		d. Flat head								
		e. Round head								
		f. Washer head								
		g. Headless								
		h. Fillister head		SOA/M6/S/83						
		i. Truss head and all machine screws		SOA/M6/S/83						
	* Studs : types and uses, insertion and removal	Different types of studs and their uses	1	SOA/A/M6/S/83A		2	14.	To identify and know how to use the stud and dowels.	1	LAB
	* Self tapping screws, dowels	Self-tapping screw & dowels	½	SOA/M6/S/84						
	[6.5.3] Locking devices, Tab and spring washers, locking plates, split pins, pal nuts, wire locking, quick release fasteners, key circlips, cotter pins	Tab and spring washers	2		2	2	15.	To identify and know the various types of washers and their uses	3	LAB
		a. Plain washer		SOA/M6/S/85						
		b. Special washer		SOA/M6/S/85						
		c. Spring washer		SOA/M6/S/86						
		d. Taper pin washer		SOA/M6/S/86						
		e. Star-lock washer		SOA/M6/S/87						
		f. Locking plates		SOA/M6/S/87						
		g. Split pin		SOA/M6/S/87a						

MODULE - 6 : MATERIALS AND HARDWARE **SEMESTER : THIRD**

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		h. Pal nuts		SOA/M6/S/87						
		i. Wire locking		SOA/M6/S/88-90						
		j. Quick release fasteners		SOA/M6/S/91-93						
		k. Key circlip		SOA/M6/S/94						
		l. Cotter pins		SOA/M6/S/94A						
	[6.5.4.] Aircraft rivets	1. Types of rivets, specification and identification	1	SOA/M6/S/95-98	2	2	16.	Identification and uses of different rivets	4	ON AIRCRAFT
	Types of solid and blind rivets: specifications and identification, heat treatment.	a. Universal head								
		b. Round head								
		c. Flat head								
		d. Counter sunk head								
		e. Special blind rivets mechanically expanded rivets		SOA/M6/S/95-98A						
		f. Non-structural and mechanical lock.		SOA/M6/S/95-98B						
		2. Heat treatment of different types of rivets.	1							
6.	[6.6] Pipes and unions									
a.	Identification, and types of rigid and flexible pipes and their connectors used in aircraft	Different types of pipes and unions used in aircraft	0.5	SOA/M6/S/99-104	2	2	17.	To identify uses and bending of pipes (Hydraulic used in aircraft)	3	ON AIRCRAFT
		a. Plumbing line								
		b. Rigid tubing								
		c. Identification of material								
		d. Flexible hose								
		e. Synthetic hose								
		f. Taflon hose								

MODULE - 6 : MATERIALS AND HARDWARE

SEMESTER : THIRD

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
b.	Standard unions for aircraft hydraulic, fuel oil, pneumatic and air system pipes	a. Plumbing connectors	1		2					
		b. Flared, tube fittings								
		c. Flareless tube fittings.								
7.	[6.7] Springs				2					
	Types of springs, material, characteristics and application	Different types of springs, material testing, characteristics and application	1	SOA/M6/S/100		2	18.	To know the different types of springs and testings and uses	2	ON AIRCRAFT
8.	[6.8] Bearing			SOA/M6/S/101-105	2					
	1. Purpose of bearing, loads, material, construction	1. Purpose of bearing, loads, material construction	0.5			2	19.	To know and identify the different types of bearing.	3	ON AIRCRAFT
	2. Types of bearings and their application	2. Types & uses of bearings	1							
		a. Ball and roller bearing								
		b. Journal bearing								
		c. Rod end bearing								
		d. Conical bearing								
		e. Truncated pivot bearing								
		f. Collared bearing								
		g. Needle and cylindrical bearing								
9.	[6.9] Transmission				2					
i.	Gear types and their application	i. Different types of gear	1½	SOA/M6/S/106-116		2	20.	To know the operation and uses of different gears	3	ON AIRCRAFT
		a. Spur		SOA/M6/S/116-126						
		b. Helical		SOA/M6/S/116-126						

MODULE - 6 : MATERIALS AND HARDWARE **SEMESTER : THIRD**

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		c. Spiral		SOA/M6/S/116-126						
		d. Rack & pinion		SOA/M6/S/116-126						
		e. Worm & worm wheel		SOA/M6/S/116-126						
		f. Bevel gear		SOA/M6/S/116-126						
		g. Riverted gear		SOA/M6/S/116-126						
		h. Simple and compound train		SOA/M6/S/116-126						
		i. Epicyclic gear train		SOA/M6/S/116-126						
ii.	Gear ratios, reduction and multiplication gear system, driven and driving gear, idler gears and mesh patterns	ii. Undrstanding terms :	1							
		a. Gear ratio		SOA/M6/S/116-126A						
		b. Reduction & multiplication gear system		SOA/M6/S/116-126B						
		c. Driven & driving gear		SOA/M6/S/116-126C						
		d. Idler gears & mesh patterns		SOA/M6/S/116-126 D						
iii.	Belts and pulleys chains and sprokets	iii. Different types of belts and pulleys, chain & sprocket and their uses	1	SOA/M6/S/127-131	2					
10.	[6.10] Control cables			SOA/M6/S/131-137	2					
	1. Types of cables	1. Different types of control cables	1							
	2. End fittings, turn buckles and compensation devices	2 a. Cable end fittings (AN663-AN668)	1			2	21.	To know practically how swaging is carried out on control cables	3	ON AIRCRAFT
		b. Turn buckles & compensation devices								

MODULE - 6 : MATERIALS AND HARDWARE

SEMESTER : THIRD

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	3. Pulleys and cable system components	3. Pulleys & cable system components								
	4. Bowden cables	4. Bowden cables								
	5. Aircraft flexible control system	5. Aircraft flexible control system								
11.	[6.11] Electrical cables control connectors		1		2					
	Cable types, construction and characteristics	a. Types of electrical cables		SOA/M6/S/138						
		b. Cable constructions								
		c. Cable characteristics								
	High tension and co-axial cables	a. High tension cable	½		2					
		b. Co-axial cable		SOA/M6/S/139		2	22.	To acquaint with various parts of co-axial cable	2	ON AIRCRAFT
	Crimping	Crimping	½	SOA/M6/S/140	2					
	Connector types, pins, plugs, sockets, insulators, current and voltage rating, coupling, identification codes	a. Types of connectors	1	SOA/M6/S/141	2					
		b. Current and voltage rating								
		c. Coupling								
		d. Identification code		SOA/M6/S/141		2	23.	To acquaint with identification code of cables	2	ON AIRCRAFT
								TOTAL NO. OF PRACTICAL HRS. AT AIRINDIA	0	
								TOTAL NO. OF PRACTICAL HRS. AT LAB	22	
								TOTAL NO. OF PRACTICAL HRS. AT CLASS ROOM	0	
								TOTAL NO. OF PRACTICAL HRS. ON AIRCRAFT/SOA	38	
		TOTAL NO. OF HRS. (T)	90					TOTAL NO. OF HRS. (P)	50	■■■

MODULE - 15 : GAS TURBINE ENGINE**SEMESTER : FOURTH****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	[15.1] Fundamentals			SOA/M-15/S/1	2					
	(a) Potential energy, kinetic energy,	(i) Potential Energy	2.5	SOA/M-15/S/2						
	Newton's Laws of motion, Brayton Cycle	(ii) Kinetic Energy		SOA/M-15/S/3						
		(iii) Newton's Laws of motion		SOA/M-15/S/4						
		(iv) Brayton Cycle		SOA/M-15/S/5						
		a. Shell model		SOA/M-15/S/6						
		b. Incidents attributable to human factor		SOA/M-15/S/7						
	(b) The relationship between force ,	The relationship between :	2.5	SOA/M-15/S/8						
	work, power energy, velocity,	i. Force		SOA/M-15/S/9						
	acceleration	ii. Work		SOA/M-15/S/10						
		iii. Power		SOA/M-15/S/11						
		iv. Energy		SOA/M-15/S/12						
		v. Velocity		SOA/M-15/S/13						
		vi. Acceleration		SOA/M-15/S/14						
	(c) Constructional arrangement and	Construction arrangement and operation of	5							
	operation of Turbojet turbofan,	(i) Turbojet Engine		SOA/M-15/S/15						
	turboshaft turboprop engine	(ii) Turbofan Engine		SOA/M-15/S/16						
		(iii) Turboshift Engine		SOA/M-15/S/17						
		(iv) Turboprop Engine		SOA/M-15/S/18						
2.	[15.2] Engine Performance				2					
	(a) Gross Thrust, net thrust, choked	(i) Gross Thrust	5	SOA/M-15/S/19						
	nozzle thrust, Thrust distribution,	(ii) Net Thrust		SOA/M-15/S/20						

MODULE - 15 : GAS TURBINE ENGINE

SEMESTER : FOURTH

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	resultant thrust, Thrust horse power,	(iii) Chocked nozzle thrust		SOA/M-15/S/21						
	Equivalent Shaft horse power, specific	(iv) Thrust distribution		SOA/M-15/S/22						
	fuel, consumption	(v) Resultant Thrust		SOA/M-15/S/23						
		(vi) Thrust horsepower		SOA/M-15/S/24						
		(vii) Equivalent Shaft horse power		SOA/M-15/S/25						
		(viii) Specific fuel consumption		SOA/M-15/S/26						
	(b) Engine efficiency	(i) Thermal efficiency	2	SOA/M-15/S/27						
		(ii) Equivalent Specific fuel consumption		SOA/M-15/S/28						
		(iii) Propulsive efficiency		SOA/M-15/S/29						
	(c) By pass ratio and engine pressure	(i) By pass ratio of turbo fan engine	2	SOA/M-15/S/30	2					
	ratio	(ii) Engine pressure ratio of engine		SOA/M-15/S/31						
	(d) Pressure, temperature and velocity	(i) Pressure of gas flow of engine	2	SOA/M-15/S/32						
	of the gas flow	(ii) Temperature of gas flow of engine		SOA/M-15/S/33						
		(iii) Velocity of gas flow engine		SOA/M-15/S/34						
	(e) Engine ratings static thrust influence	(i) Engine ratings	2	SOA/M-15/S/35		2	1.	To acquaint with engine inhibition process	4	IN AIR INDIA
	of speed attitude and hot climate, flat	(ii) Static Thrust		SOA/M-15/S/36						
	rating limitations	(iii) Influence of speed		SOA/M-15/S/37						
		(iv) Influence of altitude		SOA/M-15/S/38						
		(v) Influence of hot climate		SOA/M-15/S/39						
		(vi) Flat rating		SOA/M-15/S/40						
		(vii) Limitations		SOA/M-15/S/41						

MODULE - 15 : GAS TURBINE ENGINE

SEMESTER : FOURTH

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
3.	[15.3] Inlet									
	Compressor inlet ducts	Types	4	SOA/M-15/S/42	2					
		(i) Subsonic duct		SOA/M-15/S/43						
		(ii) Transonic duct		SOA/M-15/S/44						
		(iii) Supersonic duct with variable geometry		SOA/M-15/S/45						
		(iv) Ramp of wedge type duct below design speed		SOA/M-15/S/46						
		(v) Ramp or wedge type duct as design speed		SOA/M-15/S/47						
		(vi) Ramp or wedge type duct e stabliting multiple		SOA/M-15/S/48						
		oblique shocks								
	(b) Effect of various inlet configurations	i. Effect of various inlet configurations	2	SOA/M-15/S/49						
	(c) Ice Protection	i. Anti icing of inlet duct with heating effect	2	SOA/M-15/S/50						
4.	[15.4] Compressors				2					
	(a) Axial and configural type	(i) Role of compressors engine	3	SOA/M-15/S/51						
		(ii) Types of compressors		SOA/M-15/S/52						
		(iii) The Centrifugal flow compressor		SOA/M-15/S/53						
		(iv) The axial flow compressor		SOA/M-15/S/54						
	(b) Construction features and operating principles and applications	(i) Constructional feature of centrifugal compressor	3	SOA/M-15/S/55						
		(ii) Operating principle of centrifugal compressor		SOA/M-15/S/56						
		(iii) application of centrifugal compressors		SOA/M-15/S/57						
		(iv) Construction feature fo axial flow compressors		SOA/M-15/S/58						

MODULE - 15 : GAS TURBINE ENGINE
SEMESTER : FOURTH

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		(v) operation principle of axial flow compressor		SOA/M-15/S/59						
		(vi) Application of axial flow compressor		SOA/M-15/S/60						
	(c) Fan Balancing	(i) Fan balancing of compressor	2	SOA/M-15/S/61						
		(ii) Function and operation of terms of compressors		SOA/M-15/S/62						
	(d) Cause and effects of compressor	(i) Definition of surge and stall of compressor	3	SOA/M-15/S/63						
	stall and surge	(ii) Causes		SOA/M-15/S/64						
		(iii) effect of stall and surge of compressor		SOA/M-15/S/65						
	(e) Methods of air flow control bleed	(i) Bleed valve for airflow control	3	SOA/M-15/S/66		2	2.	To acquaint with air bleed control valve EICAS panel and engine indicators	4	IN AIR INDIA
	valves variable inlet guide vane variable	(ii) Airflow control by variable inlet guidance		SOA/M-15/S/67						
	stator vanes rotating stator blades	(iii) Airflow control by rotating stator blades		SOA/M-15/S/68						
	(f) Compressor ratio	(i) Compressor ration of contrifugal compressor	2	SOA/M-15/S/69						
		(ii) Compresor ratio of axial flow compressor ratio		SOA/M-15/S/70						
5.	[15.5] Combustion section									
	(a) Constructional feature and principles of	(i) Types of combustion chambers	2	SOA/M-15/S/71						
	operation	(ii) Principle of operation	2	SOA/M-15/S/72						
		(iii) Constructional features of different types of	3	SOA/M-15/S/73						
		combustion chambers								

MODULE - 15 : GAS TURBINE ENGINE

SEMESTER : FOURTH

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
6.	[15.6] Turbine Section									
	(a) Operation and characteristics of different turbine blade type	(i) Operation and function of turbine (ii) Different parts of turbine (iii) Types of blader used on turbine and there characteristics	3	SOA/M-15/S/74 SOA/M-15/S/75 SOA/M-15/S/76	2					
	(b) Blade to disk attachment	(i) Different types of attachment methods of blade attachment	2	SOA/M-15/S/77						
	(c) Nozzle guide vane	(i) Function of nozzle guide vane (ii) Material of nozzle guide vanes (iii) Types of nozzle guide vane	3	SOA/M-15/S/78 SOA/M-15/S/79 SOA/M-15/S/80						
	(d) Causes and effects of turbine blade stress and creep	(i) Causes of turbine blade of stress (ii) Effect of stress (iii) Concept of creep in blade and its effect	2	SOA/M-15/S/81 SOA/M-15/S/82 SOA/M-15/S/83		2	3.	To acquaint with turbine blade creep inspection	4	IN AIR INDIA
7.	[15.7] Exhaust									
	(a) Constructional features and principle of operation	(i) Purpose of exhoust in engine (ii) Different part of exhaust and their function (ii) Material of exhaust cone (iv) Principle of operation	2	SOA/M-15/S/84 SOA/M-15/S/85 SOA/M-15/S/86 SOA/M-15/S/87	2					
	(b) Convergent divergent and variable area nozzle	(i) Convergent nozzle and it function and purpose	2	SOA/M-15/S/88						

MODULE - 15 : GAS TURBINE ENGINE **SEMESTER : FOURTH**

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		(ii) Divergent nozzle, its function and purpose		SOA/M-15/S/89						
		(iii) Variable area nozzles and its function		SOA/M-15/S/90						
	(c) Engine noise reduction	(i) Cause of engine	2	SOA/M-15/S/91						
		(ii) Method to reduce the engine noise		SOA/M-15/S/92						
	(d) Thrust reverser	(i) Purpose of thrust reversers	2	SOA/M-15/S/93		2	4.	To acquaint with thrust reversal and its operating mechanism.	5	IN AIR INDIA
		(ii) Types of thrust reversers and their function		SOA/M-15/S/94						
8.	[15.8] Bearings & seals	Constructional features & principle of operation	2	SOA/M-15/S/95	2					
9.	[15.9] Lubricants and fuels		10		2					
	(a) Lubricants Properties & specifications	(i) Function of lubricants in gas turbine engine		SOA/M-15/S/96						
		(ii) Types of Lubricants oils		SOA/M-15/S/97						
		(iii) Properties of lubricant for use in gas turbine engine		SOA/M-15/S/98						
		(iv) Care in handling synthetic lubricants		SOA/M-15/S/99						
	(b) Fuels properties & specifications	(i) Introduction		SOA/M-15/S/100						
		(ii) Fuel requirements for gas turbine engine		SOA/M-15/S/101						
		(iii) Jet fuel properties and characteristics		SOA/M-15/S/102						
		(iv) Types of Jet fuels		SOA/M-15/S/103						
	(c) Fuel Additive	(i) Purpose of fuel additives		SOA/M-15/S/104						

MODULE - 15 : GAS TURBINE ENGINE

SEMESTER : FOURTH

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		(ii) Types of fuel additives used in fuel of gas turbine engine		SOA/M-15/S/105						
	(d) Safety precautions	(i) Refueling precautions		SOA/M-15/S/106						
		(ii) Avoidance of inter mixing of jet fuels		SOA/M-15/S/107						
10.	[15.10] Lubrication System:		12	SOA/M-15/S/108	2					
	System operation/ layout and			SOA/M-15/S/109						
	components									
	Lubrication System	Components and function there of		SOA/M-15/S/110		2	5.	To acquaint with engine module replacement.	5	IN AIRINDIA
		(i) oil tank		SOA/M-15/S/111						
		(ii) Pressure oil pump		SOA/M-15/S/112						
		(iii) Scavenge oil system		SOA/M-15/S/113						
		(iv) Oil filter		SOA/M-15/S/114						
		(v) Magnetic chip detector		SOA/M-15/S/115						
		(vi) Oil Cooler		SOA/M-15/S/116						
		(vii) Oil breather system		SOA/M-15/S/117						
		(viii) oil indicating and warning system		SOA/M-15/S/118						
	System operation	Different type of system for lubrication		SOA/M-15/S/119						
		(i) Pressure relief valve system		SOA/M-15/S/120						

MODULE - 15 : GAS TURBINE ENGINE

SEMESTER : FOURTH

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		(ii) Full-flow system		SOA/M-15/S/121						
		(iii) Total loss systems		SOA/M-15/S/122						
		(iv) Lubrication system for a Turbofan engine		SOA/M-15/S/123						
		(v) Lubrication system for gas turbine engine		SOA/M-15/S/124						
11.	[15.11] Fuel systems operation of engine control and fuel metering system including electronic engine control [FADEC]	(i) Gas turbine fuel system components	20	SOA/M-15/S/125	2	2	6.	To acquaint with FADEC system components	3	IN AIRINDIA
		(ii) Gas turbine engine fuel system		SOA/M-15/S/126						
		(iii) Large aircraft turbofan engine fuel system		SOA/M-15/S/127						
		fuel spray								
		(iv) Nozzles		SOA/M-15/S/128						
		(v) Principle of fuel control		SOA/M-15/S/129						
		(vi) General operation of FCU		SOA/M-15/S/130		2	7.	To demonstrate the rigging of fuel control unit as per manufacturers recommendation	3	IN AIRINDIA
		(vii) Metering system		SOA/M-15/S/131						
		(viii) Computing system		SOA/M-15/S/132						
		(ix) Electronic engine controls		SOA/M-15/S/133						
		(x) Full authority EEC		SOA/M-15/S/134						
	(b) System layout & components	The layout of General electric CJ 1805-23 (J-79)		SOA/M-15/S/135						
		Fuel system & component		SOA/M-15/S/136						
		(i) Fuel Filling		SOA/M-15/S/137						
		(ii) Fuel Heater		SOA/M-15/S/138						
		(iii) Assesory cooling		SOA/M-15/S/139						

MODULE - 15 : GAS TURBINE ENGINE **SEMESTER : FOURTH**

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		(iv) Fuel nozzle		SOA/M-15/S/140						
		(v) Pressurizing and drain valve		SOA/M-15/S/141						
		(vi) Inlet guide vane actuator		SOA/M-15/S/142						
		(vii) Fuel control		SOA/M-15/S/143						
		(viii) Inlet-guidance mechanical feed back assembly		SOA/M-15/S/144						
		(ix) CIT sensor		SOA/M-15/S/145						
		(x) Variable-Stator reset mechanism		SOA/M-15/S/146						
12.	[15.12] Air Systems operation of engine air distribution and anti ice control system, including internal cooling sealing and external air services		10		2					
		Air cooling of gas turbine engines		SOA/M-15/S/147						
		(i) Introduction		SOA/M-15/S/148						
		(ii) Internal cooling		SOA/M-15/S/149						
		(iii) Accessory cooling		SOA/M-15/S/150						
		(iv) External Cooling & ventilation		SOA/M-15/S/151						
13.	Starting and Ignition System operation of engine start system and component	Starting Systems	15	SOA/M-15/S/152	2	2	8.	To acquaint with monitoring of engine start	6	IN AIRINDIA
		i) Purpose		SOA/M-15/S/153						
		ii) Factor affecting starting system length of starting cycle		SOA/M-15/S/154						
		Availability of starting power design features		SOA/M-15/S/155						
		iii) Various forms of gas turbine starter		SOA/M-15/S/156						
		° Electric Starter motor		SOA/M-15/S/157						

MODULE - 15 : GAS TURBINE ENGINE **SEMESTER : FOURTH**

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		° Electric starter generator		SOA/M-15/S/158						
		(ii) Modern capacitor type ignition system		SOA/M-15/S/159		2	9.	To demonstrate function and different parts of H.E.I.O.	5	ON A/C AND LAB
		(iii) High voltage capacitor system DC input (more		SOA/M-15/S/160						
		then 5000V to the plug)								
		(iv) Two high voltage capacitor system A.C. input		SOA/M-15/S/161		2	10.	Safety precaution to be observed during handling of H.E.I.U on A/c and in Lab	5	A/c & Lab
		(v) Low voltage capacitor system DC input (Less		SOA/M-15/S/162						
		then 1000 V to the plug).								
		(vi) Jet engine ignitors.		SOA/M-15/S/163						
	(c) Maintenance Safety requirements	Safety requirements during maintenance		SOA/M-15/S/164						
		° Pneumatic and air urban starter		SOA/M-15/S/165		2	11.	To demonstrate different type starter of gas turbine engine	5	LAB
		° Catridge or solid propellant starter		SOA/M-15/S/166						
		° Fuel-air combustion starter		SOA/M-15/S/167						
		° Gas turbine starter		SOA/M-15/S/168						
		° Hydraulic motor starter		SOA/M-15/S/169						
		° Liquid mono propellant starter		SOA/M-15/S/170						
		° Air impingement starter		SOA/M-15/S/171						
		° Hand-Crank starter		SOA/M-15/S/172						
	(d) Ignition System and component	(i) Requirement for the gas turbine ignition system		SOA/M-15/S/173		2	12.	To acquaint with testing of engine ignition system.	8	IN AIRINDIA
		(ii) Early induction type ignition system		SOA/M-15/S/174						

MODULE - 15 : GAS TURBINE ENGINE

SEMESTER : FOURTH

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
14.	15.14 Engine indication System	° Electric starter generator	12	SOA/M-15/S/175		2	13.	To demonstrate constructional details of exhaust gas temperature gauge	8	LAB
	(a) Exhaust gas temperature interstage turbine temperatures	(i) EGT Indicator		SOA/M-15/S/176						
		(ii) Engine thrust indicator		SOA/M-15/S/177		2	14.	To demonstrate construction features of EPR gauge	8	LAB
		(iii) EPR indicator		SOA/M-15/S/178						
		(iv) Engine turbine discharge pressure or Jet pipe pressure system indicator		SOA/M-15/S/179		2	15.	To demonstrate functions and different parts of oil temperature indicator	8	LAB
	* Engine thrust indication , Engine Pressure ratio, engine turbine discharge pressure or jet pipe pressure system			SOA/M-15/S/180						
	(b) Oil pressure and temperature	(i) oil temperature indicator		SOA/M-15/S/181						
		(ii) oil pr indicator		SOA/M-15/S/182						
	(c) Fuel pressor and flow	(i) Fuel pressure indicates		SOA/M-15/S/183						
		(ii) Fuel flow indicator		SOA/M-15/S/184						
						2	16.	To demonstrate funelction of fuel flow indicator	8	LAB
	(d) Engien speed	(i) Engine speed indicator		SOA/M-15/S/185						
	(e) Vibration measurement and indication	(i) Vibration measurement and indication system		SOA/M-15/S/186		2	17.	To demonstrate dismentling inspection of R.P.M. gauge	8	LAB
	(f) Torque	(i) Engine torque indicator		SOA/M-15/S/187		2	18.	To demonstrate the constructional detail of engine thrust indicator	8	LAB
	(g) Power	(i) Engine power indicator		SOA/M-15/S/188						

MODULE - 15 : GAS TURBINE ENGINE **SEMESTER : FOURTH**

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
15.	15.15 Power augmentation system	Operation and application of	12	SOA/M-15/S/189	2					
		(i) Water injection system		SOA/M-15/S/190		2	19.	Strip inspection and reassembly of electrically operated ratiometer	6	LAB
		(ii) Water methanol system		SOA/M-15/S/191						
		(iii) After burner system		SOA/M-15/S/192						
16.	15.16 Turbo prop engine		12		2					
	(a) Gas Coupled/free turbine and gear coupled turbines	(i) Gas Coupled/ free turbine for propeller rotation		SOA/M-15/S/193						
		(ii) Gear Coupled turbine for propeller rotation		SOA/M-15/S/194						
	(b) Reduction gears	(i) Reduction gear arrangement for propeller rotation		SOA/M-15/S/195						
	(c) Over speed safety devices	(i) Propeller control unit		SOA/M-15/S/196						
		(ii) Propeller over speed governor and in the beta range (propeller operation on the ground		SOA/M-15/S/197						
		(iii) E.E.C.		SOA/M-15/S/198						
17.	15.17 Turbo shaft engine arrangements drive systems reduction gearing couplings, control systems	(i) Introduction	15	SOA/M-15/S/199	2	2	20.	To demonstrate the different component and their function of turbo shaft engine	7	LAB
		(ii) Allied signal lycoming turboshaft engine		SOA/M-15/S/200						
		° Specification		SOA/M-15/S/201						
		° Directional references		SOA/M-15/S/202						
		° Engine major assemblies :-		SOA/M-15/S/203						
		Inlet housing over speed governor techmeter drive		SOA/M-15/S/204						

MODULE - 15 : GAS TURBINE ENGINE

SEMESTER : FOURTH

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		assembly accessory gear by assemble								
		output reduction carrier and gear assembly.								
		Compressor and impeller housing assembly.								
		Compressor rotor assembly, Diffusor housing								
		combustor turbine assembly piping and								
		accessories								
18.	15.18 Auxiliary power unit purpose, operation and protective system	(i) Purpose of Auxilliary power unit	11	SOA/M-15/S/205	2	2	21.	To acquaint with aircraft APU system.	6	IN AIRINDIA
		(ii) All operation		SOA/M-15/S/206						
		(iii) APU location and discription		SOA/M-15/S/207						
		(iv) APU System		SOA/M-15/S/208						
				SOA/M-15/S/209						
19.	15.19 Power Plant installation configuration of fire walls, cowlings accousils panels, Engine mounts anti. Vibration mounts, hose pipes, feders, connectors wiring looms control cables and rods, lifting points and drains		15		2					
		(i) Purpose of configuration of fire wall		SOA/M-15/S/210						
		(ii) Purpose and location of coolings		SOA/M-15/S/211						
		(iii) Accoustic ponds		SOA/M-15/S/212		2	22.	To acquaint with engine vibration monitoring.	6	IN AIRINDIA
		(iv) Engine mounts		SOA/M-15/S/213						
		(v) Anti Vibration mounts		SOA/M-15/S/214						
		(vi) Hose pipes and feeder connection		SOA/M-15/S/215						
		(vii) Electrical wire looms		SOA/M-15/S/216						
		(viii) Control cables and rods		SOA/M-15/S/217						

MODULE - 15 : GAS TURBINE ENGINE

SEMESTER : FOURTH

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		(ix) Lifting points		SOA/M-15/S/218						
		(x) Drains		SOA/M-15/S/219						
20.	15.20 Fire Protection systems.	(i) Types of system firewal system kiddie system	15	SOA/M-15/S/220	2					
	Operation of detection and extinguishing	pneumatic system.								
	system.	(ii) Routing of fire warning sensors.		SOA/M-15/S/221						
		(iii) Fire suppression systems		SOA/M-15/S/222		2	23.	To demonstrate the layout of fire suppression and fire indication system A/c	8	IN AIRINDIA
		System for light aircraft systems for transport aircraft		SOA/M-15/S/223						
		(iv) Fire extinguishing system indicator		SOA/M-15/S/224						
		(v) Maintenance of fire extinguishing system		SOA/M-15/S/225						
21.	Engine monitoring and ground operation		12		2					
	(a) Procedure for starting and ground	(i) Turbine engine starting and ground run-up		SOA/M-15/S/226						
	run up.	(ii) Interpretation of engine power out put and		SOA/M-15/S/227		2	24.	To demonstrate the starting and ground run of engine and parameter observation on A/c	8	IN AIRINDIA
		parameters								
	(b) Trends (including of oil analysing	(i) Oil analysis of engine oil and its periodicity		SOA/M-15/S/228						
	vibration, and boroscopic) monitoring	(ii) Vibration monitoring		SOA/M-15/S/229		2	25.	To acquaint with checking of accessory gear box chip detector for metal chips.	6	IN AIRINDIA
		(iii) Boroscopic check during maintenance and over		SOA/M-15/S/230						
		heat cong condition								

MODULE - 15 : GAS TURBINE ENGINE**SEMESTER : FOURTH****STREAM : MECHANICAL**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	(c) Inspection of engine and component to criteria, tolerance and data specified by engine manufacturer	(i) Inspection engine components as per manufacturer periodicity for tolerance check at defined servicing hrs/time lapse		SOA/M-15/S/231		2	26.	To acquaint with special inspection of engine for injection of FOD/brid hit.	5	IN AIRINDIA
	(d) Compressor washing/cleaning	(i) Purpose of compressor washing		SOA/M-15/S/232		2	27.	To demonstrate the procedure of compressor washing and its purpose	8	IN AIRINDIA
		(ii) Water washing		SOA/M-15/S/233						
		(iii) Grit washing		SOA/M-15/S/234						
	(e) Foreign object damage	Check after F.O.D. ingran in the engine		SOA/M-15/S/235						
22.	15.22 Engine storage and preservation Preservation and depreservation for the engine and accessories system		15		2	2	28.	To acquaint with engine module replacement.	5	IN AIRINDIA
		(i) Install turbine engine preservation		SOA/M-15/S/236						
		(ii) Short term inhibition		SOA/M-15/S/237						
		(iii) Fuel system inhibiting		SOA/M-15/S/238						
		(iv) Motoring method		SOA/M-15/S/239		2	29.	To acquaint with inspection of integrated engine and propeller control.	5	IN AIRINDIA
		(v) Pressuring method		SOA/M-15/S/240						
		(vi) Gravity method		SOA/M-15/S/241						
		(vii) Lubrication system		SOA/M-15/S/242						
		(viii) External treatment		SOA/M-15/S/243		2	30.	To know about the engine preservation and depreservation.	5	IN AIRINDIA
		(ix) Long term storage		SOA/M-15/S/244						
		(x) Uninstalled engines		SOA/M-15/S/245						
		(xi) Insection		SOA/M-15/S/246		2	31.	To acquaint with Boroscopic inspection of engine.	4	IN AIRINDIA
								TOTAL NO. OF PRACTICAL HRS. AT AIRINDIA	108	
								TOTAL NO. OF PRACTICAL HRS. AT LAB	76	
								TOTAL NO. OF PRACTICAL HRS. AT CLASS ROOM	0	
								TOTAL NO. OF PRACTICAL HRS. ON AIRCRAFT/SOA	0	
		TOTAL NO. OF HRS. (T)	260					TOTAL NO. OF HRS. (P)	184	

MODULE - 17A : PROPELLER
SEMESTER : FOURTH

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	[17.1] Fundamentals		18		2					
	(a) Blade Element Theory	(i) Blade Element Theory		SOA/M-17A/S/01			1.	To under stand the nomenclature of blade.	6	LAB
		(ii) Blade Station		SOA/M-17A/S/02						
		(iii) Blade Angle		SOA/M-17A/S/03						
		(iv) Hig/Low Blade Angle		SOA/M-17A/S/04						
		(v) Reverse Angle		SOA/M-17A/S/05						
		(vi) Angle of Attack		SOA/M-17A/S/06						
		(vii) Rotational Speed		SOA/M-17A/S/07						
	[17.1b] Propeller Slip	i. Concept of propeller Slip		SOA/M-17A/S/08	2					
		ii. Geometrical pitch		SOA/M-17A/S/09						
		iii. Effective pitch		SOA/M-17A/S/10						
		iv. Mean geometrical pitch		SOA/M-17A/S/11						
		v. Zero thrust pitch		SOA/M-17A/S/12						
	[17.1c] Aerodynamic centrifugal and thrust forces	(i) Forces to which propellers are subjected at high		SOA/M-17A/S/13	2					
		speed.								
		(ii) Contrifugal force		SOA/M-17A/S/14						
		(iii) Torque bending force		SOA/M-17A/S/15						
		(iv) Thrust bending force.		SOA/M-17A/S/16						
		(v) Aerodynamic twisting force		SOA/M-17A/S/17						
	[17.1d] Torque	concept of propeller torque when propeller		SOA/M-17A/S/18	2					
		rotating.								

MODULE - 17A : PROPELLER
SEMESTER : FOURTH

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	(e) Relative air flow on blade angle of attack	(i) Blade angle		SOA/M-17A/S/19	2					
		(ii) Angle of attack in flight		SOA/M-17A/S/20						
		(iii) Angle of attack on ground		SOA/M-17A/S/21						
		(iv) Concept of relative wind		SOA/M-17A/S/22						
	(f) Vibration and resonance	(i) Courses of propeller vibration		SOA/M-17A/S/23	2					
		(ii) Concept of tip speed of propeller		SOA/M-17A/S/24						
		(iii) Effect on propeller of high tip speed		SOA/M-17A/S/25						
17.2	Propeller construction	Propeller construction	18	SOA/M-17A/S/26	2					
	(a) Construction Method	(i) Wooden propeller		SOA/M-17A/S/27						
		(ii) Material used in wooden propeller		SOA/M-17A/S/28						
		(iii) Composite material propeller		SOA/M-17A/S/29						
		(iv) Metal propeller		SOA/M-17A/S/30						
	(b)	(i) Blade station		SOA/M-17A/S/31						
		(ii) Blade face		SOA/M-17A/S/32						
		(iii) Blade shank		SOA/M-17A/S/33						
		(iv) Blade back		SOA/M-17A/S/34						
		(v) Hub Assembly		SOA/M-17A/S/35						
	(c) Fixed pitch, controllable pitch	(i) Concept of fixed pitch propeller		SOA/M-17A/S/36						
	constant speeding propeller	(ii) Controlable pitch propeller		SOA/M-17A/S/37						
		(iii) Ground adjustable propeller		SOA/M-17A/S/38						

MODULE - 17A : PROPELLER **SEMESTER : FOURTH**

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		(iv) Constant speed proeller		SOA/M-17A/S/39						
		(v) Principle of operation of constant speed propeller		SOA/M-17A/S/40		2	2.	To install the propeller and spinner on A/c	08	IN AIRINDIA
	(d) Propeller/spinner installation	Propeller & spinner installation		SOA/M-17A/S/41						
17.3	Propeller pitch control	Propeller pitch control	14	SOA/M-17A/S/42	2	2	3.	To acquaint with electrical/electronics pitch change mechanism.	04	IN AIRINDIA
	(a) Speed control and pitch change method mechanical and electrical/electronic	(i) Speed control		SOA/M-17A/S/43						
		(ii) Pitch control method		SOA/M-17A/S/44						
		(iii) Propeller Governer		SOA/M-17A/S/45						
		(iv) Constant speed counter weight propeller		SOA/M-17A/S/46						
		(v) Two position propeller		SOA/M-17A/S/47						
		(vi) General Electrical C-17 propeller control system		SOA/M-17A/S/48						
	(b) Feathering & reverse pitch	(i) Feathering of propeller and it's use		SOA/M-17A/S/49	2	2	4.	To check the feathering unfeathering and Auto fitting of propeller fitted on A/c on ground	08	IN AIRINDIA
		(ii) Unfeathering of propeller		SOA/M-17A/S/50						
		(iii) Auto feathering of propeller		SOA/M-17A/S/51						
		(iv) Concept of reverse pitch of propeller and its use on A/c		SOA/M-17A/S/52		2	5.	To acquaint with propeller reverse pitch operations.	04	IN AIRINDIA
	(c) Over speed protection	Over speed protection of propeller system		SOA/M-17A/S/53						
17.4	Propeller synchronising	(i) Requirement of propeller synchronising	4	SOA/M-17A/S/54	2	2	6.	To acquaint with propeller synchronization and synchrophasing.	04	IN AIRINDIA
		(ii) Synchronising and Synchrophasing equipment		SOA/M-17A/S/55						

MODULE - 17A : PROPELLER
SEMESTER : FOURTH

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
17.5	Propeller ice protection	Concept of propeller ice protection	10	SOA/M-17A/S/56	2					
	(a) Fluid and electrical deicing equipment	(i) Fluid de-icing system of propeller		SOA/M-17A/S/57						
		(ii) Fluid used for de-icing of propeller		SOA/M-17A/S/58						
		(iii) Electrical de-icing system and equipment used		SOA/M-17A/S/59		2	7.	To check de-icing by electrical system of propeller	4	IN AIRINDIA
		for propeller deicing								
17.6	Propeller Maintenance	Propeller maintenance	10	SOA/M-17A/S/60	2					
	(a) Static & dynamic balancing	(i) Static balancing		SOA/M-17A/S/61		2	8.	To acquaint with dynamic balancing of propeller.	4	IN AIRINDIA
		(ii) Dynamic balancing		SOA/M-17A/S/62		2	9.	To acquaint with static balancing of propeller	4	IN AIRINDIA
	(b) Blade Tracking	(i) Method of blade tracking		SOA/M-17A/S/63			10.	To check the blade tracking of four blade propeller on A/c	8	IN AIRINDIA
	(c) Assessment of blade damage	(i) Assessment of blade damage		SOA/M-17A/S/64			11.	To check the propeller for erosion, corrosion an after impart damage of propeller and repair thereof	8	LAB
	erosion, corrosion imact damage	(ii) Assessment of erosion of propeller blade		SOA/M-17A/S/65						
	delamination	(iii) Assessment of corrosion on the blade		SOA/M-17A/S/66						
		(iv) Different type of check as per SRM after impact		SOA/M-17A/S/67						
		damage of propeller								
		(v) Concept of delamination of propeller blade		SOA/M-17A/S/68						
	(d) Propeller treatment repair scheme	Repair of damage of propeller as per repair		SOA/M-17A/S/69						
		manual of propeller manufacturer								

**MODULE - 17A : PROPELLER
SEMESTER : FOURTH**

STREAM : MECHANICAL

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	(e) Propeller engine running	(i) Precaution before starting of propeller engine		SOA/M-17A/S/70	2	2	12.	To ground run the engine fitted with propeller	06	ON AIRCRAFT
		ground running								
		(ii) Parameter to be observed		SOA/M-17A/S/71						
		(iii) Stopping of ground running		SOA/M-17A/S/72						
		(iv) Checks after ground run		SOA/M-17A/S/73						
17.7	Propeller Storage and preservation	Propeller storage and preservation	10	SOA/M-17A/S/74	2	2	13.	To acquaint with propeller preservation and depreservation.	04	IN AIRINDIA
	(a) Propeller preservation and	(i) Preservation of Propeller		SOA/M-17A/S/75						
	depreservation	(ii) De-preservation of propeller		SOA/M-17A/S/76						
								TOTAL NO. OF PRACTICAL HRS. AT AIRINDIA	58	
								TOTAL NO. OF PRACTICAL HRS. AT LAB	14	
								TOTAL NO. OF PRACTICAL HRS. AT CLASS ROOM	0	
								TOTAL NO. OF PRACTICAL HRS. ON AIRCRAFT/SOA	0	
		TOTAL NO. OF HRS. (T)	84					TOTAL NO. OF HRS. (P)	72	



School of Aeronautics (Neemrana)

**Scheme
of
Aircraft Maintenance Engineering
Category B2-Avionics Stream
Semester I –IV
(DGCA-CAR 66)**

2.5.5.2 Total Time Duration of Various Subjects Semester Wise

2.5.5.2.2 Avionics (B.2)

SEMESTER: FIRST

TOTAL NUMBER OF HOURS: 600

S.NO.	NAME OF SUBJECT	MODULE NO.	TOTAL (Hours)	THEORY (Hours)	PRACTICAL (Hours)		
					LAB/CR	ON SOAA/C	AIR INDIA
1.	Maintenance Practices	7A	370	177	193	0	0
2.	Basic Aerodynamic	8	70	50	0	20	0
3.	Aviation Legislation	10	132	112	0	20	0
4.	Human Factor	9A	28	21	7	0	0
	TOTAL HOURS		600	360	200	40	0

2.5.5.2 Total Time Duration of Various Subjects Semester Wise

2.5.5.2.2 Avionics (B.2)

SEMESTER: SECOND

TOTAL NUMBER OF HOURS: 600

S.NO.	NAME OF SUBJECT	MODULE NO.	TOTAL (Hours)	THEORY (Hours)	PRACTICAL (Hours)		
					LAB/CR	ON SOAA/C	AIR INDIA
1.	Electrical Fundamental	3	210	126	84	0	0
2.	Digital Tech. Instrument System	5	198	109	63	0	26
3.	Electronics Fundamental	4	100	60	40	0	0
4.	Aircraft Aerodynamics, Structure & System (AS)	13	92	55	04	12	21
	TOTAL HOURS		600	350	191	12	47

2.5.5.2 Total Time Duration of Various Subjects Semester Wise

2.5.5.2.2 Avionics (B.2)

SEMESTER: THIRD

TOTAL NUMBER OF HOURS: 600

S.NO.	NAME OF SUBJECT	MODULE NO.	TOTAL (Hours)	THEORY (Hours)	PRACTICAL (Hours)		
					LAB/CR	ON SOAA/C	AIR INDIA
1.	Material & Hardware	6	150	90	24	36	0
2.	Aircraft Aerodynamics, Structure & System (CN)	13	338	199	59	8	72
3.	Propulsion	14	112	68	14	0	30
	TOTAL HOURS		600	357	97	44	102

2.5.5.2 Total Time Duration of Various Subjects Semester Wise

2.5.5.2.2 Avionics (B.2)

SEMESTER: FOURTH

TOTAL NUMBER OF HOURS: 600

S.NO.	NAME OF SUBJECT	MODULE NO.	TOTAL (Hours)	THEORY (Hours)	PRACTICAL (Hours)		
					LAB/CR	ON SOAA/C	AIR INDIA
1.	Aircraft Aerodynamics, Structure & System (IS)	13	300	175	20	5	100
2.	Aircraft Aerodynamics, Structure & System (ES)	13	300	180	20	0	100
	TOTAL HOURS		600	355	40	5	200



School of Aeronautics (Neemrana)

Syllabus
of
Aircraft Maintenance Engineering
Category B2-Avionics Stream
Semester I –IV
(DGCA-CAR 66)

MODULE - 7A : MAINTENANCE PRACTICES**SEMESTER : FIRST****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	[7.1] Safety Precautions : Aircraft & Workshop				3					
	* Aspects of safe working practices including precautions to take when working with electricity, gases especially oxygen, oils & chemicals.	General & safety precautions while working with								
		a. Electricity	1	SOA/M7/S/1		2	1.	To acquaint with safe working in the workshops	4	LAB
		b. Various gases like oxygen	1	SOA/M7/S/2				a. Oxygen workshops		
		c. Oils & various chemicals	2	SOA/M7/S/3				b. Oil workshops c. Chemical workshops		
	* Also, instruction in 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.	Remedial measures to be taken in case of	1							
		a. Fire or		SOA/M7/S/4-5						
		b. Accident								
		Types of fire extinguishers & knowledge of extinguishing agents		SOA/M7/S/6-7						
2.	[7.2] Workshop practices				3					
	* Care of tools, control of tools, use of workshop materials	Care to be taken when handling with	3							
		a. Tools		SOA/M7/S/8-10		2	2.	Care and maintenance of workshop tools and material	3	LAB
		b. Workshop materials		SOA/M7/S/11-12						
	* Dimensions, allowances & tolerances, standards of workmanship	Understanding terms : Allowances, Dimensions, workmanship standards.	1							
	* Calibration of tools & equipments, calibration standards	Calibration of various tools & equipments, calibration standards	1							

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STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
3.	[7.3] Tools				3					
	* Common hand tool types	1. Marking & Measuring Tools	8½			3	3.	To learn and practice the use of marking and measuring tools	12	LAB
	* Common power tool types	i. Steel Rule		SOA/M7/S/13				i. Steel Rule		
	* Operation & use of precision measuring tools	ii. Combination set		SOA/M7/S/13				ii. Combination set		
		iii. Calipers (Inside and outside)		SOA/M7/S/14				iii. Calipers (Inside and outside)		
		iv. Scribes		SOA/M7/S/15				iv. Scribes		
		v. Surface Gauge		SOA/M7/S/16				v. Surface Gauge		
		vi. Divider		SOA/M7/S/17				vi. Divider		
		vii. Trammel		SOA/M7/S/18				vii. Trammel		
		viii. Bevel Protector		SOA/M7/S/13				viii. Bevel Protector		
		ix. Punches		SOA/M7/S/19				ix. Punches		
		x. Angle plate		SOA/M7/S/20				x. Angle plate		
		xi. Try square		SOA/M7/S/21				xi. Try square		
		2. Cutting Tools	06			3	4.	To learn and practice the use of cutting tools	6	LAB
		i. Saws		SOA/M7/S/22				i. Saws		
		ii. Chisel		SOA/M7/S/23				ii. Chisel		
		iii. Files		SOA/M7/S/24-26				iii. Files		
		iv. Scrapers		SOA/M7/S/S/27				iv. Scrapers		
		v. Snipes		SOA/M7/S/28				v. Snipes		
		3. Striking, Benchwork and Fitting Tools	06			3	5.	To learn and practice the use of striking, benchwork and fitting tools.	15	LAB
		i. Hammers		SOA/M7/S/29				i. Hammers		
		ii. Screw Drivers		SOA/M7/S/30-33				ii. Screw Drivers		
		iii. Spanners		SOA/M7/S/34-37				iii. Spanners		
		iv. Pliers		SOA/M7/S/38-39				iv. Pliers		

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S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		4. Work Holding Tools	03			3	6.	To learn and practice the use of work holding tools.	02	LAB
		i. Vices		SOA/M7/S/40-41				i. Vices		
		ii. Vee Blocks		SOA/M7/S/42				ii. Vee Blocks		
		iii. 'C' Clamps / 'U' Clamps		SOA/M7/S/43				iii. 'C' Clamps / 'U' Clamps		
		5. Precision Measurement Tools & Gauges	21			3	7.	To learn and practice the use of precision tools & measuring instruments	25	LAB
		i. Micrometers						i. Micrometers		
		a. Screw Thread Micrometer		SOA/M7/S/44				a. Screw Thread Micrometer		
		b. Depth Micrometer		SOA/M7/S/45				b. Depth Micrometer		
		c. Inside and outside Micrometer		SOA/M7/S/46-47				c. Inside and outside Micrometer		
		d. Vernier Micrometer		SOA/M7/S/48				d. Vernier Micrometer		
		ii. Vernier Calipers, Vernier Height Gauge, Vernier Depth Gauge		SOA/M7/S/49-50				ii. Vernier Calipers, Vernier Height Gauge, Vernier Depth Gauge		
		iii. Plug Gauge		SOA/M7/S/45				iii. Plug Gauge		
		iv. Filler Gauge		SOA/M7/S/50				iv. Filler Gauge		
		v. Slip Gauges (Gauge Block)		SOA/M7/S/51				v. Slip Gauges (Gauge Block)		
		vi. Radius Gauge		SOA/M7/S/52				vi. Radius Gauge		
		vii. Wire Gauge		SOA/M7/S/52				vii. Wire Gauge		
		viii. Dial Test Indicator		SOA/M7/S/53				viii. Dial Test Indicator		
		ix. Sine Bar		SOA/M7/S/54				ix. Sine Bar		
		x. Screw Pitch Gauge		SOA/M7/S/55				x. Screw Pitch Gauge		
		xi. Ring Gauge		SOA/M7/S/45				xi. Ring Gauge		
		xii. Snap Gauge		SOA/M7/S/56				xii. Snap Gauge		

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					THEORY	PRACTICAL				
		6. Thread Cutting Tools	4			3	8.	To learn and practice the use of thread cutting tools.	6	LAB
		i. Dies		SOA/M7/S/57				i. Dies		
		ii. Taps		SOA/M7/S/58				ii. Taps		
		7. Reamers & Drills	4	SOA/M7/S/59-60		3	9.	To learn and practice the use of reamers and drills.	4	LAB
		i. Twist Drill		SOA/M7/S/60-61				i. Twist Drill		
		8. Power Hacksaw	01	SOA/M7/S/62		3	10.	To learn and practice the use of power hack saw	2	LAB
		9. Lathe, Types of lathe and Milling Machine	10	SOA/M7/S/63		3	11.	To learn and practice the use of lathe and Milling machine	14	LAB
		i. Parts of Lathe Machine		SOA/M7/S/64				i. Principal parts of lathe machine		
		ii. Principal Lathe Operations						ii. Operation of lathe machine		
		a. Facing		SOA/M7/S/65				a. Facing		
		b. Turning		SOA/M7/S/66-67				b. Turning		
		c. Step Facing		SOA/M7/S/68				c. Step Facing		
		d. Grooving		SOA/M7/S/69				d. Grooving		
		e. Knurling		SOA/M7/S/70				e. Knurling		
		iii. Milling Maching		SOA/M7/S/71-72				iii. Milling Machine		
	* Lubrication equipment & methods	Concept of lubrication lubricants	02							LAB
		1. Lubrication methods				3	12.	To demonstrate the operation of lubricant	3	
		a. By hand		SOA/M7/S/73				a. By hand		
		b. By grease gun		SOA/M7/S/74				b. By grease gun		
		2. Periodicity								
		a. Daily & periodic oiling								
		b. Maintaining the stored parts by grease/oil		SOA/M7/S/75						

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					THEORY	PRACTICAL				
	* Operation, function & use of electrical general test equipment	Operation, function & use of electrical general test equipment	4							
		1. DC measuring instruments								
		a. Multimeter		SOA/M7/S/76						
		b. Voltmeter		SOA/M7/S/77						
		c. Ammeter		SOA/M7/S/78						
		2. AC measuring instruments								
		a. Frequency meter		SOA/M7/S/79						
4.	[7.4] Avionic General Test Equipment				3					
	* Operation, function and use of Avionic general test equipment	Multimeter	3			3	13.	To learn the use of multimeter	2	LAB
		1. Analog multimeter		SOA/M7/S/80						
		2. Digital multimeter		SOA/M7/S/81						
		Insulation Tester (Megger)	1	SOA/M7/S/82		3	14.	To learn the use of insulation tester	2	LAB
						3	15.	Cable tracing practice, continuity and insulation check on cable runs continuity and insulation test on aircraft circuit use of megger testers (#).	3	ON AIRCRAFT
		Bonding Tester	1	SOA/M7/S/83		3	16.	To learn the use of Bonding Tester	1	LAB
							17.	To perform Milivolt drop check at cable joints & terminal ends.	1	LAB
		Clamp Meter	1	SOA/M7/S/84		3	18.	To learn the use of Clamp meter	1	LAB
		CRO (Cathode Ray Oscilloscope)	3	SOA/M7/S/85		3	19.	To learn the use of CRO	2	[ELECTRONIC LAB]

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					THEORY	PRACTICAL				
5.	[7.5] Engineering Drawings, Diagrams & Standards	1. Introduction, importance of engineering drawing in aviation	1		2					
		2. Care and use of drawing instruments	1							
	Drawing types and diagrams	1. Types of Engineering Drawings	3							
		a. Production Drawing		SOA/M7/S/86						
		b. Assembly Drawing		SOA/M7/S/87						
		c. Exploded view assembly Drawing		SOA/M7/S/88						
		d. Installation Drawing		SOA/M7/S/89						
		2. Letter writing	1	SOA/M7/S/90		2	20.	Letter writing	1	CLASS ROOM
	Conventions + symbols used in Engineering Drawing	1. Fitting on aircrafts	1			2	21.	Aircraft plumbing fittings	1	CLASS ROOM
		2. Convention for electrical components	1	SOA/M7/S/91		2	22.	Electrical symbols	1	CLASS ROOM
		3. Standard material and shape symbols	1	SOA/M7/S/92		2	23.	Material and shape symbols	1	CLASS ROOM
		4. Theoretical circuit and wiring diagrams	1			2	24.	Circuits and wiring diagrams	1	CLASS ROOM
	Dimensions	Rules, types and methods	1			2	25.	Dimensioning rules, methods & systems	2	CLASS ROOM
	Tolerances	Limits, fits and tolerances	2	SOA/M7/S/93		2	26.	Illustrating tolances. Demonstration of following fits :	2	CLASS ROOM
		a. Types of fits		SOA/M7/S/94				a. Clearance fits		
								b. Transition fits		
								c. Interference fits		

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					THEORY	PRACTICAL				
	Projections	1. Projections - types of projections	4			2	27.	Types of projections to explain the types of projections by drawing the projections of A cuboid.	2	CLASS ROOM
		a. Orthographic		SOA/M7/S/94						
		b. Isometric		SOA/M7/S/95						
		c. Oblique		SOA/M7/S/96						
		d. Perspective		SOA/M7/S/97						
		2. Theory of Orthographic projections	4			2	28.	a. Projection planes	2	CLASS ROOM
		a. Projection planes		SOA/M7/S/98				b. Difference between 1 st and 3 rd angle system		CLASS ROOM
		b. 1 st angle & 3 rd angle systems		SOA/M7/S/99						
		c. Conversion of pictorial drawings to orthographic in 1 st & 3 rd angle systems				2	29.	Conversion of pictorial view to orthographic views	3	CLASS ROOM
	Identifying title block information	1. General sheet layout margins, title block, revision block, bill of materials, grid system	2	SOA/M7/S/100		2	29.	General sheet layout, margins, title block, revision blocks and grid system	2	CLASS ROOM
		2. Types of lines used in Engineering Drawing	1	SOA/M7/S/101		2	31.	Types of lines	2	CLASS ROOM
	Microfilm, microfiche & computerised presentations	Presentation methods	2							
		a. Microfilms		SOA/M7/S/102						
		b. Microfiches		SOA/M7/S/103						
		Uses, advantages and disadvantages								
	Specification 100 of Air Transport Association (ATA) of America	1. Familiarisation with ATA - 100	1	SOA/M7/S/104						
		2. What is ATA - 100	0.5							
		3. How to refer it	0.5							

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					THEORY	PRACTICAL				
	Aeronautical & other applicable standards including ISO, AN, MS, NAS & MIL	15. Introduction to the following standard system related to aviation	2			2	32.	Drawing of the various aircraft hardware using following standards ISO, MS, AN, NAS, MIL	2	CLASS ROOM
		a. ISO								
		b. AN								
		c. MS								
		d. NAS								
		e. MIL								
		Aeronautical publications, manufacturers series bulletins manuals, catalogues, aircraft logs, airworthiness directives, type certification datasheet.								
	Schematic diagrams & wiring diagrams	e. Schematic diagrams	1	SOA/M7/S/92						
		f. Wiring diagrams	1							
6.	[7.6] Fits and Clearances				1					
	Drill sizes for bolt holes, classes of fits	Classes of Fits	2			1	33.	To acquaint with different classes of fits.	1	LAB
		a. Class 1								
		b. Class 2								
		c. Class 3								
		d. Class 4								
		Drill Sizes	2			1	34.	2. To acquaint with the different types of drill sizes	2	LAB
		a. Letter series		SOA/M7/S/105						
		b. Number series		SOA/M7/S/106						
		c. Fractional series		SOA/M7/S/107						

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					THEORY	PRACTICAL				
	Schedule of fits and clearances for aircraft and engines	Schedule of fits & clearance	1							
		a. Aircraft								
		b. Engines								
	Limits for bow, twist and wear	a. Limits for bow	1							
		b. Twist								
		c. Wear								
	Standard methods for checking shafts, bearings and other parts	Lubrication	1							
		Inspection								
7.	[7.7] Electrical cables and connectors				2					
	* Continuity, insulation and bonding techniques and testing.	Continuity test	1	SOA/M7/S/108		2	35.	To carry out continuity test	2	LAB
		Insulation test	1	SOA/M7/S/109		2	36.	To carry out insulation test	2	LAB
		Bonding technique and test	1	SOA/M7/S/110		2	37.	Bonding checks, use of bonding tester (#)	2	LAB
	* Use of crimping tools : Hand and hydraulic operated	Use of hand and hydraulic operated crimping tool	1	SOA/M7/S/111		2	38.	To learn use of hand operated crimping tool	3	LAB
						2	39.	To learn use of hydraulic operated crimping tool	3	LAB
	* Testing of crimp joints	Testing (inspection) of crimp joints	1							
	* Connector pin removal and insertion	Connector pin removal and insertion	1	SOA/M7/S/112		2	40.	To learn connector pin removal and insertion technique	2	LAB
	* Co-axial cables : Testing and installation precautions	Co-axial cables	1	SOA/M7/S/113		2	41.	To acquaint with testing of co-axial cable	2	LAB
		1. Testing								
		2. Precautions								

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					THEORY	PRACTICAL				
	* Wiring protection technique : Cable looming and loom support, cable clamps, protective sleeving techniques including heat shrink wrapping, shielding.	Wiring protection technique	2							
		1. Cable looming		SOA/M7/S/114						
		2. Loom support		SOA/M7/S/115						
		3. Cable clamps		SOA/M7/S/116						
		Protective sleeving technique	2			2	42.	To learn protective sleeving technique	2	LAB
		1. Heat shrink wrapping								
		2. Shielding								
8.	[7.15] Welding, Brazing, Soldering & Bonding				2					
a.	Soldering methods, inspection of soldered joints	1. Soldering	1			2	43.	To learn and practice the use of the following welding operations (#)	6	LAB
		a. Soft soldering		SOA/M7/S/117				a. Soft soldering		
		b. Hard soldering		SOA/M7/S/118				b. Hard soldering		
		c. Flux etc.						c. Flux etc.		
		d. Testing of soldered joints						d. Testing of soldered joints		
							44.	To learn and practice the use of the following welding operation	8	LAB
9.	[7.16] Aircraft Weight and Balance	1. Purpose	½		2			a. Gas welding		
	* Centre of gravity /balance limit calculation : use of relevant documents	2. Need for weighing	½					b. Electric Arc welding		
		3. Theory of weight & balance	1	SOA/M7/S/129				c. Resistance and TIG welding		
		4. Datum location and centre of gravity	1	SOA/M7/S/130			45.	To learn and practice the use of Brazing	2	LAB
		5. Documentation	½							

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					THEORY	PRACTICAL				
10.	[7.17] Aircraft Handling and Storage	1. Equipments used for towing	½	SOA/M7/S/134	2		46.	To know & understand weighing procedure on aircraft	2	LAB
	* Aircraft towing/taxiing and associated safety precautions	2. Procedure of towing	½	SOA/M7/S/135						
		3. Precautions observed while towing	½							
		4. Procedure of taxiing	½							
		5. WHO is authorised for towing/taxiing	½							
		6. Precautions observed while taxiing.	½			2	47.	To demonstrate towing/taxiing of aircraft	2	LAB
	* Aircraft Jacking, chocking, securing and associated safety precaution.	1. Knowledge of different types of jacks	½	SOA/M7/S/136						
		2. Jacking and lowering	½	SOA/M7/S/137						
		3. Precautions observed while jacking and lowering.	½	SOA/M7/S/138-139		2	48.	To acquaint with the procedures of acking levelling on aircraft	2	LAB
	* Aircraft Storage method	Discussion over storage	½							
		1. Short term storage	½							
		2. Long term storage & precautions	½							
		3. Documentation	½							
	* Refuelling/Defuelling procedures	1. Identification & knowledge of fuel/grade/octane	½							
		2. Discussion about refueller and sampling of fuel	½							
		3. Pressure/undewing refuelling	½							
		4. Manual/owerwing refueling	½	SOA/M7/S/140						
		5. Precautions observed while refueling/defuelling.	½	SOA/M7/S/141		2	49.	To know and understand the refuelling & defuelling procedure on aircraft	2	LAB
		6. Documentation	½							
	* Deicing/Anti-icing procedures	Icing	1							
		1. Types of icing	½	SOA/M7/S/142						

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					THEORY	PRACTICAL				
		2. Different methods of anti-icing	½	SOA/M7/S/143						
		3. Pneumatic anti-icing	½	SOA/M7/S/144						
		4. Electrical anti-icing	½	SOA/M7/S/144A						
		5. Alcohol spray		SOA/M7/S/145						
		6. Pneumatic De-icing system boots/shoes		SOA/M7/S/146						
	* Electrical, hydraulic & pneumatic ground supplies .	1. Source of electrical supply	1	SOA/M7/S/147						
		2. Source of hydraulic supply	1	SOA/M7/S/148						
		3. Source of pneumatic supply	1	SOA/M7/S/149						
		4. Knowledge of above system	1							
		5. Precautions observed while handling above equipment	1	SOA/M7/S/150		2	50.	To demonstrate the operation of electrical(GPU), & Hydraulic power test rig.	2	LAB
		6. Maintenance of above equipment	1							
	* Effects of environmental condition on aircraft handling & operation	Effects of icing and turbulence	½							
		Effects of altitude	½							
		Effects of humidity, temperature, pressure & density	½							
11 .	[7.18] Disassembly, inspection, repair and assembly techniques									
	a. Types of defects and visual inspection techniques	a. Types of defects and visual inspection	1							
	Corrosion removal, assessment and re-protection	1. Inspection	½							
		2. Treatment of structural parts.	½		2					
		3. Removal of corrosion products	½			2	51.	To study various corrosion control methods	4	LAB
		4. Treatment of components	½					a. Treatment of aluminium alloy corrosion		

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					THEORY	PRACTICAL				
		5. Assessment of corrosion damage	½					b. Treatment of alloy steel corrosion		
		6. Methods of protection						c. Treatment of magnesium alloy corrosion		
		a. Prevention of corrosion	½							
		b. Treatment of aircraft parts	½							
		c. The control of corrosion	½							
	b. Non-destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods	1. Oil and chalk processes	½		1	1	52.	To study various types of NDT methods	4	LAB
		2. Penetrant dye process	½	SOA/M7/S/151				a. Oil and chalk method		
		3. Magnetic flaw detection	½	SOA/M7/S/152-154				b. Dye penetrant and fluorescent method		
		4. Fluorescent penetrant	½					c. Magnetic flaw detection		
		5. Endoscope inspections	½	SOA/M7/S/155						
		6. Ultrasonic flaw detection and thickness measurement	½	SOA/M7/S/156						
		7. Radiological examination of aircraft structure.	½	SOA/M7/S/157						
		8. Eddy current method	½	SOA/M7/S/158-160						
	c. Disassembly and re-assembly techniques	c. Assembly procedures of disassemblies & trouble shooting	½	SOA/M7/S/161-162	2					
	d. Trouble shooting techniques	d. Theory and practice	½		2					
14.	[7.19] Abnormal Events				2					
	* Inspections following lightning strike & H.I.R.F. penetration	1. Structural inspection	½							
		a. Wings, Fuselage	½							
		b. Empenage	½							
		c. Landing gear	½							
		d. Engine nacell	½			2	53.	To acquaint with structural inspection procedures carried out on aircraft parts (a) wings (b) empenage (c) landing gear (d) engine nacelle	4	LAB

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					THEORY	PRACTICAL				
15.	[7.20] Maintenance procedure				2					
	* Maintenance planning	1. Reliability monitoring	½			2	54.	To become acquaint with Engineering Statistics report reliability monitoring etc.	2	LAB
		2. Defect monitoring	½							
		3. Remedial measures	½							
		4. Inspection	½							
		5. Repair	½							
		6. Minor repair/major repair	½							
		7. Hard time, ontime, condition monitoring	½							
		8. Staggering the aircraft operation	½							
	* Modification Procedures	1. Discussion about modification	½							
		2. What is a modification and why it is needed	½							
		3. Procedures of documentation	½							
		4. To meet operational requirements	½							
		5. To remove exsisting defects in manufacturing design	½							
		6. Completion & recording	½							
	* Stores procedures	1. General requirement & condition	½							
		2. Temperature & relative humidity	½							
		3. Protective material for storage	½							
		4. Use of desicant	½							
		5. Raks & bins	½							

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SEMESTER : FIRST

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S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		6. Rotation of issue of storage items/components	½							
	* Certification/Release procedures	Issuance of certificate of release	½							
		1. Form (Page - F - 88)	½							
		2. Method	½							
		3. Certificate of maintenance and release	½							
	* Interface with aircraft operation	Discussion on the subject	½							
		How to deal with operational requirement and trouble shooting	1							
	* Maintenance, inspection/quality controle/quality assurance	1. Quality controle & its manual	½			2	55.	To become acquaint with different manuals like Quality Control Manual, Maintenance System Manual	2	LAB
		2. Quality assurance & its manual	½							
		3. Practices & methods	½							
		4. Quality controle manager/Dy. manager	½							
		5. Quality system/Quality controle cell	½							
		6. Quality assurance	½							
		7. Quality controle cum assurance manual	½							
		8. Quality controle Assurance manual (Appendix G)	½							
		9. Quality controle system procedure	½							
		10. On the spot check by quality contol team	½							

MODULE - 7A : MAINTENANCE PRACTICES**SEMESTER : FIRST****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Additional Maintenance Procedures	Procedure								
		1. Service bulletins requiring additional structural inspection of specific areas at certain intervals	½							
		2. Suplimental structural inspection	½							
		3. Repair & modification	½							
		4. Corrosion precaution and control	½							
		5. Repair assesment program	½							
	* Control of life limited components	1. Control by reliability method	½							
		a. Unschedule removal	½							
		b. Confirmed failure	½							
		c. Reported failure per 1000 hr.	½							
								TOTAL NO. OF PRACTICAL HRS. AT LAB	193	
								TOTAL NO. OF PRACTICAL HRS. AT CLASS ROOM	00	
								TOTAL NO. OF PRACTICAL HRS. ON AIRCRAFT	00	
								TOTAL NO. OF PRACTICAL HRS. IN CLASS ROOM	00	
		TOTAL NO. OF HRS. (T)	177					TOTAL NO. OF HRS. (P)	193	

MODULE - 8 : BASIC AERODYNAMICS

SEMESTER : FIRST

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	[8.1] Physics of atmosphere				2					
	* International standard atmosphere	(ISA) Mesosphere, Ionosphere, Exosphere	2	SOA/M8/S/1						
	* Application to aerodynamics	a. Temperature		SOA/M8/S/2						
		b. Pressure								
		c. Density								
		d. Viscosity		SOA/M8/S/3						
		e. Humidity								
2.	[8.2] Aerodynamics				2					
	* Airflow around a body	a. Bernoulli's Principle	3	SOA/M8/S/4						
		b. Motion								
		c. Velocity & acceleration								
		d. Newton's law of motion								
		e. Aerofoils		SOA/M8/S/5						
		f. Lifting surfaces		SOA/M8/S/6-7		2	1.	To acquaint with lifting surfaces	4	ON AIRCRAFT
		g. Lift		SOA/M8/S/8						
		h. Airflow & pressure over aerofoil		SOA/M8/S/9						
	* The terms : Camber, Chord, Mean Aerodynamic Chord, Profile Drag, Centre of Pressure, Angle of Attack, Wash in & Wash out, Fineness Ratio, Wing Shape & Aspect Ratio induced drag	a. Plan Form	15	SOA/M8/S/10						
		b. Sectional Form		SOA/M8/S/11						
		c. Chord Line		SOA/M8/S/12						

MODULE - 8 : BASIC AERODYNAMICS

SEMESTER : FIRST

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
*	Boundary layer laminar & turbulent flow, free stream flow, relative airflow, upwash & downwash, vortices, stagnation	d. Mean Camber Line		SOA/M8/S/13						
		e. Trailing Edge Angle		SOA/M8/S/14-15						
		f. Wing Area		SOA/M8/S/16		2	2.	To acquaint with Aerofoil Terminology	6	ON AIRCRAFT
		g. Wing Span		SOA/M8/S/17						
		h. Average Chord		SOA/M8/S/17						
		i. Aspect Ratio		SOA/M8/S/17						
		j. Sweep Back Angle		SOA/M8/S/17						
		k. Mean Aerodynamic Chord		SOA/M8/S/17						
		l. Dihedral Angle		SOA/M8/S/18						
		m. Camber		SOA/M8/S/19						
		n. Chord Line & Angle of Attack		SOA/M8/S/20						
		o. Centre of Pressure		SOA/M8/S/21-22						
		p. Movement of Centre of Pressure								
		q. Angle of Incidence		SOA/M8/S/23						
		r. Parts of an Airplane		SOA/M8/S/24-26						
		s. Wings		SOA/M8/S/27						
		t. Aspect Ratio		SOA/M8/S/28						
		u. Fineness Ratio		SOA/M8/S/29						
		v. Profile Drag		SOA/M8/S/30						
		w. Parasite Drag		SOA/M8/S/31						
		x. Induced Drag		SOA/M8/S/32						

MODULE - 8 : BASIC AERODYNAMICS**SEMESTER : FIRST****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Thrust, weight, aerodynamic resultant	a. Four forces	3	SOA/M8/S/43						
		b. Condition of equilibrium		SOA/M8/S/44						
		c. Difficulties in balancing the four forces		SOA/M8/S/45-46						
		d. For tail plane aeroplane		SOA/M8/S/47						
		e. For tail-less aeroplane		SOA/M8/S/48						
	* Generation of lift & drag : Angle of attack, lift coeff. , drag coeff, polar curve, stall	a. Lift coefficient	2	SOA/M8/S/49						
		b. Drag coefficient		SOA/M8/S/50						
		c. Lift/drag ratio curve		SOA/M8/S/51						
		d. Stalling of aerofoil		SOA/M8/S/52						
		e. Pitching moment of aerofoil		SOA/M8/S/53						
	* Aerofoil contamination including ice, snow first	a. General	2	SOA/M8/S/54		2	3.	To acquaint with Pneumatic de-icing system.	4	ON AIRCRAFT
		b. Icing effects								
		c. Thermal anti-icing system		SOA/M8/S/55						
		d. Anti-icing using engine bleed air		SOA/M8/S/56						
3.	[8.3] Theory of flight				2					
	* Relationship between lift, weight, drag & thrust	a. Thrust/drag/centre of gravity.	3	SOA/M8/S/57-58						
		b. Power available & required curves		SOA/M8/S/59						
		c. Maximum level flight speed		SOA/M8/S/60						
		d. Minimum level flight speed								

MODULE - 8 : BASIC AERODYNAMICS**SEMESTER : FIRST****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Steady state flights performance	a. Steady level flight	2	SOA/M8/S/61						
		b. Pitching moment		SOA/M8/S/62						
		c. Variation of speed in level flight		SOA/M8/S/63						
		d. Attitude in level flight		SOA/M8/S/64						
		e. Effect of weight on level flight		SOA/M8/S/65						
	* Glide ratio	a. Climbing	4	SOA/M8/S/66						
		b. Forces in the climb		SOA/M8/S/67						
		c. Angle of climb		SOA/M8/S/68-69						
		c. Various climb speed		SOA/M8/S/70-72						
		e. Effects of a steady wind on climb								
		f. Gliding		SOA/M8/S/73						
		g. Wrong airspeed steepens the glide		SOA/M8/S/74						
		h. Flaps steepens the glide		SOA/M8/S/75						
		i. Reduced weight doesnot change glide angle		SOA/M8/S/76-78						
		j. Gliding distance over ground								
		k. Estimation of gliding distance in still air.								
		l. Flatten the descent by increasing power		SOA/M8/S/79-80						
		m. Effect of wind on glide		SOA/M8/S/81						
		n. Effect of weight on glide		SOA/M8/S/82						
		o. Effect of weight on endurance								
		p. Gliding angle		SOA/M8/S/82						

MODULE - 8 : BASIC AERODYNAMICS**SEMESTER : FIRST****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Theory of the turn	a. Equation of co-ordinated turn	2	SOA/M8/S/83						
		b. Skidding								
	* Influence of load factor : Stall, flight envelope & structural limitations	a. Lift formula & the stall	2							
		b. Effect of weight on the stall		SOA/M8/S/84						
		c. Wing tip stalling		SOA/M8/S/85						
		d. Methods of preventing tip stalling								
		e. Trailing-edge vortices		SOA/M8/S/86-87						
		f. Wing tip vortices		SOA/M8/S/88-89						
	* Lift Augmentation	a. Introduction	4							
		b. Principal method in use		SOA/M8/S/90						
		c. Slats		SOA/M8/S/91						
		d. Automatic slats								
		e. Use of slats		SOA/M8/S/92						
		f. Aircraft slat				2	4.	To acquaint with lift augmentation devices	6	ON AIRCRAFT
		g. Stalling with slat								
		h. Variable wing area								
		i. Variable camber								
		j. Flaps		SOA/M8/S/93-97						
		k. Action of flaps		SOA/M8/S/98						
		l. Types of flaps		SOA/M8/S/99						
		m. Effect of flap on L/D ratio								
		n. Use of flap for take-off		SOA/M8/S/100						

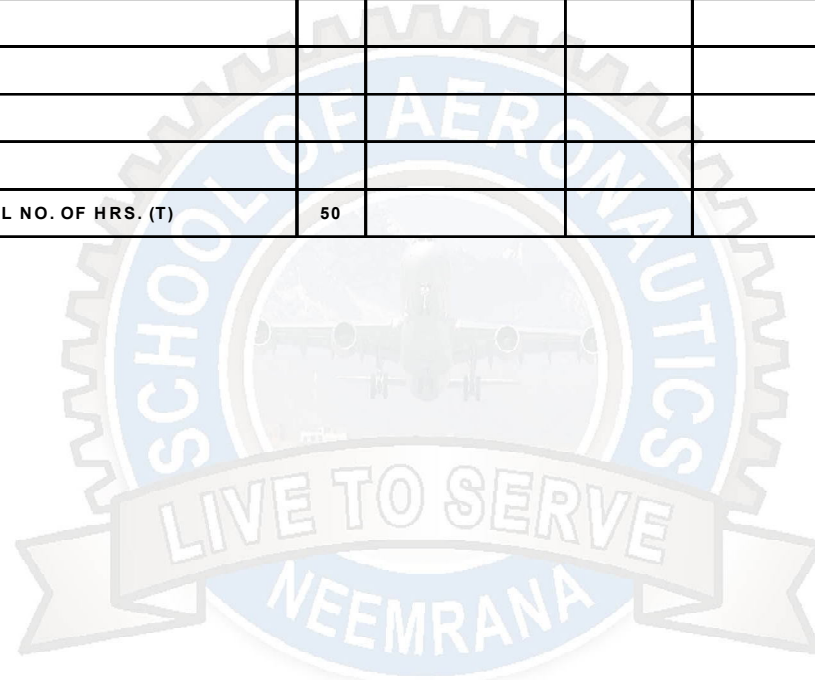
MODULE - 8 : BASIC AERODYNAMICS**SEMESTER : FIRST****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		o. Raising the flap in flight		SOA/M8/S/101						
		p. Advantages of flaps								
		q. Disadvantage of flaps								
		r. Slotted aerofoils		SOA/M8/S/102						
		s. Theory		SOA/M8/S/103						
		t. Types of slot		SOA/M8/S/104						
		u. Fixed slot		SOA/M8/S/105						
		v. Use of slot		SOA/M8/S/106						
4.	[8.4] Flight stability & dynamics	a. Static stability	6	SOA/M8/S/107	2					
	* Longitudinal, lateral & directional stability	b. Longitudinal stability		SOA/M8/S/108						
		c. Lateral stability		SOA/M8/S/109						
		d. Directional stability		SOA/M8/S/110						
		e. Factors affecting longitudinal stability		SOA/M8/S/111						
		f. Static margin & neutral point		SOA/M8/S/112						
		g. Factors affecting lateral stability		SOA/M8/S/113-115						
		h. Factors affecting directional stability		SOA/M8/S/116-122						
		i. Spiral divergence		SOA/M8/S/123						
		j. Directional divergence		SOA/M8/S/124						
		k. Dutch roll		SOA/M8/S/125						

MODULE - 8 : BASIC AERODYNAMICS
SEMESTER : FIRST

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		l. Aerodynamic balancing		SOA/M8/S/126-130						
		m. Aero-elastic effects		SOA/M8/S/131-132						
		n. Adverse yaw		SOA/M8/S/133-135						
								TOTAL NO. OF PRACTICAL HRS. IN CLASS ROOM	00	
								TOTAL NO. OF PRACTICAL HRS. AT LAB	0	
								TOTAL NO. OF PRACTICAL HRS. ON AIRCRAFT	20	
								TOTAL NO. OF PRACTICAL HRS. IN AIR INDIA	00	
		TOTAL NO. OF HRS. (T)	50					TOTAL NO. OF HRS. (P)	20	



MODULE - 10 : AVIATION LEGISLATION**SEMESTER : FIRST****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	Air Law	1. Aircraft Acts & Rules	8	SOA/M10/S/1-15	2					
2.	Airworthiness Requirements	1. Introduction to Civil Aviation Requirements	1		2					
		2. CAR Section - 2, Series - B, Part - I	3	SOA/M10/S/26-27	3	2	1.	To become acquaint with minimum equipment list, emergency cheklists etc.	3	ON AIRCRAFT
		3. CAR Section - 2, Series - C, Part - I	3	SOA/M10/S/30-33	3					
		4. CAR 145	7							
		5. CAR M	6							
		6. CAR Section - 2, Series - E, Part - I	2	SOA/M10/S/52-62	4	2	2.	To become acquaint with different manuals like Quality Control Manual, Maintenance System Manual etc.	3	ON AIRCRAFT
		7. CAR 21	8							
		8. CAR Section - 2, Series E, Part - VI	1	SOA/M10/S/68-69	2		3.	To become acquaint with engineering statistics report, Reliability reports etc	3	ON AIRCRAFT
		9. CAR Section - 2, Series E, Part - VIII	1	SOA/M10/S/68-69	2					
		10. CAR Section - 2, Series - E, Part - XI	2	SOA/M10/S/72-74	2					
		11. CAR Section - 2, Series - E, Part - XII	3	SOA/M10/S/75-76	2					
		12. CAR - 147	7	SOA/M10/S/77-81	2					
		13. CAR- 147 (Basic)	5							
3.	Airworthiness Requirements - II	1. CAR Section - 2, Series - F, Part - I	2	SOA/M10/S/1-3	2	2	4.	To understand the placement of registration & nationality marking on aircraft	2	ON AIRCRAFT
		2. CAR Section - 2, Series - F, Part - III	2	SOA/M10/S/13-20	2					
		3. CAR Section - 2, Series - F, Part - VII	1	SOA/M10/S/22	2					
		4. CAR Section - 2, Series - F, Part - XIII	1	SOA/M10/S/38-42	2					
		5. CAR Section - 2, Series - F, Part - XIV	1		2					
		6. CAR Section - 2, Series - F, Part - XV	1	SOA/M10/S/47-50	2	2	5.	To become acquaint with aircraft flight manual	2	ON AIRCRAFT
		7. CAR Section - 2, Series - F, Part - XX	1	SOA/M10/S/60-64	2					
		8. CAR Section - 2, Series - F, Part - XXII	1	SOA/M10/S/66-71	2					

MODULE - 10 : AVIATION LEGISLATION**SEMESTER : FIRST****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		9. CAR Section - 2, Series - F, Part - XXIII	1		2					
		10. CAR Section - 2, Series - H, Part - II	1		2					
		11. CAR Section - 2, Series - H, Part - III	1		2					
		12. CAR Section - 2, Series - I, Part - II	2	SOA/M10/S/76-94	2		6.	To acquaint with the placement of various instruments fitted on aircraft.	1	ON AIRCRAFT
		13. CAR Section - 2, Series - I, Part - V	2	SOA/M10/S/96-99	2					
		14. CAR Section - 2, Series - I, Part - VI	1	SOA/M10/S/103-104	2					
		15. CAR Section - 2, Series - I, Part - VII	1	SOA/M10/S/105-111	2					
		16. CAR Section - 2, Series - I, Part - VIII	1	SOA/M10/S/112-116	2					
		17. CAR 66	9		2					
		18. CAR Section - 2, Series - L, Part - VII	1	SOA/M10/S/126	2					
		19. CAR Section - 2, Series - L, Part - IX	1		2					
		20. CAR Section - 2, Series - L, Part - XI	1	SOA/M10/S/134	2					
		21. CAR Section - 2, Series - L, Part - XV	2	SOA/M10/S/136	2					
		22. CAR Section - 2, Series - L, Part - XVI	1	SOA/M10/S/145-146	2					
		23. CAR 66 Section - 2, Series - M, Part - I	1	SOA/M10/S/147-151	2					
		24. CAR Section - 2, Series - O, Part - VI	1	SOA/M10/S/214-219	2		7.	To acquaint with operation manual	2	ON AIRCRAFT
		25. CAR Section - 2, Series - O, Part - XIV	1	SOA/M10/S/228-229	2					
		26. CAR Section - 2, Series - R, Part - II	1	SOA/M10/S/232-233	2					
		27. CAR Section - 2, Series - R, Part - IV	2	SOA/M10/S/235-236	2					
		28. CAR Section - 2, Series - T, Part - II	2	SOA/M10/S/249-253	2					
		29. CAR Section - 2, Series - X, Part - II	1	SOA/M10/S/254-258	2					
		30. CAR Section - 2, Series - X, Part - III	1	SOA/M10/S/259-264	2					
		31. CAR Section - 2, Series - X Part - IV	1	SOA/M10/S/265-274	2					
		32. CAR Section - 2, Series - X, Part - VI	2	SOA/M10/S/276-281	2	2	8.	To acquaint with various log books	2	ON AIRCRAFT

MODULE - 10 : AVIATION LEGISLATION
SEMESTER : FIRST

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		33. CAR Section - 2, Series - X, Part - VII	1	SOAM10/S/282-304	2	2	9.	To acquaint with various documents to be carried on board	2	ON AIRCRAFT
		34. CAR Section - 2, Series - X, Part - VIII	1	SOAM10/S/305-309	2					
		35. Airworthiness Advisory Circulars (AAC) & Aeronautical Information Circulars (AIC).	5	SOA/M10/S/88-89	2	2				
								TOTAL NO. OF PRACTICAL HRS. AT LAB	0	
								TOTAL NO. OF PRACTICAL. ON AIRCRAFT	20	
								TOTAL NO. OF PRACTICAL HRS. IN CLASS ROOM	0	
								TOTAL NO. OF PRACTICAL HRS. IN AIR INDIA	0	
		TOTAL NO. OF HRS. (T)	112					TOTAL NO. OF HRS. (P)	20	

MODULE - 9 : HUMAN FACTORS
SEMESTER : FIRST

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	[9.1] General	Introduction	1		2					
		Murphy's law								
		Meaning of human factor								
		Disciples of human factor								
		Conceptual model of human factor								
		a. Shell model		SOA/M9/S/1		2	1.	Demonstrate the different angles of shell model.	1	CLASS ROOM
		b. Incidents attributable to human factor								
2.	[9.2] Human performance and limitations	* Vision	1.5	SOA/M9/S/2	2					
		a. Light		SOA/M9/S/3		2	2.	To understand factors effecting safety of a/c operation which depends on light	1	CLASS ROOM
		i. Characteristics & management								
		ii. Colour								
		* Eye								
		a. Physiology		SOA/M9/S/4						
		b. Farsightedness & shortsightedness		SOA/M9/S/5						
		* Hearing								
		a. Voice & the speech mechanism		SOA/M9/S/6		2	3.	To understand factors effecting safety of a/c operation which depends on human ability to produce & hear sound	1	CLASS ROOM
		b. Hearing deficiencies		SOA/M9/S/7						
		* Information Processing								
		a. Sensing								
		b. Perception								
		c. Model of the human information processing system		SOA/M9/S/8						
		d. Attention								
		* Memory	0.5							
		a. Short term memory		SOA/M9/S/9						

MODULE - 9 : HUMAN FACTORS
SEMESTER : FIRST

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		b. Long term memory								
		c. Memory enhancement								
		d. Effect of sleep & age								
		e. Continuous and serial activities								
		* Claustrophobia	0.5							
		a. Environment tolerances								
		b. Physical access								
3.	[9.3] Social Psychology	* Responsibility	0.25	SOA/M9/S/10	1	1	4.	Various factors of social psychology effecting the airworthiness of aircraft	1	CLASS ROOM
		a. Individual to organisation								
		* Motivaton and de-motivation	0.25							
		a. Approach to motivation		SOA/M9/S/11						
		b. Complacency, professionalism & discipline								
		c. Influcny motivation at work								
		* Peer pressure	0.5							
		Cultural issues								
		* Team working	0.25							
		* Management and supervision	0.5							
		a. Management contribution to safety								
		b. Four Ps		SOA/M9/S/12						
		c. Risk management		SOA/M9/S/13						
		* Leadership	1							
		a. Meaning of leadership								
		b. Characteristics of a leader								
		c. Task and problems of a leader								

MODULE - 9 : HUMAN FACTORS

SEMESTER : FIRST

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
4.	[9.4] Factors Affecting Performance	* Fitness/Health	0.5	SOA/HF/S14	2					
		a. Definition of fitness				2	5.	Various factors of health, stress, workload, sleep, alcohol etc. affecting the aviation personnel	1	CLASS ROOM
		b. Factors affecting fitness								
		* Stress	0.5							
		a. In aviation								
		b. Domestic influences								
		* Sleep and fatigue, shiftwork	1							
		a. Fatigue								
		b. Body rhythm disturbance								
		c. Sleep								
		* Alcohol, medicaiton, drug abuse	0.5							
		a. Alcohol								
		i. Performance								
		ii. Metabolism								
		iii. Safety								
		* Workload	0.25							
		a. Overload								
		b. Underload								
		* Time pressure & deadlines								
5.	[9.5] Physical Environment	* Noise & fumes	1	SOA/M9/S/15	1					
		a. Definition of noise								
		b. Sources								
		c. Effects								

MODULE - 9 : HUMAN FACTORS
SEMESTER : FIRST

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		* Illumination	0.5							
		a. Nature of quantity								
		b. Glare				2	6.	Factors of environmental conditions effecting the aviation personnel.	1	
		* Climate and temperature	2							
		a. Controlling or temperature								
		b. Human generate heat								
		c. Physicological effects of temp.								
		d. Cold temp.								
		e. Humidity								
		* Motion and Vibration	0.5							
		a. Definition of vibration								
		b. Operational significance								
		c. Protection								
		* Working environment	0.5							
		a. Stress								
6.	[9.6] Tasks	a. Physical work	1	SOA/M9/S/16	1					
		b. Repetitive tasks								
		c. Visual inspection								
		d. Complex systems	0.5							
7.	[9.7] Communication	* Within and between teams	1	SOA/M9/S/17	2					
		a. Types of communicaiton								

MODULE - 9 : HUMAN FACTORS

SEMESTER : FIRST

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		b. Verbal communication				2	7.	a. Acquaint with need of clear & precise communication methods. b. Demonstration of proper communication skills.	1	CLASS ROOM
		c. Body language								
		d. Word intelligibility								
		* Work logging and according	0.5							
		a. Documentation								
		b. Manuals, handbooks and technical papers								
		c. Questionnaires and forms		SOA/M9/S/18						
		* Keeping up to date, currency	0.5							
		Dissemination of information								
8.	[9.8] Human Error	* Error model and theories	1	SOA/M9/S/19	2					
		a. Error rates								
		b. Accident proneness		SOA/M9/S/20						
		* Types of errors in maintenance tasks	0.5							
		a. Random, systematic and sporadic		SOA/M9/S/21						
		b. Omission, commission and substitution								
		c. Reversible and Irreversible								
		* Implication of errors	0.5							
		a. Errors and their consequences								
		* Avoiding and managing errors	0.5							
		a. Two pronged attack								
9.	[9.9] Hazards in the workplace	* Recognising and avoiding hazards	0.5	SOA/M9/S/22	2					
		a. Conduct or investigation								

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MODULE - 3 : ELECTRICAL FUNDAMENTALS **SEMESTER : SECOND**

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	[3.1] Electron theory	1. Electron theory	0.5	SOA/M3/S/1	1					
	* Structure & distribution of electrical charges withing atoms, molecules, ions, compounds.	2. Structure & distribution of electrical charges within	0.5	SOA/M3/S/2						
		a. Atoms								
		b. Molecules								
		c. Ions								
		d. Compounds								
	* Molecular structure of conductors, semi-conductors & insulators	3. Molecular structures of	0.5	SOA/M3/S/3						
		a. Conductors	0.5							
		b. Semiconductors								
		c. Insulators								
2.	[3.2] Static electricity & conduction									
	* Static electricity & distribution of electrostatic charges	1. Static electricity	0.25	SOA/M3/S/4	2					
		2. Distribution of electrostatic charges.	0.25	SOA/M3/S/4						
	* Electrostatic laws of attraction & repulsion	3. Electrostatic laws	0.5	SOA/M3/S/5						
		a. Attraction								
		b. Repulsion								
	* Unit of charge, and coulmb's law	4. Units of charge	0.25							
		5. Coulmb's law	0.25							
	* Conduction of electricity in solids, liquids, gases & a vacuum.	6. Conduction of electricity in	0.5							

MODULE - 3 : ELECTRICAL FUNDAMENTALS

SEMESTER : SECOND

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		a. Solids								
		b. Liquids								
		c. Gases								
		d. Vacuum								
3.	[3.3] Electrical terminology	Electrical Terminology			2	2	1.	To understand the feasibility of Electrical terminology and components in (AC/DC) circuits.	1	LAB
	* The following terms, their units & factors affecting them:- potential difference, electromotive force, voltage current, resistance, charge, conductance, conventional current flow, electron flow.	1. Introduction of the following terms, units & factors affecting them				2	2.	To know and understand the basic electrical circuit	1	LAB
		a. Potential difference	0.25	SOA/M3/S/6						
		b. Electromotive force	0.25	SOA/M3/S/6						
		c. Voltage, current, resistance, conductance and charge	0.25							
		d. Conventional current flow & electron flow	0.25	SOA/M3/S/7						
4.	[3.4] Generation of electricity				1					
	* Production of electricity by the following methods : light, heat, friction, pressure, chemical action, magnetism & motion	1. Production of electricity by the following methods	1							
		a. Light, heat								
		b. Friction, pressure								
		c. Chemical action								
		d. Magnetism, motion								

MOLDULE -3 : ELECTRICAL FUNDAMENTALS **SEMESTER : SECOND**

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
5.	[3.5] DC sources of electricity				2	2	3.	To become acquaint with	1	LAB
	* Construction & basic chemical action of primary cells	1. Construction & basic chemical action of	2.5					a. Lead acid battery		
		a. Primary cell and secondary cell		SOA/M3/S/8				b. Alkaline battery		
	* Secondary cells, lead acid cells, nickel cadmium	b. Lead acid cells		SOA/M3/S/9		2	4.	To perform charging and discharging of a. Lead acid cell	1	LAB
		c. Nickel cadmium cell		SOA/M3/S/10				b. Nickel cadmium cell		
	* Alkaline cells	d. Alkaline cells		SOA/M3/S/10						
	* Internal resistance & its effect on a battery	2. Internal resistance and its effect on a battery	0.5	SOA/M3/S/11		2	5.	To find the internal resistance of a battery.	1	LAB
	* Cell connected in series & parallel	3. Cells connection in	1	SOA/M3/S/12						
		a. Series								
		b. Parallel				2	6.	To perform the series and parallel arrangement of cell.	1	LAB
	* Construction, materials & operation of thermocouple	4. Construction, materials & operation of thermocouples	1							
	* Operation of photocells	5. Operation of photocells	1							
6.	[3.6] DC circuits									
	* Ohms law, Kirchoff's Voltage laws & Current laws	1. Ohm's law	0.5	SOA/M3/S/13	2	2	7.	To verify ohm's law	1	LAB
		2. Kirchoff's law's	1.5	SOA/M3/S/14						
		a. Voltage law				2	8.	To verify Kirchoff's voltage law	1	LAB
		b. Current law				2	9.	To verify Kirchoff's current law	1	LAB
	* Calculations using the above laws to find resistance voltage & current.	3. Calculation using the above laws to find resistance, voltage & current.	2.5							
	* Significance of the internal resistance of a supply.	4. Significance of the internal resistance of a supply	1.5							

MODULE - 3 : ELECTRICAL FUNDAMENTALS

SEMESTER : SECOND

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
7.	[3.7] Resistance / Resistor									
a.	* Resistance & affecting factor	1. Resistance & affecting factors	1		2					
	* Specific resistance	2. Specific resistance								
	* Resistors colour code, values & tolerances, preferred values, wattage ratings	3. Resistance colour coding	1	SOA/M3/S/15		2	10.	Using multimeter for measuring & comparing value of resistance with those written in colour code	2	LAB
		a. Values & tolerances								
		b. Preferred values, wattage ratings								
	* Resistors in series & parallel	4. Resistors in series & parallel	1	SOA/M3/S/16		2	11.	To perform different arrangement of resistors, voltage and current.	2	LAB
	* Calculation of total resistance using series, parallel & series parallel combinations	5. Calculation of total resistance using	1							
		a. Series								
		b. Parallel								
		c. Series & parallel								
	* Operation & use of Potentiometers & Rheostats	6. Operation and use of potentiometers & rheostats	1	SOA/M3/S/17		2	12.	a. To compare the emf of two given primary cells using a potentiometer.	2	LAB
						2		b. To determine the internal resistance of a primary cell using potentiometer	2	
	* Operation of Wheatstone Bridge	7. Operation of wheatstone bridge	1	SOA/M3/S/18		2	13.	To find the unknown resistance using Wheatstone Bridge	1	LAB
b.	* Positive & negative temperature coefficient conductance. Fixed resistors, stability tolerance & limitation, methods of construction	1. Positive & negative temperature coefficient of conductance	0.5	SOA/M3/S/19	1					
		2. Fixed resistors	1.5	SOA/M3/S/19		1	14.	To identify the different types of resistors and to classify by their color codes.	1	LAB
		a. Stability								
		b. Tolerance								
		c. Limitations								
		d. Methods of construction		SOA/M3/S/20						

MODULE - 3 : ELECTRICAL FUNDAMENTALS

SEMESTER : SECOND

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Variable resistors, thermistors, voltage dependent resistors	3. Variable resistor thermistors, voltage dependent resistors	1.5	SOA/M3/S/21-22		2 2	15. 16.	To identify different types of thermistor To perform voltage regulation using variable resistor.	2 1	LAB
	* Construction of potentiometer & rheostat	4. Construction of potentiometers & rheostat	0.5			2	17.	To perform rheostat used as a potential divider	1	LAB
	* Construction of Wheatstone Bridge	5. Construction of Wheatstone Bridge								
8.	[3.8] Power	1a. Power	2.5		2	2	18.	To measure the single phase AC power by using wattmeter	1	LAB
	* Power, work & energy (Kinetic & Potential)	b. Work								
		c. Energy (Kinetic & Potential)								
	* Dissipation of power by a resistor	2. Dissipation of power by a resistor	0.5			2	19.	To measure the dissipation of power across a known resistor	1	LAB
	* Power formula	3. Power formula	0.5							
	* Calculations involving power, work & energy	4. Calculations involving power, work & energy	1							
9.	[3.9] Capacitance /Capacitor									
	* Operation & function of capacitor	1. Operation & function of a capacitor	0.5	SOA/M3/S/23	2	2	20.	To identify various types of capacitors	1	LAB
	* Factor affecting capacitance, area of plates, distance, no. of plates, dielectric	2. Factor affecting capacitance	1							
		a. Area of plates								
		b. Distance between plates								
		c. Number of plates								
		d. Dielectric								
	* Dielectric constant, working voltage, voltage rating	3. Dielectric constant working voltage, voltage rating	1							
	* Capacitor types, construction & function	4. Capacitors types	1	SOA/M3/S/24-25						
		a. Constructions								
		b. Functions								

MODULE - 3: ELECTRICAL FUNDAMENTALS

SEMESTER : SECOND

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Capacitor colour coding	5. Capacitor colour coding	1	SOA/M3/S/26		2	21.	To classify capacitors with their colour coding	1	LAB
	* Calculations of capacitance and voltage in series & parallel circuits	6. Calculations of capacitance & voltage	1	SOA/M3/S/27						
		a. In series circuit								
		b. In parallel circuit								
	* Exponential charge & discharge of a capacitor & time constants	7. Exponential charge and discharge of a capacitor, time constants	1.5	SOA/M3/S/28		2	22.	To perform charging and discharging of a capacitor	2	LAB
	* Testing of capacitors	8. Testing of capacitors	0.5							
10.	[3.10] Magnetism									
a.	* Theory of magnetism	a. Faraday's law	2.5		2					
		b. Permeability								
		c. Magnetic flux		SOA/M3/S/29			23.	To perform induced emf & current by using magnetic flux variation	1	LAB
		d. Magnetic field intensity								
	* Properties of a magnet	Characteristics of lines of magnetic flux	1							
	* Action of magnet suspended in the Earth's magnetic field	a. Magnetic axis and geographic axis	1							
		b. Cause of earth's magnetism		SOA/M3/S/30			24.	To perform magnetisation and demagnetisation in conductors	1	LAB
		c. Magnetism of earth's magnetic field								
	* Magnetisation and demagnetisation	a. Magnetisation	1.5							
		b. Magnetisation curves								
		c. Demagnetisation								
	* Magnetic shielding	a. Shielding principle	1.5							
		b. EM/RFI gasket design								
		c. EM/RFI Pressure gasket design								
	* Various types of magnetic material	a. Magnetic moment of atoms	2.5			2	25.	To classify magnetic materials	1	LAB
		b. Diamagnetic material		SOA/M3/S/31						
		c. Paramagnetic material		SOA/M3/S/32						
		d. Ferromagnetic material		SOA/M3/S/33						

MODULE - 3 : ELECTRICAL FUNDAMENTALS
SEMESTER : SECOND

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Electromagnets construction and principles of operation	a. Solenoid	1.5							
		b. Relays								
	Hand clasp rules to determine: magnetic field around current carrying conductor	a. Left hand rules	1			2	26.	To determine magnetic field around current carry conductors	1	LAB
		b. Right hand rules		SOA/M3/S/34						
b.	* Magnetomotive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents	a. Magnetomotive force	1.5		2					
		b. Field strength,								
		c. Magnetic flux desity								
		d. Permeability								
		e. Hysteresis loop								
		f. Retentivity		SOA/M3/S/35						
		g. Coercive force reluctance								
		h. Saturation point								
		i. Eddy currents								
	Precautions for care and storage of magnets	Precautions for care and storage of magnets	0.5							
11.	[3.11]Inductance/Inductor				2					
	* Faraday's Law	a. First law	0.5							
		b. Second law								
	* Action of inducing a voltage in a conductor moving in a magnetic field	Dynamically induced e.m.f.	0.5			2	27.	To perform induced volatage in a conductor moving in a magnetic field	1	LAB
	* Induction principles	a. Realtion between magnetism & electricity	0.5	SOA/M3/S/36						
		b. Production of induced e.m.f. & current		SOA/M3/S/37						
	* Effects of the following on the magnitude of an induced voltage: magnetic field strength, rate of change of flux, number of conductor turns	a. Induced voltage	2			2	28.	To dertermine induced voltage by unsing different number of conductor turns	1	LAB
		b. Magnetic field strength								
		c. Rate of change of flux								
		d. number of conductor turn								

MODULE - 3 : ELECTRICAL FUNDAMENTALS**SEMESTER : SECOND****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Mutual induction	Mutual induction	0.5	SOA/M3/S/38						
	* The effect the rate of change of primary current and mutual inductance has on induced voltage	Mutually induced e.m.f.	0.5			2	29.	To perform mutual induction by variation of current in two coils	1	LAB
	* Factors affecting mutual inductance: number of turns in coil, physical size of coil, permeability of coil, position of coils with respect to each other	a. Coefficient of mutual inductance	1.5							
		b. Number of turns in coil								
		c. Physical size of coil								
		d. Permeability of coil								
	* Lenz's Law and polarity determining rules	a. Lenz's law	0.5	SOA/M3/S/39						
		b. Polarity determining rules								
	* Back emf, self induction	a. Back emf	0.5							
		b. Self induction		SOA/M3/S/40		2	30.	To perform self induction by emf induced in a coil	1	LAB
	* Saturation point	Saturation point	0.5							
	* Principle uses of inductors	Uses of inductors	0.5			2	31.	To acquaint with uses of inductors	1	LAB
12.	[3.12] DC motor/generator				2					
	* Basic motor & generator theory	1. Basic motor & generator theory	2.5	SOA/M3/S/41						
	* Construction & purpose of components in DC generator	2. DC generator	2.5	SOA/M3/S/42						
		a. Construction				2	32.	To become familiar with constructional & operational details of DC genrator.	1	LAB
		b. Purpose of its components								
		c. Types of amature winding(Lap and wave winding)								
		d. Types of DC generator		SOA/M3/S/43						
		i. Seperately excited				2	33.	To determine & draw the characterisitics of separately excited generator.	1	LAB
		ii. Self excited				2	34.	To determine & draw the characteristics of self excited generator.	1	
	* Operation of factors affecting output & direction of current flow in DC generators	3a. Operation of DC shunt generator	2.5	SOA/M3/S/44		1	35.	To find the magnetization characteristics of DC shunt generator	1	LAB
		b. Factors affecting								
		i. Output power				2	36.	To perform load test on shunt generator	1	LAB

MODULE - 3 : ELECTRICAL FUNDAMENTALS

SEMESTER : SECOND

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		ii. Direction of current flow in DC generator								
	* Operation of factors affecting output power, torque, speed & direction of rotation of DC motors	4. DC motor	2.5	SOA/M3/S/45						
		a. Operation								
		b. Factor affecting								
		i. Output power								
		ii. Torque speed		SOA/M3/S/46-47						
		iii. Direction of rotation								
	* Series wound, shunt wound & compound motors	5. Types of DC motors	2.5	SOA/M3/S/48		2	37.	To become familiar with various type of D.C. Motor.	1	LAB
		a. Series wound								
		b. Shunt wound				2	38.	To determine & draw the characteristics of shunt wound motor	1	LAB
		c. Compound wound				2	39.	To determine & draw the characteristics of compound wound motor	1	LAB
	* Starter generator construction									
13.	[3.13] AC Theory				2					
	* Sinusoidal wave forms, phase, period, frequency cycle	1. Sinusoidal waveform	2.5	SOA/M3/S/49		2	40.	To see an sinusoidal wave form on CRO and find the	2	LAB
		a. Phase						a. Phase		
		b. Period						b. Voltage		
		c. Frequency						c. Frequency		
		d. Cycle								
	* Instantaneous, average, RMS, peak, peak to peak current values & calculation of these values in relation to voltage, current & power	2a. Instantaneous value	2.5	SOA/M3/S/50						
		b. Average value		SOA/M3/S/51						
		c. Root mean square		SOA/M3/S/52						
		d. Peak to peak current								
		e. Calculations of these value in relation to voltage, current & power								
	* Triangular/square waves	3. Triangular/square waves	2.0	SOA/M3/S/53		2	41.	To trace the Square wave form and triangular wave form on CRO.	3	LAB

MODULE - 3 : ELECTRICAL FUNDAMENTALS

SEMESTER : SECOND

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Single and three-phase principle	4. Single and three phase principles	2.5	SOA/M3/S/54-55						
14.	[3.14] Resistive (R), Capacitive (C), Inductive (L), circuits.				2					
	* Phase relationship of voltage & current in L, C & R	1. Phase relationship of voltage & current in	2.5	SOA/M3/S/56-57						
		a. Inductive circuit								
		b. Capacitive circuit								
		c. Resistive circuit								
	* R, L, C circuits parallel, series & series parallel	2. Circuit of LCR	2.5	SOA/M3/S/58						
		a. Series								
		b. Parallel								
		c. Series & parallel								
	* Power dissipation in L, C & R circuit	3. Power dissipation in L, C & R circuit.	2.5							
	* Impedance, phase angle, power factor & current calculations	4a. Impedance	2.5	SOA/M3/S/59-60						
		b. Phase angle								
		c. Power factor								
		d. Current calculation in L, C & R circuit								
	* True power, apparent power & reactive power calculations	5. Different power in an ac circuit	2.5	SOA/M3/S/61		1	42.	To find the value of an AC circuit	3	LAB
		a. True power						1. True power		
		b. Apparent power						2. Apparent power		
		c. Reactive power						3. Reactive power		
		d. Their calculations								

MODULE - 3 : ELECTRICAL FUNDAMENTALS

SEMESTER : SECOND

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
15.	[3.15] Transformer				2					
	* Transformer construction principles & operation	1a. Transformers construction	2	SOA/M3/S/62-63		2	43.	To become familiar with construction of transformer	1	LAB
		b. Operation principles								
	* Transformer losses & methods for overcoming them	2. Transformer losses & methods for overcoming them.	2							
	* Transformer action under load & no load condition	3. Transformer action	2	SOA/M3/S/64		2	44.	To perform transformer verification of transformation ratio	1	LAB
		a. No load				2	45.	To perform no load test on a transformer	2	LAB
		b. Short Circuit				2	46.	To perform short circuit test on a transformer	2	LAB
		c. Load				2	47.	To perform load test on a transformer	2	LAB
	* Power transfer, efficiency, polarity markings	4a. Power transformer	2							
		b. Efficiency								
		c. Polarity markings				2	48.	To perform polarity test of single phase transformer	2	LAB
	* Calculation of line & phase voltage & current	5. Calculation of	2							
		a. Line voltage & current								
		b. Phase voltage & current								
	* Calculation of power in a three phase system	6. Calculation of power in three phase system	2	SOA/M3/S/65-66						
	* Primary & secondary current, voltage, turns ratio	7. Primary & secondary current, voltage turns ratio.	0.33							
	* Power efficiency	8. Power efficiency	0.33							
	* Auto transformer	9. Auto transformer	0.34	SOA/M3/S/67						
16.	[3.16] Filters				1					
	* Operation, application & uses of the filters following filter's.	1. Operation, application & uses of following filters	2	SOA/M3/S/68-69		1	49.	To perform the test on a	4	LAB
	* Low pass, high pass, band pass, band stop	a. Low pass						a. Low pass filter		
		b. High pass						b. High pass filter		

MODULE - 3 : ELECTRICAL FUNDAMENTALS

SEMESTER : SECOND

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		c. Band pass						c. Band pass filter		
		d. Band stop						d. Band stop filter		
17.	[3.17] AC generators				2					
	* Rotation of loop in a magnetic field & waveform produced	1. Rotation of loop in a magnetic field & waveform produced	2.5							
	* Operation & construction of revolving armature & revolving field type AC generator	2. Operation & construction of revolving armature & revolving field type generator	2.5	SOA/M3/S/70		2	50.	To become familiar with an alternator.	1	LAB
	* Single phase, two phase & three phase alternator	3. Types of alternator	2.5	SOA/M3/S/71		2	51.	To draw the characteristics of an AC generator	2	LAB
		a. Single phase								
		b. Three phase				2	52.	To draw the SCC of an alternator	2	LAB
						2	53.	To draw the OCC of an alternator	2	
	* Three phase star & delta connections advantages & uses	4. Three phase connections its advantage & uses	2	SOA/M3/S/72		2	54.	Determine the characteristic of an alternator on three phase load	2	LAB
		a. Star connection								
		b. Delta connection and uses								
	* Permanent magnet generators.	5. Permanent magnet generators	0.5							
18.	[3.18] AC Motors				2					
	* Construction, principles of operation & characteristics of AC synchronous & induction motors both single & poly phase	1a. Construction, principles of operation								
		i. AC synchronous motor (single phase & three phase)	0.5	SOA/M3/S/73						
		ii. AC induction motor (single & three phase)	0.5							
		b. Characteristics of	0.5							
		i. AC synchronous motor								
		ii. AC induction motor		SOA/M3/S/74-75		2	55.	Draw the characteristics of single phase induction motor.	2	LAB
						2	56.	Draw the characters of 3-phase induction motor	2	

MODULE - 3 : ELECTRICAL FUNDAMENTALS

SEMESTER : SECOND

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Methods of speed control & direction of rotation	2. Methods of speed control & direction or rotation	1.5							
		a. Change of slip								
		b. Change of frequency								
		c. Cascade method of speed control		SOA/M3/S/76						
		d. Change of poles								
	* Methods of producing a rotating field : capacitor, inductor, shaded or split pole	3. Methods of producing a rotating field	1.5	SOA/M3/S/77-78						
		a. Capacitor								
		b. Inductor								
		c. Shaded of split pole								
								TOTAL NO. OF PRACTICAL HRS. AT SOA (N) LAB	84	
								TOTAL NO. OF PRACTICAL HRS. ON AIRCRAFT	0	
								TOTAL NO. OF PRACTICAL HRS. IN CLASS ROOM	0	
								TOTAL NO. OF PRACTICAL HRS. IN AIR INDIA	0	
		TOTAL NO. OF HRS.(T)	126					TOTAL NO. OF HRS.(P)	84	

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS**SEMESTER : SECOND****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	[5.2] Numbering systems				2					
	* Numbering systems: Binary, Octal and Hexadecimal	1. Commonly used number systems	1.5	SOA/M5B2/S/01						
		a. Binary								
		b. Decimal								
		c. Octal								
		d. Hexadecimal								
	* Demonstration of conversion between the decimal and binary, octal and hexadecimal systems and vice-versa	1. Conversion from decimal to binary & vice-versa	2			2	1.	To perform decimal to binary conversion using BCD display	4	LAB
		2. Conversion from decimal to octal and vice-versa								
		3. Conversion from decimal to hexadecimal and vice-versa								
		4. Conversion from binary to octal and vice-versa								
		5. Conversion from binary to hexadecimal and via-versa								
2.	[5.3] Data conversion				2					
	* Analogue data, digital data	1. Analogue data and its application	1							
		2. Digital data and its applications								
	* Operation and application of analogue to digital and digital to analogue convertors, inputs and outputs, limitations of various types	1. Data conversion								
		1. Analogue to digital convertor(A/D) : input and output, operation, applications and limitations of	3			2	2.	To perform analogue to digital conversion using following convertors	4	LAB
		a. Ramp type A/D convertor		SOA/M5B2/S/2				a. Ramp type		
		b. Successive approximation A/D convertor		SOA/M5B2/S/3-4				b. Successive approximation		

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS

SEMESTER : SECOND

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		c. Integration type A/D convertor		SOA/M5B2/S/5				c. Integration type		
		d. Dual slope A/D convertor		SOA/M5B2/S/6				d. Dual slope		
		2. Digital to analogue convertors (D/A) : input and output, operation, applications and limitations of	1			2	3.	To perform digital to analogue conversion using following convertors :-	5	LAB
		a. Weighted resistor D/A convertor		SOA/M5B2/S/7				a. Weighted resistor		
		b. R-2R ladder D/A convertor		SOA/M5B2/S/8				b. R-2R ladder		
3.	[5.4] Data buses				2					
	* Operation of data buses in aircraft systems including knowledge of ARINC and other specifications	1. Digital computer fundamentals	1							
		2. Transfer of digital data ARINC 429	0.5							
		3. Other specifications of ARINC	0.5							
		4. Aircraft network / ethernet	0.5							
4.	[5.5] Logic Circuits									
a.	* Identification of common logic gate symbols, tables and equivalent circuits	1. Types of logic gates : symbol and truth table of	1	SOA/M5B2/S/9-10	2	2	4.	To verify truth table of following gates	5	LAB
		a. NOT gate						a. NOT gate		
		b. AND gate						b. AND gate		
		c. OR gate						c. OR gate		
		d. NAND gate						d. NAND gate		
		e. NOR gate						e. NOR gate		
		f. Ex-OR gate						f. Ex - OR gate		
		g. Ex - NOR gate						g. Ex - NOR gate		
		2. Equivalent circuit of logic gates								
	* Applications used for aircraft systems schematic diagram	Application used for aircraft systems	1							

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS**SEMESTER : SECOND****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
b.	Interpretation of logic diagrams	1. Standard representation for logical functions	2		2					
		a. SOP								
		b. POS								
		2. Karnaugh map representation of logical functions								
		3. Simplification of logical functions using Boolean algebra								
		4. Simplification of logical functions using K-map								
*	Flip-flop	* Types of digital circuits	2							
		- Combinational								
		- Sequential								
		* Necessity of flip-flop								
		* Types of flip-flop : working and truth table of				2	5.	To verify the truth table of	4	LAB
		- S - R flip-flop		SOA/M5B2/S/11				a. S - R flip-flop		
		- J - K flip-flop		SOA/M5B2/S/12				b. J - K flip-flop		
		- D flip-flop						c. D flip-flop		
		- T flip-flop		SOA/M5B2/S/13				d. T flip-flop		
		- Master-slave flip-flop		SOA/M5B2/S/14						
		* Uses of flip-flop								
5.	[5.6] Basic computer structure				2					
a.	Computer terminology (including bit, byte, software, hardware, CPU, IC and various memory devices such as RAM, ROM, PROM)	1. Data representation	1.5			2	6.	To identify major components of computer	3	LAB
		a. Bit								
		b. Byte								
		c. Nibble								
		2. Computer terminology	0.5							
		a. Software								
		b. Hardware								
		3. Block diagram of computer and its elements	0.5	SOA/M5B2/S/15						
		4. Central processing unit	0.5	SOA/M5B2/S/16						

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS**SEMESTER : SECOND****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
b.	* Operation, layout and interface of the major components in a micro computer including their associated bus systems	1. Block diagram of microcomputer	2.5	SOA/M5B2/S/17						
		2. Components of micro computer								
		3. Micro computer configuration including bus system		SOA/M5B2/S/18						
	* Information contained in single and multiaddress instruction words	1. Single address instruction word	1							
		2. Multiaddress instruction word								
	* Memory associated terms; operation of typical memory devices	1. Memory organization	3.5							
		2. Types of memory								
		a. Primary memory								
		i. RAM								
		ii. ROM								
		b. Secondary memory								
		i. Magnetic hard disk		SOA/M5B2/S/19						
		ii. Floppy disk		SOA/M5B2/S/20						
		iii. Compact disk read only memory (CDROM)		SOA/M5B2/S/21						
	(DVDROM)	iv. Digital versatile disk read only memory								
		v. CDROM-R (Recordable CDROM)								
	* Operation, advantages and disadvantages of the various data storage systems	1. Advantages and disadvantages of various data storage systems	0.5							
6.	[5.7] Microprocessors				2					
	* Functions performed and overall operation of a microprocessor	1. Introduction of microprocessor	0.5	SOA/M5B2/S/22		2	7.	To run various programs on microprocessor kit	6	LAB
		2. Task performed by microprocessor	1							
		a. Data transfer								
		b. Arithmetic & logic operation								

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS

SEMESTER : SECOND

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		c. Program flow via simple decision								
		3. Bus architecture	0.5	SOA/M5B2/S/23						
		4. Architecture of microprocessor	1.5	SOA/M5B2/S/24						
		a. Bus interface unit								
		b. Execution unit								
		5. Pin description of microprocessor	1	SOA/M5B2/S/25						
		6. Working principle of microprocessor	1							
	* Basic operation of each of the following microprocessor elements control and processing unit, clock, register, arithmetic logic unit	Microprocessor architecture	3	SOA/M5B2/S/26						
		1. Data bus								
		2. Address bus								
		3. Control bus								
		4. Arithmetic logic unit (ALU)								
		5. Registers								
		6. Program counter								
		7. Flags								
		8. Timing and control section								
		9. Stack pointer								
7.	[5.8] Integrated circuits				2					
	* Operation and use of encoders and decoders	Combinational circuits : operation and uses of	2							
		1. Encoder		SOA/M5B2/S/27		2	8.	To verify encoder circuit	3	LAB
		2. Decoder		SOA/M5B2/S/28		2	9.	To verify decoder circuit	3	LAB

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS**SEMESTER : SECOND****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Function of encoder types	Types of encoder	2							
		a. Decimal to BCD encoder								
		b. Octal to Binary encoder								
	* Uses of medium, large and very large scale interagion	Types of integration : Principle and uses of	2							
		1. Medium scale integration (MSI)								
		2. Large scale integration (LSI)								
		3. Very large scale integration (VLSI)								
8.	[5.9] Multiplexing				2					
	* Operation , application and identification in logic diagrams of multiplexers and demultiplexers	Construction, operation and uses of	2							
		1. Multiplexers		SOA/M5B2/S/29		2	10.	To verify multiplexer circuit	3	LAB
		2. Demultiplexers		SOA/M5B2/S/30		2	11.	To verify demultiplexer circuit	3	LAB
9.	[5.1]Electronic Instrument Systems				3					
	Typical systems arrangements and cockpit layout of electronic instrument systems	a. Panels and layout	0.5	SOA/M5B2/S/01						
		b. Display units	0.5			3	12.	To acquaint with the layout of panels & display units	3	LAB
10.	[5.10] Fibre optics									
	* Advantages and disadvantages of fibre optic data transmission over electrical wire propagation	1. Advantages of fibre optic data transmission	0.5		2	2	13.	To perform data transmission using fibre optical cable	3	LAB
		2. Diadvantages of fibre optic data transmission	0.5							
	* Fibre optic data bus	1. Optic fibre and fibre cables	2	SOA/M5B2/S/2						
		2. Fibre characteristic and classification								

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS**SEMESTER : SECOND****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Fibre optic related terms	1. Refraction, reflection	2	SOA/M5B2/S/3						
		2. Dispersion, diffraction, absorption, scattering		SOA/M5B2/S/4						
	* Terminations	1. Fibre optic components and system	3							
		a. Source		SOA/M5B2/S/5						
		b. Noise								
		c. Response time								
		d. Optical link								
		e. System		SOA/M5B2/S/6						
	* Couplers, control terminals remote terminals	1. Couplers	4							
		a. Fused tapered								
		b. Splitting								
		c. Reflective star								
		2. Control terminals								
		3. Remote terminals								
	* Application of fibre optics in aircraft system	Application of fibre optics in aircraft system	1							
11.	[5.11] Electronic displays				2					
	* Principles of operation of common types of displays used in modern aircraft, including Cathode Ray Tube, light emitting diodes and liquid crystal display	Cathode Ray Tube	2	SOA/M5B2/S/7		2	14.	To analyse the waveform, amplitude and frequency in CRO	3	LAB
		1. Introduction to CRT								

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS**SEMESTER : SECOND****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		2. Block diagram of CRT								
		3. Main parts of CRT	2							
		a. Glass plates								
		b. The electron gun								
		c. The deflection system								
		d. The fluorescent screen								
		4. Working of CRT								
		Light Emitting Diode	4			2	15.	To observe forward biasing effect on LED	3	LAB
		1. Principle of LED								
		2. Construction of LED		SOA/M5B2/S/8						
		3. Type of radiation mechanism in LED								
		a. Direct recombination								
		b. Indirect recombination								
		4. Material used for LED								
		a. GaAsP								
		b. GaAs								
		5. Operation of LED								
		6. Advantage of LED								
		Liquid Crystal Display	5			2	16.	To demonstrate LCD display	2	LAB
		1. Introduction to LCD								

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS-II**SEMESTER : SECOND****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		2. Construction of LCD		SOA/M5B2/S/9						
		3. Types of LCD								
		a. Dynamic scattering type								
		b. Field effect type								
		4. Advantage and disadvantage of LCD								
		5. Uses of LCD								
12.	[5.12] Electrostatic sensitive devices	1. Operation of the electrostatic sensitive devices	3		2		17.	To verify operation of ESD	2	LAB
	* Special handling of components sensitive to electrostatic discharges	2. Different types of electrostatic devices								
		3. Application of ESD								
		4. Handling of components								
	* Awareness of risks and possible damage, component and personnel anti-static protection devices	1. Safety measures	2							
		a. Awareness of risks and possible damage								
		b. Anti-static protection devices.								
13.	[5.13] Software management control	1. Determination of quality of computer software	2		2					
	* Awareness of restriction airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.	2. Quality assurance program								
		3. Restrictions & other limitations including strict control over incorporation of changes in the data								
14.	[5.14] Electromagnetic environment				2					
	* Influence of the following phenomena on maintenance practices for electronic system	1. EMC	2							

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS**SEMESTER : SECOND****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		a. Principle of EMC								
		b. Influence of EMC on maintenance practices for electronic system								
	* EMC - Electromagnetic compatibility.	2. EMI	1							
	EMI - Electromagnetic interference.	a. Principle of EMI				2	18.	Simulating and practically observing various types of interferences in radio equipments	2	LAB
	HIRF - High intensity radiated field lightning /lightening protection	b. Influence of EMI on maintenance practices for electronic system								
		3. HIRF	3							
		a. Principle of HIRF								
		b. Influence of HIRF on maintenance practices for electronic system								
		c. Influence of lightening								
		d. Lightening protection				2	19.	Safety precaution associated with electrostatic discharge, radio frequency emission and microwave emission.	2	LAB
15.	[5.15] Typical Electronic/Digital Aircraft System				2					
	* General arrangements of typical electronic /digital aircraft system and associated BITE (Built in Test Equipment) testing such as									
	* ACARS - ARINC Communication and addressing and reporting system	General description of	4	SOA/M5B2/S/10						
		1. AIRCOM System								
		2. ACARS		SOA/M5B2/S/11						
		3. Satellite communication		SOA/M5B2/S/12						
	* ECAM (Electronic Centralised Aircraft Monitoring)	1. Introduction	4	SOA/M5B2/S/13						
		2. General description of								
		a. Display units								

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS**SEMESTER : SECOND****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		b. Display modes		SOA/M5B2/S/14						
		c. Control panel		SOA/M5B2/S/15			20.	Testing of electronic instrument system cockpit display	1	AIR INDIA
		d. System testing		SOA/M5B2/S/16						
							21.	Testing of operational mode and display of primary parameter and secondary parameter of EICAS and status mode.	1	AIR INDIA
	* EICAS (Engine Indicating and crew alerting system)	1. Introduction	2							
		2. General description of					22.	Testing of Manual mode operation of ECAM	1	AIR INDIA
		a. Display unit		SOA/M5B2/S/17						
		b. Symbol generator		SOA/M5B2/S/18						
		c. Control panel		SOA/M5B2/S/19			23.	Operation/checking of data busses in aircraft systems	1	AIR INDIA
		d. Remote light sensor								
		2. Display presentations		SOA/M5B2/S/20-21						
		3. Failure annunciations					24.	Operation/testing of computer used in aircraft systems	1	AIR INDIA
		4. Data source selection								
		5. Display of air data								
							25.	Operation/testing of fibre optics in aircraft systems	1	AIR INDIA
	* FMS Flight Management System	General description of	2							
		1. Introduction								
		2. Typical systems		SOA/M5B2/S/22						
		3. Flight management system		SOA/M5B2/S/23						
		a. Flight management computer								
		b. Control and display unit								

MODULE - 5 : DIGITAL TECHNIQUES ELECTRONIC INSTRUMENT SYSTEMS
SEMESTER : SECOND
STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		c. Data pages and flight plan control		SOA/M5B2/S/24						
		d. System Configuration		SOA/M5B2/S/25						
	* FBW -Fly-By-Wire System	1. Introduction	5	SOA/M5B2/S/26			26.	Inspection of types of display used in aircraft	1	AIR INDIA
		2. General description of								
		a. Advanced FBW concept								
		b. Architecture					27.	Operation/testing of electrostatic sensitive devices	1	AIR INDIA
		c. Control laws								
		d. Pitch control		SOA/M5B2/S/27			28.	Operation/testing of software's used in aircraft (CVR & FDR)	1	AIR INDIA
		e. Roll control		SOA/M5B2/S/28						
		f. Control interceptor								
							29.	Servicing and testing of lightning protection and electromagnetic compatibility device	1	AIR INDIA
	* GPS - Global Positioning System	1. Introduction	1	SOA/M5B2/S/28-29						
		2. General description of					30.	BITE testing of : 1. ACARS 2. EFIS 3. FMS 4. IRS 5. GPS 6. TCAS	15	AIR INDIA
		a. Space segment								
		b. Control segment					31.	Operational check of Map mode of HSI	1	AIR INDIA
		c. User segment								
	* IRS - Inertial Reference System	1. Introduction	2.5							
		2. General description of								
		a. Navigation fundamentals								
		b. Fundamental principle of a system								
		c. Ring laser gyroscope (RLG)		SOA/M5B2/S/30						
		d. Strapdown configuration								
		e. System malfunctions								
		f. Malfunction code								
	* TCAS - Traffic Alert Collision Avoidance System	1. Introduction	0.5							
		2. TCAS Theory of operation	1	SOA/M5B2/S/31						
		* EFIS - Electronic centralized aircraft monitoring	1							
		* Integrated modular avionics	1							
		* Cabin system	0.5							
		* Information Systems	0.5							
								TOTAL NO. OF PRACTICAL HRS. IN SOA LAB	63	
								TOTAL NO. OF PRACTICAL HRS. ON AIRCRAFT	0	
								TOTAL NO. OF PRACTICAL HRS. IN CLASS ROOM	0	
								TOTAL NO. OF PRACTICAL HRS. IN AIR INDIA	26	
		TOTAL NO. OF HRS. (T)	109					TOTAL NO. OF HRS. (P)	89	

MODULE - 4 : ELECTRONIC FUNDAMENTALS
SEMESTER : SECOND

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	[4.1] Semiconductors	Atomic structure	1	SOA/M4B2/S/1-3		2	1.	To acquaint with different types of semiconductors	1	LAB
2.	[4.1.1] Diodes	a. pn junction diode	1	SOA/M4B2/S/4		2	2.	To acquaint with P-N junction diode characteristics	1	LAB
		b. Depletion zone		SOA/M4B2/S/5						
		c. Biasing		SOA/M4B2/S/6						
		d. Leakage current				2	3.	To become familiar with diode testing	1	LAB
a.	Diode symbols	Diode symbols	1		2					
	Diode characteristics and properties	a. Volt.-amp. characteristics		SOA/M4B2/S/7						
		b. Breakdown voltage				2	4.	To acquaint with voltage amp. characteristics of the diode	1	LAB
	Diodes in series and parallel	Diodes in series and parallel	1			2	5.	Finding the internal resistance of diode	1	LAB
	Main characteristics and use of silicon controlled rectifiers (thyristor)s, light emitting diode, photo conductive diode, varistor, rectifier diodes	a. LED (To be discussed in s.no. 1-b)	1	SOA/M4B2/S/8		2	6.	a. Testing of LED b. Calculation of LED resistor value	1	LAB
		i. Characteristics		SOA/M4B2/S/9				c. LED characteristics		
		ii. Breakdown voltage								
		b. SCR (To be discussed in s.no. 1-b)		SOA/M4B2/S/10		2	7.	SCR characteristics	1	LAB
		i. Characteristics		SOA/M4B2/S/11				i. Saturation characteristics		
		ii. Breakdown voltage rating						ii. No load iii. Full load		
		c. Varistors (To be discussed in s.no. 1-b)	1			2	8.	Different types of varistors	1	LAB
		d. Rectifiers (To be discussed in s.no. 1-b)	1							
		i. Half wave rectifier		SOA/M4B2/S/12		2	9.	a. To acquaint with halfwave rectifier	1	LAB
		ii. Full wave rectifier		SOA/M4B2/S/13				b. To acquaint with fullwave rectifier		
		iii. Photo conductive diode (To be discussed in s.no. 1-b)		SOA/M4B2/S/14						

MODULE - 4 : ELECTRONIC FUNDAMENTALS **SEMESTER : SECOND**

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	Functional testing of diodes	a. Ohmmeter	1			2	10.	To acquaint with functional testing of diodes	1	LAB
		b. DMM test (digital multimeter)								
b.(i).	Materials, electron configuration, electrical properties (To be discussed with s.no. 1)	a. Atomic structure	1.5	SOA/M4B2/S/15	2					
		b. Forming a crystal		SOA/M4B2/S/16						
		c. Electrical properties								
(ii).	P and N type materials: effects of impurities on conduction, majority and minority charaters (To be discussed with s.no. 1)	a. Doping								
		b. P-type semiconductors		SOA/M4B2/S/17						
		c. n-type semiconductors	1.5	SOA/M4B2/S/18						
		d. Majority and minority carriers								
		e. Effect of impurity								
(iii).	PN junction in a semiconductor, development of a potential across a PN junction in unbiased, forward biased and reverse biased conditions (To be discussed with s.no. 2)	a. Development of potential across a PN junction	1	SOA/M4B2/S/19						
		b. Biasing								
		i. Forward biasing		SOA/M4B2/S/20		2	11.	a. Forward bias characteristics of LED.	1	LAB
		ii. Reverse biasing		SOA/M4B2/S/21				b. Reverse bias characteristics of LED.		LAB
(iv)	Diode parameter: peak inverse voltage, maximum forward current, temperature, frequency, leakage current, power fissionation	a. PV	1							
		b. Breakdown voltage								
		c. Max. forward current								
		d. Leakage current								
		e. Reverse current								
(v)	Operation and function of diodes in the following circuits: clippers, clampers, full and half wave rectifiers, bridge rectifiers, voltage doublers and triplers	a. Clippers	1	SOA/M4B2/S/22		2	12.	To obtain the load regulation and ripple factor of a half rectifier with and without filter	1	LAB

MODULE - 4 : ELECTRONIC FUNDAMENTALS **SEMESTER : SECOND**

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		b. Clampers		SOA/M4B2/S23						
		c. Full wave rectifiers		SOA/M4B2/S24						
		d. Half wave rectifiers		SOA/M4B2/S25						
		e. Bridge rectifiers		SOA/M4B2/S26						
		f. Votage doublers & triplers				2	13.	To find the ripple factor & regulation of a full wave rectifier with & without filter	1	LAB
(vi)	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	a. SCR (To be discussed in s.no. 3-b)	1	SOA/M4B2/S27						
		i Construction and symbol		SOA/M4B2/S28		2	14.	To draw the V-I characteristics of SCR	1	LAB
		ii. Voltage current characteristics		SOA/M4B2/S29						
		v. Applications		SOA/M4B2/S30						
		b. LED	0.5			2	15.	a. Testing of LED	1	LAB
		i. Biasing		SOA/M4B2/S31				b. Bistable multivibrator		
		ii. Characteristics								
		iii. Breakdown voltage		SOA/M4B2/S32						
		iv Applications								
		c. Zener diodes	1			2	16.	To acquaint with zener diode characteristics	1	LAB
		i. Volt-ampr. characteristics curve		SOA/M4B2/S33						
		ii. Applications		SOA/M4B2/S34		2	17.	To find voltage regulation of a given zener diode	1	LAB
		d. Schottky diode	1							
		i. Symbol								
		ii. Characteristics		SOA/M4B2/S35		2	18.	Schottky diode characteristics	1	LAB
		iii. Application								
		e. Tunnel diode	1							
		f. Photo conductive diode		SOA/M4B2/S36		2	19.	Various types of photo diode	1	LAB
		g. Varactor diode, shockly diode	0.5							
		h. Varistors, silicon bilateral diode								

MODULE - 4 : ELECTRONIC FUNDAMENTALS

SEMESTER : SECOND

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
3.	[4.1.2] Transistors	Transistors								
a.	* Transistor symbols	1. Transistor symbols	1.5	SOA/M4B2/S/37	2					
		a. NPN transistor symbol								
		b. PNP transistor symbol								
	* Component description and orientation	1. Introduction to BJT	1.5	SOA/M4B2/S/38						
		2. Types of BJT								
		a. NPN								
		b. PNP								
		3. Components of BJT	1	SOA/M4B2/S/39						
		a. Emitter								
		b. Base								
		c. Collector								
		4. Transistor connection	1.5							
		a. Common base		SOA/M4B2/S/40						
		b. common emitter		SOA/M4B2/S/41						
		c. Common collector		SOA/M4B2/S/42						
	* Transistor characteristics and properties	1. Characteristics of transistor : Input and Output characteristics of -	1.5							
		a. Common base characteristics		SOA/M4B2/S/43		2	20.	To obtain input and output characteristics in common base connection	1	LAB
		b. Common emitter characteristic		SOA/M4B2/S/44		2	21.	To obtain input and output characteristics in common emitter connection	1	LAB
		c. Common collector characterisitc		SOA/M4B2/S/45		2	22.	To obtain input and output characteristics in common collector connection	1	LAB

MODULE - 4 : ELECTRONIC FUNDAMENTALS

SEMESTER : SECOND

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		2. Properties of transistor	2							
		a. Input resistance property		SOA/M4B2/S/46						
		b. Output resistance		SOA/M4B2/S/47						
		c. Effective collector load		SOA/M4B2/S/48						
		d. Current gain								
		e. Voltage gain								
		f. Power gain								
b.	* Construction and operation of PNP and NPN transistors	1. Construction and operation of transistor	1	SOA/M4B2/S/49	2					
		a. NPN								
		b. PNP								
	* Base, collector and emitter configurations	1. Base configuration	1	SOA/M4B2/S/50						
		a. Current amplification factor (α)								
		b. Expression for collector current		SOA/M4B2/S/51						
		2. Emitter configuration	1	SOA/M4B2/S/52						
		a. Current amplification factor (β)								
		b. Expression for collector current		SOA/M4B2/S/53						
		3. Collector configuration	1	SOA/M4B2/S/54						
		a. Current amplification factor (γ)								
		b. Expression for collector current		SOA/M4B2/S/55						

MODULE - 4 : ELECTRONIC FUNDAMENTALS**SEMESTER : SECOND****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Testing of transistors	Testing of transistors	1			2	23.	To perform testing of transistor	1	LAB
		1. Lead identification of transistor		SOA/M4B2/S/56				a. Lead identification method		
		2. Using ohmmeter		SOA/M4B2/S/57				b. Using ohmmeter		
	* Basic appreciation of other transistor types and their uses	1. Other transistor types : construction, operation, characteristics and application of -								
		a. JFET	0.5	SOA/M4B2/S/58		2	24.	To obtain drain and transfer characteristics of JFET	1	LAB
		b. MOSFET	0.5	SOA/M4B2/S/59		2	25.	To obtain drain and transfer characteristics of MOSFET	1	LAB
		c. UJT	0.5	SOA/M4B2/S/60		2	26.	To obtain V - I characteristics of UJT	1	LAB
		d. SCR, TRIAC, DIAC	0.5	SOA/M4B2/S/61		2	27.	To obtain V - I characteristics of (a) SCR (b) TRIAC (c) DIAC	1	LAB
	* Application of transistors : classes of amplifier (A, B, C)	1. Application of transistor	1							
		a. Common base application								
		b. Common emitter application								
		c. Common collector application								
		2. Transistor as an amplifier								
		3. Transistor as a switch	0.5							
		4. Classes of amplifier : working, characteristics and applications of	1	SOA/M4B2/S/62						
		a. Class A				2	28.	To draw the characteristic curve of class-A amplifier	1	LAB
		b. Class B				2	29.	To draw the characteristic curve of class-B amplifier	1	LAB
		c. Class C				2	30.	To draw the characteristic curve of class - c amplifier	1	LAB
	* Simple circuits including : bias, decoupling, feedback and stabilisation	1. Transistor biasing	1							
		a. Need of biasing								

MODULE - 4 : ELECTRONIC FUNDAMENTALS **SEMESTER : SECOND**

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		b. Methods of transistor biasing : circuit analysis, stability factor, advantages and disadvantages of								
		i. Base resistor method		SOA/M4B2/S/63						
		ii. Biasing with feedback resistor		SOA/M4B2/S/64						
		iii. Voltage divider method		SOA/M4B2/S/65						
		2. Decoupling	1							
		i. Circuit analysis								
		ii. Advantages								
		iii. Disadvantages								
		3. Feedback	1							
		a. Principle of feedback								
		b. Types of feedback								
		i. Negative feedback		SOA/M4B2/S/66						
		ii. Positive feedback		SOA/M4B2/S/67						
		c. Feedback circuit	1	SOA/M4B2/S/68		2	31.	To obtain voltage gain in following feedback circuits	1	LAB
		i. Voltage series feedback						a. Voltage series feedback		
		ii. Voltage shunt feedback						b. Voltage shunt feedback		
		iii. Current series feedback						c. Current series feedback		
		iv. Current shunt feedback						d. Current shunt feedback		
		4. Stabilisation	1							
		a. Principle of stabilisation								
		b. Need for stabilisation								
		c. Stability factor								
		d. Thermal runaway								

MODULE - 4 : ELECTRONIC FUNDAMENTALS

SEMESTER : SECOND

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Multistage circuit principles : cascades, push-pull, oscillators, multivibrators	1. Multistage transistor amplifier	1	SOA/M4B2/S/69						
		a. Terms								
		i. Gain								
		ii. Frequency response								
		iii. Decibel gain								
		iv. Bandwidth								
		b. Cascading circuits : operation, frequency response, advantages, disadvantages and application of	1							
		i. RC coupled		SOA/M4B2/S/70						
		ii. Transformer coupled		SOA/M4B2/S/71						
		iii. Direct coupled		SOA/M4B2/S/72						
		c. Push-pull	2	SOA/M4B2/S/73		2	32.	To draw transfer characteristics of push-pull amplifier	1	LAB
		i. Principle of push-pull								
		ii. Operation								
		iii. Advantages								
		iv. Disadvantages								
		v. Applications								
		vi. Cross over distortion								
		vii. Complementry symmetry push-pull		SOA/M4B2/S/74						
		d. Oscillators	1.5							
		i. Principle of oscillations		SOA/M4B2/S/75						
		ii. Types of oscillations		SOA/M4B2/S/76						
		iii. Essentials of oscillator		SOA/M4B2/S/77						

MODULE - 4 : ELECTRONIC FUNDAMENTALS**SEMESTER : SECOND****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		iv. Barkhausen criterion		SOA/M4B2/S/78						
		v. Types of oscillators : operation, frequency of oscillation, feedback fraction				2	33.	To identify and measure frequency and observe the wave shape of output of oscillations of	1	LAB
		* Tuned collector oscillator		SOA/M4B2/S/79				a. Tuned collector oscillator		
		* Colpitt's oscillator		SOA/M4B2/S/80				b. Colpitt oscillator		
		* Hartley oscillator		SOA/M4B2/S/81				c. Hartley oscillator		
		* Crystal oscillator		SOA/M4B2/S/82				d. Crystal oscillator		
						2	34.	To identify and measure frequency and observe the wave shape of output of oscillations of	1	LAB
		* Phase shift oscillator		SOA/M4B2/S/83				a. Phase-shift oscillator		
		* Wien bridge oscillator		SOA/M4B2/S/84				b. Wien bridge oscillator		
		- Comparison between different types of oscillators								
		e. Multivibrators	2							
		i. Principle of multivibrator		SOA/M4B2/S/85						
		ii. Types of multivibrator : circuit operation, ON or OFF time and application of				2	35.	To identify and measure frequency and observe the waveshape of output of	1	LAB
		* Astable multivibrator		SOA/M4B2/S/86				a. Astable multivibrator		
		* Monostable multivibrator		SOA/M4B2/S/87				b. Monostable multivibrator		
		* Bistable multivibrator		SOA/M4B2/S/88				c. Bistable multivibrator		
4.	[4.1.3] Integrated circuits									
	* Description and operation of logic circuits and linear circuits.	1. Introduction to integrated circuits	1	SOA/M4B2/S/89	2					
		2. Advantages of IC's								
		3. Drawbacks of IC's								
		4. Scale of integration								
	* Introduction to operation and function of an operational amplifier used as : Integrator, differentiator, voltage follower, comparator	1. Principle of operational amplifier (OP-AMP)	0.5							
		2. OP-AMP symbol	0.5	SOA/M4B2/S/90						
		3. Polarity convention		SOA/M4B2/S/91						
		a. Non-inverting								
		b. Inverting								

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STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		4. Ideal OP-AMP	0.5							
		5. OP-AMP applications	1			2	36.	To verify operational amplifier as	2	LAB
		a. Integrator		SOA/M4B2/S/92				a. Integrator		
		b. Differentiator		SOA/M4B2/S/93				b. Differentiator		
		c. Voltage follower		SOA/M4B2/S/94				c. Voltage follower		
		d. Comparator		SOA/M4B2/S/95				d. Comparator		
	* Operation and amplifier stages connecting methods : resistive capacitive, inductive (transformer), inductive resistive (IR), direct.	1. Amplifier stages connecting methods : operation, voltage gain, advantages & disadvantages	1	SOA/M4B2/S/96		2	37.	To draw the frequency response curve of following multistage amplifier	2	LAB
		a. Resistive capacitive (RC) coupling.		SOA/M4B2/S/97				a. Resistance capacitance coupled		
		b. Inductive resistive coupling		SOA/M4B2/S/98				b. Inductance coupled		
		c. Transformer coupling		SOA/M4B2/S/99				c. Transformer coupled		
		d. Direct coupling		SOA/M4B2/S/100				d. Direct coupled		
	* Advantages and disadvantages of positive and negative feedback	1. Positive and negative feedback	0.5							
		a. Advantages								
		b. Disadvantages								
5.	[4.2] Printed circuit boards.				2					
	* Description and use of printed circuit boards	1. Introduction to printed circuit boards	1	SOA/M4B2/S/101		2	38.	Construction details of PCB circuit	1	LAB
		2. Construction and designing of PCB								
		3. Uses of PCB								
6.	[4.3] Servomechanisms				2					
	* Understanding of the following terms : open and closed loop, follow up, servomechanism, analogue, transducer, null, damping, feedback, deadband;	1. Open loop systems	0.5	SOA/M4B2/S/102						
	* Principle of operations and use of the following synchro system	2. Closed loop systems		SOA/M4B2/S/103						
		3. Feedback		SOA/M4B2/S/104						
	components/ features resolvers,	4. Follow-up		SOA/M4B2/S/105						
	differential control & torque	5. Analogue transducers		SOA/M4B2/S/106						
	transformers & inductance									
	capacitance transmitters	1. Servomechanism	0.5							
		a. Construction of servomotor and rate generator		SOA/M4B2/S/107						
		b. Position control servomechanism		SOA/M4B2/S/108						
		c. Speed control servomechanism		SOA/M4B2/S/109						
		i. Mechanical coupling								
		d. Response of servomechanism		SOA/M4B2/S/110						

MODULE - 4 : ELECTRONIC FUNDAMENTALS
SEMESTER : SECOND

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		1. Damping	1							
		a. Viscous damping		SOA/M4B2/S/111						
		b. Velocity feedback damping		SOA/M4B2/S/112						
		c. Error rate damping		SOA/M4B2/S/113						
		d. Transient velocity damping		SOA/M4B2/S/114						
		e. Phase advance damping		SOA/M4B2/S/115						
	* Construction operation and use of the following synchro system components : resolvers, differential, control and torque, E and I transformers, inductances transmitters.	1. Integral control	1							
		2. Trouble shooting of servomotor								
		3. Study of various synchros		SOA/M4B2/S/116						
		a. Resolver synchro		SOA/M4B2/S/117						
		b. Control synchro		SOA/M4B2/S/118						
		c. Torque synchro		SOA/M4B2/S/119						
		d. Differential synchro		SOA/M4B2/S/120						
	* Capacitance transmitters, synchronous transmitters	* DC synchronous transmitter	0.5							
		* AC synchronous transmitter								
	* Servomechanism defects, reversal of synchro leads, hunting	1. Reversing links	0.5							
								TOTAL NO. OF PRACTICAL HRS. AT SOA (N) LAB	40	
								TOTAL NO. OF PRACTICAL HRS. ON AIRCRAFT	00	
								TOTAL NO. OF PRACTICAL HRS. ON AIRCRAFT	00	
								TOTAL NO. OF PRACTICAL HRS. ON AIRCRAFT	00	
		TOTAL NO. OF HRS. (T)	60					TOTAL NO. OF HRS. (P)	40	

MODULE - 13 : AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (AS)

SEMESTER : SECOND

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1	[13.1] Theory of flight									
a.	Aeroplane aerodynamics and flight controls.				1					
	* Operation & effect of									
	- Roll Control : Ailerons and spoilers	A. Roll Control	2	SOA/M13/S/1		1	1.	To acquaint with aircraft roll control.	1	ON AIRCRAFT
		i. Aileron		SOA/M13/S/2-3						
		ii. Spoilers		SOA/M13/S/4-5						
	- Pitch Control : Elevators, Stabilizers, Variables incidence stabilizers and canards.	B. Pitch Control	2			1	2.	To acquaint with aircraft pitch control	1	ON AIRCRAFT
		i. Elevators		SOA/M13/S/6-7						
		ii. Stabilizers		SOA/M13/S/8-10						
		iii. Variable incidence stabiliers and canards		SOA/M13/S/11-15						
	- Yaw control, rudder limiters	C. Yaw control	2	SOA/M13/S/16		1	3.	To acquaint with aircraft yaw control	1	ON AIRCRAFT
		i. Rudder limiters								
		ii. Elevon, flapons		SOA/M13/S/17						
		iii. Rudder vators		SOA/M13/S/18						
	* Control using elevons rudder vators	Control using	2	SOA/M13/S/19						
		a. Elevons, flapons		SOA/M13/S/20						
		b. Rudder vators		SOA/M13/S/21						

MODULE - 13 : AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (AS)

SEMESTER : SECOND

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* High lift devices : slots, slats, flaps	High lift devices	2	SOA/M13/S/22						
		i Slots		SOA/M13/S/23-24						
		ii. Slats		SOA/M13/S/25-26						
		iii. Flaps		SOA/M13/S/27						
	* Drag Inducing devices spoilers, speed brakes, lift dumpers	Drag inducing devices	2	SOA/M13/S/28		1	4.	To acquaint with aircraft lift augmentation devices	3	ON AIRCRAFT
		a. Spoilers (lift dumper)		SOA/M13/S/29						
		b. Speed brakes		SOA/M13/S/30						
		c. Lift dumpers		SOA/M13/S/31						
	* Operation and effect of trim tabs, servo tabs, control surface bias	Operation & effect of :	2	SOA/M13/S/32						
		a. Trim tabs		SOA/M13/S/33-34						
		b. Servo tabs		SOA/M13/S/35						
		c. Balancing the control surface								
b.	High speed flight	High speed flight	2	SOA/M13/S/36	1					
	* Speed of sound, subsonic flight, transonic flight, supersonic flight	i. Speed of sound								
		ii. Subsonic flight		SOA/M13/S/37						
		iii. Transonic flight		SOA/M13/S/38						
		iv. Supersonic flight		SOA/M13/S/39						

MODULE - 13 : AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (AS)

SEMESTER : SECOND

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	* Mach number, critical mach number	Mach number, Critical mach number	1	SOA/M13/S/40						
c.	Rotary Wing Aerodynamics				1					
	* Terminology	Terminology	1	SOA/M13/S/41						
		a. Angle of attack		SOA/M13/S/42						
		b. Conic angle		SOA/M13/S/43						
		c. Flapping angle		SOA/M13/S/44						
		d. Hunting of the blades								
	* Operation and effect of cyclic pitch, collective pitch and anti-torque controls	Operation & effect of	2	SOA/M13/S/45-46						
		a. Cyclic pitch control								
		b. Collective pitch control								
		c. Anti-torque controls		SOA/M13/S/47						
2.	[13.2] Structures - General concepts									
a.	Fundamentals of structural systems	a. Stresses	2	SOA/M13/S/48-50	1	1	5.	To acquaint with aircraft major components on aircraft and to identify their location.	1	ON AIRCRAFT
		b. Construction of major components of aircraft		SOA/M13/S/51-79						
		c. Fuselage, wing, and control surfaces								
b.	Zonal and station identification systems	a. Aircraft station numbers, fuselage station numbers, wing station numbers, components station numbers.	2	SOA/M13/S/80	2	2	6.	To acquaint with aircraft structure fuselage station, wing station number	1	ON AIRCRAFT
		b. Zoning	½	SOA/M13/S/81						
		c. Nomenclature and definition	½							
	* Electrical bonding	Electrical bonding	1	SOA/M13/S/82		2	7.	To know and understand electrical bonding on aircraft	1	ON AIRCRAFT
	* Lightning strike protection provision	Lightning strike protection provision	1							

MODULE - 13 : AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (AS) **SEMESTER : SECOND**

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
3.	[13.7] Flight Controls (ATA 27)									
a.	* Primary controls : aileron, elevator, rudder, spoiler	a. Introduction	1		1					
		b. Aileron		SOA/M13/S/83-87		1	8.	To acquaint with primary control surfaces	1	ON AIRCRAFT
		c. Elevator		SOA/M13/S/88-89						
		d. Rudder		SOA/M13/S/90						
		e. Spoilers		SOA/M13/S/91-92			9.	To acquaint with various types of tabs	1	ON AIRCRAFT
	* Trim control	a. Tabs	1	SOA/M13/S/93			10.	To acquaint with manual system operation	1	ON AIRCRAFT
		b. Trim tabs		SOA/M13/S/94						
		c. Servo tabs		SOA/M13/S/95		1	11.	To acquaint with fixed volume pump	1	LAB
		d. Balance tabs		SOA/M13/S/96						
						1	12.	To acquaint with hydraulic accumulator	1	LAB
	* Active Load Control	a. Aircraft loads	1							
		b. V-N Diagram		SOA/M13/S/97		1	13.	To acquaint with hydraulic actuator	1	LAB
	* High lift devices	a. Introduction of slots	2	SOA/M13/S/98		1	14.	To acquaint with AIR BOTTLE	1	LAB
		b. Types of slots		SOA/M13/S/99-100						
		c. Flaps		SOA/M13/S/101-103		1	15.	To acquaint with stall protection system	2	ON AIRCRAFT
		d. Types of flaps		SOA/M13/S/104-106						
						1	16.	Removal & installation of spoiler mixer unit & aileron balance panels	1	ON AIRCRAFT
	* Lift dump, speed brakes	a. Lift dumpers	½	SOA/M13/S/107						
		b. Speed brakes		SOA/M13/S/108		1	17.	Pressure leak test/ condition check/ operational check on oxygen system	1	AIR INDIA
	* System operation:					1	18.	Removal and installation of portable protective breathing equipment.	1	AIR INDIA
i.	Manual system	a. Chains	½	SOA/M13/S/109-112						
		b. Pulley	½	SOA/M13/S/112-113		1	19.	a. Servicing and maintenance of bleed air isolation valve and pre-cooler control valves (pneumatic system) b. Removal and installation of bleed air check valves (pneumatic system)	1	AIR INDIA
ii.	Hydraulic system	a. Introduction	½	SOA/M13/S/114						
		b. Pascal law & mechanical advantage				1	20.	Vacuum pressure test of water system	1	AIR INDIA
		c. Types & properties of hydraulic fluid	1	SOA/M13/S/115						
		d. Types of hydraulic pumps				1	21.	Servicing and maintenance of outflow valve actuator	1	AIR INDIA

MODULE - 13 : AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (AS)**SEMESTER : SECOND**

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		i. Fixed volume pump	2	SOA/M13/S/115-119		1	22.	a. Servicing, maintenance and testing of electronic equipment cooling fans	1	AIR INDIA
		ii. Variable volume pump		SOA/M13/S/120				b. Servicing and maintenance of outflow valve position indicator and equipment cooling over board flight exhaust valve		
		iii. Hand pump		SOA/M13/S/121						
		e. Hydraulic components				1	23.	Operational test of recirculation system (air condition system)	1	AIR INDIA
		i. Non-return valve	2	SOA/M13/S/122						
		ii. Relief valve		SOA/M13/S/123		1	24.	Inspection and servicing of recirculation fan check valve	1	AIR INDIA
		iii. Cut-out valve		SOA/M13/S/124						
		iv. Reducing valve		SOA/M13/S/125		1	25.	a. Removal and installation of engine fire detector element	1	AIR INDIA
		v. Pressure maintaing valve		SOA/M13/S/126				b. Inspection, servicing, replacement of fire extinguisher bottles		
		vi. Selector valve	1	SOA/M13/S/127-128						
		vii. Shuttle valve	1	SOA/M13/S/129		1	26.	Operational testing of cargo bay smoke detector	1	AIR INDIA
		viii. Sequence valve		SOA/M13/S/130						
		ix. Hydraulic accumulator	1	SOA/M13/S/131		1	27.	a. Inspection and maintenance of boost pump	1	AIR INDIA
		x. Hydraulic reservoir	2	SOA/M13/S/132				b. Inspection and servicing of cross feed valve and fuelling manifold check valve		
		xi. Hydraulic actuator		SOA/M13/S/133						
		xii. Hydraulic filter & seal		SOA/M13/S/134-135		1	28.	a. Removal of microbial growth from fuel tank	1	AIR INDIA
		f. Layout of basic hydraulic system	1	SOA/M13/S/136-137				b. Removal and installation of surge tank pressure relief valve		
		g. Layout of typical hydraulic system	1	SOA/M13/S/138						
		h. Power-pack system	1	SOA/M13/S/139		1	29.	Functional test of cross feed valve and operational test of fuel scavenge system.	1	AIR INDIA
		i. Power flying control		SOA/M13/S/140						
						1	30.	a. Contamination test on hydraulic fluid system	1	AIR INDIA
	iii. Pneumatic system	a. Introduction	1					b. Removal and installation of hydraulic fluid overheat warning switch		
		b. Advantages & disadvantages								
		c. Typical layout of high pressure pneumatic system	1	SOA/M13/S/141						

MODULE - 13 : AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (AS)

SEMESTER : SECOND

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		d. Pneumatic components :				1	31.	a. Removal and fitment of Nose wheel	1	AIR INDIA
		i. Compressors	1	SOA/M13/S/142				b. Removal and fitment of Main wheel		
		ii. Pressure regulators	1	SOA/M13/S/143				c. Checking of filters and clog indicators of landing gear system		
		iii. Oil & water trap								
		iv. Storage bottle		SOA/M13/S/144		1	32.	Removal and installation of brake shuttle valve	1	AIR INDIA
		v. Pressure reducing valve	1½	SOA/M13/S/145						
		vi. Pressure maintaining valve		SOA/M13/S/146		1	33.	Removal and installation of antiskid control unit, antiskid valve & antiskid wheel speed transducer	1	AIR INDIA
		vii. Control valve		SOA/M13/S/147-149						
		viii. Actuator		SOA/M13/S/150		1	34.	Removal and installation of steering mechanism & steering metering valve	1	AIR INDIA
	* Artificial feel, yaw damper, mach trim, rudder limiter, gust locks	a. Artificial feel	1½			1	35.	Servicing and leak testing of wing ant ice system	1	AIR INDIA
		b. Yaw damper system		SOA/M13/S/151						
		c. Mach trim system		SOA/M13/S/152-153		1	36.	Removal and installation of waste drain line heater	1	AIR INDIA
		d. Gust lock								
		e. Rudder limiter (Stops)		SOA/M13/S/154		1	37.	Removal, cleaning & installation of crew & passenger oxygen mask	1	AIR INDIA
	* Stall protection system	a. Introduction								
		b. Stick pusher (Nudger)	1							
		c. Mach warning system								
		d. Take-off warning								
								TOTAL NO. OF PRACTICAL HRS. AT LAB	04	
								TOTAL NO. OF PRACTICAL HRS. ON AIRCRAFT	12	
								TOTAL NO. OF PRACTICAL HRS. IN CLASS ROOM	00	
								TOTAL NO. OF PRACTICAL HRS. IN AIR INDIA	21	
		TOTAL NO. OF HRS. (T)	55					TOTAL NO. OF HRS. (P)	37	

MODULE - 6 : MATERIALS AND HARDWARE **SEMESTER : THIRD**

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	[6.1] Aircraft material : ferrous									
	[6.1(a)] Characteristics, properties of common alloy steels	1. Terms and definition	0.5	SOA/M6/S/1-6	1					
		2. Steel production method	0.5							
		3. Application of plain carbon steels, classification based on the degree of de-oxidation.	1							
		4. Influence of other materials in carbon steels.	0.5							
		5. Alloy steels, effect of alloying elements	0.5							
		6. Classification of steels & special alloy steels	1	SOA/M6/S/7-9						
	Heat treatment & application of alloy steels	1. Critical range and internal structure of steel. Theory of heat treatment.	1	SOA/M6/S/10-12						
		2. Annealing and normalising	1							
		3. Hardening, tempering and refining	1	SOA/M6/S/13-16						
		4. Practical heat treatment.	1							
		5. Cycle annealing austempering	1							
		6. Martempering and hardenability	1							
		7. Case hardening	1							
		a. Solid & liquid carburising	1							
		b. Cyaniding and nitriding	1							
		c. Induction hardening and shot-peening	1							
2.	[6.2] Aircraft materials. Non-ferrous									
	[6.2 (a)] Characteristics, properties of non-ferrous materials used in aircraft	1. Non-ferrous metals and their properties and uses	1		1					
		2. Non-ferrous alloys :								
		a. Brasses	1							
		b. Bronzes	0.5							
		c. Aluminium and magnesium alloys	0.5							
		d. Nickel alloys	1							
		e. Bearing materials and other alloys	1							

MODULE - 6 : MATERIALS AND HARDWARE **SEMESTER : THIRD**

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	Heat treatment of non-ferrous materials	1. Solution heat treatment	0.5							
		2. Precipitation heat treatment	0.5							
		3. Heat treatment of aluminium alloy	1							
		4. Heat treatment of magnesium alloy	0.5							
		5. Heat treatment of titanium alloys	1							
	[6.1 (a) & 6.2 (a)] Identification of ferrous & non-ferrous materials used in aircraft.	1. Identification of ferrous and non-ferrous metals	0.5		1					
		2. Selection of materials	1		1					
	[6.1 (b) & 6.2 (b)] Testing of ferrous & non-ferrous materials for hardness, tensile strength, fatigue strength and impact resistance	1. Stress and strain	1		1					
		2. Principal mechanical properties	2							
		3. Tensile and compression tests	2	SOA/M6/S/17-20						
		4. Hardness testing	2							
		a. Brinell and rockwell hardness tests	2	SOA/M6/S/21-24						
		b. Vickers hardness, micro hardness, scratch and rebound hardness tests	2	SOA/M6/S/25						
		5. Impact Tests								
		a. Izod impact test	2	SOA/M6/S/26						
		b. Charpy impact test	2	SOA/M6/S/27						
		6. Fatigue and creep tests	1							
3.	[6.3.] Aircraft materials : Composite and non metallic	1. Plastics : Introduction and classification	1	SOA/M6/S/28-30						
	[6.3.1(a)] Composite & non-metallic other than wood & fabric. Characteristics properties and identification of common composite and non-metallic materials other then wood used in aircraft, sealant & bonding agents.	2. Physical and working properties of plastics	1		2					
4.	[6.4] Corrosion									
	a. Chemical fundamentals, formation by galvanic action process, microbiological, stress.	1. Introduction of corrosion	1	SOA/M6/S/61	1					
	b. Types of corrosion and their identification	2. Types of corrosion	1		2					
	c. Causes of corrosion	3. Conditions causing corrosion	1							

MODULE - 6 : MATERIALS AND HARDWARE
SEMESTER : THIRD
STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	d. Materials types : susceptibility to corrosion	4. Order of corrodibility in metals	1							
5.	[6.5] Fasteners									
	[6.5.1] Screw threads				2					
	1. Screw Nomenclature	Different form of screw threads :	1			2	1.	To identify and to know the uses of different types of screw thread used in aircraft	4	LAB
		a. BA, BSW, BSP		SOA/M6/S/62						
		b. British standard and fine threads		SOA/M6/S/63						
		c. American sellers		SOA/M6/S/64						
		d. Metric threads		SOA/M6/S/65						
		e. Unified thread		SOA/M6/S/66						
		f. Square thread/ACME		SOA/M6/S/67						
		g. Butterress thread		SOA/M6/S/68						
		h. Knuckel thread		SOA/M6/S/69						
	2. Thread forms, dimensions and tolerances for standard threads used in aircraft.	a. Thread forms	1	SOA/M6/S/70						
		b. Dimensions		SOA/M6/S/71						
		c. Tolerances		SOA/M6/S/72						
	3. Measuring screw threads	Measuring screw threads	1	SOA/M6/S/73						
	[6.5.2] Bolts, studs and a screws				2					
	* Bolt types: specification, identification and marking of aircraft bolts, international standards.	1. Aircraft Bolts								
		i. Bolt types, specification and identification	5	SOA/M6/S/74		2	2.	To identify and to know the uses of different types of bolts.	4	LAB
		a. Hexagonal headed bolt		SOA/M6/S/74						
		b. Clevis bolt		SOA/M6/S/74						
		c. Eye bolt		SOA/M6/S/74						
		d. DR Hd engine bolt		SOA/M6/S/74						
		e. Countersunk head bolt		SOA/M6/S/74						
		f. Drilled hex head bolt		SOA/M6/S/74						

MODULE - 6 : MATERIALS AND HARDWARE **SEMESTER : THIRD**

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		g. Internal hex head bolt		SOA/M6/S/74						
		h. AN standard steel bolt		SOA/M6/S/74						
		i. Special bolt		SOA/M6/S/74						
		j. Drilled head bolt		SOA/M6/S/74						
		k. NAS close tolerance bolt		SOA/M6/S/74						
		l. Al alloy bolt		SOA/M6/S/74						
		m. Magnetically inspected bolt		SOA/M6/S/74						
		n. Orange dyed		SOA/M6/S/74						
		o. reworked bolt		SOA/M6/S/74						
		p. Low strength material bolt		SOA/M6/S/74						
		ii. Lock bolt types	1	SOA/M6/S/75						
		iii. Lock bolt numbering system	1	SOA/M6/S/76						
	* Nuts : Self locking, anchor, standard types	i. Non- self locking nuts :	2	SOA/M6/S/77		2	3.	To identify and know the uses of various types of Non-self locking nuts.	2	LAB
		a. AN 310								
		b. AN 315								
		c. AN 320								
		d. AN 335								
		e. AN 340								
		f. AN315								
		g. AN 350								
		ii. Self-locking & anchor types of nuts	2	SOA/M6/S/78		2	4.	To identify and know the uses of various types self-locking nuts.	2	LAB
		a. Hexagonal		SOA/M6/S/78						
		b. Castle		SOA/M6/S/79						
		c. Ring		SOA/M6/S/80						

MODULE - 6 : MATERIALS AND HARDWARE
SEMESTER : THIRD

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		d. Flanged		SOA/M6/S/81						
		e. Slotted		SOA/M6/S/82						
		f. Pal								
		g. Check								
		h. Wing								
		i. Dome nuts								
	* Machine screws : aircraft specifications	Types of screws & specification	2	SOA/M6/S/82A		2	5.	To identify and know the uses of aircraft screws	8	ON AIRCRAFT
		a. Structural								
		b. Self tapping								
		c. Drive								
		d. Flat head								
		e. Round head								
		f. Washer head								
		g. Headless								
		h. Fillister head		SOA/M6/S/83						
		i. Truss head and all machine screws		SOA/M6/S/83						
	* Studs : types and uses, insertion and removal	Different types of studs and their uses	1	SOA/A/M6/S/83A		2	6.	To identify and know how to use the stud and dowels.	7	ON AIRCRAFT
	* Self tapping screws, dowels	Self-tapping screw & dowels	1	SOA/M6/S/84						
	[6.5.3] Locking devices, Tab and spring washers, locking plates, split pins, pal nuts, wire locking, quick release fasteners, key circlips, cotter pins	Tab and spring washers	3		2	2	7.	To identify and know the various types of washers and their uses	2	LAB
		a. Plain washer		SOA/M6/S/85						
		b. Special washer		SOA/M6/S/85						

MODULE - 6 : MATERIALS AND HARDWARE
SEMESTER : THIRD

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		c. Spring washer		SOA/M6/S/86						
		d. Taper pin washer		SOA/M6/S/86						
		e. Star-lock washer		SOA/M6/S/87						
		f. Locking plates		SOA/M6/S/87						
		g. Split pin		SOA/M6/S/87a						
		h. Pal nuts		SOA/M6/S/87						
		i. Wire locking		SOA/M6/S/88-90						
		j. Quick release fasteners		SOA/M6/S/91-93						
		k. Key circlip		SOA/M6/S/94						
		l. Cotter pins		SOA/M6/S/94A						
	[6.5.4.] Aircraft rivets	1. Types of rivets, specification and identification	2	SOA/M6/S/95-98	1	1	8.	Identification and uses of different rivets	2	LAB
	Types of solid and blind rivets: specifications and identification, heat treatment.	a. Universal head								
		b. Round head								
		c. Flat head								
		d. Counter sunk head								
		e. Special blind rivets mechanically expanded rivets		SOA/M6/S/95-98A						
		f. Non-structural and mechanical lock.		SOA/M6/S/95-98B						
		2. Heat treatment of different types of rivets.	1							
6.	[6.6] Pipes and unions									
a.	Identification, and types of rigid and flexible pipes and their connectors used in aircraft	Different types of pipes and unions used in aircraft	2	SOA/M6/S/99-104	2	2	9.	To identify uses and bending of pipes (Hydraulic used in aircraft)	2	LAB
		a. Plumbing line								

MODULE - 6 : MATERIALS AND HARDWARE **SEMESTER : THIRD**

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		b. Rigid tubing								
		c. Identification of material								
		d. Flexible hose								
		e. Synthetic hose								
		f. Teflon hose								
b.	Standard unions for aircraft hydraulic, fuel oil, pneumatic and air system pipes	a. Plumbing connectors	1		1					
		b. Flared, tube fittings								
		c. Flareless tube fittings.								
7.	[6.7] Springs				1					
	Types of springs, material, characteristics and application	Different types of springs, material testing, characteristics and application	1	SOA/M6/S/100		1	10.	To know the different types of springs and testings and uses	2	LAB
8.	[6.8] Bearing			SOA/M6/S/101-105	2					
	1. Purpose of bearing, loads, material, construction	1. Purpose of bearing, loads, material construction	½			2	11.	To know and identify the different types of bearing.	2	LAB
	2. Types of bearings and their application	2. Types & uses of bearings	2.5							
		a. Ball and roller bearing								
		b. Journal bearing								
		c. Rod end bearing								
		d. Conical bearing								
		e. Truncated pivot bearing								
		f. Collared bearing								
		g. Needle and cylindrical bearing								

MODULE - 6 : MATERIALS AND HARDWARE **SEMESTER : THIRD**

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
9.	[6.9] Transmission				2					
i.	Gear types and their application	i. Different types of gear	3	SOA/M6/S/106-116		2	12.	To know the operation and uses of different gears	2	LAB
		a. Spur		SOA/M6/S/116-126						
		b. Helical		SOA/M6/S/116-126						
		c. Spiral		SOA/M6/S/116-126						
		d. Rack & pinion		SOA/M6/S/116-126						
		e. Worm & worm wheel		SOA/M6/S/116-126						
		f. Bevel gear		SOA/M6/S/116-126						
		g. Riverted gear		SOA/M6/S/116-126						
		h. Simple and compound train		SOA/M6/S/116-126						
		i. Epicyclic gear train		SOA/M6/S/116-126						
ii.	Gear ratios, reduction and multiplication gear system, driven and driving gear, idler gears and mesh patterns	ii. Undrstanding terms :	2							
		a. Gear ratio		SOA/M6/S/116-126A						
		b. Reduction & multiplication gear system		SOA/M6/S/116-126B						
		c. Driven & driving gear		SOA/M6/S/116-126C						
		d. Idler gears & mesh patterns		SOA/M6/S/116-126 D						
iii.	Belts and pulleys chains and sprokets	iii. Different types of belts and pulleys, chain & sprocket and their uses	1	SOA/M6/S/127-131	2					

MODULE - 6 : MATERIALS AND HARDWARE
SEMESTER : THIRD

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
10.	[6.10] Control cables			SOA/M6/S/131-137	1					
	1. Types of cables	1. Different types of control cables	1							
	2. End fittings, turn buckles and compensation devices	2 a. Cable end fittings (AN663-AN668)	2			1	13.	To know practically how swaging is carried out on control cables	7	ON AIRCRAFT
		b. Turn buckles & compensation devices								
	3. Pulleys and cable system components	3. Pulleys & cable system components								
	4. Bowden cables	4. Bowden cables								
	5. Aircraft flexible control system	5. Aircraft flexible control system								
11.	[6.11] Electrical cables control connectors				2					
	Cable types, construction and characteristics	a. Types of electrical cables	1	SOA/M6/S/138						
		b. Cable constructions								
		c. Cable characteristics								
	High tension and co-axial cables	a. High tension cable	0.5		2					
		b. Co-axial cable		SOA/M6/S/139		2	14.	To acquaint with various parts of co-axial cable	7	ON AIRCRAFT
	Crimping	Crimping	0.5	SOA/M6/S/140	2					
	Connector types, pins, plugs, sockets, insulators, current and voltage rating, coupling, identification codes	a. Types of connectors	2	SOA/M6/S/141	2					
		b. Current and voltage rating								
		c. Coupling								
		d. Identification code	7	SOA/M6/S/141		2	15.	To acquaint with identification code of cables	7	ON AIRCRAFT
								TOTAL NO. OF PRACTICAL HRS. IN LAB	24	
								TOTAL NO. OF PRACTICAL HRS. ON AIRCRAFT	36	
								TOTAL NO. OF PRACTICAL HRS. IN CLASS ROOM	00	
								TOTAL NO. OF PRACTICAL HRS. IN AIR INDIA	00	
		TOTAL NO. OF HRS. (T)	90					TOTAL NO. OF HRS. (P)	60	

MODULE - 13 : AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (CN)**SEMESTER : THIRD****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	FACILITIES FOR IDENTIFICATION	LOCATION
					THEORY	PRACTICAL					
	CN - I										
	[13.4] Communication/Navigation (ATA23/34)				3						
1.	* Fundamentals of radio wave propagation, antennas, transmission lines, communication, receiver and transmitter	1. Fundamentals of radio wave (EM)	20								
		Effects of environment									
		2. Propagation of waves									
		a. Ground waves		SOA/M13/S/1							
		b. Sky waves		SOA/M13/S/2							
		c. Space waves									
		d. Tropospheric scatter propagation		SOA/M13/S/3							
		e. Extra terrestrial communication									
		3. Antennas		SOA/M13/S/4							
		a. Basic consideration									
		b. Wire radiators in space									
		c. Terms and definitions									
		d. Effects of ground on antennas									
		e. Antenna coupling at medium frequencies									
		f. Directional high frequency antennas									
		g. UHF and microwave antennas				3	1.	Demonstration, familiarization of maintenance, removal & repair of (#) a. Directional HF antennas	3		AIR INDIA
		h. Wide band and special purpose antennas						b. UHF & microwave antennas.			
		4. Transmission lines				3	2.	To observe effects upon a transmission line when terminated in a short circuit, an open circuit & on impedance equal to its characteristics impedance. (#)	6		LAB
		a. Fundamentals of transmission lines									
		b. Losses in transmission lines									

MODULE - 13 : AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (CN)**SEMESTER : THIRD****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	FACILITIES FOR IDENTIFICATION	LOCATION
					THEORY	PRACTICAL					
		c. Standing waves									
		d. Standing wave ratio									
		e. Transmission line components									
		5. Communication system				3	3.	Demonstration and familiarization of various stages of communication system operation, function, measurement, experiment, testing of its sub-assemblies & their troubleshooting practices for (#)	6		LAB
		a. Block diagram		SOA/M13/S/5				a. Transmitter			
		b. Transmitter		SOA/M13/S/6				b. Demodulation			
		c. Receiver		SOA/M13/S/7				c. AM receiver			
		d. Modulation						d. FM receiver.			
2.	* Working principle of very high frequency (VHF) communication system	1. Basic principle	8								
		2. Installation		SOA/M13/S/8		3	4.	To become acquaint with selcal equipment and VHF communication, installation characteristics, ramp testing and maintenance. (#)	12		LAB/ AIR INDIA
		3. Control and operation									
		4. Block diagram		SOA/M13/S/9							
3.	* Working principle of high frequency communication system	1. Basic principle	8			3	5.	To become acquaint with installation, block diagram and ramp testing maintenance of HF communication (#)	12		LAB/ AIR INDIA
		2. Installation		SOA/M13/S/10							
		3. Controls and operation									
		4. Block diagram		SOA/M13/S/11							
4.	* Working principles of audio integrating system (AIS)	1. Introduction	10	SOA/M13/S/12		3	6.	Demonstration AIS, operation, function, typical performance levels & specification. Installation & interface with other aircraft system (#)	11		LAB/ AIR INDIA
		2. Service interphone		SOA/M13/S/13				a. Service interphone			
		3. Cabin interphone		SOA/M13/S/14				b. Testing & trouble shooting audio system.			
		4. Flight interphone		SOA/M13/S/15				c. Testing battery power supplies & condition.			

MODULE - 13 : AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (CN)**SEMESTER : THIRD****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	FACILITIES FOR IDENTIFICATION	LOCATION
					THEORY	PRACTICAL					
		5. Passenger address		SET/M13/S/16				d. Passenger addressing system.			
		6. Passenger entertainment system (PES)		SET/M13/S/17							
		7. Gound crew call system		SET/M13/S/17							
5.	* Working principles of emergency locator transmitters (ELT)	1. Introduction	5			3	7.	Understanding of ELT, Working of its various subassemblies and battery system (#)	3		AIR INDIA
		2. Testing for ELT									
		3. Service for ELT									
6.	* Working principles of cockpit voice recorder (CVR)	Cockpit voice recorder	5	SET/M13/S/18		3	8.	Demonstration of CVR system, its sub assemblies, connection power supplies, control and indication and system testing in aircraft. (#)	3		AIR INDIA
7.	* Working principle of very high frequency omnidirectional range (VOR)	1. Introduction	8			3	9.	To demonstrate of VOR equipment, its various subassemblies, connection and power supplies, installation, aerial system, output and ramp testing (#)	3		AIR INDIA
		2. Basic principles									
		3. Block diagram		SET/M13/S/19							
8.	* Working principle of automatic direction finding (ADF)	1. Introduction	8								
		2. Basic principle				3	10.	To demonstrate ADF equipment, its various subassemblies, connection and power supplies, installation, sources of system error (#)	5		F-27/ AIR INDIA
		a. Loop antenna		SET/M13/S/20							
		b. Sense antenna									
		3. Simplified block diagram operation		SET/M13/S/21		3	11.	Demonstration of composite field pattern created by loop and sense antenna, control and operation , characteristics, calibration and testing or ramp (#)	2		F-27
		4. Installation									

MODULE - 13 : AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (CN)**SEMESTER : THIRD****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	FACILITIES FOR IDENTIFICATION	LOCATION
					THEORY	PRACTICAL					
9.	* Working principle of instrument landing system (ILS)	1. Introduction	8			3	12.	Demonstration of ILS system, its various subassemblies, connection and power supplies, installation and characteristics and ramp testing (#)	4		F-27/ AIR INDIA
		2. Basic principle						a. Landing aid representation.			
		3. Block diagram		SET/M13/S/22							
		4. Installation									
		5. Controls and operation		SET/M13/S/23							
10.	* Working principle of microwave landing system (MLS)	1. Introduction	8			3	13.	Understanding of MLS, working of its various subassemblies and battery system (#)	2		AIR INDIA
		2. Basic principle		SET/M13/S/24							
		3. Block diagram		SET/M13/S/25							
11.	* Working principle of distance measuring equipment (DME)	1. Introduction	8			3	14.	To demonstrate the DME system, its subassemblies, connections, power supplies, radiation patterns and indications and ramp testing. (#)	4		INDIA
		2. Basic principle		SOA/M13/S/26				a. Interrogation			
		3. Simplified block diagram		SOA/M13/S/27				b. Installation			
		4. Controls and operation		SOA/M13/S/27				c. Controls & operations			
12.	* Working principle of very low frequency and hyperbolic navigation (VLF/OMEGA)	1. General principles	10			3	15.	Understanding of OMEGA navigation, its subassemblies working, connection, power supplies, control and operation (#)	8		LAB/ AIR INDIA
		a. Continuous wave hyperbolic principle		SOA/M13/S/28							
		b. Pulsed hyperbolic principle		SOA/M13/S/29							
		c. Continuous wave rho rho & rho-rho-rho system									
		d. Comparison of system									
		2. Omega navigation system									
		a. Omega station and broadcast pattern									
		b. Propagation									
		c. Position fixing		SOA/M13/S/30							
		d. Rate aiding									

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S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	FACILITIES FOR IDENTIFICATION	LOCATION
					THEORY	PRACTICAL					
13.	* Working principle of Doppler navigation	1. Introduction	20			3	16.	Understanding of doppler navigation, working of its various subassemblies, connection, power supplies control and indication. (#)	8		LAB/ AIR INDIA
		2. Doppler effect									
		3. Antenna mechanisation									
		4. Doppler spectrum									
		5. Beam geometry		SOA/M13/S/31							
		6. Transmitter frequency									
		7. Block diagram operation		SOA/M13/S/32							
		8. Controls and operation									
14.	* Working principle of area navigation, RNAV system	1. Generalize area navigation system	8	SOA/M13/S/33							
		2. VOR/DME based RNAV principle		SOA/M13/S/34							
15.	* Working principle of global positioning system (GPS); global navigation, Satellite system	1. Introduction	8			3	17.	To demonstrate GPS components	8		LAB/ AIR INDIA
		2. Space segment		SOA/M13/S/35-36							
		3. Control segment									
		4. User segment									
		5. Doppler navigation system		SOA/M13/S/36							
16.	* Air traffic control transponder, secondary surveillance radar	1. Introduction	8			3	18.	To demonstrate air traffic control transponder, its subassemblies, connection, power supplies, control and indication (#)	2		AIR INDIA
		2. Basic principles									
		3. Installation									
		4. Controls and operation									
		5. Secondary surveillance radar		SOA/M13/S/37							

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SEMESTER : THIRD

STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	FACILITIES FOR IDENTIFICATION	LOCATION
					THEORY	PRACTICAL					
17.	* Traffic alert and collision avoidance system (TCAS)	1. Introduction	5			3	19.	a. To demonstrate the components of TCAS (#) b. BITE check and fault analysis including trouble shooting on aircraft "TCAS".	2		AIR INDIA
		2. TCAS theory of operation		SOA/M13/S/38			20.	BITE check and fault analysis including trouble shooting on aircraft VHF communication system.	2		AIR INDIA
							21.	BITE check and fault analysis including trouble shooting on aircraft audio intergeneration system.	2		AIR INDIA
18.	(13.4) Weather avoidance radar (ATA 23/34)	1. Introduction	10		3		22.	BITE check and fault analysis including trouble shooting on aircraft "ADF" system.	2		AIR INDIA
		2. Weather radar					23.	BITE check and fault analysis including trouble shooting on aircraft instrument landing system.	2		AIR INDIA
		a. Basic principle		SOA/M13/S/28			24.	BITE check and fault analysis including trouble shooting on aircraft radio altimeter system.	2		AIR INDIA
		3. Choice of characteristic and features					25.	Testing and fault analysis including trouble shooting on Aircraft "ATC" transponder system.	2		AIR INDIA
		4. Installation					26.	Testing and fault analysis including trouble shooting of aircraft "GPWS".	2		AIR INDIA
		5. Controls					27.	Testing and maintenance of flight director system fault analysis including trouble shooting.	2		AIR INDIA
		6. Operation		SOA/M13/S/29			28.	BITE check and fault analysis including trouble shooting on aircraft R-NAV, INS system.	2		AIR INDIA
		7. Block diagram operation		SOA/M13/S/30			29.	BITE check and fault analysis including trouble shooting on aircraft Doppler navigation system.	2		AIR INDIA
		8. Digital weather radar					30.	BITE check and fault analysis including trouble shooting on aircraft flight management system.	2		AIR INDIA
		9. Application for weather radar					31.	BITE check and fault analysis including trouble shooting on aircraft weather radar system.	2		AIR INDIA
		10. Weather radar characteristics					32.	Calibration of magnetic Direction Indicator.	3		AIR INDIA
19.	Inertial navigation system INS		5								
20.	ARINC communication & reporting		5								
21.	Radio Altimeter		3								
22.	Cabin System (ATA 44)		11								
		1. Introduction									
		2. Data/Radio communication		SOA/M13/S/31			33.	Demonstration of various stage of radio communication	2		AIR INDIA
		3. Access to pre-departure/departure reports									
		4. E-mail/Intranet/ internet Access									
		5. Passenger database									

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S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	FACILITIES FOR IDENTIFICATION	LOCATION
					THEORY	PRACTICAL					
1.	[14.1] Turbine Engines										
a.	Constructional arrangement and operation of turbojet, turbofan, turboshaft and turbopropeller engines	1. Principle and methods of jet propulsion	1		1						
		2. Types of gas turbine engines, limitations and variation in designs	1	SOA/M14/S/1-4							
		3. Differences between various type of engines	1								
		4. Constructional details of gas turbine engines									
		a. Inlet ducts and entry guide vanes	1	SOA/M14/S/5							
		b. Compressors:		SOA/M14/S/6-9		1	1.	(a) To demonstrate the functioning of centrifugal compressors.	1		LAB
	(b) To demonstrate the functioning of axial flow types	i. Centrifugal types	1					(b) To demonstrate the functioning of axial flow types.			LAB
		ii. Axial flow types	2			1	2.	To demonstrate the operation of combustion chambers	1		LAB
		c. Combustion chambers	2	SOA/M14/S/10-13		1	3.	(a) To demonstrate the functioning of turbine nozzle guide vanes	1		LAB
		d. Turbine nozzle guide vanes and turbines	1	SOA/M14/S/14-16		1		(b) To demonstrate the operations of exhaust cone & propelling nozzle.			LAB
		e. Exhaust cone and propelling nozzle	1	SOA/M14/S/17-18		1	4.	(a) Engine high energy igniter units. (b) Safety precautions.	1		LAB
		f. Thrust reversers	1	SOA/M14/S/19-22							
		g. Accessories gear box and accessories	1	SOA/M14/S/22A							
		h. After burner	1	SOA/M14/S/22B							
		5. Materials for gas turbine engines	1								
		6. Performance and factors effect the thrust of gas turbine engine	1								
		7. Starting and ignition systems				1					
		a. Methods of starting	1	SOA/M14/S/23-26							
		b. Starting and ignition system of jet engines	1	SOA/M14/S/27-29							
		8. Ground running of gas turbine engine	1			1	5.	To demonstrate ground running of gas turbine engine.	3		AIR INDIA
		9. Lubrication systems of gas turbine engines	1	SOA/M14/S/30-32							
		10. Ventilation and cooling of gas turbine engine	1	SOA/M14/S/33							

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S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	FACILITIES FOR IDENTIFICATION	LOCATION
					THEORY	PRACTICAL					
b.	Electroic engine control and fuel metering systems (FADEC)	1. Electronic engine control	2	SOA/M14/S/34-36	2						
		2. Fuel control systems									
		a. Fuel pump and its control systems	2	SOA/M14/S/37-38							
		b. Pressure control system	2	SOA/M14/S/39							
		c. Flow control system	2	SOA/M14/S/40							
		d. Combine acceleration and speed control	1	SOA/M14/S/41							
		e. Fuel burners and additional controls	1	SOA/M14/S/41A							
	* Turbo propellers	1. Introduction, and forces acting on propeller during operation	1								
		2. Propeller balance and types of propellers	2	SOA/M14/S/42-44							
		3. Propeller controls				2	6.	To demonstrate the operation of propeller controls	3		AIR INDIA
		a. Constant speed unit	1	SOA/M14/S/45							
		b. Propeller control unit	2	SOA/M14/S/46							
		4. Fine pitch stops, feathering, unfeathering reversing and 'Beta' controls	2								
		5. Electrically operated propellers	2								
		6. Anti-icing systems of gas turbine engines and propellers	2	SOA/M14/S/47-49							
2.	[14.2] Engine Indicating System (ATA 77)				2						
	* Exhaust gas temperature/interstage turbine temperature	1. Types of probes	5	SOA/M14/S/25		2	7.	To demonstrate constructional details of exhaust gas temperature gauge	1		LAB
		2. Location of probes		SOA/M14/S/25							
		3. Indicators		SOA/M14/S/26							

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STREAM : AVIONICS

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	FACILITIES FOR IDENTIFICATION	LOCATION
					THEORY	PRACTICAL					
	* Engine speed	1. RPM measurement	4			2	8.	To demonstrate dismantling, inspection and reassembling of ESI generator. (AC & DC) (#)	1		LAB
		2. Generator and indicator system		SOA/M14/S/27							
		3. Percentage RPM indicator		SOA/M14/S/28		2	9.	To demonstrate dismantling, inspection and reassembling of RPM gauge	1		LAB
		4. Servo operated indicator		SOA/M-14/S/29							
		5. Tacho probe and indicator system		SOA/M14/S/30-31		2	10.	To carry out calibration check of tacho generator and gauge (#)	1		LAB
	* Engine thrust indicator, engine pressure ratio, engine turbine discharge pressure or jet pipe pressure system	1. Percentage thrust indicator	4	SOA/M14/S/32		2	11.	To demonstrate the constructional details of engine thrust indicator	1		AIR INDIA
		2. Engine pressure ratio		SOA/M14/S/33							
		3. Engine turbine discharge pressure indicator		SOA/M14/S/34							
	* Oil pressure and temperature	1. Pressure measurement (Electrical Type)	4	SOA/M14/S/35		2	12.	Strip inspection, and reassembling of electrically operated ratio meter type pressure gauge.	2		LAB
		2. Indicating system		SOA/M14/S/36							
		3. Pressure switches		SOA/M14/S/37							
	* Fuel pressure, temperature and flow	1. Fuel pressure gauge	4	SOA/M14/S/47			13.	To dismantle, inspect and reassemble the fuel flow meter gauge (#)	1		LAB
		2. Fuel temperature indicator					14.	(a) To explain and demonstrate the principle of operation of fuel flow meter gauge (#)	1		LAB
		3. Fuel flow measurement		SOA/M14/S/48				(b) To demonstrate testing of fuel flow meter gauge (#)			LAB
		a. Basic system									
		b. Integrated fuel flow system		SOA/M14/S/49							

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S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	FACILITIES FOR IDENTIFICATION	LOCATION
					THEORY	PRACTICAL					
	* Manifold pressure	1. Manifold pressure gauge	2	SOA/M14/S/50		2	15.	(a) To demonstrate constructional details of manifold pressure gauge	1		LAB
								(b) To demonstrate the constructional details of torque pressure indicator			
	* Engine torque, propeller speed	1. Desynn torque pressure indicating system	2	SOA/M14/S/51 & 33		2	16.	Engine speed synchronising gauge : examination and determination of principle relating the gauge. (#)	1		LAB
		2. Synchro torque pressure indicating system		SOA/M14/S/52			17.	Testing of fuel metering system (FADEC)	3		AIR INDIA
							18.	Performance checking of engine electronic display indicators in cockpit	3		AIR INDIA
							19.	Parameters monitoring during engine starting using APU mode	3		AIR INDIA
							20.	Inspection of engine ignition systems and its components maintenance	3		AIR INDIA
							21.	Removal and installation of aircraft engines	3		AIR INDIA
							22.	Servicing and adjustment of propeller governor	3		AIR INDIA
							23.	Replacement of FCU and its adjustments	3		AIR INDIA
							24.	Cleaning and replacement of engine filters	2		AIR INDIA
								TOTAL NO. OF PRACTICAL HRS. AT LAB	14		
								TOTAL NO. OF PRACTICALS ON AIRCRAFT	00		
								TOTAL NO. OF PRACTICALS IN CLASS ROOM	00		
								TOTAL NO. OF PRACTICALS IN AIR INDIA	30		
		TOTAL NO. OF HRS. (T)	68					TOTAL NO. OF HRS. (P)	44		

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SEMESTER : FOURTH

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	IS-I									
	(13.8) Instrument System (ATA-31)				2					
1.	* Compass system	1. Direct reading magnetic compass	7			2	1.	a. To demonstrate the constructional details of direct reading compass b. To demonstrate the procedure of compass swinging (#)	1	LAB
	b. To demonstrate the procedure of compass swinging (#)	a. Magnetic properties		SOA/M13/S/1						
		b. Hard and soft iron		SOA/M13/S/1						
		c. Magnetic variation		SOA/M13/S/2		2	2.	a. To carry out compass swinging and compensation (#) b. To prepare deviation correction card (#)	1	LAB
		d. Magnetic dip		SOA/M13/S/2		2	3.	To carry out friction and damping test of magnetic compass (#)	3	LAB & IN AIRINDIA
		2. Types of DR compass		SOA/M13/S/3						
		a. Construction				2	4.	To demonstrate and examine the remote reading compass and functioning (#)	5	LAB & IN AIRINDIA
		b. Liquid damping				2	5.	To demonstrate partial dismantling, inspection and reassembly of remote reading compass system (#)	5	LAB & IN AIRINDIA
		c. Acceleration & turning error		SOA/M13/S/4						
		3. Remote reading compass				2	6.	To demonstrate the constructional details of flight data recording system	3	LAB & IN AIRINDIA
		a. Flux detector construction and function		SOA/M13/S/5						
		b. Gyroscope and indicator monitoring		SOA/M13/S/6						
		c. Heading indicator		SOA/M13/S/7						
		d. Modes of operating compass system		SOA/M13/S/7-8		2	7.	To demonstrate and identify GPWS equipment its subassemblies, connection, antenna, power supply, CRT displays and mapping a. GPWS modes b. Interface with other aircraft systems. c. Future trends.	4	IN AIRINDIA
		e. Radio magnetic indicator		SOA/M13/S/9						
2.	* Flight data recording system	1. Accelerometer and fatigue meter	7							
		a. Basic accelerometer principle		SOA/M13/S/10						
		b. Fatigue meter		SOA/M13/S/11						
		2. Flight data recorder		SOA/M13/S/12		2	8.	To demonstrate the constructional details of flight data recording system	4	IN AIRINDIA
		a. Parameter selected								
		b. Methods of recording		SOA/M13/S/13						
		3. Data recovery and analysis								
		4. Protection and location of flight data recorder								
		5. Aircraft integrated data system		SOA/M13/S/14						

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SEMESTER : FOURTH

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
3.	* Ground proximity warning system	1. Introduction	3	SOA/M13/S/15						
		2. Basic principle				3	9.	To demonstrate installation of auto pilot component in aircraft/simulator (#)	5	ON AIRCRAFT & IN AIRINDIA
		3. GPWS modes								
		4. Basic input/output diagram of GPWS		SOA/M13/S/16						
		5. Future trends		SOA/M13/S/17						
4.	* Electronic flight instrument system	1. Units of a system	8	SOA/M13/S/28						
		a. Display unit		SOA/M13/S/29						
		b. Symbol generator		SOA/M13/S/30						
		c. Control panel		SOA/M13/S/31						
		d. Remote light sensor								
		2. Display presentation								
		a. EADI		SOA/M13/S/32						
		b. EHSI		SOA/M13/S/33						
		c. Failure annunciation								
		3. Data source selection								
		4. Display of air data		SOA/M13/S/34						
5.	[13.4] Communication/Navigation (ATA 23/24)				3					
	* Working principle of flight director system (FDS)	1. Introduction and component of FDS	6	SOA/M13/S/18						
		2. ADI operation		SOA/M13/S/19-20		3	10.	To examine the components of autopilot system (#)	5	ON AIRCRAFT & IN AIRINDIA
		3. HSI operation		SOA/M13/S/21-27						
6.	* Inertial navigation system	1. Inertial navigation system	9							
		a. Introduction								
		b. Definition		SOA/M13/S/35						
		c. Fundamental principle		SOA/M13/S/36						
		d. Gyro stabilized platform								
		e. Gimballed platform arrangement		SOA/M13/S/37						
		f. INS operation								

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SEMESTER : FOURTH

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
7.	System operation : Electrical, fly by wire	a. Introduction	6							
		b. Advanced FBW concepts								
		c. Architecture		SOA/M13/S/38						
		d. Control laws								
		e. Pitch control		SOA/M13/S/39						
		f. Roll control								
		g. Control interceptor								
8.	* Working principle of flight management System	1. Introduction	6							
		2. Typical system								
		3. Flight management system		SOA/M13/S/40						
9.	[13.3] Autoflight (ATA 22)									
	* Fundamentals of automatic flight control including working principles and current terminology	1. The role of AFCS	5							
		2. Definitions				3	11.	To demonstrate the dismentling, inspection & reassembling of autopilot units (#)	5	ON AIRCRAFT & IN AIRINDIA
		3. Components of AFCS		SOA/M13/S/41		3	12.	To examine and testing of elements of autopilot, automatic flare and automatic landing system (#)	4	IN AIRINDIA
		4. Fundamentals of automatic control		SOA/M13/S/42		3	13.	a. To acquaint with various types of tools used in instrument workshop. b. To demonstrate the constructional details of u-tube manometer (#)	1	LAB
10.	* Command signal processing	1. Signal processing	5	SOA/M13/S/43						
		2. Limiting								
		3. Synchronising		SOA/M13/S/44						
		4. Demodulation								
		5. Gain and gain programming								
		6. Feedback								
		7. Integration								
		8. Data transfer								

MODULE - 13 : AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (IS)
SEMESTER : FOURTH

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
11.	[13.3] Auto flight [ATA 22]* Modes of operation; Roll, pitch & yaw channels	1. Altitude hold	3	SOA/M 13/S/45						
		2. Airspeed hold								
		3. Mach hold								
		4. Vertical speed selection and hold		SOA/M 13/S/46						
		5. Heading hold								
12.	* Yaw damper	1. Yaw damper system	3	SOA/M 13/S/47						
13.	* Stability augmentation system in helicopter	1. Stability augmentation system in helicopter (SAS)	3	SOA/M 13/S/48						
		a. Pilot commanded inputs								
		b. Retriming								
		c. Stability and control augmentation system								
14.	* Automatic trim control	1. Automatic trim control	2							
15.	* Autopilot navigation aids interface	1. ILS coupling	3	SOA/M 13/S/49		3	14.	To demonstrate maintenance checking of pitot head & static vents (#)	2	LAB
		2. VOR coupling		SOA/M 13/S/50				a. Security of attachment to instrument panel.		
								b. Security of pressure and electrical connections.		
16.	* Auto throttle system	1. Operating modes	2	SOA/M 13/S/51				c. Evidence of craking of cases, bezel mounting, flanges and coverglasses. The latter should be carefully inspected as cracks caused by glancing blows struck by safety harness fittings head sets, etc. are often difficult to detect.		
		2. Take off modes		SOA/M 13/S/52				d. Checking of dial markings, counters and pointers for legibility, discoloration and flaking.		
		3. Speed control modes		SOA/M 13/S/53				e. Checking of coloured operational markings.		
		4. Go around modes						f. Presence of moisture or water inside the cover glass or on the dial.		
								g. Functioning and smoothness of pointer operation during leak testing of pitot static system.		
17.	* Automatic landing system; principles and categories	1. Fundamental landing requirement	2					h. Checking of pointer direction and that pitot and static lines are connected to their respective instrument connection.		
		2. ICAO categorisation		SOA/M 13/S/54				i. The zero setting of pointers must also be checked and in particular this applies to altimeters and vertical speed indicators.		
								j. To carry out pitot-static leak check		
18.	* Modes of operation, approach, glideslope, land; go-around	1. Automatic landing sequence	1	SOA/M 13/S/55						
19.	* System monitors and failure conditions	1. Display presentation	2							
		2. Failure annunciation								
20.	* Instrument warning systems including master warning systems and centralised warning panels	1. Warning System	2							
		2. Display of warning								

MODULE - 13 : AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (IS)**SEMESTER : FOURTH**

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	IS-II									
	[13.8] Instrument system (ATA 31) Continued from S.No. 4.				2					
21.	* Classification	1. Classification of instrument system.	2							
22.	* Atmosphere	1. Different layers of atmosphere	2	SOA/M13/S/56						
		2. Atmospheric pressure								
		3. Atmospheric temperature								
		4. Standard atmosphere								
23.	* Terminology	1. Definition of various terms used in instrument system	5			2	15.	a. To demonstrate dismantling, inspection and reassembling of an altimeter (#) b. To carry out calibration checks of altimeter (#)	1	LAB
		2. Instrument elements		SOA/M13/S/57						
		a. Lever mechanism		SOA/M13/S/58						
		b. Rod mechanism		SOA/M13/S/59						
		c. Gears		SOA/M13/S/60						
		d. Hair spring		SOA/M13/S/60						
		e. Temperature compensation		SOA/M13/S/61						
		3. Instrument display and panels layout								
		a. Quantitative display		SOA/M13/S/62						
		b. Digital display		SOA/M13/S/63						
		c. Qualitative display		SOA/M13/S/64						
		d. Director display		SOA/M13/S/65						
		4. Conversion of measuring units from one system to another.								
24.	* Pressure measuring devices and systems	1. Method of measuring pressure	3							

MODULE - 13 : AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (IS)**SEMESTER : FOURTH**

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		a. Absolute pressure								
		b. Gauge pressure								
		c. U-tube manometer		SOA/M13/S/66		2	16.	a. To demonstrate the constructional detail and calibration of servo altimeter (pressure transducer) (#) b. To demonstrate dismantling, inspection and reassembling of vertical speed indicator. (#)	3	LAB & AIRINDIA
		d. Pressure/weight balancing		SOA/M13/S/67						
		2. Elastic pressure sensitive elements								
		a. Diaphragm		SOA/M13/S/68						
		b. Capsule		SOA/M13/S/69						
		c. Bellows		SOA/M13/S/70						
		d. Bourdon tube		SOA/M13/S/71						
25.	* Pitot static system	1. Pitot static layout	5	SOA/M13/S/72		2	17.	a. To carry out calibration check of VSI b. To demonstrate dismantling, inspection and reassembling of air speed indicator (#)	1	LAB
		a. Pitot pressure								
		b. Pitot-static probes		SOA/M13/S/73						
		c. Static vents		SOA/M13/S/74						
		d. Heating circuit arrangement		SOA/M13/S/75						
		e. Position error								
		f. Location of probes and static vents		SOA/M13/S/76						
		g. Alternate pressure source		SOA/M13/S/77						
		h. Drain (moisture traps)		SOA/M13/S/78						
26.	* Altimeters	1. Aneroid barometer and altimeter	5	SOA/M13/S/79		2	18.	a. To carry out the calibration check of airspeed indicator (#) b. To demonstrate dismantling, inspection and reassembling of mach meter (#)	½	LAB

MODULE - 13 : AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (IS)
SEMESTER : FOURTH

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		2. Altimeter dial presentation		SOA/M13/S/80		2	19.	a. To carry out the calibration check of mach meter (#) b. To demonstrate the construction of vaccum pump	½	LAB
		3. Barometric pressure setting		SOA/M13/S/81						
		4. Q codes for altmeter setting		SOA/M13/S/82						
		5. Maintenance and functional testing and trouble shooting of altimeter								
		6. Servo altimeter		SOA/M13/S/83		2	20.	a. To demonstrate the partial dismantling, strip inspection and reassembling of mechanically operated gauge (#) b. To calibrate mechanically operated pressure gauge with the help of dead weight tester (#)	½	LAB
27.	* Vertical speed indicators	1. Metering unit	2	SOA/M13/S/84		2	21.	a. To demonstrate the constructional detail of physical type (Vapour pressure) thermometer b. Demonstration on various kinds of temperature sensing units like fire & overheating detector etc. (#)	½	LAB
		2. Dial presentation		SOA/M13/S/85						
		3. Instantaneous vertical speed indicator (IVSI)		SOA/M13/S/86		2	22.	a. To demonstrate partial dismantling, inspection and reassembling and calibration of ratiometer type temperature gauge (#) b. To demonstrate cylinder head, Jet pipe temperature and other type thermocouple (#)	½	LAB
28.	* Air speed indicator	1. Air speed indicator (pneumatic)	5	SOA/M13/S/87		2	23.	Use of portable test kit for checking gas turbine power plant thermocouple installation (#)	4	AIRINDIA
		2. Pitot pressure								
		3. Air speed terminology		SOA/M13/S/88		2	24.	a. To examine and carry out the demonstration & operation of capacitance type fuel content gauge (#) b. To examine and carry out the demonstration and operation of desynn type fuel content gauge (#)	½	LAB
		4. Square law and its compensation		SOA/M13/S/89						
		a. Rocking lever/sector arm method		SOA/M13/S/89						
		b. Banana slot method		SOA/M13/S/90						
		c. Retard/tunning spring method		SOA/M13/S/90						
		5. Maintenance and functional testing and trouble shooting		SOA/M13/S/91						

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S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
29.	* Mach meter	1. Mach no. and critical mach no.	3	SOA/M13/S/92		2	25.	To dismentle, inspect, reassemble and testing of the capacitance type content gauge (#)	4	AIRINDIA
		2. Maintenance, functional and trouble shooting		SOA/M13/S/93		2	26.	a. To dismentle, inspect and reassemble the desynn type content gauge (#) b. To test the float type fuel quantity indicator operated by desynn system (#)	1	LAB
30.	* Altitude reporting/alerting system	1. Altitude alerting system	2	SOA/M13/S/94						
31.	* Air data computers	1. Analog ADC	5	SOA/M13/S/95						
		a. Transducer (force balance)		SOA/M13/S/96-97						
		b. Module operation								
		c. Failure warning								
		d. Indicators		SOA/M13/S/98-99						
		2. Digital ADC		SOA/M13/S/100						
32.	* Instrument Pneumatic System	1. Venturi system	3	SOA/M13/S/101						
		2. Vaccum pump system		SOA/M13/S/102		2	27.	a. Examination & demonstration of other types of miscellaneous instruments. b. To demonstrate partial dismantling inspection and re-assembling of air driven Artificial Horizon (#)	1	LAB
		3. Typical pump driven vaccum system		SOA/M13/S/102						
33.	* Direct reading pressure & temperature gauges	1. Mechanical type transmitting pressure gauge	3	SOA/M13/S/103		2	28.	To demonstrate partial dismantaling, inspection, reassembly of electrical driven Artificial Horizon (#)	½	LAB
		2. Vacuum gauge		SOA/M13/S/104		2	29.	To demonstrate partial dismantling inspection, reassembling of turn & bank indicator (pneumatic) (#)	½	LAB
		3. Mercury thermometer	2	SOA/M13/S/105						
		4. Vapour pressure thermometer		SOA/M13/S/106		2	30.	a. To demonstrate partial dismantling, inspection, reassembly of turn & bank indicator (electrical type) (#) b. To demonstrate dismantling, inspection and reassembling of directional gyro (#)	1	LAB

MODULE - 13 : AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (IS)**SEMESTER : FOURTH**

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
34.	* Temperature indicating system	1. Air temperature sensing	7	SOA/M13/S/107		2	31.	a. To carry out calibration check of Gyroscopic instruments on gyro turn table (#) b. To demonstrate the constructional details of engine vibration monitoring	1	LAB
		2. Air temperature indicator		SOA/M13/S/108		2	32.	Leak test on Pitot static system.	5	ON AIRCRAFT & IN AIRINDIA
		3. Indicating system								
		a. Variable resistance system								
		b. Sensor units		SOA/M13/S/109						
		c. Wheatstone bridge system		SOA/M13/S/110						
		d. Ratiometer system		SOA/M13/S/111						
		e. Thermo emf system				2	33.	Pre flight check on gyroscopic instruments (DG, AH & TSI).	4	IN AIRINDIA
		f. Thermo couple principles		SOA/M13/S/112						
		g. Types of thermocouple sensor		SOA/M13/S/113		2	34.	Compass swinging of DR and RR compass.	4	IN AIRINDIA
		h. Cold junction temperature compensation		SOA/M13/S/114						
		i. Various temperature compensation method								
		j. External circuit and resistance								
35.	* Fuel quantity indicating system	1. Capacitance type system	8			2	35.	Inspection/testing of angle of attack and stall warning systems.	1	ON AIRCRAFT
		a. Electrical capacitance		SOA/M13/S/115						
		b. Basic indicating system		SOA/M13/S/116						
		c. Effects of fuel temperature change		SOA/M13/S/117		2	36.	Inspection and maintenance of aircraft glass cockpit.	4	IN AIRINDIA
		d. Measurement of fuel quantity by weight				2	37.	Frictional check on auto Pilot system.	4	IN AIRINDIA
		e. Compensated indicating system		SOA/M13/S/118		2	38.	Servicing, testing and maintenance of automatic trim control.	4	IN AIRINDIA
		f. Densitometers		SOA/M13/S/119						
		2. Construction of probes								
		3. Location and connection of tank probes		SOA/M13/S/120		2	39.	Servicing, testing and maintenance of fly-by-wire system.	4	IN AIRINDIA
		4. Empty and full position adjustment		SOA/M13/S/121		2				
		5. Electronic display		SOA/M13/S/122						
		6. Fail-safe and test circuit								
		7. Totaliser indicator		SOA/M13/S/123		2				
						2	40.	Servicing, testing and maintenance of mach trim and yaw damper.	4	IN AIRINDIA

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SEMESTER : FOURTH

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
36.	* Gyroscopic principles	1. Gyroscope and its properties	5	SOA/M13/S/124						
		a. Rigidity		SOA/M13/S/125						
		b. Precession		SOA/M13/S/126						
		c. Determining the direction of precession		SOA/M13/S/127						
		2. References established by gyroscope (types of gyroscope)		SOA/M13/S/128						
		a. Horizontal axis gyroscope		SOA/M13/S/128						
		b. Vertical axis gyroscope		SOA/M13/S/128						
		3. Limitation of free gyroscope		SOA/M13/S/129						
		a. Apperent drift		SOA/M13/S/129						
		b. Real drift								
		c. Transport wander		SOA/M13/S/129						
		d. Gimbal lock		SOA/M13/S/130						
		e. Gimbal error		SOA/M13/S/130						
		4. Methods of operating gyroscopic flight instrument								
		a. Vaccum driven gyro		SOA/M13/S/131						
		b. Electrical driven gyro		SOA/M13/S/132						
37.	* Artificial horizon	1. Gyro horizon principle	5	SOA/M13/S/133		2	41.	Servicing, testing and maintenance of Air Data computers.	4	IN AIRINDIA
		2. Pneumatic type gyro horizon		SOA/M13/S/134						
		3. Electrical type gyro horizon		SOA/M13/S/132& 135						
		4. Standby attitude indicator		SOA/M13/S/135						
		5. Erection system (Mechanical)								
		a. Pendulous vane unit		SOA/M13/S/136		2	42.	On board maintenance/testing of instrument systems.	3	IN AIRINDIA

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SEMESTER : FOURTH

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		b. Ball type erection unit		SOA/M13/S/137						
		6. Erection system (Electrical)		SOA/M13/S/138						
		a. Torque motor and leveling switch system								
		b. Fast erection system		SOA/M13/S/139						
		c. Erection rate								
		7. Errors in artificial horizon								
		a. Acceleration & turning error		SOA/M13/S/140						
		b. Erection errors		SOA/M13/S/140						
38.	* Slip Indicator	1. Turn and bank indicator	3	SOA/M13/S/141		2	43.	Servicing, testing and maintenance of temperature indicating systems.	3	IN AIRINDIA
		a. Rate gyroscope		SOA/M13/S/141						
		b. Bank indication		SOA/M13/S/141						
		c. Typical pneumatic type		SOA/M13/S/142						
		d. Electrical type		SOA/M13/S/143		2	44.	Testing/adjustment on fuel quantity indicating systems.	3	IN AIRINDIA
		2. Turn co-ordinator		SOA/M13/S/144						
39.	* Directional Gyro	1. Pneumatically operated directional gyro	3	SOA/M13/S/145		2	45.	Servicing and maintenance of GPWS.	3	IN AIRINDIA
		a. Control of drift								
		b. Gimbal ring balancing								
		c. Erection devices				2	46.	Servicing and maintenance of Flight data Recorder.	3	IN AIRINDIA
		d. Gimbal errors		SOA/M13/S/146						

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SEMESTER : FOURTH

S.No.	DGCA SYLLABUS	THEORITICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
40.	* Stall warning and angle of attack indicating system	1. Angle of attack indicator	2	SOA/M13/S/147						
		2. Stall warning		SOA/M13/S/148						
		a. Stick pusher								
41.	* Vibration measurement and indication	1. Engine vibration monitoring	2	SOA/M13/S/149		2	47.	Servicing and maintenance of "EFIS"	3	IN AIRINDIA
42.	Glass cockpit	EICAS	2	SOA/M13/S/150						
		ECAM								
43.	[13.17] Oxygen	System layout: cockpit, cabin; sources, storage, charging and distribution ; supply regulation ; Indication and warnings	3	SOA/M13/S/151						
42.	[13.20] Integrated modular Avionics	a. Bleed Management	3							
	[ATA 42]	b. Air pressure control								
		c. Air ventilation & control								
		d. Avionics & cockpit ventilation control								
		e. Temperature control								
		f. Air Traffic communication								
		g. Avionics communication router								
		h. Electrical load management								
		i. Circuit Breaker Monitoring								
		j. Electrical system BITE								

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S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
1.	[13.5] Batteries Installation and operation	a. Location of battery in aircraft	1	SOA/M13/S/28	3	3	1.	Lead acid : checking of battery condition, adjustment of specific gravity of electrolyte, battery charging, capacity discharge, insulation test, safety precautions and overhaul procedure including leak test of cells (#).	1	LAB
		b. Battery connection	1	SOA/M13/S/29						
		c. Installation of battery in aircraft	2	SOA/M13/S/30		3	2.	Ni-Cd : checking of battery condition, determine state of charge, cell balancing, charging, checking of electrolyte level, insulation testing, safety precaution, cell replacement and deep cycling (#).	1	LAB
		d. Typical battery system	2	SOA/M13/S/31						
		e. Battery charging from external power	2	SOA/M13/S/32						
		f. On board battery charger	2	SOA/M13/S/33						
2.	a. DC Power generation	a. Fundamental principle of DC power generation	2	SOA/M13/S/34		3	3.	(a) To learn constructional details of DC generator	1	LAB
		b. Construction		SOA/M13/S/35		3		(b) To carry out dismantling, examination and re-assembly of DC generator (#).		LAB
		c. Classification of DC generator arrangement	2	SOA/M13/S/36		3	4.	To carry out strip inspection mica under cutting of commutator and to check for brush wear, brush spring loading and brush bedding (#).	1	LAB
		d. Generator characteristic	2	SOA/M13/S/37		3	5.	Current balancing, adjustment of dc power circuits on aircraft electrical system (#).	4	AIR INDIA
		e. Self excited shunt wound generator	2	SOA/M13/S/38						
		f. DC generator construction	2	SOA/M13/S/39		3	6.	To carry out testing of DC generator elements, armature testing continuity test on field coil armature shaft alignment & wear of ball races & housing (#)	1	LAB
		i. The Yoke		SOA/M13/S/40						
		ii. Interpole and compensating winding	2	SOA/M13/S/41						
		iii. Auxiliary interpole	1			3	7.	(a) To carry out reassembly and insulation test of generator (#)	1	LAB
		iv. Brush gear assembly	1	SOA/M13/S/42				(b) To carry out testing of generator and alternator on test rig (#)	1	LAB
		v. End frame	1	SOA/M13/S/43						
		g. Rectified power supply	1	SOA/M13/S/44		3				
		h. Generator/engine coupling	1	SOA/M13/S/45						
		i. Cooling of generator	1	SOA/M13/S/46						
		j. Brush wear	1							
		k. Armature reaction	2	SOA/M13/S/47						
		l. Commutation	2	SOA/M13/S/48						
		m. DC generator maintenance	2	SOA/M13/S/49						
		n. Trouble shooting	2							

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S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
	b. Electric motors	Starter generator construction	3	SOA/M13/S/50		3	8.	(a) Starter motor for piston and turbine aero engine, dismantling examination for condition and wear.	1	LAB
	Starter generator construction							(b) Check for brush gear and commutator, check for clutches and gear drive, reassembly (#)		LAB
						3	9.	Dismantling inspection reassembly and test of motors for fuel line pumps and wind screen wipers (#)	1	LAB
						3	10.	Linear and rotary actuators dismantling examination for condition and wear reassembly and bench testing. (#)	1	LAB
3.	AC Power generation	a. Cycle and frequency, RMS value	1	SOA/M13/S/51						
		b. Instantaneous and amplitude values	1	SOA/M13/S/52						
		c. Phasing and phase relationships	2	SOA/M13/S/53						
		d. Inter connection of phases	1	SOA/M13/S/54						
		e. AC Generator ratings	1							
		f. AC Generator construction	2	SOA/M13/S/55		3	11.	To learn constructional details of alternator	1	LAB
		g. Principle of aircraft alternator.	2	SOA/M13/S/56		3	12.	(a) To carry out dismantling, examination and reassembly of AC generator (#)	1	LAB
		h. Light aircraft alternator	2	SOA/M13/S/57				To carry out test on AC generator (#)		LAB
		i. Maintenance of alternator	2	SOA/M13/S/58						
		j. Aircraft alternator	2	SOA/M13/S/59						
		i. Alternator construction	2	SOA/M13/S/60						
		ii. CSD	2	SOA/M13/S/61		3	13.	To carry out removal of CSD from alternator and testing (#)	4	AIR INDIA
		k. Generator construction IDG	2	SOA/M13/S/62		3	14.	To carry out dismantling, inspection and overhauling of IDG generator (#)	4	AIR INDIA
		l. Field excitation of alternator	1	SOA/M13/S/63						
		i. Frequency wild generator	2	SOA/M13/S/64						
		ii. Air driven generator	1	SOA/M13/S/65						
4.	Emergency power generation	DC emergency								
		i. Transformer rectifier unit.	2	SOA/M13/S/66						
		ii. Operation/control and indicating and protection	2							

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S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		AC Emergency								
		a. A constant speed motor/generator	2							
		b. (CSM/G) including a hydraulic motor, AC generator	2							
		c. GCU and its operation	2							
5.	* Voltage regulation	1. Principle of voltage regulator	2	SOA/M13/S/1		3	15.	(a) Partial dismantling, followed by examination of carbon pile & other type of voltage regulators (#)	1	LAB
		a. Vibrating contact type regulator, current regulator	2	SOA/M13/S/2				(b) To learn overhaul procedure of voltage regulator correction of its basic setting and adjustment making (#)		
		b. Carbon pile voltage regulator	2	SOA/M13/S/3						
		c. Solid state voltage regulator	2	SOA/M13/S/4						
		d. Three unit regulator	2	SOA/M13/S/5						
		e. Voltage regulation of alternator	2	SOA/M13/S/6						
		f. Frequency wild	2	SOA/M13/S/7						
		g. Transistorised	2	SOA/M13/S/8						
		h. Magnetic amplifier regulator	2	SOA/M13/S/9-10						
6.	* Power distribution	Busbar system	2	SOA/M13/S/11						
		a. Wires & cables, routing of wires	3	SOA/M13/S/12		3	16.	(a) To learn about identification of cables & wires	1	LAB
		b. Special purpose cables	2	SOA/M13/S/13				(b) To become familiar with plugs & sockets		
		c. Earthing	1							
		d. Grounding	1							
		e. Cable termination	2	SOA/M13/S/14						
		f. Plugs & sockets and potting method	3							
		g. Electrical bonding	2	SOA/M13/S/15						
		h. Static discharge	2							
		i. Screening	1							
		j. Standardising of distribution	1	SOA/M13/S/16						

MODULE - 13 : AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (ES)**SEMESTER : FOUR****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
7.	* Inverters, transformer, rectifier	Power conversion								
		1. Equipment rectifiers	2	SOA/M13/S/17						
		a. Selenium rectifier	1	SOA/M13/S/18						
		b. Silicon rectifiers	1	SOA/M13/S/19						
		c. Silicon controlled rectifiers	1	SOA/M13/S/20						
		d. Rectifier circuit connections	2	SOA/M13/S/21		3	17.	Examination & practical overhaul of a wide range of miscellaneous electrical components such as transducers, magnetic amplifiers, rectifiers, transformers wheatstone bridge and other balancing devices and sensing elements (#)	1	LAB
						3	18.	Adherence of all testing in accordance with manufactures instruction for electrical circuit equipment (#)	1	LAB
		2. Transformer		SOA/M13/S/22						
		a. Principle of operation	1							
		b. Circuit connections	1	SOA/M13/S/23						
		c. Current transformer	1	SOA/M13/S/24						
		d. Auto transformer	1	SOA/M13/S/25						
		e. Transformer rating	1							
		f. Transformer rectifier	1	SOA/M13/S/26		3	19.	To learn constructional detail of transformer rectifier unit.	1	LAB
		g. Rotary converting equipment	1	SOA/M13/S/27		3	20.	Dismantling, examination and reassembly of electrical components including convertors, inverters, switch gear, heating units and actuators (#)	1	LAB
		h. Static inverter	2	SOA/M13/S/28		3	21.	Testing : checking of input & output voltages adjustment of frequency control.	1	LAB
						3	22.	To carry out inspection of static inverter, adjustment & testing of output voltage and frequency.	1	LAB
8.	* Circuit protection	Circuit protection devices								
		a. Fuse, current limiter	1	SOA/M13/S/29						
		b. Limiting resistor	1	SOA/M13/S/30						
		c. Circuit breaker	1	SOA/M13/S/31						
		d. Protection against reverse current	2			3	23.	Dismantling, examination & reassembly of cutout, solenoids & relays from various circuits, & thermal CB, reverse current relays.	1	AB

MODULE - 13 : AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS (ES)**SEMESTER : FOUR****STREAM : AVIONICS**

S.No.	DGCA SYLLABUS	THEORETICAL SYLLABUS	HRS	SLIDES No.	LEVEL OF KNOWLEDGE		S.No.	PRACTICAL SYLLABUS	HRS	LOCATION
					THEORY	PRACTICAL				
		e. Reverse current - cutout relay	1	SOA/M13/S/32		3	24.	Adjustmet and rig testing of cutouts relays (#)	4	AIR INDIA
		f. Switched reverse current relay	1	SOA/M13/S/33						
		g. reverse current - circuit breaker	2	SOA/M13/S/34		3	25.	Electromagnetic relays : inspection and closing of contacts setting and adjustment & milivolt drop test on test rig.	4	AIR INDIA
		h. Over voltage protection	1	SOA/M13/S/35		3	26.	To learn over/under voltage protection & over/under frequency protection	5	AIR INDIA
		i. under voltage protection	1							
		j. Over excitation and under excitation	2							
		k. Under and over frequency protection	2							
		l. Differential current protection	2	SOA/M13/S/36						
		m. Merz-price protection	2	SOA/M13/S/37						
9.	* External/Ground power	DC system	2							
		Three pin receptacle system	2	SOA/M13/S/38		3	27.	To carry out connection/disconnection practice of three pin receptacle system	5	AIR INDIA
		AC system								
		a. APU starting	2	SOA/M13/S/39						
		b. AC external power supply	2	SOA/M13/S/40						
		c. Auxiliary power unit	2	SOA/M13/S/41						
10.	[13.9] Light (ATA -33)				3					
	* External, Navigation, Taxing, Ice, Landing	External lighting	4	SOA/M13/S/42		3	28.	To perform external lighting on aircraft.	5	AIR INDIA
		a. Navigation								
		b. Anticollision		SOA/M13/S/43						
		c. Landing and taxing light		SOA/M13/S/44						
		d. Ice inspection								

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STREAM : AVIONICS

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