ALAGAPPA UNIVERSITY

(Accredited with A+ Grade by NAAC (CGPA: 3.64) in the Third Cycle,
Graded as Category-I University and granted autonomy by MHRD-UGC)

DIRECTORATE OF COLLABORATIVE PROGRAMMES

B.Sc. (Aircraft Maintenance Science)

Regulations and Syllabus

[For those who join the Course in July 2023 and after]

CHOICE BASED CREDIT SYSTEM

GENERAL INSTRUCTIONS AND REGULATIONS

B.Sc. Aircraft Maintenance Science conducted by Alagappa University, Karaikudi, Tamil Nadu through its Collaborative Institution **Nehru College of Aeronautics and Applied Sciences** at Kuniamuthur, Coimbatore.

Applicable to all the candidates admitted from the academic year 2023 onwards.

1. **Eligibility:**

   A pass in the Higher Secondary Examination (HSC) or an examination accepted as equivalent thereto by the Syndicate. Candidate for admission to **B.Sc Aircraft Maintenance Science** shall be required to **have passed qualifying examination** with Physics, Chemistry and Mathematics (PCM).

2. **For the Degree:**

   The candidates shall have subsequently undergone the prescribed programme of study in a institute for not less than three academic years, passed the examinations prescribed and fulfil such conditions as have been prescribed therefore.

3. **Admission:**

   Admission is based on the marks in the qualifying examination.

4. **Duration of the course:**

   The course shall extend over a period of Three years under semester pattern accounting to six semesters.

5. **Standard of Passing and Award of Division**:

   a. Students shall have a minimum of 40% of total marks of the University examinations in each subject. The overall passing minimum is 40% both in aggregate of Continuous Internal Assessment and external in each subject.
   b. The minimum marks for passing in each theory / Lab course shall be 40% of the marks prescribed for the paper / lab.
   c. A candidate who secures 40% or more marks but less than 50% of the aggregate marks prescribed for three years taken together, shall be awarded **THIRD CLASS.**
   d. A candidate who secures 40% or more marks but less than 60% of the aggregate marks prescribed for three years taken together, shall be awarded **SECOND CLASS.**
   e. A candidate who secures 60% or more of the aggregate marks prescribed for three years taken together, shall be awarded **FIRST CLASS.**
   f. Only Part-III subjects were considered for the ranking.
   g. The Practical / Project shall be assessed by the two examiners, by an internal examiner and an external examiner.

6. **Continuous internal Assessment:**
    a. Continuous Internal Assessment for each paper shall be by means of Written Tests, Assignments, Class tests and Seminars
    b. **25 marks** allotted for the Continuous Internal assessment is distributed for Written Test, Assignment, Class test and Seminars.
    c. Two Internal Tests of 2 hours duration may be conducted during the semester for each course / subject and the best marks may be considered and one Model Examination will be conducted at the end of the semester prior to University examination. Students may be asked to submit at least five assignments in each subject. They should also participate in Seminars conducted for each subject and marks allocated accordingly.
    d. Conductofthecontinuousinternalassessmentshallbetheresponsibilityoftheconcerned faculty.
    e. The continuous internal assessment marks are to be submitted to the University at the end of every year.
    f. The valued answer papers /assignments should be given to the students after the valuation is over and they should be asked to check up and satisfy themselves about the marks they have scored.
    g. All mark lists and other records connected with the continuous internal assessments should be in the safe custody of the institution for at least one year after the assessment.

7. **Attendance:**

    Students must have earned 75% of attendance in each course for appearing for the examination.
    Students who have earned 74% to 70% of attendance to be applied for condonation in the prescribed form with the prescribed fee
    Students who have earned 69% to 60% of attendance to be applied for condonation in the prescribed form with the prescribed fee along with the medical certificate
    Students who have below 60% of attendance are not eligible to appear for the examination. They shall re-do the semester(s) after completion of the programme.

8. **Examination:**

    Candidate must complete course duration to appear for the university examination. Examination will be conducted with concurrence of Controller of Examinations as per the Alagappa University regulations. **University may send therepresentatives as the observer during examinations.** University Examination will be held at the end of the each semester for duration of 3 hours for each subject. Certificate will be issued as per the AU regulations. **Hall ticket will be issued to the 1st year candidates and upon submission of the list of enrolled students along with the prescribed course fee subsequent 2nd and 3rd year hall tickets will be issued.**

9. Miscellaneous

a. Each student possess the prescribed text books for the subject and the workshop tools as required for theory and practical classes.

b. Each student is issued with an identity card by the University to identify his / her admission to the course

c. Students are provided library and internet facilities for development of their studies.

d. Students are to maintain the record of practical conducted in the respective laboratory in a separate Practical Record Book and the same will have to be presented for review by the University examiner.

e. Students who successful complete the course within the stipulated period will be awarded the degree by the University.

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10. Fee structure

Course fee shall be as prescribed by the University and 50% of the course fee should be disbursed to University. Special fees and other fees shall be as prescribed by the Institution and the fees structure must intimated to the University. Course fees should be only by Demand draft /NEFT and A U has right to revise the fees accordingly.

11. Other Regulations:

Besides the above, the common regulation of the University shall also be applicable to this programme.

Department of B.Sc. Aircraft Maintenance Science

VISION:

- To be the leader in aircraft maintenance Science through quality education and Training in emerging areas with a high degree of interpersonal skills and ethical responsibilities.
- To provide Aeronautical Education with nationally and internationally accepted qualifications by considering contemporary educational culture and values,
- To attain excellence and a global reputation in Aeronautical Education and Training.

MISSION:

- Prepare the students to have very good fundamental knowledge to meet the present and future needs of industries.
- Improve the technical knowledge of the students in tune with the current requirements through collaboration with industries and Training organizations.
- Make the students gain enough knowledge in various aspects of system integration.
- Motivate the students to take up jobs in national laboratories, aircraft manufacturing industries, aerospace industries, airline industries, MRO, AMO, Technical publication companies, and all other Aviation related and allied industries of our country.

GRADUATE ATTRIBUTES:

1. Graduates will demonstrate a comprehensive understanding of aircraft systems, structures, and components, showcasing their ability to perform maintenance, repairs, and inspections with a high level of technical expertise.
2. Graduates will exhibit strong analytical skills, enabling them to identify, diagnose, and resolve complex issues within aircraft systems, fostering a safe and efficient operational environment.
3. Graduates will prioritize safety above all else, adhering to industry standards, regulations, and best practices to ensure the highest level of aviation safety for passengers, crew, and aircraft.
4. Graduates will effectively communicate with team members, engineers, and other stakeholders, both verbally and in writing, to relay technical information and collaborate on maintenance tasks.
5. Graduates will exhibit leadership qualities by taking initiative, mentoring junior colleagues, and leading by example, thereby contributing to the professional growth of the aircraft maintenance industry.

P.E.O- Programme Education Objectives.

PEO 1	To acquire knowledge in Aircraft Maintenance Science and to work towards solving complex problems to excel in the professional career.
PEO 2	To Work effectively as an individual and as a team member with professional ethics, social and environmental concerns.
PEO 3	To provide exposure to the advancements in aircraft maintenance science and Training and related fields.
PEO 4	To gain competence and confidence to handle problems in theoretical and experimental aspects of various domains of aeronautical
PEO 5	To continue their professional development by utilizing educational and career-building opportunities through their employer, educational institutions, or professional bodies.

P.S.O-Programme Specific Objectives

PSO 1	To cultivate a high level of technical competence in aircraft maintenance procedures, encompassing inspection, repair, and servicing protocols. Acquire hands-on skills in utilizing advanced tools, equipment, and software relevant to the field, fostering the ability to diagnose, rectify, and prevent mechanical issues.
PSO 2	To demonstrate a meticulous understanding of aviation regulations and safety standards, including those outlined by aviation authorities such as FAA, EASA, and ICAO. Learn to apply these regulations rigorously in maintenance operations, ensuring a safe operating environment for aircraft and personnel.
PSO 3	To enhance critical thinking abilities by systematically approaching complex maintenance challenges. Acquire the capability to analyse symptoms, identify root causes, and formulate effective solutions in real-time scenarios, considering safety, efficiency, and regulatory aspects.
PSO 4	To foster the ability to collaborate effectively within maintenance teams, acknowledging diverse perspectives and harnessing collective strengths to achieve common goals. Additionally, develop leadership traits that can guide and inspire teams toward efficient and safe aircraft maintenance practices.
PSO 5	To cultivate a comprehensive awareness of the broader aviation industry, including its stakeholders, emerging technologies, and market trends. Develop networking skills to establish meaningful connections within the aviation community, opening doors to potential career opportunities and collaborations.

Program Outcome (POs)

On successful completion of B.Sc. (Aircraft Maintenance Science) program:	
PO 1	Students will develop a deep understanding of aircraft systems, encompassing avionics, power plants, structures, and control systems, enabling students to comprehend the intricacies of aviation technology.
PO 2	Students will Identify, formulate, review, and analyse complex engineering problems using the first principles of mathematics, and synthesis the information to provide valid conclusion.
PO 3	Students will design solutions for complex aircraft problems related to diagnose complex aviation issues and make informed decisions quickly, minimizing downtime and ensuring flight safety that meet the specified needs with appropriate consideration for public health and safety and the cultural societal and environmental consideration.
PO 4	Students will engage in investigations of complex problems including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
PO 5	Students will be aware of the emerging technologies used in aircraft to Create, Select, and apply appropriate techniques, resources, and IT tools including prediction and modelling in the field of Aeronautical Science.
PO 6	Students will apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Aircraft Maintenance practice.
PO 7	Students will understand the impact of Aeronautical solutions in societal and environmental contexts and demonstrate the knowledge in need for sustainable development.
PO 8	Foster a strong sense of ethics, integrity, and professionalism, emphasizing the importance of responsible conduct and ethical decision-making within the aviation industry.
PO 9	Cultivate the ability to work collaboratively within diverse teams of aviation professionals, promoting effective communication, leadership, and teamwork skills.
PO 10	Students will communicate their thoughts and ideas in writing effective reports and design documentation, making effective presentations, and giving and receiving clear instructions.
PO 11	Students will demonstrate knowledge and understanding of Aircraft Maintenance Science and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.
PO 12	Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

P.S.O-Program Specific Outcome

After the successful completion of B.Sc. in Aircraft Maintenance Science programme, the students are expected to:

PSO 1	Utilize the knowledge of Aircraft Maintenance Science in innovative, dynamic, and challenging environments for the design and development of new products.
PSO 2	Use the software package in the design, manufacturing, testing, and maintenance of aeronautical-based components and systems.
PSO 3	To work as a team member will be a main requirement in an industry or in any business enterprise and also play a role in the success of the organization.
PSO 4	To undertake research in the areas of aircraft maintenance, design requirements of aircraft, aero engine and demonstrate professional acumen in the development of aircraft Maintenance Science.
PSO 5	To exhibit professionalism in their chosen profession and adapt to current trends, technologies and industrial scenarios.

B.Sc. Aircraft Maintenance Science
Programme Structure

Part	Course Code	Courses	Name	T/P	Cr.	Hrs./ Week	Marks		Total
							Int.	Ext.	
			SEMESTER-I						
I	91311T/11H/ 11F/11M	T/OL	Tamil/ Other Languages-I	T	3	3	25	75	100
II	91312	E	General English-I	T	3	3	25	75	100
III	91313	CC	Basic Aerodynamics	T	5	5	25	75	100
	91314	CC	Basic Aerodynamics - Practical	P	4	8	25	75	100
	91315	Allied	Mathematics	T	3	4	25	75	100
	91316	Allied	Computer Lab - Practical	P	2	4	25	75	100
IV	91317	SEC I	Value Education	T	2	2	25	75	100
			Library			1	--	--	
			Total		**22**	**30**	**175**	**525**	**700**
			SEMESTER-II						
I	91321T/H/F/ M/TU/A/S	T/OL	Tamil/ Other Languages-II	T	3	3	25	75	100
II	91322	E	General English-II	T	3	3	25	75	100
III	91323	CC	Workshop Practices	T	5	5	25	75	100
	91324	CC	Workshop Practices - Practical	P	4	8	25	75	100
	91325	Allied	Electronic Fundamentals	T	3	4	25	75	100
	91326	Allied	Electronic Fundamentals - Practical	P	2	4	25	75	100
IV	91327	SEC II	Environmental Studies	T	2	2	25	75	100
			Library			1	--	--	--
			Total		**22**	**30**	**175**	**525**	**700**
			SEMESTER-III						
I	91331T/H/F/ M/TU/A/S	T/OL	Tamil/ Other Languages-III	T	3	3	25	75	100
II	91332	E	General English-III	T	3	3	25	75	100
III	91333	CC	Aircraft Materials & Hardware	T	3	4	25	75	100
	91334	CC	Aviation Legislation	T	3	3	25	75	100
	91335	CC	Aircraft Material & Hardware - Practical	P	3	6	25	75	100
	91336	Allied	Electrical Fundamentals - I	T	3	3	25	75	100
	91337	Allied	Electrical Fundamentals – I Practical	P	2	4	25	75	100
IV	91338	SEC III	Entrepreneurship	T	2	2	25	75	100
	91339A 91339B 91339C	SEC IV	1. Adipadai Tamil (Compulsory for non-tamil students)	P	2	2	25	75	100
			2. Advance Tamil	T					
			3. IT Skill for Employment	T					
		Optional	Self-Learning Course – MOOC'S	T	Extra Credit				
			Total		**24**	**30**	**225**	**675**	**900**

SEMESTER-IV

Part	Course Code	Courses	Name		Cr.	Hrs./ Week	Marks		
							Int.	Ext.	Total
I	91341T/H/F/ M/TU/S/A	T/OL	Tamil/ Other Languages-IV	T	3	3	25	75	100
II	91342	E	General English-IV	T	3	3	25	75	100
III	91343	CC	Maintenance Practices - I	T	4	4	25	75	100
	91344	CC	Human Factors	T	4	4	25	75	100
	91345	CC	Maintenance Practices – I Practical	P	3	6	25	75	100

	91346	Allied	Electrical Fundamentals - II	T	3	4	25	75	100
	91347	Allied	Electrical Fundamentals – II Practical	P	2	4	25	75	100
IV	91348A 91348B 91348C	SEC V	1. Adipadai Tamil (Compulsory for non-tamil students) 2. Advance Tamil 3. Small Business Management	P T T	2	2	25	75	100
		Optional	Self-Learning Course-MOOC'S	T	Extra Credit				
					24	**30**	**200**	**600**	**800**
			SEMESTER-V						
III	91351	CC (T)	Maintenance Practices - II	T	4	4	25	75	100
	91352	CC (T)	Digital Techniques and Electronic Instrument Systems	T	4	4	25	75	100
	91353A 91353B 91353C	DSE	**Elective– I** a. Aeroplane Structure & Systems b. Helicopter Structure & Systems c. Aircraft Electrical Systems	T	4	4	25	75	100
	91354A 91354B 91354C	DSE	**Elective II** a. Gas Turbine Engines b. Piston Engines c. Aircraft Instrument Systems	T	4	4	25	75	100
	91355A 91355B 91355C	DSE	**Elective III** a. Aeroplane Hydraulic Systems b. Helicopter Hydraulic Systems c. Aircraft Communication & Navigation Systems	T	4	4	25	75	100
	91356	CC	Maintenance Practices - II Practical	P	4	8	25	75	100
			Career Development/ Employability Skill			2	--	--	
			Total		**24**	**30**	**150**	**450**	**600**
			SEMESTER-VI						
III	91361	CC	Aeroplane System Maintenance	T	4	4	25	75	100
	91362	CC	Avionics System Maintenance	T	4	4	25	75	100
	91363	CC	Aeroplane System Maintenance - Practical	P	4	8	25	75	100
	91364A 91364B 91364C	DSE	**Elective IV** a. Aircraft Propellers and Control b. NDT, Welding and Heat Treatment c. Engine Propulsion System	T	4	4	25	75	100
	91365A 91365B		Project/ Dissertation	PR/ D	8	10	25	75	100
			Total		**24**	**30**	**125**	**375**	**500**
					140	**180**	**1050**	**3150**	**4200**

I - Semester					
T/OL	**Course code: 91311F**	**French-I**	**T**	**Credits: 3**	**Hours: 3**
Course Objectives	1. Recall and remember the usage of grammatical tenses in constructingsentences in a dialogue. 2. Apply the learnt grammar rules in practice exercises to improve theirunderstanding 3. Explain the nuances in the usage of various grammatical tenses andtheir aspects 4. Demonstrate knowledge of various expressions used to express opinions, emotions, cause, effect, purpose, and hypothesis in French 5. Communicate in French and summarize a given text				
Unit I	Salut ! Enchanté				
Unit II	J'adore				
Unit III	Tu veux bien ?				
Unit IV	On se voit quand				
Unit V	Bonne idée				

References

Régine Mérieux & Yves Loiseau, *Latitudes* -1- (A1 /A2), méthode defrançais, Didier, 2017 (units 1-6 only)

Course Outcomes		**Knowledge level**
CO-1	Identify the basic French sentence structure	K1
CO-2	Define and describe the various grammatical tenses and use them to communicate in French	K2
CO-3	Examine the various documents presented and discuss and reply to the questions asked on it	K2 and K3
CO-4	Analyze and interpret expressions used to convey thecause, the effect, the purpose, and the opposition in French	K4
CO-5	Evaluate the grammatical nature present in passages	K5

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	S	M	M	L	S	M	L	S	S	M	S	M
CO 2	S	M	M	L	M	M	L	S	S	S	S	M
CO 3	M	S	S	M	M	M	L	M	M	M	S	M
CO 4	S	M	M	L	S	M	L	S	S	M	S	M
CO 5	S	M	M	L	M	M	L	S	S	S	S	M

S-Strong M-Medium L-Low

I - Semester				
Course code:91312	**GENERAL ENGLISH-I**	**T**	**Credits: 3**	**Hours: 3**

Course Objectives	To enable learners to acquire self-awareness and positive thinking required in various life situations. To help them acquire the attribute of empathy. To assist them in acquiring creative and critical thinking abilities To enable them to learn the basic grammar To assist them in developing LSRW skills
Unit I	**SELF-AWARENESS (WHO) & POSITIVE THINKING(UNICEF)** **Life Story** 1.1 Chapter 1 from MalalaYousafzai, I am Malala An Autobiography or The Story of My Experiments with Truth (Chapters 1, 2 & 3) M.K.Gandhi **Poem** 1.3 Where the Mind is Without Fear – Gitanjali 35 – Rabindranath Tagore Love Cycle – Chinua Achebe
Unit II	**EMPATHY** **Poem** Nine Gold Medals – David Roth Alice Fell or poverty – William Wordsworth **Short Story** The School for Sympathy – E.V. Lucas Barn Burning – William Faulkner
Unit III	**CRITICAL & CREATIVE THINKING** **Poem** The Things That Haven't Been Done Before –Edgar Guest Stopping by the Woods on a Snowy Evening –Robert Frost **Readers Theatre** The Magic Brocade – A Tale of China Stories on Stage – Aaron Shepard (Three Sideway Stories from Wayside School" by LouisSachar)
Unit IV	**Part of Speech** Articles Noun Pronoun Verb Adverb Adjective Preposition
Unit V	**Paragraph and Essay Writing** Descriptive Expository Persuasive Narrative **Reading Comprehension**

References

1 MalalaYousafzai. I am Malala, Little, Brown and Company, 2013.
2 M.K. Gandhi. An Autobiography or The Story of My Experiments with Truth(Chapter – I), Rupa Publications, 2011.
3 Rabindranath Tagore. "Gitanjali 35" from Gitanjali (Song Offerings): A Collection of Prose Translations Made by the Author from the Original Bengali.
4 MacMillan, 1913.
5 N.Krishnasamy. Modern English: A Book of Grammar, Usage and CompositionMacmillan, 1975.
6 Aaron Shepard. Stories on Stage, ShepardPublications, 2017.
7 J.C. Nesfield. English Grammar Composition and Usage, Macmillan, 2019.

Course Outcomes		**Knowledge level**
CO-1	Acquire self-awareness and positive thinking required in various life situations	PO1,PO7
CO-2	Acquire the attribute of empathy.	PO1,PO2,PO10
CO-3	Acquire creative and critical thinking abilities.	PO4,PO6,PO9
CO-4	Learn basic grammar	PO4,PO5,PO6
CO-5	Development and integrate the use of four language skills i.e., listening, speaking, reading and writing.	PO3,PO8

Mapping with Programme Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	3	3	3	3	3	3	2	3	2
CO2	2	3	3	3	2	3	3	2	2	2
CO3	3	3	3	2	3	3	3	2	3	2
CO4	3	3	3	3	3	3	3	2	2	2
CO5	3	2	3	3	3	3	3	2	2	3

Mapping with Programme Specific Outcomes:

CO /PO	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO1	3	3	3	3
CO2	3	3	3	3
CO3	3	3	3	3
CO4	3	3	3	3
CO5	3	3	3	3
Weightage	15	15	15	15
Weighted percentage of Course Contribution to POS	3.0	3.0	3.0	3.0

3– Strong, 2 – Medium, 1 – Low

I - Semester				
Course code:91313	**Basic Aerodynamics**	**T**	**Credits: 5**	**Hours: 5**

Course Objectives	1. To familiarize the basic concepts and characteristics associated with the atmosphere and the concepts of the application of the International Standard Atmosphere (ISA) to aerodynamics. 2. To provide technical knowledge on airflow around a body its' relationship between lift, weight, thrust and drag, methods of lift augmentation. 3. To educate and provide an understanding in the flight controls, level flight conditions, operation and effect of controls. 4. To learn and apply their knowledge on various design features that provide aircraft stability about that axis. 5. To educate the students to understand compressible subsonic and transonic flows and supersonic flows.
Unit I	**Physics of the Atmosphere** The characteristics associated with the atmosphere - such as Composition - Pressure – temperature - distribution effects of altitude - and effects of humidity - temperature and - Pressure on density - International Standard Atmosphere (ISA) - its application to aerodynamics.
Unit II	**Aerodynamics** Airflow around a body - Boundary layer - laminar and turbulent flow - free stream flow - relative airflow - up wash and Downwash – vortices – stagnation - The terms: camber – chord - mean aerodynamic chord - profile (parasite) drag - induced drag - center of pressure - angle of attack - wash in and wash out - fineness ratio - wing shape and aspect ratio – Thrust – Weight - Aerodynamic Resultant - Generation of Lift and Drag - Lift coefficient - Drag coefficient – stall - High lift devices – slots – slats – flaps – Relationship - between lift – weight - thrust and drag.
Unit III	**Theory of Flight** Aero plane Aerodynamics - Flight Controls - Level flight conditions - Operation and effect of roll control - ailerons and spoilers - pitch control – elevators – stabilizers - yaw control – rudders – fin – maneuvers – climbing – turning - gliding.
Unit IV	**Flight Stability and Dynamics** Static stability - Dynamic stability – Longitudinal - lateral - and directional stability - spiral stability and Dutch roll stability.
Unit V	**High Speed Theory** The speed of sound - compressibility and incompressibility - approaching the speed of sound – shock waves and their observation - effects of shock waves - shock drag - variation of speed of sound – critical Mach number – subsonic – transonic - supersonic speeds - behavior of aeroplane at shock stalls.

References

Text Books:

1. Module 8 Basic Aerodynamics by Thomas Forenz, Aircraft Technical Book Company, 2016
2. Aircraft Basic science by Michael J. Kroes; Michael S. Nolan; Publisher: The McGraw-Hill Companies, Inc. Edition: Eighth Edition - 2013

REFERENCE BOOKS:

1. Mechanics of Flight by A C Kermode, Pearson 11 edition
2. Aerodynamics - By L J Clancy; Publisher: Shroff; Date 1 January 2006
3. Airframe & Power plant Mechanics (General Handbook EA-AC 65-15A) by Federal Aviation Administration, 2019

Course Outcomes		Knowledge level
CO-1	To have knowledge on the atmosphere and the concepts of the International Standard Atmosphere (ISA) to aerodynamics	K 1
CO-2	To understand and give a detailed description about the airflow around the body and aerofoil.	K 2
CO-3	The applicant will be able to apply his knowledge on generation of Lift, Drag Relationship between lift, weight, thrust and drag.	K 3
CO-4	The applicant will be able to analyse the equilibrium position in level flight, operation and effect of roll, pitch and yaw.	K 4
CO-5	The applicant will be able to evaluate the flight stability and dynamics; the speed of sound, compressibility, incompressibility and behaviour of aeroplane at shock stalls	K 5

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	2	1	3	1	2	1	3	2	1
CO2	2	1	3	2	3	1	2	1	3	2	3	1
CO3	3	1	2	2	1	2	2	2	1	2	3	2
CO4	3	2	2	1	2	1	2	3	2	2	1	2
CO5	2	3	1	1	2	3	1	2	2	2	1	2
W.AV	**2.6**	**2**	**1.8**	**1.6**	**1.8**	**2**	**1.6**	**2**	**1.8**	**2.2**	**2**	**1.6**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	2
CO2	2	1	2	2	1
CO3	2	2	1	1	2
CO4	2	3	3	1	2
CO5	2	2	2	3	1
W.AV	**2.2**	**2**	**2**	**1.8**	**1.6**

S –Strong (3), M-Medium (2), L- Low (1)

I - Semester				
Course code:91314	**Basic Aerodynamics - Practical**	**P**	**Credits: 4**	**Hours: 8**

Course Objectives	1. To familiarize with basic control surfaces of the aircraft 2. To provide technical knowledge on size of the components with reference to aircraft design feature. 3. To learn and apply their knowledge on control surface movement with respect to cockpit controls 4. To educate the applicant to understand the operation flight controls.

LAB EXPERIMENTS:

1. Identifying and locating main components of an aircraft.
2. Measurement of wing span and average chord of an aerofoil for calculation of aspect ratio.
3. Measurement of dihedral/anhedral angle of aero plane wing.
4. Demonstration of airflow over aerofoil and its effect in wind tunnel.
5. Measurement of angle of incidence of wing and determination of wash-in/wash-out.
6. Measurement of wheel base and track.
7. Operation of aileron and identification of linkages from cockpit control to the control surfaces and their Movement.
8. Operation of elevator and identification of linkages from cockpit control to the control surface and their Movement.
9. Operation of rudder and identification of linkages from cockpit control to the control surface and their Movement.
10. Operation of flaps and identification of linkages from cockpit control to the control surface and their Movement
11. Identification of different tabs, their linkages with controls and its operation.
12. Measurement of sweep back angle of swept back wing.

Course Outcomes		**Knowledge level**
CO-1	To have knowledge on the operation flight controls.	K 1
CO-2	To understand and give a detailed description how the lift is being generated.	K 2
CO-3	The applicant will be able to analyse the plan form of wings and their angle of attachment.	K 4

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	2	3	1	1	1	1	2	2
CO2	3	1	1	1	2	1	1	1	1	1	1	2
CO3	3	1	2	2	3	1	1	1	1	1	1	2
W.AV	**2.6**	**1**	**1.3**	**1.3**	**2.3**	**1.6**	**1**	1	1	**1**	1	**2**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	1	2	2
CO2	2	2	2	2	3
CO3	1	1	1	2	3
W.AV	**1.6**	**1.3**	**1.3**	**2**	**2.6**

S –Strong (3), M-Medium (2), L- Low (1)

I - Semester					
Allied	**Course code:91315**	**Mathematics**	**T**	**Credits: 3**	**Hours: 4**
Course Objectives	1.To develop logical understanding of the subjects 2.To visualize and conceptualize the problems 3.To provide the students with sufficient knowledge in calculus and matrix algebra to model the problem mathematically 4.To establish a correspondence between geometric curves and algebraic equations. 5.To assist the students in identifying the way to optimize the cost and the time involved in networking activities and project planning.				
Unit I	**Matrices** Rank of a matrix- Consistency of linear system of equations – Eigenvalue problem – Eigenvalues and eigenvectors of a real matrix- Characteristic equation – Properties of eigenvalues and eigenvectors – Cayley – Hamilton theorem–inverse of a matrix-Similarity transformation-Basic concepts–Diagonalization by similarity transformation**.**				
Unit II	**Three-dimensional analytical geometry** Direction cosines and ratios, Angle between two lines- Equations of a plane- Equations of a straight line – Coplanar lines – Shortest distance between skew lines – Sphere – Tangent plane – Plane section of a sphere – Orthogonal spheres.				
Unit III	**Geometrical applications of differential calculus** Curvature – Cartesian and polar co-ordinates – Centre and radius of curvature – Circle of curvature – Involutes and evolutes – Envelopes – Properties of envelopes and evolutes - Evolutes as envelope of normal.				
Unit IV	**Functions of several variables** Functions of two variables – Partial derivatives – Total differential – Taylor's expansion – Maxima and minima – Constrained maxima and minima – Lagrange's Multiplier method – Jacobians				
Unit V	**Network analysis** Programme Evaluation and Review Technique (PERT)-Critical Path Method (CPM)-Concepts-Application Problems-Computation of earliest time-Latest time-floats.				

References

TEXT BOOKS

1. Veerarajan, T., "Engineering Mathematics (for First Year)", Second Edition, Tata McGraw –Hill Pub. Co.Ltd. New Delhi, 2012.

REFERENCE BOOKS

1. Venkataraman, M.M. "Engineering Mathematics, Volume I, "Fourth Edition, the National Pub. Co., Chennai, 2003.
2. Kreyszig, E, "Advanced Engineering Mathematics", Eight Edition, John Wiley and Sons (Asia) Ltd, Singapore, 2001.
3. C.R. Kothari," Quantitative Techniques (New Format)", Third Edition, Vikas Publishing,2013.
4. S K Bhattacharya Manpreet Singh, "Network Analysis and Synthesis", Pearson Publishing.

Course Outcomes		Knowledge level
CO-1	Apply the knowledge of matrices to solve the problem and understand the applications of matrices.	K 3
CO-2	Analyse the characteristics and properties of three-dimensional geometric shapes and develop mathematical arguments about geometric relationships. Specify locations and describe spatial relationships using coordinate geometry and other representational systems.	K 4
CO-3	Fix the center of curvature, determines the direction of curvature of the curve at that specific point and to find the radius of curvature which determines the magnitude of that curvature	K 3
CO-4	Find the rate of change of quantity with respect to other, find a function which is increasing or decreasing and to find the maximum and minimum value of a curve.	K 3
CO-5	Get a clear idea about of how to manage and plan their project, concerning resource and time	K 3

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	2	1	1	1	1	1	3	2	1
CO2	2	1	2	2	2	1	1	1	3	2	3	1
CO3	2	1	2	2	1	1	1	1	1	2	3	2
CO4	2	2	2	1	1	1	1	1	2	2	1	2
CO5	2	3	1	1	2	1	1	1	2	2	1	2
W.AV	**2.2**	**2**	**1.8**	**1.6**	**1.4**	**1**	**1**	**1**	**1.8**	**2.2**	**2**	**1.6**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	2	2
CO2	2	1	2	2	1
CO3	2	2	1	2	1
CO4	2	3	3	1	2
CO5	2	2	2	2	1
W.AV	**2.2**	**2**	**2**	**1.8**	**1.4**

S –Strong (3), M-Medium (2), L- Low (1)

I - Semester					
Allied	**Course code:91316**	**Computer Lab - Practical**	**P**	**Credits: 2**	**Hours: 4**

Course Objectives	To educate about creating professional documents using word. To educate about analyse, manage and present data using excel. To educate how to create and manage presentation using power point. To study about insert a table, picture and drawing into the documents. To educate about create a data base using access.

List of Experiments

1. Create a document and apply different formatting options.
2. Design a Greeting Card using Word Art for different festivals.
3. Create your Bio-data and use page borders and shading.
4. Create a document and insert header and footer, page title etc.
5. To create a document, set the margins, orientation, size, column, water mark, page color and page borders.
6. Prepare a mark sheet of your class subjects.
7. Apply the creating, editing, saving, printing securing & protecting operations to an excel spreadsheets.
8. Prepare a bar chart & pie chart for analysis of five year results of your institute.
9. Work on the following exercise on a workbook:
   a. Copy an existing sheet.
   b. Rename the old sheet.
   c. Insert a new sheet into an existing Workbook.
   d. Delete the renamed sheet.
10. Prepare an Attendance sheet of 10 students for any 6 subjects of your syllabus. Calculate their total attendance, total percentage of attendance of each student & average of attendance.
11. Apply themes and layouts to power point slides and insert pictures, graphics, shapes, and tables into presentations.
12. In power point slide make use of adding transitions and animation & Working with mater slides.
13. Create a excel worksheet and perform computations using available data and using mathematical functions chosen from menus.
14. Create a database on students list of any 4 faculties and perform following database functions on it.
    a. Sort data by Name
    b. Filter data by Class
    c. Subtotal of no. of students by Class
15. Create Database to maintain at least 10 addresses of your class mates with the following constraints
    a. Roll no. should be the primary key.
    b. Name should be not null

Course Outcomes		**Knowledge level**
CO-1	To create and manage professional documents using word.	K 6
CO-2	To analyse, manage and present data using excel	K 4
CO-3	To create and manage presentation using power point	K 6
CO-4	To insert a table, picture and drawing into the documents.	K 4
CO-5	To create a data base using access.	K 6

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	2	2	1	2	2	2	2	2
CO2	1	2	3	1	1	1	2	1	2	2	2	2
CO3	2	2	2	2	2	1	2	2	2	2	1	2
CO4	2	2	2	1	1	2	2	1	2	2	2	2
CO5	2	2	2	2	1	2	2	2	2	2	2	2
W.AV	**1.8**	**2**	**2.1**	**1.6**	**1.4**	**1.6**	**1.8**	1.6	2	**2**	1.8	**2**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	3	2
CO2	2	2	2	1	2
CO3	1	1	2	2	1
CO4	2	2	2	2	1
CO5	2	1	2	2	1
W.AV	**2**	**1.6**	**2**	**2**	**1.4**

S –Strong (3), M-Medium (2), L- Low (1)

I - Semester					
SEC I	**Course code:91317**	**Value Education**	**P**	**Credits: 2**	**Hours: 2**
Course Objectives	1.To impart humanism values among the student under various religious thoughts 2.To make them awareness of ethics and civil rights 3.To familiarities the students with basic features of extracurricular activities such NSS and NCC and relevance of Abdul Kalam and Mother Teresa efforts to teach values 4.To impart skills by preparing project works such as writing poems and stories				
Unit I	**Introduction** Definition – Need for Value Education – How Important Human Values are – Humanism and Humanistic Movement in the World and in India – Literature on the Teaching of Values Under Various Religions Like Hinduism, Buddhism, Christianity, Jainism, Islam, Etc. Agencies for Teaching Value Education in India – National Resource Centre for Value Education – NCERT– IITS and IGNOU				
Unit II	**Vedic Period** Influence of Buddhism and Jainism – Hindu Dynasties – Islam Invasion – Moghul Invasion – British Rule – Culture Clash – Bhakti Cult – Social Reformers – Gandhi – Swami Vivekananda – Tagore – Their Role in Value Education				
Unit III	**Value Crisis – After Independence** Independence – Democracy – Equality – Fundamental Duties – Fall of Standards in All Fields – Social, Economic, Political, Religious and Environmental – Corruption in Society. Politics Without Principle – Commerce Without Ethics – Education Without Character – Science Without Humanism – Wealth Without Work – Pleasure Without Conscience – Prayer Without Sacrifice – Steps Taken by The Governments – Central and State – To Remove Disparities on the Basis of Class, Creed, Gender.				
Unit IV	**Value Education on College Campus** Transition from School to College – Problems – Control – Free Atmosphere – Freedom Mistaken for License – Need for Value Education – Ways of Inculcating It – Teaching of Etiquettes – Extra-Curricular Activities – N.S.S., N.C.C., Club Activities – Relevance of Dr.A.P.J. Abdual Kalam's Efforts to Teach Values – Mother Teresa.				
Unit V	**Project Work** 1. Collecting Details about Value Education from Newspapers, Journals and Magazines. 2. Writing Poems, Skits, Stories Centering on Value-Erosion in Society. 3. Presenting Personal Experience in Teaching Values. 4. Suggesting Solutions to Value – Based Problems on the Campus.				

Reference and Textbooks

Chakrabarti, M. (1997). Value education: changing perspectives. Kanishka Publishers.
Eknath Ranade (1991). Swami Vivekananda's Rousing Call to Hindu Nation. Centenary Publication
Karabi Kakoti, Value Education – Need of the Hour.
Radhakrishnan, S. (1968). Religion and culture. Orient Paperbacks, New Delhi
Saraswathi, T. S. (Ed.). (1999). Culture, socialization and human development: Theory, research and applications in India. SAGE Publications Pvt. Limited.
Satchidananda, M. K. (1991). Ethics, education, Indian unity and culture. Ajanta Publications, Delhi.
Venkataiah, N. (Ed.). (1998). Value education. APH Publishing, New Delhi.

Course Outcomes		Knowledge level
CO-1	Knowledge about Humanism and Humanistic Movement in the World and in India	K 2
CO-2	Understand the Social Reformers and Their Role in Value Education	K 2
CO-3	Understand the Value crisis after Independence	K 2
CO-4	Explore the theories of Fundamental Duties, Ethics, Extra-Curricular Activities – N.S.S., N.C.C	K 3
CO-5	Know the concept of Value Education on College Campus, Project Work regarding Writing Poems, Skits, Stories Centering on Value-Erosion in Society	K 3

Mapping Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	1	1	2	3	2	2	2	1	2
CO2	1	1	2	2	1	2	2	2	3	2	1	3
CO3	1	1	1	1	1	2	3	2	2	2	1	2
CO4	1	1	2	2	1	2	1	2	3	2	1	3
CO5	1	1	1	2	1	1	1	2	1	1	1	1
W.AV	**1**	**1**	**1.4**	**1.6**	**1**	**1.8**	**2**	2	2.2	**1.8**	1	**2.2**

S –Strong (3), M-Medium (2), L- Low (1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	3	1	1
CO2	1	1	3	2	1
CO3	1	1	2	1	1
CO4	1	1	2	2	2
2CO5	1	1	2	1	1
W.AV	**1.2**	**1**	**2.4**	**1.4**	**1.2**

S –Strong (3), M-Medium (2), L- Low (1)

II-Semester					
T/OL	**Course Code:** 91321F	**FRENCH-II**	**T**	**Credits:3**	**Hours:3**
Course Objectives	1. Understand and apply the grammatical concepts in drafting sentences and paragraphs 2. Apply the rules and regulations to effectively employ past tense 3. Practice exercises and identify errors 4. Explain and summarize a French document such as posters, bulletins, info graphics,etc. 5. Demonstrate knowledge of various expressions used to convey opinion, emotions, cause, effect, purpose, and hypothesis in French 6. Build upon acquired writing and communication skills to develop them				
Unit I	C'est où?				
Unit II	N'oubliez pas				
Unit III	Belle vue sur la mer				
Unit IV	Quel beau voyage				
Unit V	Oh joli Et après				

Reference and Textbooks

Régine Mérieux & Yves Loiseau, *Latitudes* -1- (A1 /A2), méthode defrançais, Didier, 2017(units 7-12 only)

Course Outcomes		**Knowledge Level**
CO-1	Revise and recall the French sentence structure	K1
CO-2	Enumerate the various grammatical tenses and use them to communicate better in French	K2
CO-3	Summarize and develop ideas from the documents after discussing it in detail	K2 and K3
CO-4	Analyze and interpret verbal expressions of cause, effect, purpose, and opposition in French	K4
CO-5	Evaluate and comprehend text passages	K5

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	M	L	M	M	L	S	M	M	M	M
CO2	S	M	M	L	M	M	L	S	M	S	M	M
CO3	M	S	S	M	S	M	M	M	S	M	S	S
CO4	S	S	M	L	S	M	L	S	S	M	S	S
CO5	S	S	S	L	M	M	L	S	S	M	S	S

S-Strong M-Medium L-Low

II-Semester					
E	**Course Code:** 91322	**GENERAL ENGLISH-II**	**T**	**Credits:3**	**Hours:3**
Course Objectives	To make students realize the importance of resilience To enable them to become good decision makers To enable them to imbibe problem-solving skills To enable them to use tenses appropriately To help them use English effectively at the work place.				
Unit I	**RESILIENCE** **Poem** Don't Quit – Edgar A. Guest Still Here – Langston Hughes **Short Story** Engine Trouble – R.K. Narayan Rip Van Winkle – Washington Irving				
Unit II	**DECISION MAKING** **Short Story** The Scribe – Kristin Hunter The Lady or the Tiger - Frank Stockton **Poem** The Road not Taken – Robert Frost Snake – D. H Lawrence				
Unit III	**PROBLEM SOLVING** **Prose life Story** 3.1 How I taught My Grandmother to Read –Sudha Murthy **Autobiography** How frog Went to Heaven – A Tale ofAngolo Wings of Fire (Chapters 1,2,3) by A.P.JAbdul Kalam				
Unit IV	**Tenses** Present Past Future Concord				
Unit V	**English in the Workplace** E-mail – Invitation, Enquiry, Seeking Clarification Circular Memo Minutes of the Meeting				

Reference and Textbooks

1 Martin Hewings. Advanced English Grammar. Cambridge University Press, 2000
2 SP Bakshi, Richa Sharma. Descriptive English. Arihant Publications (India) Ltd.,2019.
3 Sheena Cameron, Louise Dempsey. The Reading Book: A Complete Guide to Teaching Reading. S & L. Publishing, 2019.
4 Barbara Sherman. Skimming and Scanning Techniques, Liberty University Press,2014.
5 Phil Chambers. Brilliant Speed Reading: Whatever you need to read, however Pearson, 2013.
6 Communication Skills: Practical Approach Ed.ShaikhMoula

Course Outcomes		Knowledge level
CO-1	Realize the importance of resilience	PO1,PO7
CO-2	Become good decision-makers	PO1,PO2,PO10
CO-3	Imbibe problem-solving skills	PO4,PO6,PO9
CO-4	Use tenses appropriately	PO4, PO5,PO6
CO-5	Realize the importance of resilience	PO3,PO8

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	3	3	3	2	3	2
CO2	2	3	3	3	2	3	3	2	2	2
CO3	3	3	3	2	3	3	3	2	3	2
CO4	3	3	3	3	3	3	3	2	2	2
CO5	3	2	3	3	3	3	3	2	2	3

3 – Strong, 2 – Medium , 1 – Low

Mapping with Programme Specific Outcomes:

CO/PO	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3
CO2	3	3	3	3
CO3	3	3	3	3
CO4	3	3	3	3
CO5	3	3	3	3
Weightage	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0

II-Semester					
Core	**Course Code:** 91323	**Workshop Practices**	**T**	**Credits:5**	**Hours:5**
Course Objectives	1. To educate the students about the safety precautions to be taken in aircraft and workshop. 2. To familiarize students to understand about the tools used in aircraft maintenance. 3. To analyse the precision instruments used in aircraft maintenance. 4. To understand the fits and clearances used in dismantling and assembling of aircraft components. 5. To educate about heat treatment process of steels to improve its properties.				
Unit I	**Safety Precautions-Aircraft and Workshop:** Aspects of safe working practices including - Personal precautions - Fire - general precautions - Fuel spillage - Work in fuel tanks - Working with electricity - Working with compressed gases - Oxygen - Working with oils, chemicals - Work on aircraft - Engine running - Hand held fire extinguishers - Aircraft hand held extinguishers - Fire in a building - Fire in an aircraft/ engine - Workplace notices.				
Unit II	**Tools** Common hand tool types - Common power tool types - Lubrication equipment and methods – operation - function and use of electrical general test Equipment - Care of tools - control of tools - use of workshop materials – Dimensions - allowances and tolerances - standards of workmanship - Calibration of tools and equipment - calibration standards.				
Unit III	**Precision Instruments:** Construction, operation and use of precision instruments - Micrometers of various types - internal micrometer external micrometer - depth micrometer - tube micrometer - purpose usage and calibration and error correction - Vernier calipers - purpose, usage and calibration - Vernier bevel protractor - Dial gauge - optical flat - slip gauge - usages.				
Unit IV	**Fits and Clearances:** Drill sizes for bolt holes - classes of fits - Common system of fits and clearances - Schedule of fits and clearances for aircraft and engines - Limits for bow, twist and wear - Standard methods for checking shafts - bearings and other parts.				
Unit V	**Heat treatment of steels**: Relation between heat treatment and physical properties of steels - critical temperatures – annealing - normalizing hardening – tempering - case carburizing and hardening - nitriding and other surface hardening methods – quenching - Hardness number - Hardness Testing Machines.				

References

Text Books:

1. Airframe & Powerplant Mechanics (General Handbook EA-AC 65-9A) - Federal Aviation Administration; Publisher: Shroff; Edition: 2012.
2. Airframe handbook EA-AC 65-15A Federal Aviation Administration; Publisher: Shroff; Edition: 2012.

Reference Books:

1. Shop Theory; Author: James Anderson Earl E. Tata; Publisher: McGraw Hill; Edition: 6th edition 2016
2. Civil Aircraft Inspection Procedures (CAP 459-Part I, Basic) by CAA UK, Sterling book House Mumbai Edition 2006.
3. EASA Module-07 A Maintenance practices; Publisher: Aircraft tech book & co.
4. Workshop technology; Author: AK Hajra Choudhary and SK Hajra Choudhary; Publisher: Media Promoters and Publications pvt. Ltd. Mumbai; Edition: 2007
5. Aircraft general engineering; Author: Lalit Gupta; Publisher: Himalayan Books, New Delhi

Course Outcomes		Knowledge Level
CO-1	Knowledge about Safety Precautions-Aircraft and Workshop	K 1
CO-2	Understanding tools	K 2
CO-3	Understand about Precision Instruments	K 2
CO-4	Evaluate Fits and Clearances	K 5
CO-5	Analysis about the Heat treatment of steels	K 4

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	2	2	3	1	1	2	2	3	2
CO2	3	2	2	1	2	2	1	1	2	2	1	2
CO3	2	2	1	1	2	1	2	2	2	1	1	1
CO4	1	1	2	2	3	1	3	2	2	1	2	2
CO5	2	3	2	2	1	2	2	1	3	2	2	2
W.AV	**2.2**	**2**	**1.6**	**1.6**	**2**	**1.8**	**1.8**	**1.4**	**2.2**	**1.8**	**1.8**	**1.8**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	2	1	2	2
CO2	2	2	2	2	3
CO3	2	2	2	2	3
CO4	3	2	3	2	2
CO5	2	1	2	2	2
W.AV	**2**	**1.8**	**2**	**2**	**2.4**

S–Strong(3),M-Medium(2),L-Low(1)

II-Semester					
Core	**Course Code:** 91324	**Workshop Practices - Practical**	**P**	**Credits:4**	**Hours:8**
Course Objectives	1.To educate the students about the use of thread cutting taps and dies. 2.To familiarize students with dial test indicator. 3.To understand the use of power operated tools.				

List of Practical:

1. Demonstration of Vernier caliper and Practice of Vernier caliper reading.
2. Cutting and filing of metals.
3. Demonstration of micrometer and Practice of micro meter Reading.
4. Making L, V, T job as per dimensions.
5. Internal thread cutting using taps.
6. External thread cutting using dies.
7. Demonstration and use of dial test indicator.
8. Drilling Holes using power drill on various metals.
9. Reaming of holes.

Course Outcomes		**Knowledge Level**
CO-1	Gain knowledge about 'Safety Precautions' while working in workshop	K1
CO-2	To Understand the use of Vernier caliper and Micrometer	K2
CO-3	To apply practical knowledge on drilling and thread cutting	K3

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO10	PO1 1	PO12
CO1	2	1	1	1	2	3	1	1	1	1	2	2
CO2	3	1	1	1	2	1	1	1	1	1	1	2
CO3	3	1	2	2	3	1	1	1	1	1	1	2
W.AV	**2.6**	**1**	**1.3**	**1.3**	**2.3**	**1.6**	**1**	1	1	**1**	1	**2**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	2	2
CO2	1	2	1	2	2
CO3	1	1	2	1	2
W.AV	**1**	**1.3**	**1.3**	**1.6**	**2**

S–Strong(3),M-Medium(2),L-Low(1)

II-Semester					
Allied	**Course Code:** 91325	**Electronic Fundamentals**	**T**	**Credits:3**	**Hours:4**

Course Objectives	1. To learn basic semiconductor devices and their characteristics and application 2. To educate to operate a BJT in different configurations 3. To understand the fundamental parameters of Boolean Logic and expose to linear and non-linear applications of operational amplifiers. 4. To provide fundamental knowledge about basic and fabrication of PCB. 5. To learn about the basics and working of servo mechanism and Transducer
Unit I	**Diodes** Diode symbols - Diode characteristics - properties - Diodes in series and parallel - Main characteristics and use of silicon-controlled rectifiers (thyristors) - light emitting diode - photo conductive diode – varistor - rectifier diodes - Functional testing of diodes.
Unit II	**Transistors** Transistor symbols - Component orientation - Transistor Configuration - CE Configuration CB Configuration - Description - CC Configuration -Transistor characteristics - properties.
Unit III	**Integrated Circuits** Description and operation of logic circuits - Logic gate symbol - Truth table for Buffer Gate -NOT Gate - AND Gate - OR Gate- EX-OR Gate - NAND Gate - NOR Gate - EX-NOR Gate -linear circuits / operational amplifiers.
Unit IV	**Printed Circuit Boards** Description of printed circuit boards - PCB Boards - Single Layer Board - Double Layered Board and Multi - Layered Board - use of printed circuit boards.
Unit V	**Servomechanisms** Understanding of the following terms - Open and closed loop systems- feedback - follow up - - analogue transducers – LVDT – RVDT - Principles of synchro system-operation - types

References

Text Book:

1. EASA Module - 04 Electrical Fundamental, Aircraft Tech Book Co. Aviation Maintenance Technician Certification Series.
2. Principle of Electronics by V. K. Metha, Rohit Metha S Chand Publishing ,1th edition, 2020.

REFERENCE BOOK:

1. Electronic communication systems (4th edition) by George Kennedy, 1999, Publisher Tata McGraw Hill
2. Integrated Electronics (2nd edition), Jacob Millman, Christos Halkias, , McGraw-Hill publication, July 2017
3. Aircraft Instruments and Integrated Systems (1st edition) by E H J Pallet, Pearson Education. 1992

Course Outcomes		**Knowledge Level**
CO-1	Acquire knowledge on the structure of a pn junction diode and its characteristics	K 2
CO-2	Understand the characteristics of a BJT in different configuration and its operation	K 2
CO-3	Analyze the characteristics and parameters of Logic Gates and operational amplifiers	K 4

CO-4	Explain the basics and fabrication of PCB	K 2
CO-5	Analyze the working of servomechanism and Transducer	K 4

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	3	2	2	1	2	2	1	3
CO2	1	1	1	2	2	1	1	1	2	3	2	1
CO3	3	2	1	3	2	2	1	2	1	1	3	2
CO4	2	3	3	2	1	2	3	3	2	2	2	2
CO5	2	2	2	2	2	3	2	2	1	1	2	1
W.AV	**2**	**2**	**1.8**	**2.2**	**2**	**2**	**1.8**	**1.8**	**1.6**	**1.8**	**2**	**1.8**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	3	2	1
CO2	3	2	2	2	2
CO3	2	1	2	1	2
CO4	1	2	1	1	3
CO5	3	2	2	2	1
W.AV	**2.2**	**1.8**	**2**	**1.6**	**1.8**

S–Strong(3),M-Medium(2),L-Low(1)

II-Semester					
Allied	**Course Code:** 91326	**Electronic Fundamentals - Practical**	**P**	**Credits:2**	**Hours:4**
Course Objectives	1. To familiarize with basic semiconductor devices 2. To understand the characteristics of diodes as halfway and full wave rectifiers 3. To Analysis of characteristics of transistor in forward and reverse biasing				

List of Experiments

1. Analysis of characteristics of diode in forward and reverse biasing
2. Analysis of characteristics of two diodes connected in series
3. Analysis of characteristics of two diodes connected in parallel
4. Analysis of characteristics of Silicon Controlled Rectifier
5. Analysis of characteristics of Light Emitting Diode in forward and reverse biasing
6. Analysis of characteristics of diode as Half wave Rectifier
7. Analysis of characteristics of diode as Full wave Rectifier
8. Analysis of characteristics of diode as Full wave Bridge Rectifier
9. Analysis of functional testing of diode
10. Analysis of characteristics of Transistor in forward and reverse biasing

Course Outcomes		**Knowledge Level**
CO-1	Able to analyse the characteristics of transistor in forward and reverse biasing	K 4
CO-2	To examine the characteristics of diode as Half wave Rectifier and full wave rectifier	K 4
CO-3	To understand the functional testing of diode	K 2

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	2	3	1	1	1	1	2	2
CO2	3	1	1	1	2	1	1	1	1	1	1	2
CO3	3	1	2	2	3	1	1	1	1	1	1	2
W.AV	**2.6**	**1**	**1.3**	**1.3**	**2.3**	**1.6**	**1**	1	1	**1**	1	**2**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	2	2
CO2	1	2	1	2	1
CO3	1	1	1	2	2
W.AV	**1**	**1.3**	**1**	**2**	**1.6**

S–Strong(3),M-Medium(2),L-Low(1)

II-Semester					
SEC II	**Course Code:** 91327	**Environmental Studies**	**P**	**Credits:2**	**Hours:2**
Course Objectives	1. To understand the multidisciplinary nature of environmental studies such as forest, water, mineral and energy and land resources. 2. To portray the eco system bio diversity and its conservation. 3. To impart the knowledge of environmental pollution. 4. To know the importance of field work to study common plants, insects and birds and visit local areas to document environmental assets				
Unit I	**The Multidisciplinary Nature of Environmental Studies:** Definition, Scope and importance - Need for public awareness				
Unit II	**Natural Resources**: Renewable and non-renewable resources **A). Forest Resources:** Use and Over-Exploitation, Deforestation, Case Studies, Timber Extraction, Mining, Dams and Their Effect on Forests and Tribal People. **B). Water Resources:** Use and Over-Utilization of Surface and Ground Water, Floods, Drought, Conflicts over Water, Dams- Benefits and Problems. **C). Mineral Resources:** Use and Exploitation, Experimental Effects of Extracting and Using Mineral Resources, Case Studies. **D). Food Resources**: World Food Problems, Changes Caused by Agriculture and Overgrazing, Effects of Modern Agriculture, Fertilizer-Pesticide Problems, Water Logging, Salinity, Case Studies. **E). Energy Resources:** Growing Energy Needs, Renewable and Non-Renewable Energy Sources, Use of Alternate Energy Resources, Case Studies. **F). Land Resources:** Land as a Resource, Land Degradation, Main Induced Landsides, Soil-Erosion and Desertification. Role of Individual in Conservation of Natural Resources -Equitable Use of Resources for Sustainable Lifestyle				
Unit III	**ECOSYSTEMS, BIO-DIVERSITY AND ITS CONSERVATION** **Ecosystems:** Concept of an Ecosystem, Structure and Function of an Ecosystem, Energy Flow in The Ecosystem, Food Chains, Food Webs and Ecological Pyramids. **Biodiversity and Its Conservation:** Introduction- Definition: Genetic, Species and Ecosystem Diversity, Bio-Geographical Classification of India, Value of Biodiversity: Consumptive Use, Productive Use, Social Ethical, Aesthetic and Option Values. Biodiversity at Global, National and Local Levels, India as a Mega-Diversity Nation, Hot Spots of Biodiversity, Threats to Biodiversity: Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts, Endangered and Endemic Species of India, Conservation of Biodiversity: In-Situ And Ex-Situ Conservation of Biodiversity.				
Unit IV	**Environmental Pollution:** Causes, Effects And Control Measures of: **A).**Air Pollution, **B).** Water Pollution,**C).** Soil Pollution, **D).** Marine Pollution, **E).** Noise Pollution, **F).** Thermal Pollution, **G).** Nuclear Hazards.				
Unit V	**Field Work** 1. Visit to a Local Area to Document Environmental Assets–River/ Forest/ Grassland/ Hill/ Mountain 2. Visit to a Local Polluted Site- Urban/Rural/Industrial/Agricultural 3. Study of Common Plants, Insects, Birds 4. Study of Simple Ecosystem-Pond, River, Hill Slopes, etc.				

References

Text Book:

1. EASA Module - 04 Electrical Fundamental, Aircraft Tech Book Co. Aviation Maintenance Technician Certification Series.
2. Principle of Electronics by V. K. Metha, Rohit Metha S Chand Publishing ,1th edition, 2020.

REFERENCE BOOK:

1. Electronic communication systems (4th edition) by George Kennedy, 1999, Publisher Tata McGraw Hill
2. Integrated Electronics (2nd edition), Jacob Millman, Christos Halkias, , McGraw-Hill publication, July 2017
3. Aircraft Instruments and Integrated Systems (1st edition) by E H J Pallet, Pearson Education. 1992

Course Outcomes		**Knowledge Level**
CO-1	Acquire knowledge on the structure of a pn junction diode and its characteristics	K 2
CO-2	Understand the characteristics of a BJT in different configuration and its operation	K 2
CO-3	Analyze the characteristics and parameters of Logic Gates and operational amplifiers	K 4
CO-4	Explain the basics and fabrication of PCB	K 2
CO-5	Analyze the working of servomechanism and Transducer	K 4

Mapping Course Outcome VS Programme Specific Outcomes

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	1	1	1	1	1	2	3	2	2	2	1	2
CO2	1	1	2	2	1	2	2	2	3	2	1	3
CO3	1	1	1	1	1	2	3	2	2	2	1	2
CO4	1	1	2	2	1	2	1	2	3	2	1	3
CO5	1	1	1	2	1	1	1	2	1	1	1	1
W.AV	**1**	**1**	**1.4**	**1.6**	**1**	**1.8**	**2**	2	2.2	**1.8**	1	**2.2**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	3	2	1
CO2	1	1	3	1	2
CO3	1	1	2	1	1
CO4	1	1	2	2	2
CO5	1	1	2	1	2
W.AV	**1.2**	**1**	**2.4**	**1.4**	**1.6**

S–Strong(3),M-Medium(2),L-Low(1)

III-Semester					
T/OL	**Course Code:** 91331F	**FRENCH-III**	**T**	**Credits:3**	**Hours:3**

Course Objectives	1. Identify and appreciate the construction and the structure of different tenses and sentences 2. Translate simple texts 3. Draft and summarize literary texts 4. Apply the grammatical rules to express one's ideas using different tenses 5. Analyze literary texts with respect to their structure and composition
Unit I	Les feuilles mortesLe Vrai Père Les pronoms relatifs
Unit II	Nos études Demain dès l'aube Le passé composé
Unit III	Par une journée d'été L'imparfait Le Plus-que-parfait
Unit IV	Une visite inattendueLe subjonctif Le conditionnel
Unit V	L'hiverLelibraire Lacomparaison

References

K. Madanagobalane & N.C. Mirakamal, *Le français par les textes*, Chennai, Samhita Publications – Goyal Publisher & Distributors Pvt Ltd,2017

Course Outcomes		**Knowledge Level**
CO-1	Understand the structure and use of the different grammatical tenses	K2
CO-2	Translate texts and examine them	K2 and K4
CO-3	Draft summaries of literary texts	K2 and K6
CO-4	Identify the requirement and employ the different grammatical tenses	K3
CO-5	Analyse and critically assess the literary texts	K4 and K5

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	M	M	M	M	L	S	S	S	S	M
CO2	M	M	S	S	S	S	M	M	M	S	M	S
CO3	S	M	S	M	M	M	M	S	S	M	S	M
CO4	S	S	M	M	S	M	L	S	S	S	S	M
CO5	M	M	S	S	S	M	M	S	S	M	S	M

S-Strong M-Medium L-Low

III-Semester					
E	**Course Code:** 91332	**GENERAL ENGLISH-III**	**T**	**Credits:3**	**Hours:3**

Course Objectives	To make them active listeners To enhance the interpersonal relationship skills To embolden them to cope with stress To master grammar skills To help them to use English effectively in a business environment
Unit I	**ACTIVE LISTENING** **Short Story** In a Grove – Akutagawa Ryunosuke Translated from Japanese By Takashi Kojima The Gift of the Magi – O' Henry **Prose** Listening – Robin Sharma Nobel Prize Acceptance Speech – Wangari Maathai
Unit II	**INTERPERSONAL RELATIONSHIPS** **Prose** Telephone Conversation – Wole Soyinka Of Friendship – Francis Bacon **Song on (Motivational/ Narrative)** Ulysses – Alfred Lord Tennyson And Still I Rise – Maya Angelou
Unit III	**COPING WITH STRESS** **Poem** Leisure – W.H. Davies Anxiety Monster – Rhona McFerran **Readers Theatre** The Forty Fortunes: A Tale of Iran Where there is a Will – Mahesh Dattani
Unit IV	**Grammar** Phrasal Verbs & Idioms Modals and Auxiliaries Verb Phrases – Gerund, Participle, Infinitive
Unit V	**Composition/ Writing Skills** Official Correspondence – Leave Letter , Letter of Application, Permission Letter Drafting Invitations Brochures for Programmes and Events

References

1 Wangari Maathai – Nobel Lecture. Nobel Prize Outreach AB 2023. Jul 2023.
2 Mahesh Dattani, Where there is a Will. Penguin, 2013.
3 Martin Hewings, Advanced English Grammar, Cambridge University Press, 2000
4 Essential English Grammar by Raymond Murphy

Course Outcomes		Knowledge Level
CO-1	Listen actively	PO1,PO7
CO-2	Develop interpersonal relationship skills	PO1,PO2,PO10
CO-3	Acquire self-confidence to cope with stress	PO4,PO6,PO9
CO-4	Master grammar skills	PO4,PO5,PO6
CO-5	Carry out business communication effectively	PO3,PO8

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	3	3	3	2	3	2
CO2	2	3	3	3	2	3	3	2	2	2
CO3	3	3	3	2	3	3	3	2	3	2
CO4	3	3	3	3	3	3	3	2	2	2
CO5	3	2	3	3	3	3	3	2	2	3

3 – Strong, 2 – Medium, 1 - Low

Mapping with Programme Specific Outcomes:

CO/PO	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3
CO2	3	3	3	3
CO3	3	3	3	3
CO4	3	3	3	3
CO5	3	3	3	3
Weightage	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0

III-Semester					
Core	**Course Code:** 91333	**Aircraft Materials & Hardware**	**T**	**Credits:3**	**Hours:4**

Course Objectives	1. To familiarize with the basic properties, identification and heat treatment of metals. 2. To understand about various testing methods of metals. 3. To learn about composite materials used in Aircraft. 4. To educate different types of corrosion and causes of corrosion. 5. To practice the procedures of fastening and locking procedures
Unit I	**Aircraft Materials — Ferrous** Characteristics, properties and identification of common alloy steels used in aircraft – Heat treatment and application of alloy steels - Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.
Unit II	**Aircraft Materials — Non-Ferrous** Characteristics, properties and identification of common non-ferrous materials used in aircraft - Heat treatment and application of non-ferrous materials - Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.
Unit III	**Aircraft Materials — Composite and Non-Metallic** Composite and non-metallic other than wood and fabric - Characteristics, properties and identification of common composite and non-metallic materials other than wood used in aircraft - Sealant and bonding agents - The detection of defects/deterioration in composite and non-metallic material - Repair of composite and non-metallic material.
Unit IV	**Corrosion** Types of corrosion and their identification - Causes of corrosion - Material types, susceptibility to corrosion – Locking devices - Tab and spring washers, locking plates, split pins, wire locking, quick release fasteners, keys, circlips, and cotter pins - Aircraft rivets - Types of solid and blind rivets - Specifications and identification - Heat treatment.
Unit V	**Fasteners** Screw threads - Screw nomenclature - Thread forms, dimensions and tolerances for standard threads used in aircraft - Measuring screw threads - Bolt types: specification, identification and marking of aircraft bolts, international standards - Nuts: self-locking, anchor, standard types - Machine screw - aircraft specifications – Studs - types and uses - Insertion and removal.

References

TEXT BOOKS

1. Materials and Hardware EASA part 66/147, Torm Forenz & Michael Amrine, Aircraft Technical Book Company, 2016
2. Airframe & Power plant Mechanics (General Handbook EA-AC 65-9A), Federal Aviation Administration (FAA), U.S.Department of Transportation, Flight standard service, 1976

REFERENCE BOOKS

1. Airframe & Power plant Mechanics (Airframe Handbook EA-AC 65-15A), Federal Aviation Administration (FAA), U.S. Department of Transportation, Flight standard service, 1976
2. Civil Aircraft Inspection Procedures (CAP 459-Part I, Basic), Civil Aviation Authority (CAA) London UK, Himalayan books, 1st edition, 2010
3. Aircraft Materials and Processes , George F.Titterton, Himalayan books, 5th edition, 2015
4. Advanced Composites (EA-358), Cindy Foreman, Jeppsen sqnderson inc., 1990

5. Shop Theory, James Anderson Earl E. Tatro, Tata McGraw-Hill Publishing company Limited, 6th edition, 2007		
Course Outcomes		**Knowledge Level**
CO-1	Define basic properties of ferrous metals, heat treatment procedures, Find hardness testing of ferrous metals	K1
CO-2	Explain Heat treatment procedures, Illustrate hardness testing of Non - ferrous metals	K2
CO-3	Discuss percentage of composite materials used modern Aircraft parts and identify the defects and damage	K6
CO-4	Identify types of corrosion in Aircraft and causes, Practice locking devices and Rivets	K3
CO-5	Identify different types of fasteners used in Aircraft and practice removal and installation	K3

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	1	1	1	2	1	1	1	2	2
CO2	3	2	3	1	1	1	2	1	1	1	2	2
CO3	2	3	2	3	2	1	1	1	2	1	3	3
CO4	2	3	2	3	2	1	1	1	1	1	2	2
CO5	2	2	2	2	1	1	1	1	1	1	2	2
W.AV	**2.4**	**2.4**	**2.4**	**2**	**1.4**	**1**	**1.4**	1	1.4	**1**	2.2	**2.2**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	2	2
CO2	3	2	2	1	2
CO3	2	2	1	2	2
CO4	2	3	1	2	1
CO5	2	2	1	2	1
W.AV	**2.4**	**2.4**	**1.4**	**1.8**	**1.6**

S–Strong(3),M-Medium(2),L-Low(1)

III-Semester					
Core	**Course code:** 91334	**Aviation legislation**	**T**	**Credits:3**	**Hours:3**
Course Objectives	1. To familiarize the regulatory frame work and inter relationship between various DGCA approved organizations 2. To provide knowledge on Registration procedure of aircraft, issue of certificate of airworthiness and licensing procedure of Aircraft Maintenance Engineers (AMEs) 3. To educate DGCA requirements on aircraft maintenance and certification procedure. 4. To learn Various instruments and equipment required for operation of aircraft including test flight procedures and evaluation. 5. To educate requirements on, Aircraft fuelling precautions, procedures and aviation fuel quality control.				
Unit I	**Regulatory frame work and inter-relationship between various organizations** Aircraft Act & Rules: - Indian Aircraft Act 1934 -Aircraft Rules-1937 -Rules related to registration, airworthiness, maintenance and operation of aircraft. Role of International Civil Aviation Organisation (ICAO). Civil Aviation Requirements (CAR): - Various Sections of CAR-Procedure of issue and revision/ amendments- Various circular issued by DGCA - Aeronautical Information Circulars (AICs)-Air worthiness Advisory Circulars (AACs)-Interrelationship between various DGCA approved organisations viz-a-viz design/production organisations, training organisations, maintenance organisations and Continuing Airworthiness Management Organisation (CAMO) etc.				
Unit II	**Registration of aircraft & licensing of personnel (CARSERIES-F, PART-I, III and CAR-66)** Registration of aircraft -categories, Procedure, Validity, Registration makings, Registration fees. Certificate of airworthiness :Requirement for issue, renewal and validity. Approval of organisations - minimum requirements for grant of approval, Validity, renewal, - Functions of CAR-145 & CAR-Morganizations. Licensing of personnel: -AME license categories, Privileges and procedure for issue/extension and renewal of AME License.				
Unit III	**Aircraft maintenance, and certification** Defect Recording, Reporting, Investigation, Recertification& Analysis-Requirements on special flight permit -Weight & Balance control of Aircraft- Documents to be carried on board by Indian Registered Aircraft - Minimum Equipment List – Mandatory modifications/Airworthiness Directives (AD) - Aircraft log books, recording and preservation of logbooks. Requirements on maintenance certification.				
Unit IV	**Test flight performance evaluation and instruments** Circumstance necessitating flight testing, flight test report including its evaluation, Certification after test flight. Aircraft instruments and equipment for flying training organisation/aerial work aircraft and gliders. Aeroplane instruments/equipment and flight documents required for operation of commercial air transport – Requirements of First Aid kit, medical kit -Universal precaution kit.				
Unit V	**Fuelling procedure and Quality Control** Fuel, Oil and Lubricants - Aircraft fuelling procedures - special precautions to be taken in the fuelling zone- safety precautions against static electricity discharge bonding and earthing, fire hazard, storms and heavy rain-Servicing and maintenance of aircraft during fuelling -Fuelling aircraft with passengers aboard-Aviation fuel quality control requirements at Airport Fuelling Station (AFS).				

References

TEXT BOOK:

1. Civil Aviation Requirements (CAR) By DGCA.
2. Aircraft Manual (India) Volume I-Aircraft Act 1934(latest update on 09-11- 2022) & Aircraft Rules 1937- (Latest update on 03-09-2019)

REFERENCE BOOK:

1. Aeronautical Information Circulars (AICs)-(Latest update on 01-02-2023)
2. Airworthiness Advisory Circulars (AACs)-(Latest update on 25-06-2023
3. CAR145(Latest update -Rev-5, on 15-06-2021)
4. CAR-66(Latest update -Rev 8 on 20-04-2022)
5. CAR M (Latest update on 10-05-2022)

Reference: -DGCA web site for syllabus content: - www.dgca.gov.in

Course Outcomes		**Knowledge Level**
CO-1	Understand the fundamental structure of Regulatory requirements of DGCA	K 2
CO-2	Acquires knowledge on procedures and requirements on registration of aircraft & licensing of personnel	K 1
CO-3	Understand concept of Aircraft maintenance/ certification requirements and documents used for the same.	K 2
CO-4	Acquire knowledge on circumstances of test flying aircraft, including test flight performance evaluation and aircraft instrument and equipment required for aircraft operation.	K 1
CO-5	Apply knowledge on aircraft fuelling precautions, procedure and quality control requirements	K 3

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	2	1	1	3	3	3	2	1	1	2
CO2	1	1	2	1	1	3	3	3	2	1	1	2
CO3	1	2	2	2	2	2	2	2	3	2	1	2
CO4	2	2	2	2	2	1	1	1	2	1	1	2
CO5	2	2	1	2	2	1	2	1	2	1	1	2
W.AV	**1.4**	**1.6**	**1.8**	**1.6**	**1.6**	**2**	**2.2**	2	2.2	**1.2**	1	**2**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	2	1	1
CO2	2	2	1	2	2
CO3	3	2	1	2	2
CO4	2	3	1	1	2
CO5	2	2	1	2	2
W.AV	**2**	**2**	**1.2**	**1.6**	**1.8**

S–Strong(3),M-Medium(2),L-Low(1)

III-Semester					
Core	**Course code:** 91335	**Aircraft Material & Hardware - Practical**	**P**	**Credits:3**	**Hours:6**
Course Objectives	1.To educate the students about the use of thread cutting taps and dies. 2.To familiarize students with dial test indicator. 3.To understand the use of power operated tools.				

List of Experiments

1. Identification of various threads bolts and screws.
2. Use of torque wrenches and locking devices.
3. Safety wire locking procedure.
4. Identification of aircraft rivets and Riveting practice.
5. Identification of metals and alloys.
6. Testing ferrous and Non-ferrous metals for hardness by Brinell method.
7. Identification of different types of corrosion on metals.

Course Outcomes		**Knowledge Level**
CO-1	Gain knowledge about 'Safety Precautions' while working in workshop	K1
CO-2	To Understand the use of Vernier caliper and Micrometer	K2
CO-3	To apply practical knowledge on drilling and thread cutting	K3

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	2	3	1	1	1	1	2	2
CO2	3	1	1	1	2	1	1	1	1	1	1	2
CO3	3	1	2	2	3	1	1	1	1	1	1	2
W.AV	**2.6**	**1**	**1.3**	**1.3**	**2.3**	**1.6**	**1**	1	1	**1**	1	**2**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	2	1
CO2	1	2	1	2	2
CO3	1	1	1	1	2
W.AV	**1**	**1.3**	**1**	**1.6**	**1.6**

S–Strong(3),M-Medium(2),L-Low(1)

III-Semester					
Allied	**Course Code:** 91336	**Electrical fundamentals- I**	**T**	**Credits:3**	**Hours:3**
Course Objectives	1. To provide technical knowledge on the principle and concept of Aircraft electricity and various methods for production of electricity. 2. To familiarize with the basic elements and concept of DC sources of electricity their construction and operation 3. To educate the theoretical fundamentals of resistance, factors affecting resistance and various types of resistors used in electrical circuitry. 4. To learn and apply the use mathematical formula in conjunction with physical laws describing the subject. 5. To educate the concept of capacitance, factors affecting capacitance and various types of capacitors used in electrical circuitry.				
Unit I	**Generation of Electricity:** Structure and distribution of electrical charges - within atoms, molecules, ions, compounds - Molecular structure of conductors - semiconductors and insulators - Static electricity and distribution of electrostatic charges - Electrostatic laws of attraction and repulsion - Units of charge - Coulomb's Law - Conduction of electricity in solids – liquids - gases and a vacuum - The following terms - their units and factor affecting them: potential difference - electromotive force - voltage, current, resistance, conductance, charge, conventional current flow, electron flow - Production of electricity by the following methods - light, heat, friction, pressure, chemical action, magnetism and motion.				
Unit II	**DC Sources of Electricity:** Construction and basic chemical action of - primary cells. Secondary cells - lead acid cells - nickel cadmium cells - other alkaline cells - Cells connected in series and parallel - internal resistance and its effect on a battery construction - materials and operation of thermocouples - Operation of photo-cells. - DC Circuits - Ohms Law - Kirchhoff's Voltage and Current Laws - calculation using the above laws to find resistance, voltage and current - significance of the internal resistance of a supply.				
Unit III	**Resistance/ Resistor:** Resistance and affecting factors - specific resistance - Resistor color code - Values and tolerance - preferred values - wattage ratings - Resistors in series and parallel - Calculation of total resistance using series - parallel and series parallel combination - Operation and use of potentiometers and rheostats - Positive and negative temperature coefficient conductance - fixed resistors – stability - tolerance and limitations - methods of construction of potentiometers and rheostats - Construction of Wheatstone Bridge				
Unit IV	**Power:** Power, Work and energy (kinetic and potential) - Dissipation of power by a resistor - Power formula -Calculations involving power - work and energy.				
Unit V	**Capacitance/ Capacitor:** Operation and function of a capacitor - Factor affecting capacitance area of plates - distance between plates - number of plates, dielectric and - dielectric constant - working voltage - voltage rating - Capacitor types - construction and function - Capacitor colour coding - Calculation of capacitance and voltage in series and parallel circuits - Exponential charge and discharge of capacitor - time constant - Testing of capacitor.				

References

TEXT BOOK:

1. Aircraft Electricity and Electronics -by Thomas Eismin (5th edition)
2. EASA Module-3- by Tom Forenz, Aircraft Tech Book co.(2016)

REFERENCE BOOK:

1. Aircraft mechanics Hand Book –Airframe by FAA(9A),U.S Department of transportation, flight standard service,1976
2. Electrical Technology- by B.L.Theraja – 22nd edition
3. Aircraft Electrical System-by E.H.J.Pallett- 3rd edition Himalaya book company
4. Basic Electricity- by Dale Crane (2017)

Course Outcomes		**Knowledge Level**
CO-1	To have knowledge Aircraft electricity and various methods for production of electricity	K 1
CO-2	To understand the principle and concept of DC sources of electricity their construction and operation	K 2
CO-3	The applicant will be able to apply the concept of resistance, factors affecting resistance and various types of resistors used in electrical circuitry	K 3
CO-4	To analyze and calculate the power rating of electrical components	K 4
CO-5	The applicant will be able to evaluate the factors affecting capacitance and various types of capacitors used in electrical circuitry	K 5

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	2	1	1	3	3	3	2	1	1	2
CO2	2	1	2	1	1	3	2	3	2	1	1	2
CO3	1	2	1	2	2	1	1	2	3	2	1	2
CO4	2	2	1	2	2	1	1	1	2	2	1	3
CO5	2	2	1	2	1	1	2	1	2	1	1	2
W.AV	**1.6**	**1.6**	**1.4**	**1.6**	**1.6**	**1.8**	**1.8**	2	2.2	**1.4**	1	**2.2**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	2	1	1
CO2	3	3	1	3	2
CO3	3	2	1	2	2
CO4	2	3	2	2	3
CO5	2	2	1	3	2
W.AV	**2.2**	**2.2**	**1.4**	**2.2**	**2**

S–Strong(3),M-Medium(2),L-Low(1)

III-Semester					
Allied	**Course Code:** 91337	**Electrical Fundamentals – I Practical**	**P**	**Credits:2**	**Hours:4**
Course Objectives	1. To understand the experiment for verification of Ohm's law 2. To familiarize with Battery charging methods 3. To identify the various capacitors by testing.				

List of Experiments

1. Wiring of basic electrical circuits using series and parallel loads
2. Primary and secondary cell construction
3. Connecting the cells in series & parallel
4. Battery charging methods.
5. Experiment for verification of Ohm's law
6. Identification of the resistors with colour coding
7. Testing of capacitor

Course Outcomes		**Knowledge Level**
CO-1	To apply his knowledge in practical for carrying out verification of ohm's law	K 3
CO-2	To understand and carry out the testing of capacitors	K 2
CO-3	To be able to explain battery charging methods	K 5

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	2	3	1	1	1	1	2	2
CO2	3	1	1	1	2	1	1	1	1	1	1	2
CO3	3	1	2	2	3	1	1	1	1	1	1	2
W.AV	**2.6**	**1**	**1.3**	**1.3**	**2.3**	**1.6**	**1**	1	1	**1**	1	**2**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	2	2
CO2	1	2	1	1	3
CO3	1	1	1	2	2
W.AV	**1**	**1.3**	**1**	**1.6**	**2.3**

S–Strong(3),M-Medium(2),L-Low(1)

III-Semester					
SEC III	**Course Code:** 91338	**Entrepreneurship**	**p**	**Credits:2**	**Hours:2**

Course Objectives	1. To enable the students to understand the concept of Entrepreneurship and to learn the professional behavior about Entrepreneurship. 2. To identify significant changes and trends which create new business opportunities 3. To analyze the institutional arrangement for potential business opportunities. 4. To provide conceptual exposure on converting ideas to an women entrepreneurship
Unit I	**Entrepreneurship** Entrepreneur – Meaning – Importance – Definition – Types – Functions – Qualities of an Entrepreneur – Entrepreneurship as a career.
Unit II	**Business** Business Promotion – Product selection – Form of ownership – Plant location – land, building, water and power, raw material, machinery, power and other infrastructural facilities– Licensing, registration and local bye laws.
Unit III	**Business Plan Preparation** Institutional arrangements for entrepreneurship development – DIC, SIDCO, NSIC, SISI – Institutional finance to entrepreneurs – TIIC, SIDBI, Commercial banks – Incentives to small scale industries.
Unit IV	**Project** Project report – Meaning and importance – Project report – Format of a report (as per requirements of financial institutions) – Project appraisal – Market feasibility – Technical feasibility – Financial feasibility and economic feasibility – Break even analysis
Unit V	**Entrepreneurship Development Programme** Entrepreneurship development in India – Women entrepreneurship in India – Sickness in small scale industries and their remedial measures

References

Entrepreneurship and Management of Small business – Centre for Entrepreneurship Development, Madurai

Joseph Paul, N. Ajit kumar and T.Mampilly. Entrepreneurship development. Himalayan Publishing House.

Khan, M.A. Entrepreneurship Development Programmes in India. Kanishka Publishing House, Delhi

Saravanavel, P. (1997). Entrepreneurial Development. Ess Pee kay Publishing House, Chennai.

Vasant Desai. Dynamics of Entrepreneur Development and Management. Himalayan Publishing House.

Course Outcomes		**Knowledge Level**
CO-1	To understand the significance of entrepreneurship and entrepreneur qualities	K 2
CO-2	To know about the developing ideas and techniques of business.	K 2
CO-3	To understand about the procedures of startup.	K 2
CO-4	To identify the institutional support provided to entrepreneurs.	K 3
CO-5	To analyse the women entrepreneurship development	K 4

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	1	1	2	3	2	2	2	1	2
CO2	1	1	2	2	1	2	2	2	3	2	1	3
CO3	1	1	1	1	1	2	3	2	2	2	1	2
CO4	1	1	2	2	1	2	1	2	3	2	1	3
CO5	1	1	1	2	1	1	1	2	1	1	1	1
W.AV	**1**	**1**	**1.4**	**1.6**	**1**	**1.8**	**2**	2	2.2	**1.8**	1	**2.2**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	3	2	2
CO2	1	1	3	1	1
CO3	1	1	2	2	2
CO4	1	1	2	1	2
CO5	1	1	2	2	1
W.AV	**1.2**	**1**	**2.4**	**1.6**	**1.6**

S–Strong(3),M-Medium(2),L-Low(1)

இரண்டாம் ஆண்டு - மூன்றாம் பருவம்				
பாடக்குறியீட்டு எண்:	பள்ளியில் தமிழ் பயிலாத மாணாக்கர்களுக்கான அடிப்படைத் தமிழ்ப் பாடங்கள்	T/P	C	H/W
	தமிழ் மொழியின் அடிப்படைகள்	P	2	2
நோக்கம் :	➢ இலக்கணம் அறிந்து கொள்ள வாய்ப்பினை ஏற்படுத்துதல். ➢ தமிழ் மொழியில் பிழையின்றி எழுத அறிந்துகொள்ள வாய்ப்பினை ஏற்படுத்துதல்.			
அலகு -1	எழுத்துக்கள் – உயிர் எழுத்துக்கள் – மெய்யெழுத்துக்கள் – உயிர்மெய்யெழுத்துக்கள்			
அலகு -2	சொற்களின் வகை அறிதல் – பெயர்ச்சொல் – வினைச்சொல் – இடைச்சொல் – உரிச்சொல்			
அலகு-3	எழுத்துக்களின் வேறுபாடு அறிதல்: ணகர, னகர எழுத்துக்கள் சொற்களில் பயின்று வருதல் லகர, ழகர, ளகர வேறுபாடு அறிதல் ரகர, றகர வேறுபாடு அறிதல்.			
அலகு -4	எழுத்துக்களின் பிறப்பு – உச்சரிப்புப் பயிற்சி அளித்தல் – பிழையின்றிப் படிப்பதற்குப் பயிற்சி அளித்தல்.			
அலகு -5	பிறமொழிச் சொற்களைக் கண்டறிதல் – தமிழ் மாதங்கள் – கிழமைகள் – எண்கள் – சுவைகள் – உறவுப் பெயர்கள் ஆகியவற்றை அறிதல்			
பயன்கள்:	➢ அடிப்படை இலக்கணச் சூழலியல் கற்றால் தமிழ் மொழி இலக்கணங்கலை பிறமொழிகளோடு ஒப்பிடும் ஆற்றல் பெறுவர். ➢ அழகியல் உணர்ச்சிகளைப் புரிந்து கொள்ள ஏதுவாக இலக்கணம் இருக்கிறது என்பதை உணர்ந்து தனித்துவம் வாய்ந்தவர்களாக தன்னம்பிக்கைப் பெற்றவர்களாக மாறலாம்.			

இரண்டாம் ஆண்டு - மூன்றாம் பருவம்				
பாடக்குறியீட்டு எண்:	பள்ளியில் மேல்நிலைப் படிப்பு வரை தமிழ் பயின்று கல்லூரியில் பகுதி 1– இல் தமிழ் பயிலாத மாணாக்கர்களுக்கான சிறப்புத் தமிழ்ப் பாடங்கள்	T/P	C	H/W
	இக்கால இலக்கியம்	P	2	2

நோக்கம்	➢ கவிதை, சிறுகதை, புதினம், உரைநடை ஆகிய படைப்பியல் வகைகளைப் பற்றிய பரந்துபட்ட புலமையைப் பெருக்குதல். ➢ இக்காலத் தமிழ் இலக்கியங்களின் உள்ளடக்கம், வெளியீட்டு நெறி, படைப்பில் கொள்கை ஆகியவற்றை அறியச் செய்தல்
அலகு1	கவிதை இலக்கியம்
அலகு2	1. பாரதியார் – சுதந்திரப் பாடல்கள்: 'சுதந்திரப் பெருமை' என்ற பாடல் முதல் 'சுதந்திரப் பள்ளு' என்ற பாடல் வரை உள்ள 06 பாடல்கள். 2. பாரதிதாசன் – தமிழ் (முதல்தொகுதி) 'தமிழின் இனிமை' என்ற பாடல் முதல் 'தமிழ்க்கனவு' என்ற பாடல் வரை உள்ள 10 பாடல்கள். 3. நாமக்கல் கவிஞர் – காந்தி மலர் : 'காந்தி அஞ்சலி' என்ற பாடல் முதல் 'இணையிலர் காந்தி' என்ற பாடல்வரை உள்ள 6 பாடல்கள். 4. கவிமணி – உடல் நலம் பேணல் 'உடலின் உறுதி உடையவரே' என்ற பாடல் முதல் 'அருமை உடலின் நலமெல்லாம்' என்ற பாடல் வரை உள்ள 8 பாடல்கள் 5. பட்டுக் கோட்டை கல்யாண சுந்தரம் - காடு வெளையட்டும் பொண்ணே 6. கண்ணதாசன்- மனிதரைப் பாட மாட்டேன் (கவிதைகள்) 7. ஜீவா - பெண் விடுதலை 8. அப்துல் ரகுமான் - வீட்டுக்கொரு மரம் (கூடு துறக்கும் பறவை) 9. சண்முகம் சரவணன் - இயல்பாய் நடந்தேறியது
அலகு3	நாவல் இலக்கியம் இறையன்பு - ஆத்தங்கரை ஓரம்,
அலகு4	சிறுகதை இலக்கியம் 1. வ.வே.சு.ஐயர் - குளத்தங்கரை அரசமரம் 2. அறிஞர் அண்ணா - செவ்வாழை 3. ஜெயகாந்தன் - முன் நிலவும் பின் பனியும் 4. கி. ராஜநாராயணன். - கதவு 5. தனுஷ்கோடி ராமசாமி. - வாழ்க்கை நெருப்பூ 6. சே. செந்தமிழ்ப்பாவை. - வல்லமை தந்துவிட்டாய் 7. கரு. முருகன். - அப்பாவுக்கு காய்ச்சல் 8. சு.காந்திதுரை - துணிக்காரச் சாமி 9. கெண்டக்கரை வேட்டி - பாண்டுரங்கன்

அலகு	இலக்கணம் முதல் எழுத்துக்கள் – சார்பெழுத்துக்கள் – மொழி முதல் எழுத்துக்கள் – மொழி இறுதி எழுத்துக்கள் – வல்லினம் மிகும் இடங்கள், மிகா இடங்கள்.
நியூ செஞ்சுரி புக் ஹவுஸ் பிரைவேட் லிமிடெட்.சென்னை - 98.	
பயன்கள்	➢ இலக்கியங்கள் வாயிலாக மாணவர்கள் பல்வகைப்பட்ட சமூகப் போக்குகளையும் மக்களின் பண்பு நலன்களையும் அறிந்து கொள்ள இயலும். ➢ பல வகையான இலக்கிய வாசிப்பின் வாயிலாக மாணவர்கள் தங்களின் படைப்பாற்றல் உள்ளிட்ட பணி நிலைகளுக்கு உயர்வதற்கான வாய்ப்பினைப் பெறுவர்.

Semester III				
Course Code	**NME**	**T/P**	**C**	**H/W**
	IT Skills for Employment (Common to all UG programmes)	**P**	**2**	**2**

Objectives:

- Understand the components of computer
- Understand Internet and its terminology
- Understand basic cyber safety and security norms

Unit- 1	Introduction to Computers –Types of Computer - Hardware – Motherboard-Processor-RAM –ROM – SMPS – Graphics Card– Storage Devices – Hard Disc – SSD – DVD – CD – Pen drive- – Input/Output Devices – Keyboard – Mouse – Mic- Monitor-Camera-Types of Printer, Scanner, Projector.Basic of Computer network-Modem, Hub, Switch, Bridge, Routers-Wi-Fi – Bluetooth. Introduction to Free and Open Source Software(FOSS) – Need of Open Sources – Advantages of Open Sources– Copy rights- Software piracy.
Unit- 2	Basics of Operating System –Difference between various operating systems-User Interface of windows 10 OS - create , Copy ,Move and delete files and folders -Use of pen drive -CD-DVD Burning -Windows tools and features-Disk Space management-Disk Clean up-Managing Recycle Bin-Disk defragmentation -Add/ remove software's and programs.
Unit- 3	Basic operating of word processing - Creating, opening and closing documents- Use of shortcuts-Creating and Editing of Text - Formatting the text - Find and replace - Drawing Table-Page layout-Header / Footer - Setting page number-Creating simple applications like - resume - letter writing ,job application ets- Printing document. Basics of Excel worksheet & its importance-creating simple worksheets- formulas-conditional formatting-sort-filter- chart. Introduction to PowerPoint-understand various views of presentation, animations, transitions, header, footer etc.
Unit -4	Internet – ISP- Word wide web (www)- web browser-search engine- creating & using an email account like gmail or any other- checking email and composing Email-Attaching documents- Usageof CC & BCC. Understanding IP address-Bandwidth -Storing and retrieving file through google drive–sharing files and folders-google docs - language translation -voice to text, text to voice application-Google Meet-Zoom-Social media merits and demerits.Online educational websites (Moocs-nptel - Swayam Central- spoken-tutorial.org)-Video tutorials-Step to use Government portals like aadhaar-Election commission website-Eservices(eservices.tn.gov.in) etc-– Job Portals - Online Bill payment- Online fund transfer using UPI gateway.
Unit- 5	Internet Safety concerns: (Digital Footprints, Threats, Virus, Worm, Trojan Horse, Spam, Malware, Adware, Spyware, Snooping)-Security Measures :(Antivirus, Firewall)- Cyber Crime: (Phishing, Pharming, Spoofing, Hacking, Cracking,Identify Theft)Cyber Safety(IT Act, Cyber Laws)

Reference Books :

Vikas B. Agarwal Jyoti P. Mirani, Computer Fundamentals -Publisher: Nirali Prakashan (1 August 2019)

Lambert Joan, Lambert Steve, Windows 10 Step By Step, Publisher : PHI Learning Pvt Ltd

Mike Mc Grath and Michael, Office 2016 In Easy Steps, Price Publisher: BPB Publications

Adesh K. Pandey, Internet Fundamentals

James KL, The Internet : A Users Guide

Jaago Teens, Cyber Safety For Everyone - BPB Publications (October 12, 2019)

Refer website's and You tube tutorials .

Outcomes	➢ Skills to work efficiently with windows, word, excel, powerpoint presentation. ➢ Skills to use internet for various purpose with safe and secure.

IV-Semester					
T/OL	**Course Code:** 91341F	**FRENCH-IV**	**T**	**Credits:3**	**Hours:3**
Course Objectives	1. Apply connecting words (*cause, but, concession, condition, hypothèse, conséquence*) to improve the spoken as well as written communication skills 2. Differentiate the various past tenses in "*Les Temps du Passé*" and their unique usage 3. Summarize the literary texts 4. Identify and apply the different grammatical tenses of "*les temps dupassé*" in sample exercises to practice 5. Critically assess the literary texts through an analysis of its themes, narrative techniques,characters and its cultural significance				
Unit I	Décadi et son grand-pèreLe Petitchose Le passé simple				
Unit II	L'égoïste puniEstula Temps du passé – Emplois (le passé composé, l'imparfait, le passé simple, le plus-que-parfait)				
Unit III	Une Saison dans la vie d'Emmanuel L'expressionde la cause L'expression de la conséquence				
Unit IV	Une mauvaise nouvelle L'expression du but L'expression de la concession				
Unit V	La visite de la grand-mèreLe Horla L'expression de la condition et de l'hypothèse				

References

References

K. Madanagobalane & N.C. Mirakamal, *Le français par les textes*, Chennai, Samhita Publications – Goyal Publisher & Distributors Pvt Ltd, 2017

Course Outcomes		**Knowledge Level**
CO-1	Demonstrate the usage of connecting words in a given text	K2
CO-2	Understand and differentiate the various types of past tenses in "*Les Temps du Passé*"	K2 and K4
CO-3	Summarize the literary texts after a thorough analysis	K2 and K4
CO-4	Identify and apply the different grammatical tenses of"*les temps du passé*"	K3
CO-5	Analyze and critically assess the literary texts withregard to the themes and literary techniques	K4 and K5

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	M	S	M	L	S	M	L	S	S	M	S	L
CO2	S	M	M	L	M	M	L	S	S	S	M	L
CO3	M	S	S	M	M	M	M	S	M	M	S	L
CO4	S	M	M	L	M	M	L	S	S	S	M	L
CO5	M	S	S	M	M	M	M	S	M	M	S	L

S-Strong M-Medium L-Low

IV-Semester					
core	**Course Code:** 91342	**GENERAL ENGLISH-IV**	**T**	**Credits:3**	**Hours:3**

Course Objectives	To help learners imbibe goal-setting attitude. To enable them to understand the value of integrity To help them deal with emotions. To teach the learners to frame sentences using tenses. To enhance reporting skills.
Unit I	**GOAL SETTING (UNICEF)** **Life Story** From Chinese Cinderella – Adeline Yen Mah Why I Write - George Orwell **Short Essay** On Personal Mastery – Robin Sharma On the Love of Life – William Hazlitt
Unit II	**INTEGRITY** **Short Story** The Taxi Driver – K.S. Duggal Kabuliwala - Rabindranath Tagore A Retrieved Reformation – O Henry **Extract from a play** The Quality of Mercy (Trial Scene from theMerchant of Venice - Shakespeare)
Unit III	**COPING WITH EMOTIONS** **Poem** Pride – Dahlia Ravikovitch Phenomenal Woman – Maya Angelou **Reader's Theatre** The Giant's Wife A Tall Tale of Ireland –William Carleton The Princess and the God : A Tale of AncientIndia
Unit IV	**Language Competency Sentences** Simple Sentences Compound Sentences Complex Sentences **Direct and Indirect Speech**
Unit V	**Report Writing** Narrative Report Newspaper Report **Drafting Speeches** Welcome Address Vote of Thanks

References

1 Oxford Practice Grammar , John Eastwood, Oxford University Press
2 Cambridge Grammar of English , Ronald Carter and Michael McCarthy
3 George Orwell Essays, Penguin Classics

Course Outcomes		Knowledge Level
CO-1	Determine their goals	PO1,PO7
CO-2	Identify the value of integrity.	PO1,PO2,PO10
CO-3	Deal with emotions.	PO4,PO6,PO9
CO-4	Frame grammatically correct sentences	PO4,PO5,PO6
CO-5	Write cohesive reports.	PO3,PO8

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	3	3	3	2	3	2
CO2	2	3	3	3	2	3	3	2	2	2
CO3	3	3	3	2	3	3	3	2	3	2
CO4	3	3	3	3	3	3	3	2	2	2
CO5	3	2	3	3	3	3	3	2	2	3

3– Strong, 2 – Medium , 1 – Low

Mapping with Programme Specific Outcomes:

CO/PO	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3
CO2	3	3	3	3
CO3	3	3	3	3
CO4	3	3	3	3
CO5	3	3	3	3
Weightage	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0

IV-Semester					
Core	**Course Code:** 91343	**Maintenance Practices I**	**T**	**Credits:4**	**Hours:4**

Course Objectives	1. To familiarize the students with engineering drawing using drawing instruments. 2. To educate the students about the pipes and hoses used in aircraft. 3. To provide knowledge bearings used in aircraft systems. 4. To learn and understand about the control cables used in aircraft control surface operation. 5. To apply knowledge while handling the sheet metal with different forming operations and also Composite Material.
Unit I	**Engineering Drawings, diagram and standards** Introduction to engineering drawings - Drawing instruments - Drawing types – Projections - first angle projection - third angle projection - Reading of the drawing - ATA100 specifications - Wiring diagrams - Block diagrams - Schematic diagrams.
Unit II	**Pipes and Hoses** Introduction to pipes and Hoses - Bending and belling/ flaring aircraft pipes - Inspection and testing of aircraft pipes and hoses - Installation and clamping of pipes. – Springs- Inspection and testing of springs.
Unit III	**Bearings** Introduction to Bearings – Testing - cleaning and inspection of bearings - Lubrication requirements of bearings - Defects in bearings and their causes - Transmissions- Inspection of gears - backlash - Inspection of belts and pulleys p chains and sprockets.
Unit IV	**Control Cables** Inspection of screw jacks - lever devices - push-pull rod systems - Swaging of end fittings - Inspection and testing of control cables - Bowden cables - aircraft flexible control systems
Unit V	**Material handling** Introduction to materials handling - Sheet Metal - Marking out and calculation of bend allowance - Sheet metal working, including bending and forming - Inspection of sheet metal work - Composite and non-metallic - Bonding practices - Environmental conditions - Inspection methods.

References

Text Book:

1. Civil Aircraft Inspection Procedures (CAP 459-Part I, Basic) by CAA UK, Sterling book House Mumbai Edition 2006.
2. Airframe handbook EA-AC 65-15A (FAA) Author: Aviation supplies and academics (ASA); Publisher: Federal Aviation Administration (FAA); Edition: April 2009

REFERENCE BOOKS:

1. Shop Theory by James Anderson Earl E. Tata McGraw Hill, 6th edition. Sterling Books Company
2. EASA Module-07 A Maintenance practices; Publisher: Aircraft tech book & co.
3. Workshop technology; Author: AK Hajra Choudhary and SK Hajra Choudhary; Publisher: Himalaya Book Store, New Delhi
4. Aircraft general engineering; Author: Lalit Gupta. Publisher: Himalaya Book Store, New Delhi
5. AC – 43.13 1B/2B – Acceptable Methods: Techniques and practices of Aircraft inspection and repairs; Author: Aviation supplies and academics (ASA); Publisher: Federal Aviation Administration (FAA); Edition: April 2009

Course Outcomes		Knowledge Level
CO-1	Create Engineering Drawings, diagram and standards	K 6
CO-2	Understanding Pipes and Hoses, Springs	K 2
CO-3	Analyze the testing of Bearings, Transmission elements	K 4
CO-4	Knowledge of screw jacks, lever devices, push-pull rod systems	K 1
CO-5	To understand material handling	K 2

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	1	1	1	1	2	1	2	3
CO2	1	2	1	1	2	1	1	1	1	1	1	2
CO3	2	2	3	2	2	1	1	1	1	1	1	1
CO4	1	1	1	1	2	1	1	1	1	1	1	2
CO5	2	1	3	2	1	1	1	1	1	1	1	1
W.AV	**1.8**	**1.6**	**2**	**1.6**	**1.6**	**1**	**1**	1	1.2	**1**	1.2	**1.8**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	2	2	3
CO2	2	2	1	2	2
CO3	1	3	1	1	3
CO4	1	1	1	2	1
CO5	1	2	1	1	2
W.AV	**1.4**	**2**	**1.2**	**1.6**	**2.2**

S–Strong(3),M-Medium(2),L-Low(1)

IV-Semester					
Core	**Course Code** 91344	**Human factors**	**T**	**Credits:4**	**Hours:4**
Course Objectives	1. To familiarize with the human factors issues that we usually come across. 2. To provide valid information in respect of human performance and limitations. 3. To have better understanding on the social psychology of human and his behavior. 4. To learn more about the human performance in varying environmental conditions. 5. To provide knowledge on the communication aspects of human in society.				
Unit I	**General and Physical environment** The need to take human factors into account; Incidents attributable to human factors/human error; 'Murphy's' law.; Noise and fumes; Illumination; Climate and temperature; Motion and vibration; working environment				
Unit II	**Human Performance and Limitations and Social psychology** Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access; Responsibility-individual and group; Motivation and de-motivation; Peer pressure; 'Culture' issues; Team working- Management, supervision and leadership				
Unit III	**Factors Affecting Performance** Fitness/health; Stress-domestic and work related; Time pressure and deadlines; Workload-overload and under load; Sleep and fatigue; shift work; Alcohol, medication, drug abuse.				
Unit IV	**Tasks and Communication** Physical work-Repetitive Tasks-Visual inspection; Complex systems; Communication within and between teams; Work logging and recording; Keeping up to date-currency; Dissemination of information				
Unit V	**Human error and Hazards in workplace** Error models and theories; Types of error in maintenance tasks; Implications of errors (i.e. accidents); Avoiding and managing errors. Recognizing and avoiding hazards; Dealing with Emergencies.				

References

TEXT BOOK:

1. Module 9 Human Factors, Aircraft tech book company, Edition: V004.3, published in 2021, CO, US, Colarodo.
2. CAP 715 An Introduction to Aircraft Maintenance Engineering Human Factors for JAR 66, Civil Aviation Authority, 2002.

REFERENCE BOOK:

1. CAP 716 Aviation Maintenance Human Factors, Civil Aviation Authority, 2003
2. CAP 718 Human Factors in Aircraft Maintenance and Inspection, Civil Aviation Authority, 2002.
3. ICAO Doc 9806 Human Factor Guidelines, International Civil Aviation Organization, 2002.

Course Outcomes		**Knowledge Level**
CO-1	Students should be able to define human factors issues in general.	K1
CO-2	Students should be able to explain the basic concepts of human factors.	K2
CO-3	Students are able to apply their knowledge in day-to-day life with regards to human factors.	K3
CO-4	To analyse and solve the various human factors issues on routine basis.	K4
CO-5	Students must be able to evaluate and interpret the situation to solve the issue.	K5

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	1	1	2	3	2	2	2	1	2
CO2	1	1	2	2	1	2	2	2	3	2	1	3
CO3	1	1	1	1	1	2	3	2	2	2	1	2
CO4	1	1	2	2	1	2	1	2	3	2	1	3
CO5	1	1	1	2	1	1	1	2	1	1	1	1
W.AV	**1**	**1**	**1.4**	**1.6**	**1**	**1.8**	**2**	2	2.2	**1.8**	1	**2.2**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	3	2	2
CO2	1	1	3	1	1
CO3	1	1	2	2	2
CO4	1	1	2	2	2
CO5	1	1	2	1	1
W.AV	**1.2**	**1**	**2.4**	**1.6**	**1.6**

S–Strong(3),M-Medium(2),L-Low(1)

IV-Semester					
Core	**Course Code:** 91345	**Maintenance Practices – I Practical**	**P**	**Credits:3**	**Hours:6**
Course Objectives	1.To familiarize with the use and type of fire extinguishers. 2.To have knowledge on pipe line flaring and its tool kit. 3.To educate the students about Sheet metal Bending & Forming.				

List of Practical:

1. Identification of CO_2 and DCP fire extinguisher.
2. Riveting by Lap Joint.
3. Riveting by Butt Joint.
4. Bending & Flaring of Aluminium pipes.
5. Engineering Drawing Practices.
6. Sheet metal Bending & Forming.
7. Swaging of cables.

Course Outcomes		**Knowledge Level**
CO-1	To have knowledge about aluminiumtu be flaring procedure	K1
CO-2	To understand Engineering Drawings for carrying out the repair procedure.	K2
CO-3	To analyse and apply different type of joints while repairing the structure.	K3

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	2	3	1	1	1	1	2	2
CO2	3	1	1	1	2	1	1	1	1	1	1	2
CO3	3	1	2	2	3	1	1	1	1	1	1	2
W.AV	**2.6**	**1**	**1.3**	**1.3**	**2.3**	**1.6**	**1**	1	1	**1**	1	**2**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	2	3
CO2	1	2	1	2	2
CO3	1	1	1	2	1
W.AV	**1**	**1.3**	**1**	**2**	**1.4**

S–Strong(3),M-Medium(2),L-Low(1)

IV-Semester					
Allied	**Course Code:** 91346	**Electrical Fundamentals-II**	**T**	**Credits:3**	**Hours:4**

Course Objectives	1. To familiarize with the general description of DC generator and DC motor types and factors affecting their functions. 2. To provide technical knowledge on fundamentals of AC theory, production of sine wave, various values of sine wave, other types of wave forms and single and three phase AC principles 3. To learn and apply theoretical fundamentals of RLC circuits, phase relationship between voltage and current in RLC and able to use mathematical formula for power factor calculations 4. To educate the students understand the concept of transformer, a general description of its working principle, losses and types and to understand the operation, application and uses of various types of filters. 5. To educate the student with general description of AC generators and AC motors types and factors affecting their functions and should be able to apply his knowledge in practical manner using procedures.
Unit I	**DC Generator /Motor:** Basic motor and generator theory - Construction and purpose of components in DC generator - Operation of - and factors affecting output and direction of current flow in DC generators - speed and direction of rotation of DC motors - Series wound - shunt wound and compound motors - Starter Generator construction
Unit II	**AC Theory:** Sinusoidal waveform – phase – period – frequency – cycle – Instantaneous - average, root mean square – peak - peak to peak current values and calculations of these values - in relation to voltage - current and power - Triangular/Square waves - Single/ 3 phase principles
Unit III	**Resistive (R), Capacitive (C) and Inductive (L) Circuits:** Phase relationship of voltage and current in L - C and R - Power dissipation in L - C and R circuits – Impedance - phase angle - power factor and current calculations - True power - apparent power and reactive power calculations.
Unit IV	**Transformers & Filters:** Transformer construction principles and operation - Transformer losses and methods for overcoming them -Transformer action under load and no-load - Current - voltage transformers and auto transformers, Operation - application and uses of the following filters - low pass - high pass - band pass - band stop
Unit V	**AC Generators, AC Motors:** Rotation of loop in a magnetic field and waveform produced - Operation and construction of revolving armature and revolving field type AC generators - Single phase - two phase and three phase alternators - Three phase star and delta connections advantage and uses - Permanent Magnet Generators - AC Motors – Construction - principles of operation and characteristics of - AC synchronous and induction motors both single and poly phase - Methods of speed control and direction of rotation

REFERENCE BOOKS:

TEXT BOOK:

1. Aircraft Electricity and Electronics -by Thomas Eismin (5th edition)
2. EASA Module-3- by Tom Forenz, Aircraft Tech Book co. (2016)

REFERENCE BOOKS:

1. Aircraft mechanics Hand Book – Airframe by FAA (9A),U.S Department of transportation, flight standard service,1976

2. Electrical Technology- by B.L.Theraja – 22nd edition 3. Aircraft Electrical System-by E.H.J.Pallett - 3rd edition Himalaya Book Company 4. Basic Electricity- by Dale Crane (2017)		
Course Outcomes		**Knowledge Level**
CO-1	To have knowledge on DC generators and DC motors types and factors affecting their functions	**K1**
CO-2	To understand the principle and concept of AC theory, production of sine wave, other types of wave forms and single and three phase AC principles	**K2**
CO-3	To apply the knowledge on transformers' working principle, losses and types and to understand the operation, application and uses of various types of filters	**K3**
CO-4	The applicant will be able to analyze the principle of AC generators, types and AC motors, their types and factors affecting their functions.	**K4**
CO-5	To applicant will be able to evaluate concept of RLC circuits, phase relationship between voltage and current in RLC, power factor calculations	**K5**

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	2	2	3	2	2	2	2	2
CO2	2	2	2	2	2	2	2	2	2	2	2	2
CO3	3	3	2	2	2	2	1	1	2	1	1	3
CO4	2	2	2	2	2	2	2	2	2	2	2	2
CO5	2	2	3	2	2	2	2	2	2	2	2	2
W.AV	**2.4**	**2.1**	**1.8**	**1.8**	**2**	**2**	**2**	1.6	2	**1.8**	1.8	**2.2**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	2	2	2
CO2	2	2	2	2	2
CO3	3	2	2	3	2
CO4	2	2	3	2	2
CO5	3	2	2	3	2
W.AV	**2.4**	**1.8**	**2.1**	**2.4**	**2**

S–Strong(3),M-Medium(2),L-Low(1)

IV-Semester					
Allied	**Course Code:** 91347	**Electrical Fundamentals – II Practical**	**P**	**Credits:2**	**Hours:4**

Course Objectives	1. To learn about DC generator and DC motor parts 2. To have knowledge on measurement of triangular/ square wave pattern by using CRO 3. To educate the testing of insulators and continuity on electrical cables

List of Practical

1. Familiarization of DC Generator& parts
2. Familiarization of DC Motor& parts
3. Measurement of triangular/ square wave pattern by using CRO
4. Testing of Insulation and Continuity on electrical cables/ equipment
5. Testing of transformers in load & no-load conditions
6. Familiarization of AC Generator& parts
7. Familiarization of AC Motor& parts

Course Outcomes		**Knowledge Level**
CO-1	To apply his knowledge in practical for carrying out measurement of triangular/ square wave pattern by using CRO	K 3
CO-2	To understand and carry out the testing of insulators and continuity on electrical cables	K 2
CO-3	To be able to compare DC generator and AC generator operation	K 5

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	2	3	1	1	1	1	2	2
CO2	3	1	1	1	2	1	1	1	1	1	1	2
CO3	3	1	2	2	3	1	1	1	1	1	1	2
W.AV	**2.6**	**1**	**1.3**	**1.3**	**2.3**	**1.6**	**1**	1	1	**1**	1	**2**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	2	3
CO2	1	2	1	2	2
CO3	1	1	1	1	1
W.AV	**1**	**1.3**	**1**	**1.6**	**2**

S–Strong(3),M-Medium(2),L-Low(1)

இரண்டாம் ஆண்டு - நான்காம் பருவம்				
பாடக்குறியீட்டு எண்:	பள்ளியில் தமிழ் பயிலாத மாணாக்கர்களுக்கான அடிப்படைத் தமிழ்ப் பாடங்கள்	T/P	C	H/W
	இலக்கியமும் மொழிப் பயன்பாடும்	P	2	2

நோக்கம்	➢ மாணவர்கள் தமிழின் சிறப்புகள் அறிதல். ➢ பிழையின்றித் தமிழ் பேசுவதற்குப் பயிற்சி அளித்தல்
அலகு	தமிழ் நீதி இலக்கியக் கருத்துக்களை அறிதல் திருக்குறள் (அறன் வலியுறுத்தல்) – 10 குறட்பாக்கள் ஆத்தி சூடி – முதல் 20 பாடல்கள் மூதுரை – முதல் 15 பாடல்கள்
அலகு	தமிழின் சிறப்புகளை அறிதல் – (வாய்மொழித் தேர்வு) தமிழ்மொழியின் தொன்மை – சிறப்பு – தமிழ் இலக்கியங்கள் – சங்கப்புலவர்கள் தமிழ்க்காப்பியங்கள் – புதுக்கவிஞர்கள் – குறித்த செய்திகளை அறிதல்
அலகு	சொற்களின் பயன்பாடு. அருஞ்சொற்பொருள் அறிதல் – பிரித்து எழுதுதல் – சேர்த்து எழுதுதல் – எதிர்ச்சொல் அறிதல், ஒரெழுத்து ஒரு மொழி அறிதல்
அலகு	பிழையின்றித் தமிழ் பேசுவதற்குப் பயிற்சி அளித்தல் (வாய்மொழித் தேர்வு) 1. பழமொழிகள், உவமைகள், மரபுத்தொடர்கள் ஆகியவை குறித்து அறிந்து பேசும் திறன்களை வளர்த்தல். 2. வரவேற்புரை, நன்றியுரை ஆற்றுவதற்குப் பயிற்சி அளித்தல் 3. கதைசொல்லும் திறன்களை வளர்த்தல்.(நீதிக் கதைகள் கூறல்)
அலகு	மொழிபெயர்ப்பு ஆங்கிலத்திலிருந்து தமிழில் மொழிபெயர்த்தல் 1. ஆங்கிலச் சொற்களை மொழி பெயர்த்தல் 2. ஆங்கிலத் தொடர்களைத் தமிழில் மொழிபெயர்த்தல்
பயன்கள்	➢ அச்சமின்றி தெளிவாக தங்களது கருத்துக்களை மாணவர்கள் எடுத்துரைக்க வழி அறிதல். ➢ சொற்களின் பயன்பாடு, தயக்கமின்றி பேசக் கற்றுக்கொள்வதால் மாணவர்கள் தன்னம்பிக்கை பெறுதல்

இரண்டாம் ஆண்டு - நான்காம் பருவம்				
பாடக்குறியீட்டு எண்:	பள்ளியில் மேல்நிலைப் படிப்பு வரை தமிழ் பயின்று கல்லூரியில் பகுதி 1-இல் தமிழ் பயிலாத மாணாக்கர்களுக்கான சிறப்புத் தமிழ்ப்பாடங்கள்	T/P	C	H/W
	பழந்தமிழ் இலக்கியங்களும் இலக்கியவரலாறும்	P	2	2

நோக்கம்	➢ மாணவர்கள் தமிழ் மொழியினைக் கற்பதால் அரிய இலக்கியங்களை அறியச் செய்தல் ➢ வாழ்வியல் அறங்களுக்கு வழிகாட்டுதலாக இருத்தல்
அலகு1	சங்க இலக்கியம் 1. நற்றிணை – 'நயனும், நண்பும், நாணூ 'எனத் தொடங்கும்பாடல் (குறிஞ்சி - 392) 2. குறுந்தொகை– 'நெய்தல் இருங் கழி' எனத் தொடங்கும் நெய்தற் பத்து பாடல். (நெய்தல்) 3. ஐங்குறுநூறு – 'வானம் பாடி வறம்' எனத் தொடங்கும் கிழவன் பருவம் பாராட்டுப் பத்து பாடல். (முல்லை) 4. அகநானூறு – 'கடல்கண் டன்ன' எனத் தொடங்கும் பாடல் (மருதம் - 176) 5. புறநானூறு – 'உண்டால் அம்ம இவ்வுலகம்' எனத் தொடங்கும் பாடல் 182. பிறர்க்கென முயலுநர்! பாடியவர்: கடலுள் மாய்ந்த இளம்பெரு வழுதி.
அலகு2	காப்பிய இலக்கியம் சிலப்பதிகாரம் – அடைக்கலக் காதை (மதுரைக் காண்டம்)
அலகு3	நீதி இலக்கியம் 1. திருக்குறள் – அறிவுடைமை – 10 குறட்பாக்கள் 2. நாலடியார் – மேன்மக்கள் (முதல் பாடல்) 3. நான்மணிக்கடிகை – 'அஞ்சாமை அஞ்சுக' எனத் தொடங்கும் பாடல் எண்: 27 4. இனியவை நாற்பது – 'எவது மாறாஇளக்கிளைமை' எனத் தொடங்கும் பாடல் எண்: 3 5. இன்னா நாற்பது – 'ஆற்றல் இலாதான் பிடித்த படை' எனத் தொடங்கும் பாடல் எண்: 07
அலகு4	இலக்கியவரலாறு 1. சங்க காலம் – எட்டுத்தொகை, பத்துப்பாட்டு. 2. காப்பிய இலக்கிய வரலாறு – ஐம்பெருங் காப்பியங்கள் – ஐஞ்சிறு காப்பியங்கள் 3. சிற்றிலக்கியங்கள் தோற்றமும் வளர்ச்சியும் 4. புதுக்கவிதை தோற்றமும் வளர்ச்சியும்.

அலகு	இலக்கணம் 1. சொல்வகை – பெயர், வினை, இடை, உரி 2. அணி இலக்கணம் – உவமை அணி, உருவக அணி தற்குறிப்பேற்ற அணி, உயர்வு நவிற்சி அணி. 3. புதுக்கவிதை இலக்கணம்– படிமம் குறியீடு.
பயன்கள்	➢ அரசுப் பணி பெறுவதற்கான வாய்ப்பினை நல்குதல். ➢ நடைமுறைத் தமிழ் இலக்கியத்தை அறைய உதவுதல்

Semester-IV				
Course code:	**NME**	**T/P**	**C**	**H/W**
	Small Business Management	**P**	**2**	**2**
Objectives	➢ To understand the policy initiatives and infrastructural support for establishing a small scale enterprises ➢ To analyze the opportunities for starting a small enterprise.			
Unit-I	Small Scale enterprises–An Introduction and overview– Definition– Scope and importance – relative advantages of small scale enterprises vis - a – vis –Large and medium scale industries – Efforts to development of SSE- Meaning and concept of entrepreneurship, the history of entrepreneurship development, role of entrepreneurship in economic development, agencies in entrepreneurship management and future of entrepreneurship.			
Unit-II	Policy and institutional infrastructure for small enterprises – Development agencies for small enterprise–small enterprises growth and environmental factors influence– funding agencies and their role in Developing SSE.- Meaning of entrepreneur, the skills required to be an entrepreneur, the entrepreneurial decision process, and role models, mentors and support system.			
Unit-III	Establishing the small scale enterprises–opportunities scanning–Choice of enterprise–Market assessment for SSE–Choice of technology and selection of site– Financing the new/small enterprise– Preparation of business plan– Ownership structure and organizational framework-Business ideas, methods of generating ideas, and opportunity recognition			
Unit-IV	Operating the small-scale enterprise – Financial management issues in SSE – Operation management issues in SSE – Marketing management issues in SSE- Importance of new venture financing, types of owner ship securities, venture capital, types of debt securities, Determining ideal debt-equity mix, and financial institutions and banks			
Unit-V	Performance appraisal and growth strategies – Management performance assessment and control–Growth and stabilization strategies for small enterprises – Managing family enterprises–Related Cases-Exit strategies for entrepreneurs, bankruptcy, and Succession and harvesting strategy			
Unit-VI	Dynamic Component for Continuous Internal Assessment only: Contemporary Developments Related to the Course during the Semester concerned.			

REFERENCES:

MathurS.P.(1979)Economics of small-scale industries.

Siropolis.(1986)Entrepreneurship and small Business Management Vasant Desai.(1979)Organization and management of small scale industries.

Outcomes	➢ The student should be able find out a suitable idea for starting a small enterprise ➢ The student should be able to visualize the importance of small scale enterprises in economic development.

V-Semester					
Core	**Course Code:** 91351	**Maintenance practices II**	**T**	**Credits:4**	**Hours:4**
Course Objectives	1. To provide knowledge on practice of welding, brazing, soldering and bonding. 2. To apply knowledge on aircraft jacking, jacking, securing and storage. 3. To educate and understand disassembly, inspection, repair, assembly and NDT techniques, 4. To familiarize about fire protection system. 5. To educate on aircraft weight and balance procedure.				
Unit I	**Welding, Brazing, Soldering and Bonding:** Soldering methods – tools used, precaution to be followed - inspection of soldered joints - Welding method - tools used - precaution to be followed – types in welded joints - inspection of welded joints and brazing methods tools used - precaution to be followed - inspection of Bonded joints.				
Unit II	**Aircraft Weight and Balance:** Centre of Gravity calculation - Balance limits calculation - use of relevant documents - Preparation of aircraft for weighing - Aircraft weighing procedure - Abnormal Events - Inspections following lightning strikes and HIRF penetration - Inspections following abnormal events such as heavy landings and flight through turbulence.				
Unit III	**Aircraft Handling and Storage:** Aircraft taxiing - towing and - associated safety precautions - Aircraft jacking – chocking - securing and associated safety precautions - Aircraft storage methods – Refueling /defueling procedures - De-icing procedures - anti- icing procedures - Electrical, hydraulic and pneumatic ground supplies				
Unit IV	**Disassembly, Inspection, Repair and Assembly techniques:** Types of defects - Visual inspection techniques like boroscope - telescope, magnifying glass – Non-destructive testing – die penetrate - oil &chalk process - Fluorescent inspection - ultrasonic method – radiography - Magnetic particle inspection - Eddy current inspection - Endoscope inspection - Trouble shooting techniques				
Unit V	**Fire Protection Systems** Types of systems - Flame proofing - Fire walls - Fire detection systems - Fire extinguishing systems - Seat Safety Systems - Ejection seats - Survival packs – Parachutes - Pilot's personal equipment - life rafts - Doors, Windows and Emergency exits - Seat belts. System Testing - Ground handling equipment.				

REFERENCE BOOKS:

TEXT BOOKS:

1. Airframe handbook EA-AC 65-15A Federal Aviation Administration; Publisher: Shroff; Edition: 2012

2. Airframe & Power plant Mechanics (General Handbook EA-AC 65-9A) - Federal Aviation Administration; Publisher: Shroff; Edition: 2012.

REFERENCE BOOKS:

1. CAP 459 part-I Civil Aircraft Inspection Procedure – Basic, By: CAA; Publisher: Sterling Book House, Mumbai; Edition: Year 2006.

2. EASA Module 07A Maintenance practices; Publisher: Aircraft tech book & co.

3. Aircraft maintenance and repair; Author: Ronald Sterkenburg; Michael J. Kroes; Publisher: McGraw Hill, New Delhi; Edition: 8th Edition 13th September 2019.

4. Aviation maintenance technician handbook - Airframe volume-01: FAA–H-8083-31A Volume 2 (FAA Handbook Series; Author: Aviation Supplies and Academics (ASA); Publisher: Federal Aviation

Administration (FAA); Edition: 20th November 2018. 5. Shop Theory; Author: James Anderson Earl E. Tata; Publisher: McGraw Hill; Edition: 6th edition 2016		
Course Outcomes		**Knowledge Level**
CO-1	To have knowledge on Fire Protection Systems	**K1**
CO-2	To understand the Aircraft Handling and Storage procedure	**K2**
CO-3	To apply the knowledge on Welding, Brazing, Soldering and Bonding Procedure	**K3**
CO-4	Knowledge to analyze Disassembly, Inspection, Repair and Assembly techniques	**K4**
CO-5	To evaluate the Aircraft Weight and Balance procedure	**K5**

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	3	2	2	1	2	2	1	3
CO2	1	1	1	2	2	1	1	1	2	3	2	1
CO3	3	2	1	3	2	2	1	2	1	1	3	2
CO4	2	3	3	2	1	2	3	3	2	2	2	2
CO5	2	2	2	2	2	3	2	2	1	1	2	1
W.AV	**2**	**2**	**1.8**	**2.2**	**2**	**2**	**1.8**	**1.8**	**1.6**	**1.8**	**2**	**1.8**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	3	2	1
CO2	3	2	2	2	2
CO3	2	1	2	1	2
CO4	1	2	1	1	3
CO5	3	2	2	2	1
W.AV	**2.2**	**1.8**	**2**	**1.6**	**1.8**

S–Strong(3),M-Medium(2),L-Low(1)

V-Semester					
Core	**Course Code:** 91352	**Digital Techniques and Electronic Instrument Systems**	**T**	**Credits:4**	**Hours:4**

Course Objectives	1. To familiarize basic information about numbering system and data conversion 2. To provide technical knowledge of data buses and logic circuits in Aircraft 3. To learn the recent techniques of computer and software in Aviation 4. To familiarize about the types of display and the terms ESD, EMI 5. To Educate on Instrument panel and digital systems of Aircraft
Unit I	**Numbering Systems& Data Conversion** Numbering systems-binary, octal and hexadecimal - Demonstration of conversions between the decimal and binary octal and hexadecimal systems and vice versa - Analogue Data, Digital Data - Operation and application of analog to digital, and digital to analogue converters, inputs and outputs - limitations of various types.
Unit II	**Data Buses and Logic Circuits** Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications - Fiber optic data bus - Application of fiber optics in Aircraft - Identification of common logic gate symbols, tables and equivalent circuits - Applications used for aircraft systems, schematic diagram - Interpretation of logic diagrams.
Unit III	**Basic Computer Structure and software Management control** Computer terminology (including bit, byte, software, hardware, CPU, IC, and various memory devices such as RAM, ROM, PROM) - Computer technology (as applied in aircraft systems) - Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.
Unit IV	**Electronic Displays & Electrostatic Sensitive Devices** Principles of operation of common types of displays used in modern aircraft -Cathode Ray Tubes - Light Emitting Diodes - Liquid Crystal Display -Special handling of components sensitive to electrostatic discharges - EMC- Electromagnetic Compatibility – EMI - Electromagnetic Interference – HIRF Lightning – Lightning protection.
Unit V	**Electronic Instrument systems and digital Aircraft systems** Typical system arrangements and cockpit layout of electronic instrument systems (EFIS) – ACARS -EICAS- ECAM – FBW -FMS – IRS – GPS- TCAS.

REFERENCE BOOKS:

TEXT BOOKS:

- EASA module-05-Electronic Instrument System- Aircraft Tech book co-Aviation Maintenance Technician Certification series,2015
- Aircraft Digital Electronic & computer systems-Mike Tooley,Elsevier,1st Edition, 2007

REFERENCE BOOKS:

- Digital Fundamentals by Malvino and Leach, MC Graw Hill Inc,US-4thEdition 1986
- Electrical Technology-by B.L.Theraja-VOLUME 4-Chand Publishing,24 th Edition,2006
- Aircraft Integrated instruments System by E.H.J.Pallett,Pearson Education,1st edition,1992.

Course Outcomes		**Knowledge Level**
CO-1	Apply the concepts of numbering system, data conversion and solving the conversions	K3
CO-2	Analyze the data buses, logic circuits in Aircraft	K4
CO-3	Understanding the fundamental concept of computer and software in Aircraft	K2

CO-4	Acquire knowledge of displays, ESD, EMI of Aircraft	K1
CO-5	Evaluate the Electronic/Digital instrument system of Aircraft	K5

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	2	1	3	2	2	2	1	1
CO2	2	2	1	2	1	2	2	1	1	1	2	2
CO3	2	2	2	2	1	1	2	1	2	2	2	1
CO4	2	1	2	2	1	2	2	2	2	2	2	2
CO5	2	3	2	2	2	1	2	2	1	3	2	2
W.AV	**2**	**2**	**1.8**	**2**	**1.4**	**1.4**	**2.2**	1.6	1.8	**2**	1.8	**1.6**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	2	1
CO2	2	2	2	2	2
CO3	1	1	2	1	2
CO4	2	2	1	1	3
CO5	1	2	2	2	1
W.AV	**2**	**1.8**	**2**	**1.6**	**1.8**

S–Strong(3),M-Medium(2),L-Low(1)

V-Semester					
DSE	**Course Code:** 91353A	**Elective-I Aeroplane Structure & Systems**	**T**	**Credits:4**	**Hours:4**

Course Objectives	1. To familiarize with the general concepts and fundamentals of the aircraft structure construction. 2. To provide a detailed description of the aircraft lightening protection system and the same applied during construction with specific examples. 3. To educate on reading and understanding sketches, drawings and schematics described in the structure repair manual. 4. To learn and apply his knowledge in aircraft equipment and furnishing, positioning of emergency equipment in a practical manner using manufacturer's instructions 5. To educate the recent techniques used to interpret the various snags that are reported in the aircraft system and apply corrective action where appropriate.
Unit I	**Airframe Structures-General Concepts** Airworthiness requirements for structural strength -Structural classification -primary, secondary and tertiary - Fail safe, safe life, damage tolerance concepts -zonal and station identification systems -stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue - Drains and ventilation provisions -System installation provisions - Lightning strike protection provision -Aircraft bonding.
Unit II	**Construction methods** Stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, -floor structures -reinforcement -methods of skinning -anti-corrosive protection -wing, empennage and -engine attachments -Structure assembly techniques - riveting, bolting, bonding; -Methods of surface protection, such as Chromating, anodizing, painting -Surface cleaning. - Airframe symmetry -methods of alignment and symmetry checks.
Unit III	**Airframe Structures-Aero planes** Fuselage Construction and pressurization, sealing -wing, stabilizer, pylon and undercarriage attachments -seat installation and cargo loading system; -Doors and emergency exits -construction, mechanisms, -operation and safety devices -window and windscreen construction and mechanisms.
Unit IV	**Wings** Construction -Fuel storage; Landing gear, pylon, control surface and high lift/ drag attachments -Stabilizers Construction -Control Surface attachment -Flight Control Surfaces -Construction and attachment –Mass and aerodynamic balancing -Nacelles/ Pylon Construction -firewalls -Engine mounts.
Unit V	**Lightning strike protection provision** Lightning strikes and lightning strike protection on alumininum and composite structure. -Aircraft bonding; bonding procedures and precautions. -Equipment and Furnishing -Emergency equipment requirements -cabin layout-cabin furnishing-Galley installation-Equipment layout-cargo handling.

REFERENCE BOOKS:

TEXT BOOK:

1. Aircraft Construction Handbook- by Thomas A Dickinson (Author); Publisher: Sportsman's Vintage Press (March 2015)
2. Aircraft Structures (Paperback) - 2011 Edition; by David J. Peery (Author); Dover Books on Aeronautical Engineering

REFERENCE BOOK:

1. Aviation Maintenance Technician: Airframe, Volume 1& 2: Structures, by Dale Crane; Publisher: Aviation supplies & Academics, Edition: 17 January 2008.
2. Aircraft Maintenance & Repair; Author: Ronald Sterkenburg; Michael J. Kroes; Publisher: McGraw Hill, 8th Edition Date: 13 Sep 2019
3. AC - 43.13 1B/2B - Acceptable Methods, Techniques and Practices of Aircraft Inspection and Repair; Author: Aviation Supplies & Academics (ASA); Publisher: Federal Aviation Administration (FAA); Edition; April 2009

Course Outcomes		**Knowledge Level**
CO-1	To gain Knowledge on the aircraft structure, wing, nacelle, engine mount construction and interrelationship with other subjects.	K 1
CO-2	To understand and give a detailed description on aircraft structure, its components that are used in the structure construction.	K 2
CO-3	The applicant will be able to apply his knowledge while carrying out inspections on aircraft structure and system in a practical manner using manufacturer's instructions.	K 3
CO-4	The applicant will be able to analyse and interpret results from various test equipment that are used during the aircraft structure inspection and apply corrective action where appropriate	K 4
CO-5	The applicant will be able to evaluate the structure repair programme and diagnose the system's fault by reading and understanding the sketches, drawings and schematics describing the Aircraft structure and system.	K 5

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	2	2	2	2	3	2	2	2	2	2
CO2	2	2	1	2	1	2	2	2	2	2	2	3
CO3	2	2	2	2	2	1	2	2	1	1	2	2
CO4	2	2	1	1	2	2	2	2	2	2	2	2
CO5	2	2	1	2	2	1	2	2	1	1	2	2
W.AV	**2**	**1.8**	**1.4**	**1.8**	**1.8**	**1.6**	**2.2**	2	1.8	**1.6**	2	**2.2**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	1
CO2	2	1	1	2	2
CO3	2	1	2	2	2
CO4	1	2	1	1	2
CO5	2	2	2	2	2
W.AV	**2**	**1.6**	**1.6**	**1.6**	**1.8**

S–Strong(3),M-Medium(2),L-Low(1)

V-Semester					
DSE	**Course Code:** 91353B	**Elective-I Helicopter Structure & Systems**	**T**	**Credits:4**	**Hours:4**
Course Objectives	1. To familiarize with the general concepts and fundamentals of the helicopter structure construction. 2. To provide a detailed description of the helicopter lightening protection system and the same applied during construction with specific examples. 3. To educate on reading and understanding sketches, drawings and schematics described in the helicopter structure repair manual. 4. To learn and apply his knowledge on equipment and furnishing used in helicopter, and also positioning of emergency equipment in a practical manner using manufacturer's instructions 5. To educate the recent techniques used to interpret the various snags that are reported in the Helicopter system and apply corrective action where appropriate.				
Unit I	**Airframe Structures — General Concepts** Airworthiness requirements for structural strength - Structural classification - primary, secondary and Tertiary - Fail safe, safe life, damage tolerance concepts - Zonal and station identification systems - Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue - Drains and ventilation provisions - System installation provision - Lightning strike protection provision - Aircraft structural bonding Construction methods of: stressed skin fuselage and its components - floor structures, reinforcement, methods of skinning - Main gear box construction and engine attachments; tail boom structure assembly techniques - anti-corrosive protection – Methods of surface protection - Airframe symmetry: methods of alignment and symmetry checks.				
Unit II	**Theory of Flight — Rotary Wing Aerodynamics** Terminology used - Effects of gyroscopic precession - Torque reaction and directional control - Dissymmetry of lift - Blade tip stall - Translating tendency and its correction - Coriolis effect - compensation - Vortex ring state -power settling – overpitching - Auto-rotation - Ground effect.				
Unit III	**Helicopter Control Systems** Cyclic control - Collective control anti-corrosive protection – Swash plate - Yaw control - Anti-Torque Control - Tail rotor, bleed air - Main Rotor Head - Design and Operation features - Blade Dampers - Function and construction - Rotor - Blades: Main and tail rotor blade construction – attachment - Trim control, fixed and adjustable – stabilizers - System operation manual – by hydraulic - by electrical and fly-by wire - Artificial feel - Balancing - and Rigging.				
Unit IV	**Blade Tracking and Vibration Analysis** Rotor alignment - Main and tail rotor tracking - Static and dynamic balancing - Vibration types – vibration reduction methods - Ground resonance.				
Unit V	**Transmissions** Gear boxes - Main and tail rotors - Clutches - free wheel units and rotor brake – maintenance on Gear box – Main rotor system maintenance – Tail rotor system maintenance				

REFERENCE BOOKS:

Text Books:

1. Helicopter Maintenance-by Joseph Schafer (Order No.EA-HF-2) IAP Inc., 1980.
2. Helicopter Aerodynamics-by R.W.Prouty,2nd edition, Eagle eye solutions, 448, North Church Drive, Lebanon, 2004

REFERENCE BOOKS:

1. Basic Helicopter Hand Book-by Federal Aviation Administration (FAA), U.S. Department of Transportation Flight Standard Service, 1978
2. Basic Helicopter Aerodynamics-by J.Seddon (BSP Professional Books), American Institute of Aeronautics and astronautics, 1990.
3. Foreman Civil Aircraft Inspection Procedure (CAP 459) Part II Aircraft, Aircraft, Civil Aviation Authority (CAA), London, UK, Himalayan books, Ist edition, 2010.
4. Aviation Maintenance Technician Handbook: Airframe, Volume 1: FAA-H-8083-31A, Author: Aviation Supplies & Academics (ASA); Publisher: Federal Aviation Administration (FAA) Edition Date: 20 November 2018

Course Outcomes		**Knowledge Level**
CO-1	To gain Knowledge on the Helicopter structure, nacelle, engine mount construction and interrelationship with other subjects.	K 1
CO-2	To understand and give a detailed description on Helicopter aerodynamics.	K 2
CO-3	The applicant will be able to apply his knowledge while carrying out inspections helicopter structure and system in a practical manner using manufacturer's instructions.	K 3
CO-4	The applicant will be able to analyse and interpret results from various test equipment that are used during the helicopter inspection and apply corrective action where appropriate	K 4
CO-5	The applicant will be able to evaluate the programme and diagnose the blade tracking methods by reading and understanding the sketches, drawings and schematics describing the helicopter transmission system.	K 5

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO 1	PO2	PO 3	PO4	PO 5	PO6	PO7	PO8	PO 9	PO10	PO1 1	PO12
CO1	3	2	2	2	2	2	3	2	2	2	2	2
CO2	2	2	2	2	2	2	2	2	2	2	2	3
CO3	3	3	2	2	2	2	2	2	2	2	2	2
CO4	2	2	2	2	2	2	2	2	2	2	2	2
CO5	2	2	3	2	2	2	2	2	2	2	3	2
W.A V	**2.4**	**2.1**	**1.8**	**1.8**	**2**	**2**	**2.1**	1.6	1.8	**1.8**	2.1	**2.1**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	2	1	1
CO2	2	2	2	2	2
CO3	3	2	2	2	1
CO4	2	2	3	3	2
CO5	3	2	2	2	2
W.AV	**2.4**	**1.8**	**2.1**	**2**	**1.6**

S–Strong(3),M-Medium(2),L-Low(1)

V-Semester					
DSE	**Course Code:** 91353C	**Elective-I Aircraft Electrical Systems**	**T**	**Credits:4**	**Hours:4**
Course Objectives	1. To make the students understand the Aircraft Electrical System basic fundamentals, circuits and controls and its Arrangements. 2. To impart knowledge on the Electrical energy storage devices of aircraft and its maintenance practices. 3. To familiarise the Aircraft electrical power distribution system and wiring system and their maintenance. 4. To educate the students, on Electrical power generation and its control in aircraft. 5. To learn the Aircraft lighting and warning system and their maintenance practices.				
Unit I	**Fundamentals of Electrical supply:** Types of power supply-AC Supply advantages & disadvantages-DC Supply Advantages and Disadvantages-Basic Electrical circuits (Series, Parallel and Series-Parallel)- Single phase and Three phase system- Advantages of Three phase system over single-phase system- Control devices and Switches- Electrical & Electronic symbols- Static Dischargers- Circuit protection devices and its applications.				
Unit II	**Storage batteries:** Types and classification of aircraft batteries - Constructional features of batteries - Various ailments of Lead Acid Battery - Thermal runway - Advantages of Ni-Cd battery over Lead acid battery - Electrolyte nature and its preparation - Charging and discharging procedure of Batteries - Preparation & pre - installation checks of batteries – Installation - operation, inspection and maintenance of batteries.				
Unit III	**Power Distribution System:** Basic requirement of Power distribution system - Bus bar and its types - Single wire and its advantages - Electrical load analysis - Various types of aircraft loads - Characteristics of aircraft electrical wire - soldering & crimpling - Bonding & shielding - Description and operation of Parallel and Spilt Bus bar system - Emergency power generation - Inspection and Maintenance of Electrical Installation.				
Unit IV	**Aircraft Generator and related controls:** Basic requirement of aircraft generator - Description and types of aircraft generators, Construction features of aircraft generators - Voltage regulation in aircraft power system. Types of voltage regulators (Vibrator type, Carbon pile type, Three in one type and Solid-statetype) and their operations - Reverse Current Circuit breaker construction and its operation - Current limiter and their application in generator output control - Maintenance and inspection of generators and their Installation.				
Unit V	**Aircraft Lights and Warning Indications:** Introduction to lighting system - Objectives of internal and external lighting, Various types of internal and external lighting - Purpose and installation of Navigation - Landing, Anti-collision, Taxying, Instrument, Cabin, ice inspection lamps, and Service lighting - Exterior emergency lighting and Warning lights - Advantages of lighting in aircraft - Emergency lighting - Cargo and baggage lightings - Inspection and maintenance of lighting circuits in aircraft.				

REFERENCE BOOKS:

TEXT BOOK:

1. Aircraft electrical system by EHJ Pallet, Himalayan Book Co. 3rd edition
2. Aircraft Electricity and Electronics by Mike Tooley and David Wyatt, Reed Elsevier, Noida India, Edition 2007

REFERENCE BOOK:

1. Aircraft Electricity and electronics by Eismin, , McGraw-Hill Book Co, Fifth edition 1994
2. EASA Turbine Aeroplane Structure and Systems by Aircraft Technical Book Company July 2023 Edition
3. J E Bygate Aircraft Electrical Systems 11A, 11B Jeppesen Sanderson May 1990 Edition
4. Basic Electricity by Dale Crane July 2017 edition

Course Outcomes		**Knowledge Level**
CO-1	Students can understand and explain the concepts of the of AC and DC power supply,	**K2**
CO-2	Students can analyse the classification of different types of Batteries used in aircraft, its charging and maintenance	**K4**
CO-3	Students can compare and the Busbar and power distribution system in aircraft,.	**K4**
CO-4	Students can distinguish the various types of voltage regulators, Circuit breaker. Current limiter	**K4**
CO-5	Students can identify the aircraft lighting systems. They can predict the faults and solve it.	**K3**

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1	1	1	2	1	1	1	1	1	1
CO2	2	3	2	2	1	1	1	2	1	1	2	2
CO3	2	2	3	1	1	1	2	2	2	1	2	1
CO4	1	2	1	1	1	2	1	2	1	1	1	1
CO5	2	1	2	3	2	3	2	2	3	3	2	3
W.AV	**2**	**1.8**	**1.8**	**1.6**	**1.2**	**1.8**	**1.4**	1.8	1.6	**1.4**	1.6	**1.6**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	2	1
CO2	2	2	2	1	2
CO3	1	2	2	1	1
CO4	1	1	2	2	2
CO5	2	3	3	1	2
W.AV	**1.8**	**2**	**2.2**	**1.4**	**1.6**

S–Strong(3),M-Medium(2),L-Low(1)

V-Semester					
DSE	**Course Code:** 91354A	**Elective-II Gas Turbine Engines**	**T**	**Credits:4**	**Hours:4**

Course Objectives	1. To familiarize with mechanical arrangement of various types of gas turbine engine 2. To learn about gas turbine engine thrust and performance 3. To educate the students about construction and operation of jet engine 4. To provide technical knowledge on fuel system layout and its operation 5. To understand the engine indication system in cockpit
Unit I	**Fundamentals** Introduction to Potential energy, kinetic energy, Newton's laws of motion, Brayton cycle -The relationship between force, work, power, energy, velocity, acceleration- Constructional arrangement and operation of turbojet - turbofan – turboshaft- turboprop
Unit II	**Engine Performance** Gross thrust, net thrust, choked nozzle thrust, thrust distribution, Resultant thrust, thrust horse power, equivalent shaft horsepower, specific fuel consumption - Engine efficiencies - By-pass ratio and engine pressure ratio - Compressor ratio
Unit III	**Engine construction** Inlet- Compressors -Axial and centrifugal types - Causes and effects of compressor stall and surge - bleed valves, variable inlet guide vanes- Combustion Section - Turbine Section - turbine blade types- Turbines - impulse and reaction turbines- Exhaust - Convergent, divergent and variable area nozzles
Unit IV	**Fuel System**. Basic fuel system components- EEC-FADEC- various input for operation- fuel pump-filters-By pass valve -fuel cooled oil cooler – Heaters - fuel nozzle- Drain valves
Unit V	**Engine Indicating System:** Exhaust Gas Temperature (EGT) – Percentage RPM - Engine Pressure Ratio (EPR) - Oil pressure - Oil Temperature - Fuel Pressure -fuel flow meter- Torque Meter.

REFERENCE BOOKS:

TEXTBOOKS:

1.Jeppson aircraft gas turbine power plants by Charles E Otis and Peter A Vosbury 2002.

2. Aircraft Power Plant.by Kroes &Wild. Publisher McGraw-Hill Education Edition8Publication Date16 August 2013.

REFERENCE BOOKS:

1.Aircraft Tech Book Co. EASA Module-15 Gas Turbine Engine

2.CAP 459 Part-II Civil Aircraft Inspection Procedures by CAA; Publisher: Sterling Book House; Year 2006

3.Jet Aircraft power Systems by Casamassa & Ralph D Bent Tata McGraw-Hill

4. Aviation maintenance technician hand book-power plant-Power plant-12A-FAA, Sterling Book House

5. The Jet Engine Rolls Royce , Publisher Wiley, 5th edition date 14 Aug 2015

Course Outcomes		**Knowledge Level**
CO-1	To impart the knowledge in various types of Gas turbine engine	**K1**
CO-2	Understand the thrust of an engine and its performance	**K2**
CO-3	Explain the construction and operation of jet engine	**K5**
CO-4	To acquire knowledge on the fuel system of turbine engine	**K3**
CO-5	Discuss the various engine indicating system in cockpit used in different types of aircraft	**K6**

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	2	2	2	2	2	2	2	2
CO2	2	2	2	2	2	2	2	2	2	2	2	3
CO3	3	2	2	2	2	2	2	2	2	2	2	2
CO4	2	2	2	2	2	2	2	2	2	2	2	3
CO5	2	2	3	2	2	2	2	2	2	2	2	2
W.AV	**2.1**	**2**	**2.1**	**1.6**	**2**	**1.8**	**1.8**	1.8	2	**1.8**	2	**2.4**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	2	2
CO2	2	2	2	2	2
CO3	2	2	2	1	2
CO4	2	2	2	2	2
CO5	3	2	2	2	2
W.AV	**2.4**	**1.6**	**2**	**1.8**	**2**

S–Strong(3),M-Medium(2),L-Low(1)

V-Semester					
DSE	**Course Code:** 91354B	**Elective-II Piston Engines**	**T**	**Credits:4**	**Hours:4**

Course Objectives	1. To familiarize Students with fundamental of piston engine. 2. To provide technical knowledge in construction of piston engine. 3. To educate on recent developments in engine fuel systems and carburetors. 4. To learn the recent techniques in Ignition and Starting system of piston engine. 5. To educate the recent techniques in induction, cooling and exhaust system.
Unit I	**Fundamental of piston engine** Stroke – BDC – TDC - Square engine, Valve timing diagram-Mechanical, thermal and volumetric efficiencies -Operating principles of 2 stroke engine and 4 stroke engine - Otto and Diesel cycle -Piston displacement and compression ratio- Engine configuration and firing order.
Unit II	**Engine construction:** Construction features of Crank case, crank shaft, cam shafts, Connecting rods, Cylinder assemblies and piston assemblies - Inlet and exhaust manifolds - Valve operating mechanisms - Description of Accessory section and Propeller reduction gearbox.
Unit III	**Engine fuel systems and carburetors:** Requirements of fuel system - Gravity-feed fuel system - Pressure fuel system - Carburetor icing - Principle of carburetion - Float type carburetor - Pressure injection type carburetor.
Unit IV	**Piston engine ignition and starting system:** Principle of ignition -Types of Magneto - Magneto operational theory - Ignition booster and Auxiliary ignition unit - Sparkplug- Function, Construction -- Sparkplug reach - Heat range of spark plug - servicing procedure of aircraft spark plug - Starters for Reciprocating engine aircraft.
Unit V	**Induction System, Superchargers, Turbocharger, Cooling and Exhaust System:** Basic induction system components - Principle of Supercharging and Turbo charging - Internal Single Speed and Two speed supercharger - Reciprocating engine cooling system - Reciprocating engines exhaust systems.

REFERENCE BOOKS:

TEXT BOOKS

1.Aircraft power plants—Thomas W. Wild & Michael J. Kroes-Eighth edition. McGraw-Hill Publisher
2.Aircraft A& P Technician power plant by Jeppeson. Sterling Book House

REFERENCE BOOKS

1. Aviation maintenance technician series (power plant) by Dale Crane, Aviation Supplies& Academics
2. Aircraft piston engines by Herschel Smith, Sterling Book House
3.Aviation maintenance technician hand book-power plant Volume 1&2-FAA-Shroff Publisher
4.Civil Aircraft Inspection Procedures (CAP 459-Part II-Aircraft), Civil Aviation Authority (CAA) London UK, Sterling Book House
5.Aviation maintenance technician hand book-power plant-Power plant-12A-FAA, Sterling Book House

Course Outcomes		**Knowledge Level**
CO-1	To impart the knowledge in fundamental concepts of piston engine	**K1**
CO-2	Understand the construction of piston engine.	**K2**
CO-3	Discuss the engine fuel systems and carburetors	**K4**
CO-4	Analyze the Techniques in Ignition and Starting system of piston engine.	**K4**
CO-5	Evaluate the recent trends in induction, cooling and exhaust system.	**K5**

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	2	3	2	2	2	2	2	2
CO2	2	2	2	2	2	2	2	1	2	2	2	2
CO3	2	2	2	2	2	2	2	2	2	2	3	2
CO4	2	2	2	2	2	2	2	2	2	2	2	2
CO5	2	2	3	2	2	2	2	2	2	2	3	2
W.AV	**2.1**	**2.1**	**2**	**1.8**	**2**	**2.1**	**2**	1.6	2	**1.8**	2.4	**2**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	3	2	2
CO2	3	2	2	2	2
CO3	2	2	2	1	2
CO4	3	2	2	2	2
CO5	2	2	2	2	2
W.AV	**2.4**	**1.8**	**2.1**	**1.8**	**2**

S–Strong(3),M-Medium(2),L-Low(1)

V-Semester					
DSE	**Course Code:** 91354C	**Elective-II Aircraft Instrument Systems**	**T**	**Credits:4**	**Hours:4**
Course Objectives	1. To familiarize the students about the aircraft instrument system fundamentals. 2. To understand the aircraft air data Instruments' principle, construction features and operation. 3. To educate the students about the Air Speed Indicators - different speed terminology and errors 4. To learn about the gyroscopic theory-Rigidity and precession. 5. To have knowledge on the aircraft compasses, types, their advantages and disadvantages				
Unit I	**Fundamentals:** Fundamentals of Aircraft Instrument System and its terminology - Atmosphere, International standard atmosphere - ICAO assumptions.				
Unit II	**Instruments Layout:** Instrument displays, panels and layouts - Pitot Static instruments and systems - Instrument elements and mechanisms - Instrument dial markings and Range Markings.				
Unit III	**Air Data Instruments:** Barometer and different types of Barometer - Introduction to Air Data instruments viz - Purpose, principle, construction features and operation of Altimeters and types of Altimeters - Purpose, Principle, constructional features and operation of Air Speed Indicators - different speed terminology and errors - Purpose, principle, constructional features and operation of vertical speed indicator - Purpose, principle and constructional features and operation of Mach meter.				
Unit IV	**Gyroscopic Instruments:** Gyroscopic theory-Rigidity and precession - Purpose, principle, constructional features of Directional Gyro/Direction Indicator and its principle of operation - Purpose, principle, constructional features of Artificial Horizon /Horizon Gyro Horizon and its principle of operation - Purpose, principle, constructional features of Turn and Slip Indicator and its operation - Application of Gyro in different aircraft system.				
Unit V	**Aircraft Compasses:** Fundamentals of magnetism and different terminologies related to Earth's magnetism - Types of compasses and their advantages and disadvantages - Constructional features of direct reading compasses, their application and errors - Constructions features of Remote reading compasses, their application and errors – Description of compass calibration.				

REFERENCE BOOKS:

Text book:

1. Aircraft instruments; Author: EHJ Pallett; Publisher: Dorling Kindersley (India) pvt. Ltd., licensees of Pearson education India. First Edition 1992, First impression on 2011

2. Aircraft instruments and integrated system; Author: EHJ Pallett Publisher: Dorling Kindersley (India) pvt. Ltd., licensees of Pearson education India. First Edition 1992, First impression on 2011

REFERENCE BOOKS:

1. Aircraft instruments; Author: Dale Crane; Publisher: ASA Aviation Mechanic Handbook; Edition: Fifth Edition

2. Module 13 – Aircraft Aerodynamics, Structures and systems, Authors: Roger Peterson, Omar Khan; Publisher: The Aircraft Technical Book company; Edition Date: 01/01/2020.

3. Airframe handbook EA-AC 65-15A; Author: Aviation supplies and academics (ASA); Publisher: Federal Aviation Administration (FAA); Edition: April 2009

4. Civil Aircraft Inspection Procedures (CAP 459-Part I, Basic) by CAA UK, Sterling book House Mumbai Edition 2006.

Course Outcomes		Knowledge Level
CO-1	Understanding the fundamentals of Aircraft Instrument System and its terminology	**K2**
CO-2	Knowledge about Aircraft Instruments Layout	**K1**
CO-3	Analyze the check of Air Data Instruments	**K4**
CO-4	Understanding about Gyroscopic Instruments	**K2**
CO-5	Knowledge about Aircraft Compasses	**K1**

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	2	3	2	2	2	2	2	2
CO2	2	2	2	2	2	2	2	1	2	2	2	2
CO3	2	2	2	2	2	2	2	2	2	2	3	2
CO4	2	2	2	2	2	2	2	2	2	2	2	2
CO5	2	2	3	2	2	2	2	2	2	2	3	2
W.AV	**2.1**	**2.1**	**2**	**1.8**	**2**	**2.1**	**2**	1.6	2	**1.8**	2.4	**2**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	3	2	1
CO2	3	2	2	2	2
CO3	2	2	2	1	2
CO4	3	2	2	2	2
CO5	2	2	2	1	2
W.AV	**2.4**	**1.8**	**2.1**	**1.8**	**1.8**

S–Strong(3),M-Medium(2),L-Low(1)

V-Semester					
DSE	**Course Code:** 91355A	**Elective-III Aeroplane Hydraulic Systems**	**T**	**Credits:4**	**Hours:4**
Course Objectives	1. To familiarize the basic concepts with the principal elements of the Hydraulic Power 2. To provide technical knowledge on hydraulic power generation and their interrelationships with each hydraulic circuit. 3. To educate and provide a detailed description of the various components involved in hydraulic power generation, with a focus on the required force. 4. To learn and apply their knowledge during hydraulic oil sampling and hydraulic discipline by following the manufacturer's instructions. 5. To educate the applicant to understand the operation of hydraulic system components and carry out their maintenance.				
Unit I	**Basic Physics of Hydraulics** Fluids, Energy (Potential energy, Kinetic energy), Static Pressure, Pascal's Law - Relationship between Force, Area and Pressure -The SI System - System International, Newton's Acceleration, Mass, Force -The Imperial System, Unit Conversion Factors – to 3 Places Decimal - Transmission of Power, Multiplication of Force -Passive Hydraulic Systems - Fluid Pressure into Mechanical Force and Movement.				
Unit II	**Aircraft Hydraulic Power** System Layout -Basic Hydraulic system with Hand pump, Basic Hydraulic system with power pump, Open-Center Hydraulic Systems, Closed-Center Hydraulic Systems - Evolution of Hydraulic Systems - Hydraulic Power Pack System - Modern High-Performance Systems.				
Unit III	**Hydraulic Fluids:** Properties: Viscosity, Chemical Stability, Flash point, Fire point -Types of hydraulic fluids, Mineral-based fluids, Polyalphaolefin-based fluids, Phosphate ester-based fluid - Intermixing of fluids - Compatibility with aircraft materials - Hydraulic fluid contamination- Contamination check, Hydraulic sampling schedule, Sampling procedure -Contamination control; filters; Health and handling.				
Unit IV	**Pressure generation**: Electric, mechanical, pneumatic - Emergency pressure generation -Emergency pressure generation; -Pressure Control -Power distribution -Indication and warning systems - Interface with other systems.				
Unit V	**Hydraulic system Components & Servicing:** Hydraulic reservoirs –accumulators - Hand pump, Driven pumps - Automatic cut-out valve - pressure relief valve, sequence valve, shuttle valve, Actuators, Check valves, hydraulic fuse, priority valve, quick disconnect couplings, selector valves, Brake control valves, Hydraulic shutoff valves; Hydraulic seals: -Hydraulic system maintenance - Flushing, draining, bleeding - checking fluid level and component replacement.				

REFERENCE BOOKS:

Text books:

1. Aviation Maintenance Technician Handbook: Airframe, Volume 2: FAA-H-8083-31A, Author: Aviation Supplies & Academics (ASA); Publisher: Federal Aviation Administration (FAA) Edition Date: 20 November 2018
2. Module 11A - Turbine aeroplane aerodynamics, structures and systems, Authors: Thomas Forenz, Kurt C. Gibson, Charles L. Rodriguez and Peter Vosbury; Publisher: The Aircraft Technical Book Company; Edition Date: Version 004 - Effective Date 01.01.2020

Reference Books:

1. Module 13 - Aircraft aerodynamics, structures and systems, Authors: Roger Petersen, Omar Khan; Publisher: The Aircraft Technical Book Company; Edition Date: 01.01.2020.
2. Aircraft Systems: by Lombardo David; 2nd edition; Publisher: McGraw Hill Education India.
3. Aircraft Hydraulic Systems: Introduction to the Analysis of Systems and Components by William Green; Publisher: John Wiley & Sons Ltd; Publication Date: 24 December 1985.
4. Aircraft Hydraulic Systems - by William A. Neese (Author) Publisher: Krieger Publishing Company; Edition; 2nd revised edition, 01 December 1987.
5. Aircraft Maintenance & Repair; Author: Ronald Sterkenburg; Michael J. Kroes; Publisher: McGraw Hill,8th Edition Date: 13 Sep 2019

Course Outcomes		**Knowledge Level**
CO-1	To have knowledge on the theory of hydraulic systems and their power generation techniques.	K 1
CO-2	To understand and give a detailed description of the hydraulic system, its components used and their constructional features with examples.	K 2
CO-3	The applicant will be able to apply his knowledge in a practical manner while carrying out hydraulic oil sampling	K 3
CO-4	The applicant will be able to analyse the snags and interpret results from various sources corrective action where appropriate	K 4
CO-5	The applicant will be able to evaluate for trouble shooting the problems by understanding the sketches, drawings and schematics describing the hydraulic system.	K 5

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1	2	2	2	1	1	1	3
CO2	2	3	2	2	1	1	2	2	2	1	2	2
CO3	2	2	2	2	2	1	1	1	2	2	2	2
CO4	2	2	2	2	1	2	1	2	1	1	1	2
CO5	2	2	2	2	2	1	2	2	2	2	2	3
W.AV	**2.2**	**2.4**	**2**	**2**	**1.4**	**1.4**	**1.8**	1.8	1.6	**1.4**	1.6	**2.4**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	2	3	1
CO2	2	1	2	2	2
CO3	2	1	2	3	2
CO4	2	2	1	2	1
CO5	3	2	2	2	2
W.AV	**2.4**	**1.4**	**1.8**	**2.4**	**1.6**

S–Strong(3),M-Medium(2),L-Low(1)

V-Semester					
DSE	**Course Code:** 91355B	**Elective-III Helicopter Hydraulic Systems**	**T**	**Credits:4**	**Hours:4**
Course Objectives	1. To familiarize the basic concepts with the principal elements of the Hydraulic Power 2. To provide technical knowledge on helicopter hydraulic power generation and their interrelationships with each hydraulic circuit. 3. To educate and provide a detailed description of the various components involved in helicopter hydraulic power generation, with a focus on the required force. 4. To learn and apply their knowledge during hydraulic oil sampling and hydraulic discipline by following the manufacturer's instructions. 5. To educate the recent techniques used in helicopter hydraulic system components' construction and carry out their maintenance				
Unit I	**Physics of Hydraulics** Fluids and its desirable qualities, Energy (Potential energy, Kinetic energy), Static Pressure; Pascal's Law ;Relationship between Force, Area and Pressure; SI System - System International, Newtons, Acceleration, Mass, Force; The Imperial System - Unit Conversion Factors to 3 Places Decimal - Transmission of Power, Multiplication of Force - Passive Hydraulic Systems - Fluid Pressure into Mechanical Force and Movement.				
Unit II	**Hydraulic Fluids:** Properties: Viscosity, Chemical Stability, Flash point, Fire point -Types of hydraulic fluids, Mineral-based fluids, Polyalphaolefin-based fluids, Phosphate ester-based fluid - Intermixing of fluids - Compatibility with aircraft materials - Hydraulic fluid contamination - Contamination check - Hydraulic sampling schedule, Sampling procedure - Contamination control – filters - Health and handling.				
Unit III	**Hydraulic Power** System Layout - Basic Hydraulic system – emergency circuit and power circuit - Hydraulic System circuits - Open centre, closed-Centre and power pack type - Evolution of Hydraulic Systems - Modern High-Performance Helicopters.				
Unit IV	**Hydraulic Pressure generation in Helicopter** Electrical – mechanical – pneumatic - Emergency pressure generation - Main pressure generation - Pressure Control - Power distribution - Indication and warning systems - Interface with other systems.				
Unit V	**Hydraulic system Components & Servicing:** Storage - Hydraulic reservoirs, accumulators - Power generation - Hand pump, Driven pumps – flow and direction control valves – Pressure control valves used in Helicopter system - Hydraulic seals - Hydraulic system maintenance - checking fluid level - Flushing, draining, bleeding, filling and topping up - component replacement.				

REFERENCE BOOKS:

Text books:

1. Aviation Maintenance Technician Handbook: Airframe, Volume 2: FAA-H-8083-31A, Author: Aviation Supplies & Academics (ASA); Publisher: Federal Aviation Administration (FAA) Edition Date: 20 November 2018
2. Module 12 - Helicopter aerodynamics, structures and systems, Authors: Dominic couture, Laurence peyreburne and Peter Vosbury; Publisher: The Aircraft Technical Book Company; Edition Date: Version 001 - Effective Date 01.01.2022

Reference Books:

1. Airframe and Power plant Mechanics (AC 65-1 5A) -Airframe Hand Book, Federal Aviation Administration (FAA), U.S. Department of Transportation Flight Standard Service, 1976.
2. Civil Aircraft Inspection Procedure (CAP 459) Part II Aircraft, Civil Aviation Authority (CAA), London, UK, Himalayan books, Ist edition, 2010.
3. Module 11A - Aircraft Aerodynamics, Structures and Systems- Aircraft tech Book Company, Edition: V004.3, Published in 2021, CO, US, Colorado.
4. Module 13 A- Aeroplane Aerodynamics, Structures and Systems- Aircraft tech Book Company, Edition: V004.3, published in 2021, CO, US, Colorado

Course Outcomes		**Knowledge Level**
CO-1	To have knowledge on the theory of helicopter hydraulic systems and their power generation techniques.	K 1
CO-2	To understand and give a detailed description of the helicopter hydraulic system, it's Components used and their constructional features with examples.	K 2
CO-3	The applicant will be able to apply his knowledge in a practical manner while carrying out hydraulic oil sampling	K 3
CO-4	The applicant will be able to analyse the snags and interpret results from various sources corrective action where appropriate	K 4
CO-5	The applicant will be able to evaluate for trouble shooting the problems by understanding the sketches, drawings and schematics describing the hydraulic system.	K 5

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	2	2	3	2	2	2	2	2
CO2	2	2	2	2	2	2	2	2	2	2	2	3
CO3	3	3	2	2	2	2	2	2	2	2	2	2
CO4	2	2	2	2	2	2	2	2	2	2	2	2
CO5	2	2	3	2	2	2	2	2	2	2	3	2
W.AV	**2.4**	**2.1**	**1.8**	**1.8**	**2**	**2**	**2.1**	1.6	1.8	**1.8**	2.1	**2.1**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	2	2	1
CO2	2	2	2	1	2
CO3	3	2	2	1	1
CO4	2	2	3	2	2
CO5	3	2	2	1	2
W.AV	**2.4**	**1.8**	**2.1**	**1.4**	**1.6**

S–Strong(3),M-Medium(2),L-Low(1)

V-Semester					
DSE	**Course Code:** 91355C	**Elective-III Aircraft Communication and Navigation Systems**	**T**	**Credits:4**	**Hours:4**
Course Objectives	1. To familiarise basic information about the fundamentals of radio theory. 2. To provide knowledge about the antennas, amplifiers, radio transmitters & receivers and their functions. 3. To impart technical knowledge about the Very High Frequency & High Frequency aircraft communication Systems, their principles, operations and layouts. 4. To educate the different aircraft navigation Systems , their principles, operations. 5. To learn the Weather radar system and Distance Measuring Equipment, their layouts and Radome maintenance and radar safety.				
Unit I	**Fundamentals of Radio Theory:** Radio waves - terms: wave length and frequency - calculations - various frequency bands - frequency range and its application. Carrier waves, ground waves, sky waves and space waves its properties and characteristics.				
Unit II	**Antennas:** Antennas, various types and its dimension. Amplifiers, classification of amplifier, Class A, Class B, and Class C amplifiers, characteristics, Push pull amplifier and its applications; Radio Transmitters and Receivers: Functions of a Radio transmitter, Microphones, types, Block diagram explanation of a Radio transmitter - Modulation and its types - Antenna couplers - Qualities of a good Radio receiver - Block diagram of a simple radio receiver and super heterodyne receiver.				
Unit III	**Aircraft Communication Systems**: Basics of aircraft communication system - types - very High Frequency Communication system, Description, Principle, Operation of VHF Communication system and its layout on aircraft - High Frequency communication system, Description, Principle and operation of High Frequency communication system and its layout on aircraft - Satellite communication system, Description, Operation and its layout on aircraft				
Unit IV	**Aircraft Navigation System:** Introduction and Description of aircraft Navigational systems - Automatic Direction Finder system (ADF) - Very High Frequency Omni Radio Range (VOR) - Instrument Landing system - Description and Operation of Marker Beacon System - Radio altimeter system - Description and various segments and operation of Aircraft GPS system.				
Unit V	**Weather Radar System and Distance Measuring Equipment:**: Introduction - Description and types of Radar - Primary and Secondary Radar - Analog radar, Principal units of Analog radar system - Aircraft weather radar; Description; transmitter -receiver, Indicator, Control panel, Radome and wave guide - Radome maintenance and radar safety.				

REFERENCE
TEXT BOOK:

1. Aircraft Electricity and Electronics – Thomas K Eismin, McGraw Hill Education (India) Private Limited, 6th edition, 2014.
2. Aircraft Instruments and Avionics – Max F Henderson, Published by Jeppesen Sanderson, Edition 1993.

REFERENCE BOOKS:

1. Aircraft communication and Navigation Systems, Principles, Maintenance and Operation, Mike Tooley and David Wyatt, Elsevier Ltd, 2nd Edition, 2017.
2. Aircraft Electrical and Electronic systems - Mike Tooley and David Wyatt, Elsevier Ltd, 1st Edition, 2009.
3. Aircraft Radio Systems – James Powell, the English Book Store.
4. Aviation Maintenance Technician Hand Book Airframe, Volume – 02, 2012 Edition, FAA 2012.

Course Outcomes		**Knowledge Level**
CO-1	Students are able to describe the fundamentals of radio theory	K1
CO-2	Able to explain about antennas, amplifiers, radio transmitters & receivers and their functions.	K2
CO-3	Identify the Very High Frequency & High Frequency aircraft communication Systems, their principles, operations and layouts.	K3
CO-4	Students should distinguish different aircraft navigation Systems, their principles and operations.	K4
CO-5	Able to explain the Weather radar system and Distance Measuring Equipment, their layouts and Radome maintenance and radar safety.	K2

Mapping Course Outcome VS Programme Specific Outcomes

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	2	2	2	2	2	3	2	2	2	2	2
CO2	2	2	2	2	2	2	2	2	2	2	2	3
CO3	3	3	2	2	2	2	2	2	2	2	2	2
CO4	2	2	2	2	2	2	2	2	2	2	2	2
CO5	2	2	3	2	2	2	2	2	2	2	3	2
W.AV	**2.4**	**2.1**	**1.8**	**1.8**	**2**	**2**	**2.1**	1.6	1.8	**1.8**	2.1	**2.1**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	2	2	2	2	2
CO2	2	2	2	2	3
CO3	3	2	2	2	3
CO4	2	2	3	2	2
CO5	3	2	2	2	2
W.AV	**2.4**	**1.8**	**2.1**	**2**	**2.4**

S–Strong(3),M-Medium(2),L-Low(1)

V-Semester					
Core	**Course Code:** 91356	**Maintenance Practices - II Practical**	**P**	**Credits:4**	**Hours:8**
Course Objectives	1. To have knowledge on aircraft storage procedure. 2. To educate the students about techniques used in NDT procedures. 3. To familiarize on aircraft weight and balance.				

List of Practical:

1. Sheet metal Bending & Forming.
2. Soldering Practice.
3. Familiarization of different types of welding.
4. Aircraft Jacking, Leveling and Towing procedures.
5. Aircraft Re-fueling and De-fueling.
6. NDT method of crack detection using Dye- penetrant method.
7. Crack detection by using Magnetic particle method.

Course Outcomes		**Knowledge Level**
CO-1	To have working knowledge on soldering	K1
CO-2	To analyze the joints that are repaired with welding, Brazing.	K3
CO-3	To evaluate the aircraft Weight and Balance with given load details	K5
CO-4	To understand the use of towing bar and connecting them to aircraft	K2

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	2	3	1	1	1	1	2	2
CO2	3	1	1	1	2	1	1	1	1	1	1	2
CO3	3	1	2	2	3	1	1	1	1	1	1	2
W.AV	**2.6**	**1**	**1.3**	**1.3**	**2.3**	**1.6**	**1**	1	1	**1**	1	**2**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	3	2
CO2	1	2	1	1	2
CO3	1	1	1	2	1
W.AV	**1**	**1.3**	**1**	2	1

S–Strong(3),M-Medium(2),L-Low(1)

VI-Semester					
Core	**Course Code:** 91361	**Aeroplane System Maintenance**	**T**	**Credits:4**	**Hours:4**
Course Objectives	1. To familiarize with the general concepts and requirements of the aeroplane maintenance. 2. To provide knowledge on the aircraft maintenance schedule with specific examples including ice and rain protection. 3. To educate on carrying out servicing of periodic/ storage inspection involving fueling/ de-icing operation. 4. To learn the maintenance Programme in a sequence using manufacturer's instructions. 5. To educate the recent techniques on recurring defects found during inspection and maintenance on the aircraft and take corrective action as necessary.				
Unit I	**Ground Operations:** Ground handling of aircraft (towing bar and towing bridle); Need and various occasions of aircraft ground handling–Towing, chocking, jacking, leveling and securing the aircraft - Procedures to be followed for each and the precautions to be observed; before and during the process in each case				
Unit II	**Aircraft Storage Maintenance:** Need for storage of an aircraft - Aircraft storage methods – long term storage and short-term Storage; Brief description of each - Maintenance of aircraft during storage periods - Maintenance procedures and the safety precautions to be followed before/ during storage maintenance - Maintenance of stores and its related procedures				
Unit III	**Fueling and De-icing:** Need for fueling the aircraft – fueling equipment used and a brief description - fueling methods – procedures to be followed – precautions to be observed before and during fueling operations – sampling of fuel – grades of fuel used in aircraft - Ice and rain protection; icing effects - Ice detection - anti-ice versus de-ice - Ground applied - anti-ice; de-icing systems - Rain control systems.				
Unit IV	**Ground Support Equipment and Maintenance:** Common ground equipment used - Ladders, Fire extinguishers, Jacks chocks, Brief description of each, its uses and maintenance - Ground support vehicles used - Battery trolley, Hydraulic servicing trolley, Pneumatic servicing trolley, oxygen trolley, Nitrogen trolley, Air Vehicle, Cleaning Vehicle, Food supply and cargo vehicle.				
Unit V	**Aircraft Maintenance Procedures:** Trouble shooting techniques - Aircraft maintenance procedures – Routine maintenance – Periodic, Non-Periodic and Special Inspections on aircraft – Servicing Schedules followed in each case - Heavy Landing checks, Tire burst, Flight through turbulence, Propeller hit checks, and one-time checks on aircraft.				

REFERENCE BOOKS:

Text Books:

1. Aviation Maintenance Technician Handbook: Airframe, Volume 1: FAA-H-8083-31A, Volume 2 (FAA Handbooks Series), Author: Aviation Supplies & Academics (ASA); Publisher by Federal Aviation Administration (FAA) Edition: 20 November 2018

2. Module 11A - Turbine aeroplane aerodynamics, structures and systems, Authors: Thomas Forenz, Kurt C. Gibson, Charles L. Rodriguez and Peter Vosbury; Publisher: The Aircraft Technical Book Company; Edition Date: Version 004 - Effective Date 01.01.2020

Reference Books:

1. Module 13 - Aircraft aerodynamics, structures and systems, Authors: Roger Petersen, Omar Khan; Publisher: The Aircraft Technical Book Company; Edition Date: 01.01.2020.
2. Aircraft Systems: by Lombardo David; 2nd edition; Publisher: McGraw Hill Education India.
3. CAP 459 Part-I Civil Aircraft Inspection Procedures – Basic; By: CAA; Publisher: Sterling Book House; Year 2006
4. CAP 459 Part-II Civil Aircraft Inspection Procedures -Aircraft; By: CAA; Publisher: Sterling Book House; Year 2006
5. Aircraft Maintenance & Repair; Author: Ronald Sterkenburg; Michael J. Kroes; Publisher: McGraw Hill,8th Edition Date: 13 Sep 2019.

Course Outcomes		**Knowledge Level**
CO-1	To gain Knowledge on the aero plane maintenance Programme in order to keep the aircraft airworthy.	K 1
CO-2	To understand and give a detailed description of storage servicing including fuelling operation and anti-icing and de-icing.	K 2
CO-3	The applicant will be able to apply his knowledge while carrying out routine maintenance and non-periodic serving such as heavy landing checks, checks after lightning strike etc. in a practical manner using manufacturer's instructions.	K 3
CO-4	The applicant will be able to analyse and interpret results from various test equipment that are used during aeroplane maintenance and apply corrective action where appropriate	K 4
CO-5	The applicant will be able to evaluate the aeroplane maintenance programme and execute the same in order to keep the aircraft in airworthy condition.	K 5

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	2	1	3	1	2	1	3	2	1
CO2	2	1	3	2	3	1	2	1	3	2	3	1
CO3	3	1	2	2	1	2	2	2	1	2	3	2
CO4	3	2	2	1	2	1	2	3	2	2	1	2
CO5	2	3	1	1	2	3	1	2	2	2	1	2
W.AV	**2.6**	**2**	**1.8**	**1.6**	**1.8**	**2**	**1.6**	**2**	**1.8**	**2.2**	**2**	**1.6**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3
CO1	3	2	2
CO2	2	1	2
CO3	2	2	1
CO4	2	3	3
CO5	2	2	2
W.AV	**2.2**	**2**	**2**

S–Strong(3),M-Medium(2),L-Low(1)

VI-Semester					
Core	**Course Code:** 91362	**Avionics System Maintenance**	**T**	**Credits:4**	**Hours:4**
Course Objectives	1. To impart knowledge about the aircraft electrical power. 2. To provide knowledge about fundamentals and operation of communications and navigation systems. 3. To educate technical knowledge about the instrument systems. 4. To learn the fundamentals and operation of auto flight. 5. To understand about on Board Maintenance Systems.				
Unit I	**Electrical Power:** Introduction to Electrical power - Batteries Installation and Operation - DC power generation - Voltage regulation - Power distribution - Circuit protection and controlling devices - Inverters, transformers – Lights - External: navigation, anti-collision, landing, taxiing, ice - Internal: cabin, cockpit, cargo.				
Unit II	**Operation of Communications and Navigation Systems** Fundamentals of radio wave propagation – antennas - transmission lines - transmitters &receivers - Working principles of VHF, HF, ELT, CVR, VOR, ADF, ILS, DME, Selcal, audio integration system.				
Unit III	**Instrument Systems** Pitot static: altimeter - air speed indicator - vertical speed indicator; Gyroscopic: artificial horizon - attitude director - direction indicator - horizontal situation indicator - turn and slip indicator - turn coordinator; Compasses: direct reading, remote reading; Angle of attack indication, stall warning systems: Flight director system - Inertial reference system - air data computers: EFIS – EICAS – FMS.				
Unit IV	**Operation of Auto Flight** Fundamentals of automatic flight control including working principles& terminology - Command signal processing, yaw damper, automatic trim control - Autopilot navigation aids interface - Auto throttle & Automatic landing systems.				
Unit V	**Board Maintenance Systems** Introduction to Board Maintenance Systems, salient features of board maintenance - Central maintenance of computers; functions of central maintenance - Data loading system - Electronic library system, features involved in electronic library system - Printing, uses of printing				

REFERENCE BOOKS:

TEXT BOOKS:

1. Aircraft Electricity and Electronics – Thomas K Eismin, McGraw Hill Education (India) Private Limited, 6th edition, 2014.

2. Aircraft Instruments and Avionics – Max F Henderson, Published by Jeppesen Sanderson, Edition 1993.

REFERENCE BOOKS:

.1. Aircraft communication and Navigation Systems, Principles, Maintenance and Operation, Mike Tooley and David Wyatt, Elsevier Ltd,
2nd Edition, 2017.

.2. Aviation Maintenance Technician Hand Book Airframe, Volume – 02, 2012 Edition, FAA 2012.

3. Basic Electronics, Bemard Grob's, Published by McGraw-Hill, 11th edition, 2011.

4. EASA Turbine Aeroplane Structure and Systems by Aircraft Technical Book Company July 2023 Edition

5. J E Bygate Aircraft Electrical Systems 11A, 11B Jeppesen Sanderson May 990 Edition

Course Outcomes		Knowledge Level
CO-1	Students can explain the Batteries Installation and Operation	**K2**
CO-2	Understand the fundamentals of radio wave propagation and Working principles of VHF, HF, ELT, CVR, VOR, ADF, ILS, DME, Selcal, audio integration system.	**K2**
CO-3	Students able to identify different aircraft instruments, stall warning systems:	**K3**
CO-4	Students can understand and explain the Fundamentals of system lay-outs and operation of Auto Flight.	**K2**
CO-5	Students able to compare the on board maintenance systems and their function.	**K5**

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	2	2	3	1	1	2	2	3	2
CO2	3	2	2	1	2	2	1	1	2	2	1	2
CO3	2	2	1	1	2	1	2	2	2	1	1	1
CO4	1	1	2	2	3	1	3	2	2	1	2	2
CO5	2	3	2	2	1	2	2	1	3	2	2	2
W.AV	**2.2**	**2**	**1.6**	**1.6**	**2**	**1.8**	**1.8**	**1.4**	**2.2**	**1.8**	**1.8**	**1.8**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	2	1	1	2
CO2	2	2	2	2	1
CO3	2	2	2	2	2
CO4	3	2	3	2	1
CO5	2	1	2	3	1
W.AV	**2**	**1.8**	**2**	**2**	**1.4**

S–Strong(3),M-Medium(2),L-Low(1)

VI-Semester					
Core	**Course Code:** 91363	**Aeroplane System Maintenance - Practical**	**P**	**Credits:4**	**Hours:8**
Course Objectives	1. To familiarize with the tools that are used during maintenance. 2. To provide knowledge on servicing carried out on various systems of aircraft. 3. To learn and apply various techniques during periodic inspections. 4. To educate the applicant about safety precautions required to be followed during maintenance programme.				

List of Practical:

1. Carry out inspection of seat belts and safety harness
2. Carry out visual inspection and lubrication on Nose landing gear
3. Carry out visual inspection and lubrication on Main landing gear
4. Carry out servicing of Hydraulic reservoir
5. Carry out inspection on Aileron control layout
6. Carry out inspection on Elevator control layout
7. Carry out inspection on Rudder control layout
8. Carry out inspection on aircraft tire demounted
9. Carry out inspection on Wheel Brake unit (Multi disc)
10. Carry out inspection on Aircraft Heat Exchanger (Air-conditioning System)

Course Outcomes		**Knowledge Level**
CO-1	To have knowledge on Maintenance Programme.	K 1
CO-2	To understand and give a detailed description about maintenance schedules.	K 2
CO-3	The applicant will be able to analyze the maintenance plan and carry out the inspection and servicing accordingly.	K4

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	2	3	1	1	1	1	2	2
CO2	3	1	1	1	2	1	1	1	1	1	1	2
CO3	3	1	2	2	3	1	1	1	1	1	1	2
W.AV	**2.6**	**1**	**1.3**	**1.3**	**2.3**	**1.6**	**1**	1	1	**1**	1	**2**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	2	2
CO2	1	2	1	2	3
CO3	1	1	1	2	3
W.AV	**1**	**1.3**	**1**	**2**	**2.6**

S–Strong(3),M-Medium(2),L-Low(1)

VI-Semester					
DSE	**Course Code:** 91364A	**Elective-IV Aircraft Propellers and Control**	**T**	**Credits:4**	**Hours:4**

Course Objectives	1 To familiarize basic information *about t*he fundamental of propeller. 2. To provide technical knowledge in the construction of propeller, 3. To educate on recent developments in synchronising and ice protection of propeller 4. To learn the recent techniques in the propeller maintenance. 5. To educate the recent techniques in the storage and preservation of propeller
Unit I	**Fundamentals:** Blade element theory- Forces acting on propeller in flight- Blade Angle-Angle of Attack-Angle of advance - Plane of rotation - Propeller Slip - Geometric Pitch - Effective pitch.
Unit II	**Propeller construction**: Construction Method and material Used in Wooden- Composite and Metal Propeller-Blade Station - Blade Face - Blade Shank - Blade Back - Blade butt-Fixed Pitch Propeller - Controllable Pitch Propeller - Constant speed Propeller-Feathering Propeller- Reverse pitch propeller -Tractor Propeller - Pusher Propeller-Propeller Clearances.
Unit III	**Propeller synchronising and ice protection system:** Propeller Synchronization and Propeller synchrophasing - Type I Synchrophaser system - Type II Synchro phaser system - Propeller Anti icing system - PropellerDe-icing system.
Unit IV	**Propeller maintenance:** Static Balancing of propeller - Dynamic Balancing of propeller - Propeller Blade Tracking -Wooden propeller inspection - Metal propeller inspection - Assessment of Propeller Blade Damage.
Unit V	**Propeller Preservation And Storage** Flyable storage - Temporary storage and indefinite storage; Propeller preservation and De preservation - Storage of Propeller Governor - Storage of Accumulator.

REFERENCE BOOKS:

TEXT BOOKS:

1.EASA Module-17 Propeller, Second Edition-Aircraft Tech Book Co, Sterling Book House
2.Aircraft power plants—Thomas W. Wild & Michael J. Kroes-Eighth edition. Sterling Book House

REFERENCE BOOKS

1. Aircraft A&P Technician power plant by Jeppeson. Sterling Book House.
2. Aviation maintenance technician hand book-power plant Volume 1&2-FAA-Shroff Publisher.
3. Aircraft Maintenance & Repair by Kroes, Walkins, Delp- Sterling Book House
4. Civil Aircraft Inspection Procedures (CAP 459-Part II-Aircraft), Civil Aviation Authority (CAA) London UK, Sterling Book House
5. Aviation maintenance technician hand book-power plant-Power plant-12A-FAA, Sterling Book House

Course Outcomes		**Knowledge Level**
CO-1	To impart the knowledge in fundamental of propeller	**K1**
CO-2	Understand the construction of propeller	**K2**
CO-3	Discuss the synchronising system and ice protection of propeller	**K4**
CO-4	Analyze the techniques in in the propeller maintenance.	**K4**
CO-5	Evaluate the recent trends in the storage and preservation of propeller	**K5**

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	2	1	1	3	3	3	2	1	1	2
CO2	2	1	2	1	1	3	2	3	2	1	1	2
CO3	1	2	1	2	2	1	1	2	3	2	1	2
CO4	2	2	1	2	2	1	1	1	2	2	1	3
CO5	2	2	1	2	1	1	2	1	2	1	1	2
W.AV	**1.6**	**1.6**	**1.4**	**1.6**	**1.6**	**1.8**	**1.8**	2	2.2	**1.4**	1	**2.2**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	2	1	1
CO2	3	3	1	2	2
CO3	3	2	1	2	2
CO4	2	3	2	1	2
CO5	2	2	1	2	2
W.AV	**2.2**	**2.2**	**1.4**	**1.6**	**1.8**

S–Strong(3),M-Medium(2),L-Low(1)

VI-Semester					
DSE	**Course Code:** 91364B	**Elective-IV NDT, Welding and Heat Treatment**	**T**	**Credits:4**	**Hours:4**
Course Objectives	1. To familiarize the students about safety precautions to be taken in aircraft and workshop. 2. To understand the methods used in NDT procedure. 3. To apply their knowledge in welding techniques. 4. To educate the students about Soldering & Brazing 5. To understand and gain knowledge on Heat treatment process.				
Unit I	**Safety Precautions-Aircraft and Workshop** Aspects of safe working practices - precautions to take when working with electricity - gases especially oxygen - oils and chemicals - remedial action (instructions) in the event of a fire - accident with one or more of these hazards - knowledge on extinguishing agents.				
Unit II	**Non-Destructive Inspection/Testing:** General Techniques - Visual inspection – Boroscope - Liquid penetrant Inspection - Eddy current inspection - Ultrasonic inspection - Acoustic Emission Inspection - Magnetic particle inspection - Radiographic inspection.				
Unit III	**Aircraft Welding:** Types of Welding - Gas welding - Electric Arc Welding - Shielded metal arc welding - Gas metal Arc Welding - Gas tungsten Arc Welding - Electric Resistance Welding or spot welding - Seam welding - Plasma Arc welding - Plasma Arc Cutting - Types of welded joints - Inspection of welded joints.				
Unit IV	**Soldering and Brazing:** Types of soldering - Types of brazing - Aluminium soldering - Steel brazing - Brazing of aluminium - Silver soldering - Inspection of soldered joints - Inspection of brazed joints.				
Unit V	**Heat treatment of steels:** Relation between heat treatment and physical properties of steels - critical temperatures – annealing – normalizing – hardening – tempering - case carburizing and hardening - nitriding and other surface hardening methods – quenching - Hardness number.				

REFERENCE BOOKS:

TEXT BOOKS:

1. Airframe & Powerplant Mechanics (General Handbook EA-AC 65-9A) - Federal Aviation Administration; Publisher: Shroff; Edition: 2012.
2. Airframe handbook EA-AC 65-15A Federal Aviation Administration; Publisher: Shroff; Edition: 2012.

REFERENCE BOOKS:

1. Shop Theory; Author: James Anderson Earl E. Tata; Publisher: McGraw Hill; Edition: 6th edition 2016
2. Civil Aircraft Inspection Procedures (CAP 459-Part I, Basic) by CAA UK, Sterling book House Mumbai Edition 2006.
3. EASA Module-07 A Maintenance practices; Publisher: Aircraft tech book & co.
4. Workshop technology; Author: AK Hajra Choudhary and SK Hajra Choudhary; Publisher: Media Promoters and Publications pvt. Ltd. Mumbai; Edition: 2007
5. Aircraft general engineering; Author: Lalit Gupta; Publisher: Himalayan Books, New Delhi; Edition: 2002

Course Outcomes		Knowledge Level
CO-1	To have knowledge about safety precautions while working in Aircraft and Workshop	**K1**
CO-2	To understand and give a detailed description about Non-Destructive Inspection/ Testing	**K2**
CO-3	To apply his knowledge while carrying out Aircraft Welding	**K4**
CO-4	To analyze the quality of the soldered and brazed joints	**K4**
CO-5	To evaluate work on Heat treated steels.	**K5**

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	3	2	2	1	2	2	1	3
CO2	1	1	1	2	2	1	1	1	2	3	2	1
CO3	3	2	1	3	2	2	1	2	1	1	3	2
CO4	2	3	3	2	1	2	3	3	2	2	2	2
CO5	2	2	2	2	2	3	2	2	1	1	2	1
W.AV	**2**	**2**	**1.8**	**2.2**	**2**	**2**	**1.8**	**1.8**	**1.6**	**1.8**	**2**	**1.8**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	3	2	2
CO2	3	2	2	1	1
CO3	2	1	2	2	2
CO4	1	2	1	2	2
CO5	3	2	2	1	1
W.AV	**2.2**	**1.8**	**2**	**1.6**	**1.6**

S–Strong(3),M-Medium(2),L-Low(1)

VI-Semester					
DSE	**Course Code:** 91364C	**Elective-IV Engine Propulsion System**	**T**	**Credits:4**	**Hours:4**

Course Objectives	1 To familiarize basic information about the various types of turbine engine. 2. To provide technical knowledge in the fuel system of turbine engine 3. To educate on recent developments in the engine indicating system. 4. To learn the recent techniques in the starting system of turbine engine 5. To provide knowledge in the ignition system of turbine engine
Unit I	**Turbine engines**: Turbine engine fundamental - Newton laws of motion - Boyle's law - Charles 'law - Bray ton cycle - Turbine engine types - By pass ratio - Constructional arrangement of Turbo jet and Turbo fan engine - Constructional arrangement of Turbo propeller and Turbo shaft engine.
Unit II	**Fuel system**: FADEC Fuel control System - Electronic Engine control (EEC) - Main Fuel Pump - Fuel Heater - Fuel Filter - Simplex Fuel Nozzle - Duplex Fuel nozzle- Combustion Drain Valve.
Unit III	**Engine indicating system:** Exhaust Gas - Temperature (EGT) - Engine Pressure Ratio (EPR) - Oil pressure, Oil Temperature and Oil Quantity Indicating System -Fuel Pressure, Fuel Temperature and Fuel Quantity Indicating System -Manifold Pressure Indicator - Torque Meter.
Unit IV	**ENGINE STARTING SYSTEM:** Turbine Engine Starting Sequence - Electric Starting System -Starter Generator Staring system - Cartridge Starting System - Air Turbine Starter.
Unit V	**TURBINE ENGINE IGNITION SYSTEM**: Turbine Engine Ignition System and Components - Exciter Unit - Igniter plug - Ignition Lead -Removal, Inspection and Installation of Ignition Lead - Removal, Inspection and Installation of Igniter Plug.

REFERENCE BOOKS:

TEXT BOOKS:

1. EASA Module-14 Propulsion-Aircraft Tech Book Co
2. Aircraft Gas Turbine technology by Irwin Treger, Tata McGraw-Hill Publisher

REFERENCE BOOKS

1. Aircraft Instrument and Integrated system by E.H.J. Pallet, Sterling Book House
2. Jet aircraft power system by Casamasa & Ralph D Bent, Tata McGraw-Hill Publisher
3. Aviation maintenance technician hand book-power plant Volume 1&2-FAA-Shroff Publisher
4. Aviation maintenance technician hand book-power plant-Power plant-12A-FAA
5. Aircraft Instrument by E.H.J. Pallet, Sterling Book House

Course Outcomes		**Knowledge Level**
CO-1	To impart the knowledge in various types of turbine engine	**K1**
CO-2	Understand the fuel system of turbine engine	**K2**
CO-3	Discuss the various the engine indicating system	**K4**
CO-4	Analyze the techniques in the starting system of turbine engine	**K4**
CO-5	Evaluate the recent trends in the ignition system of turbine engine	**K5**

Mapping Course Outcome VS Programme Specific Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	2	1	1	3	3	3	2	1	1	2
CO2	2	1	2	1	1	3	2	3	2	1	1	2
CO3	1	2	1	2	2	1	1	2	3	2	1	2
CO4	2	2	1	2	2	1	1	1	2	2	1	3
CO5	2	2	1	2	1	1	2	1	2	1	1	2
W.AV	**1.6**	**1.6**	**1.4**	**1.6**	**1.6**	**1.8**	**1.8**	2	2.2	**1.4**	1	**2.2**

S–Strong(3),M-Medium(2),L-Low(1)

Mapping Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	2	2	1
CO2	3	3	1	1	2
CO3	3	2	1	1	1
CO4	2	3	2	2	2
CO5	2	2	1	1	2
W.AV	**2.2**	**2.2**	**1.4**	**1.4**	**1.6**

S–Strong(3),M-Medium(2),L-Low(1)

VI-Semester				
Sub Code: 91365A **Sub Code: 91365B**	**Project/ Dissertation**	**PR/ D**	**Credits:8**	**Hours:10**
Project/ Dissertation				

UG Programme

Passing minimum

- A candidate shall be declared to have passed in each course if he/she secures not less than 40% marks in the End Semester Examinations and 40% marks in the Internal Assessment and not less than 40% in the aggregate, taking Continuous assessment and End Semester Examinations marks together.
- The passing minimum for CIA shall be 40% out of 25 marks (i.e.10 marks) in Theory/ Practical Examinations.
- The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks) for Theory /Practical papers.
- The candidates not obtain 40% in the Internal Assessment are permitted to improve their Internal Assessment marks in the subsequent semesters (2 chances will be given) by writing the CIA tests or by submitting assignments.
- Candidates, who have secured the pass marks in the End-Semester Examination and in the CIA but failed to secure the aggregate minimum pass mark (E.S.E + C I.A), are permitted to improve their Internal Assessment mark in the following semester and/or in University examinations.
- A candidate shall be declared to have passed in the Dissertation/Project report/Internship report if he/she gets not less than 40% marks in the Internal Assessment and End Semester Examinations and not less than 40% in the aggregate, taking Continuous assessment and End Semester Examinations marks together.
- A candidate who gets less than 40% in the Dissertation / Internship/ Project Report must resubmit the thesis. Such candidates need to take again the Viva-Voce on the resubmitted report/thesis.

18.2 Grading of the Courses

The following table gives the marks, Grade points, Letter Grades, and classifications meant to indicate the overall academic performance of the candidate.

Conversion of Marks to Grade Points and Letter Grade (Performance in Course / Paper)

RANGE OF MARKS	GRADE POINTS	LETTER GRADE	DESCRIPTION
90 - 100	**9.0 – 10.0**	**O**	**Outstanding**

80 - 89	**8.0 – 8.9**	**D+**	**Excellent**
75 - 79	**7.5 – 7.9**	**D**	**Distinction**
70 - 74	**7.0 – 7.4**	**A+**	**Very Good**
60 - 69	**6.0 – 6.9**	**A**	**Good**
50 - 59	**5.0 – 5.9**	**B**	**Average**
40 - 49	**4.0 – 4.9**	**C**	**Satisfactory**
00 - 39	**0.0**	**U**	**Re-appear**
ABSENT	**0.0**	**AAA**	**ABSENT**

a) Successful candidates passing the examinations and earning a GPA between 9.0 and 10.0 and marks from 90 – 100 shall be declared to have Outstanding (O).

b) Successful candidates passing the examinations and earning GPA between 8.0 and 8.9 and marks from 80 - 89 shall be declared to have Excellent (D+).

c) Successful candidates passing the examinations and earning GPA between 7.5 – 7.9 and marks from 75 - 79 shall be declared to have Distinction (D).

d) Successful candidates passing the examinations and earning GPA between 7.0 – 7.4 and marks from 70 - 74 shall be declared to have Very Good (A+).

e) Successful candidates passing the examinations and earning GPA between 6.0 – 6.9 and marks from 60 - 69 shall be declared to have Good (A).

f) Successful candidates passing the examinations and earning GPA between 5.0 – 5.9 and marks from 50 - 59 shall be declared to have Average (B).

g) Successful candidates passing the examinations and earning GPA between 4.0 – 4.9 and marks from 40 - 49 shall be declared to have Satisfactory (C).

h) Candidates earning GPA between 0.0 and marks from 00 - 39 shall be declared to have Re-appear (U).

i) Absence from an examination shall not be taken as an attempt.

From the second semester onwards the total performance within a semester and continuous performance starting from the first semester are indicated respectively **by** Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA).

These two are calculated by the following formulate

GRADE POINT AVERAGE (GPA) = $\Sigma_i C_i \; G_i / \Sigma_i C_i$

GPA = Sum of the multiplication of grade points by the credits of the courses

Sum of the credits of the courses in a Semester

18.3 Classification of the final result

The final result of the candidate shall be based only on the CGPA earned by the candidate.

a) Successful candidates passing the examinations and earning CGPA between 9.5 and 10.0 shall be given Letter Grade (O+) and those who earned CGPA between 9.0 and 9.4 shall be given Letter Grade (O) and declared to have First Class –Exemplary*.

b) Successful candidates passing the examinations and earning CGPA between 7.5 and 7.9 shall be given Letter Grade (D), those who earned CGPA between 8.0 and 8.4 shall be given Letter Grade (D+) and those who earned CGPA between 8.5 and 8.9 shall be given Letter Grade (D++) and declared to have First Class with Distinction*.

c) Successful candidates passing the examinations and earning CGPA between 6.0 and 6.4 shall be given Letter Grade (A), those who earned CGPA between 6.5 and 6.9 shall be given Letter Grade (A+), and those who earned CGPA between 7.0 and 7.4 shall be given Letter Grade (A++) and declared to have First Class.

d) Successful candidates passing the examinations and earning CGPA between 5.0 and 5.4 shall be given Letter Grade (B) and those who earned CGPA between 5.5 and 5.9 shall be given Letter Grade (B+) and declared to have passed in the Second Class.

e) Successful candidates passing the examinations and earning CGPA between 4.0 and 4.4 shall be given Letter Grade (C) and those who earned CGPA between 4.5 and 4.9 shall be given Letter Grade (C+) and declared to have passed in the Third Class.

f) Absence from an examination shall not be taken as an attempt.

Final Result

CGPA	Grade	Classification of Final Result
9.5 – 10.0 9.0 and above but below 9.5	**O+** **O**	First Class – Exemplary*
8.5 and above but below 9.0 8.0 and above but below 8.5 7.5 and above but below 8.0	**D++** **D+** **D**	First Class with Distinction*
7.0 and above but below 7.5 6.5 and above but below 7.0 6.0 and above but below 6.5	**A++** **A+** **A**	First Class
5.5 and above but below 6.0 5.0 and above but below 5.5	**B+** **B**	Second Class

4.5 and above but below 5.0	**C+**	Third Class
4.0 and above but below 4.5	**C**	
0.0 and above but below 4.0	**U**	Re-appear

CUMULATIVE GRADE POINT AVERAGE (CGPA) = $\Sigma_n \Sigma_i C_{ni} \ G_{ni} / \Sigma_n \Sigma_i C_{ni}$

CGPA = Sum of the multiplication of grade points by the credits of the entire programme

Sum of the credits of the course for the entire Programme

Where '**Ci**' is the Credit earned for Course i in any semester; '**Gi**' is the Grade Point obtained by the student for Course i and 'n' refers to the semester in which such courses were credited.

CGPA (Cumulative Grade Point Average) = Average Grade Point of all the Courses passed starting from the first semester to the current semester.

Note: * The candidates who have passed in the first appearance and within the prescribed Semesters of the UG Programme (Major, Allied, and Elective courses alone) are eligible for this classification.