



BSc Aircraft Maintenance

Curriculum and Syllabus Regulations 2021

(Based on Choice Based Credit System

(CBCS)and

Learning Outcomes based Curriculum Framework (LOCF))

**Effective from the Academic
year 2021-2022**

Department of Aviation

Department of Aviation

VISION

To be forefront in the aviation field by contributing to the intellectual, social and economic development of the aviation industry and the citizens of our nation. It is served through precept, research fueled by the advanced curriculum to endeavour the highest standards to excel in their Aviation profession.

MISSION

- To empower and encourage the students with the knowledge and practical skills required in the field of Aircraft Maintenance.
- To impart quality education through the technologically advanced curriculum which would be delivered by the industry experts.
- To train the students to have in-depth knowledge of the subjects in the field of aviation and groom them in soft skills & survival skills.

PROGRAMME EDUCATIONAL OUTCOME (PEOs)

- PEO 1:** To produce graduates having competencies in the maintenance and repair of modern aircraft.
- PEO 2:** To produce graduates who can meet the demands of the dynamic aviation maintenance area of aviation industry.
- PEO 3:** To produce graduates having the basic knowledge and skills necessary to pursue technical and professional careers in aviation industry.

PROGRAM OUTCOMES (POs)

PO 1: **Disciplinary knowledge**

Students will demonstrate in-depth knowledge and understanding of Aircraft Maintenance.

PO 2: **Communication Skills**

Students can express thoughts and ideas effectively in writing and orally, and also able to present complex information clearly and concisely to different groups.

PO 3: **Critical thinking**

Students can apply analytic thought to a body of knowledge; analyze and evaluate evidence, arguments, claims, beliefs based on empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following a scientific approach to knowledge development.

PO 4: **Problem-solving**

Students can build the capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's learning to real-life situations.

PO 5: Analytical reasoning

Students can evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints.

PO 6: Research-related skills

Students can recognize cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyze, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; the ability to plan, execute and report the results of an experiment or investigation.

PO 7: Cooperation/Team work

Students can work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.

PO 8: Scientific reasoning

Students can analyze, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.

PO 9: Reflective thinking

Students can develop Critical sensibility to lived experiences, with self-awareness and reflexivity of both self and society.

PO 10: Information/digital literacy

Students can use ICT in a variety of learning situations, demonstrate the ability to access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of data.

PO 11: Self-directed learning

Students can work independently, identify appropriate resources required for a project, and manage a project through to completion.

PO 12: Multicultural competence

Students can get knowledge of the values and beliefs of multiple cultures and a global perspective, and the capability to effectively engage in a multicultural society and interact respectfully with diverse groups.

PO 13: Moral and ethical awareness/reasoning

Students can embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. Capable of demonstrating the ability to identify ethical issues related to one's work, avoid unethical behaviour such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights; appreciating environmental and sustainability issues; and adopting an objective, unbiased and truthful actions in all aspects of work.

PO 14: Leadership readiness/qualities

Students can develop the ability to mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team that can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide people to the right destination, smoothly and efficiently.

PO 15: Lifelong learning

Students can acquire knowledge and skills, including "learning how to learn", that is necessary for participating in learning activities throughout life.

PROGRAMME SPECIFIC OUTCOME (PSOS)

At the end of the program, the students are

- PSO 1:** Able to examine different parts of an aircraft and ensure their proper functioning.
- PSO 2:** Able to Conduct maintenance procedures in Aircraft Engines, Airframe, and Avionics systems for Continuous Airworthiness.
- PSO 3:** Able to work in an Aviation industry as a team member as well as an individual with professional qualities and evolve oneself for lifelong learning.

LIST OF BOARD OF STUDIES (BOS) MEMBERS

S.NO	NAME OF THE MEMBERS	DESIGNATION & ROLL
1	Dr. Karikalan	HOD, Professor, Department of Aviation, VISTAS Chairman.
2	Capt. Srikanth Chandrasekaran	Training Manager MH Cockpit
3	Er. Musharuf Wajahathulla S.	Internal Board Member MH Cockpit
4	Er. Immanuel Inbaezhilarsan C.	Internal Board Member MH Cockpit
5	Mrs. Vandhika Lambha	Internal Board Member MH Cockpit
6	Mrs. Lina Bose	Internal Board Member MH Cockpit
7	Mr. Waseem Raja	Internal Board Member MH Cockpit
8	Mrs. Ashika parveen	Internal Board Member MH Cockpit

UG REGULATIONS 2021

DEGREE OF BACHELOR OF SCIENCE (AIRCRAFT MAINTENANCE)

1. DURATION OF THE PROGRAMME

Three years (six semesters)

Each academic year shall be divided into two semesters. The odd semesters shall consist of the period from July to November of each year and the even semesters from January to May of each year.

1.3 There shall be not less than 90 working days for each semester.

2. ELIGIBILITY FOR ADMISSION

The details of Eligibility for Admission – Pass in Higher Secondary or equivalent to HSC

3. MEDIUM OF INSTRUCTION

The medium of instruction for all UG programs is English excluding Tamil, Hindi and French Language Papers.

4. CREDIT REQUIREMENTS AND ELIGIBILITY FOR AWARD OF DEGREE

A Candidate shall be eligible for the award of Degree only if he/she has undergone the prescribed course of study in VISTAS for not less than three academic years and passed the examinations of all the prescribed courses of Six Semesters earning a minimum of 140 credits as per the distribution given in for Part I, II, III and also fulfilled such other conditions as having been prescribed thereof.

5. COURSE

Each course/subject is to be designed under lectures/tutorials/laboratory or fieldwork/seminar / practical training / Assignments / Term paper or Report writing etc., to meet effective teaching and learning needs.

6. COURSE OF STUDY AND CREDITS

The Course Components and Credit Distribution shall consist of Part I, II & III:

The program consists of some courses. The term 'course' is applied to indicate a logical part of the subject matter of the program and is invariably equivalent to the

subject matter of a 'paper' in the conventional sense. The following are the various categories of courses suggested for the UG progress.

Part I – Language Courses (LC) (any one of Tamil, Hindi, French or special subject designed in place of the above).

Part II – English Language courses (ELC) or special subject designed in place of. The Language courses and English Language Courses are 4 each / 2 each in number and the LC and ELC are meant to develop the student's communicative skill at the UG level.

Part III – Core courses i.e., major courses that are compulsorily required for each of the programs of study (CC), Ability Enhancement Course (AEC), Discipline Specific Elective Course (DSE) and Skill Enhancement Course (SEC).

For each course, credit is assigned based on the

following: Contact hour per week CREDITS

1 Lecture hour - 1Credit

1 Tutorial hour - 1Credit

2 Practical hours - 1Credit

(Laboratory / Seminar / Project Work / etc.)

7. REQUIREMENTS FOR PROCEEDING TO SUBSEQUENT SEMESTER

Eligibility: Students shall be eligible to go to subsequent semesters only if they earn sufficient attendance as prescribed therefore by the Board of Management from time to time.

Attendance: All Students must earn 75% and above of attendance for appearing for the University Examination. (Theory/Practical)

Condonation of shortage of attendance: If a student fails to earn the minimum attendance (Percentage stipulated), the HODs shall condone the shortage of attendance on medical grounds up to a maximum limit of 10% (i.e. between 65% and above and less than 75%) after paying the prescribed fee towards the condonation of shortage of attendance. The students with attendance of less than 65 and more than 50% shall be condoned by VC on the recommendation of HODs on genuine grounds, will be

permitted to appear for the regular examination on payment of the prescribed condonation fee.

Detained students for want of attendance: Students who have earned less than 50% of attendance shall be permitted to proceed to the next semester and to complete the Program of study. Such Students shall have to repeat the semester, which they have missed by rejoining after completion of the final semester of the course, by paying the fee for the break of study as prescribed by the University from time to time.

Transfer of Students and Credits: The strength of the credits system is that it permits inter Institutional transfer of students. By providing mobility, it enables individual students to develop their capabilities fully by permitting them to move from one Institution to another following their aptitude and abilities.

Transfer of Students is permitted from one Institution to another Institution for the same program with the same nomenclature, provided, there is a vacancy in the respective program of Study in the Institution where the transfer is requested.

The marks obtained in the courses will be converted into appropriate grades as per the University norms.

The transfer students are not eligible for Rankings, Prizes and Medals.

Students who want to go to foreign Universities for up to two semesters or Project Work with the prior approval of the Departmental / University Committee are allowed to transfer their credits. Marks obtained in the courses will be converted into Grades as per the University norms and the students are eligible to get CGPA and Classification.

LEARNING OUTCOME BASED CURRICULUM FRAMEWORK (LOCF)

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Learning Outcomes-Based Curriculum Framework for Undergraduate Education in BSc (Aircraft Maintenance)

1. Introduction

The Learning Outcomes-based Curriculum Framework (LOCF) for the undergraduate programs in BSc Aircraft Maintenance is intended to make available an extensive structure to create an academic base that responds to the requirements of the students to understand the basics of Aircraft Maintenance. The learning outcomes-based curriculum framework (LOCF) for B.Sc. Aircraft Maintenance is intended to prepare a curriculum that enables the graduates to respond to the current needs of the industry and equip them with skills relevant to national and global standards. The framework will assist in maintaining international standards to ensure global competitiveness and facilitate student/graduate mobility after completion of B.Sc. Aircraft Maintenance program. The framework intends to allow for greater flexibility and innovation in curriculum design and syllabus development, teaching-learning process, assessment of student learning levels.

Many courses incorporate training and practical experience, in the form of projects, presentations, internships, industrial visits, and interaction with experts from the industry as a part of the BSc Course syllabus.

2. Learning Outcomes-based Curriculum framework

Nature and extent of BSc Aircraft Maintenance Program

The UG programs in BSc Aircraft Maintenance builds on the basic physics and maths taught at the +2 level in all the schools in the country. Ideally, the +2 senior secondary school education should aim and achieve a sound grounding in understanding the fundamentals of science orientated subjects with sufficient content of topics from the modern science subjects and contemporary areas of exciting developments in science to ignite the young minds. The curriculum provides skills in mathematics, physics, Electrics Aircraft General Knowledge, Aerodynamics, Aircraft Structures, Propulsion, Airframe & Aircraft Systems, Air Navigation, Meteorology, Air Regulation.

The Bachelor of Aircraft Maintenance is a broad-based multi-disciplinary program with a wide spectrum of courses in aircraft technology such as avionics, aerodynamics/propulsion and aerospace management targeted for the MRO and applied research and development sector of the aviation industry. The program also includes courses in airport and airline ground operations, flight operations, Air traffic management to educate and equip the graduates employable in various roles of the airline, aerospace industries. Students of this program have the privilege to earn a Bachelor degree in their area of specialization. After graduation in Aircraft Maintenance, students have the option of further advanced courses in the field such as M.E. (Aeronautical Engineering), M.Tech. (Aeronautical Engineering), PhD (Aeronautical Engineering).

The aim and objectives of the BSc Aircraft Maintenance Program. The aims and objectives of our BSc Program are structured to:

1. To produce Aviation professionals who are knowledgeable, competent and innovative which will contribute towards the human capital in airline/Aerospace/Air traffic management/ engineering technology-related industry.
2. To produce aviation professional who has effective leadership and teamwork skills as well as verbal, non-verbal and interpersonal communication skills to support their role in the industry.
3. To produce aviation professionals who are committed to the importance of lifelong learning and continuous improvement.
4. To produce leaders who practice professionalism with ethics and social responsibility.
5. To practice a high level of professionalism necessary to deliver the knowledge, expertise and skill of students through the application of research to business problems and issues.

3. Graduate attributes in BSc Aircraft Maintenance

Some of the characteristic attributes of a graduate in BSc Aircraft Maintenance are

- i. **Disciplinary knowledge and skills:** Capable of Understanding the major concepts and principles in Aircraft Maintenance and its different subfields like aerodynamics, aircraft structures, aero engines, navigation, meteorology etc.,
- ii. **Skilled communicator:** Ability to transmit National and international

information relating to all areas in the aviation field clearly and concisely in writing and oral.

- iii. **Critical thinker and problem solver:** Ability to employ critical thinking and efficient problem-solving skills in all the fields in business and management to meet the competition and for proper decision making in business.
- iv. **Sense of inquiry:** Capability for asking relevant/appropriate questions relating to contemporary issues and problems in the field of Aircraft Maintenance and aviation.
- v. **Team player/worker:** Capable of working effectively in diverse teams in both classroom and field visits like industry and market.
- vi. **Digitally Efficient:** Capable of using computers for design, analysis and computation with appropriate software, and employing modern e-library search tools.
- vii. **Ethical awareness/reasoning:** The graduate should be capable of demonstrating the ability to think and analyze rationally with a modern and scientific outlook and identify ethical issues related to one's work, avoid unethical behavior such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights, and adopting objectives, unbiased and truthful actions in all aspects of work.
- viii. **National and international perspective:** The graduates should be able to develop a national as well as international perspective for their career in the chosen field of academic activities. They should prepare themselves during their most formative years for their appropriate role in contributing towards the national development and projecting our national priorities at the international level about their field of interest and future expertise.
- ix. **Lifelong learners:** Capable of self-paced and self-directed learning aimed at personal development and for improving knowledge/skill development and reskilling in all areas of business management.

4. Qualification descriptors for BSc Aircraft Maintenance Program

A qualification descriptor indicates the generic outcomes and attributes expected for the award of a particular type of qualification. The learning experiences and assessment

procedures are expected to be designed to provide every student with the opportunity to achieve the intended program learning outcomes. The qualification descriptors reflect the followings:

1. Disciplinary knowledge and understanding
2. Skills & Ability
3. Global competencies that all students in different academic fields of study should acquire/attain and demonstrate.

Qualification descriptors for B.Sc. Aircraft Maintenance program:

Some of the expected learning outcomes that a student should be able to demonstrate on completion of a B.Sc. Aircraft Maintenance program may include the following:

Knowledge & Understanding

- i. Demonstrate extensive knowledge of the disciplinary foundation in the various areas of Aeronautics, as well as insight into contemporary research and development.
- ii. Demonstrate specialized methodological knowledge in the specialized areas of aeronautics about professional literature, principles of flight and reviewing scientific work.

Skills & Ability

- i. Demonstrate ability to apply aeronautics knowledge & experimental skills critically and systematically for assessment and solution of complex problems and issues related to aircraft design, Flight operation and other specialized areas of aviation.
- ii. Demonstrate ability to model, simulate and evaluate the phenomenon and systems in the aircraft.
- iii. Demonstrate ability to apply one's Aircraft Maintenance knowledge, experimental skills, scientific methods & advanced design, simulation and validation tools to identify and analyze complex real-life problems and frame technological solutions for them.

Competence

- i. Communicate his or her conclusions, knowledge & arguments effectively and professionally both in writing and utilizing presentation to different audiences in both national and international context.
- ii. Ability to work collaboratively with others in a team, contributions to the management, planning and implementations.
- iii. Ability to independently propose research/developmental projects, plan their

implementation, undertake its development, evaluate its outcomes and report its results properly.

iv. Ability to identify the personal need for further knowledge relating to the current and emerging areas of study by engaging in lifelong learning in practices.

5. Program learning outcomes relating to BSc Aircraft Maintenance

PL01: Able to utilize the knowledge of aeronautical/aerospace science in an innovative, dynamic and challenging environment for the design and development of new products and to manage airline operations.

PL 02: An ability to function on a multidisciplinary team.

PL03: An ability to design, troubleshoot system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.

PL04: An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

PL05: Knowledge of contemporary issues

PL06: Recognition of the need for, and an ability to engage in life-long learning.

PL07: The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

PL08: Ability to identify, formulate, and solve engineering and operational problems.

PL09: An understanding of professional and ethical responsibility.

TEACHING-LEARNING PROCESS

Teaching-learning process and assessment of student learning levels. Instead, they are intended to allow for flexibility and innovation in (i) program design and syllabi development by higher education institutions (HEIs), (ii) teaching-learning process, (iii) assessment of student learning levels, and (iv) periodic program review within a broad framework of agreed expected graduate attributes, qualification descriptors, program learning outcomes and course learning outcomes. The overall objectives of the learning outcomes-based curriculum framework are to:

- Formulate graduate attributes, qualification descriptors, program learning outcomes and course learning outcomes that are expected to be demonstrated by the holder of a qualification;
- Enable prospective students, parents, employers and others to understand the nature and level of learning outcomes (knowledge, skills, attitudes and values) or attributes a graduate of a program should be capable of demonstrating on successful completion of the program of study;
- Maintain national standards and international comparability of learning outcomes and academic standards to ensure global competitiveness, and to facilitate student/graduate mobility; and
- Provide higher education institutions with an important point of reference for designing teaching-learning strategies, assessing student learning levels, and periodic review of programs and academic standards.

7. ASSESSMENT METHODS

Examination and Evaluation

Examination:

- i) There shall be examinations at the end of each semester, for odd semesters in October / November, for even semesters in April / May. A candidate who does not pass the examination in any course(s) shall be permitted to appear in such failed courses in the subsequent examinations to be held in October / November or April /May.
- ii) A candidate should get registered for the first-semester examination. If registration is not possible owing to a shortage of attendance beyond condonation limit/regulations prescribed OR belated joining OR on medical grounds, the candidates are permitted to move to the next semester. Such candidates shall re-do the missed semester after completion of the program.
- iii) The results of all the examinations will be published through University Website. In the case of passed out candidates, their arrear results will be published through University Website.

To Register for all subjects: Students shall be permitted to proceed from the First Semester up to the Final Semester irrespective of their failure in any of the Semester Examination, except for the shortage of attendance programs. For this purpose, Students shall register for all the arrear subjects of earlier semesters along with the current (subsequent) Semester Subjects.

Marks for Continuous Internal Assessment (CIA) Examinations and End Semester

Examinations (ESE) for PART I, II, III

There shall be no passing minimum for Continuous Internal Assessment (CIA) Examinations.

For the End Semester Examination, the passing minimum shall be 40% (Forty Percentage) of the maximum marks prescribed for the Course/Practical/Project and Viva-Voce.

In the aggregate (CIA and ESE) the passing minimum shall be 40%.

7.3.4. He / She shall be declared to have passed the whole examination, if he/she passes in all the courses wherever prescribed in the curriculum by earning 140 CREDITS in Part I, II, III.

Question Paper Pattern for End Semester Examination

SECTION – A	10 compulsory questions	10 X 3 = 30 Marks
SECTION – B	5 questions out of 8 questions	5 X 8 = 40 Marks
SECTION – C	2 questions out of 4 questions	2 X 15 = 30 Marks
		Marks Total 100 Marks

SUPPLEMENTARY EXAMINATION:

Supplementary Examinations are conducted for the students who appeared in the final semester examinations. Eligible criteria for appearing in the Supplementary Examinations are as follows:

Eligibility: A Student who is having a maximum of two arrear papers is eligible to appear for the Supplementary Examination.

Non-eligibility for those who completed the program: Students who have completed their Program duration but having arrears are not eligible to appear for Supplementary Examinations.

RETOTALLING, REVALUATION AND PHOTOCOPY OF THE ANSWER SCRIPTS:

Re-totalling: All UG Students who appeared for their Semester Examinations are eligible for applying for re-totalling of their answer scripts.

Revaluation: All current batch Students who have appeared for their Semester Examinations are eligible for the Revaluation of their answer scripts. Passed out candidates are not eligible for Revaluation.

Photocopy of the answer scripts: Students who have applied for revaluation can download their answer scripts from the University Website after fifteen days from the date of publication of the results.

The examination and evaluation for MOOCs will be as per the requirements of the regulatory bodies and will be specified at the beginning of the Semester and notified by the university NPTEL-SWAYAM Coordinator (SPOC).

CLASSIFICATION OF SUCCESSFUL STUDENTS

PART I TAMIL / OTHER LANGUAGES; PART II ENGLISH AND PART III CORE SUBJECTS, ALLIED, ELECTIVES COURSES AND PROJECT: Successful Students passing the Examinations for the Part I, Part II and Part III courses and securing the marks

- a) CGPA 9.00 to 10.00 shall be declared to have passed the examination in **First class with Outstanding**.
- b) CGPA 7.50 to 8.99 shall be declared to have passed the examination in **First class with distinction**.
- c) CGPA 6.00 to 7.49 shall be declared to have passed the examination in **First Class**.
- d) CGPA 5.00 to 5.99 in the aggregate shall be declared to have passed the examination in the **Second Class**.
- e) CGPA 4.00 to 4.99 shall be declared to have passed the examination in the **THIRD Class**.

MARKS AND GRADES:

The following table shows the marks, grade points, letter grades and classification to indicate the performance of the student:

Computation of Grade Point Average (GPA) in a Semester, Cumulative Grade Point Average (CGPA) and Classification.

GPA for a Semester: $= \frac{\sum_i C_i G_i}{\sum_i C_i}$ That is, GPA is the sum of the multiplication of grade points by the credits of the courses divided by the sum of the credits of the courses in a semester.

Were

C_i = Credits earned for course I in any semester,

G_i = Grade Points obtained for course I in any semester

n = Semester in which such courses were credited.

Grade Conversion Table – UG			
Range of Marks	Grade Points	Letter Grade	Description
90 – 100	10	O	Outstanding
82 – 89	9	A+	Excellent
75 – 81	8	A	Very Good
67 – 74	7	B+	Good
60 – 66	6	B	Above Average
50 – 59	5	C	Average
40 – 49	4	D	Minimum for pass
0 – 39	0	RA	Reappear
		AAA	Absent

Letter Grade and Class CGPA

Overall Performance – UG		
CGPA	GRADE	CLASS
4.00 - 4.99	D	Third Class
5.00 - 5.99	C	Second Class
6.00 - 6.69	B	First Class
6.70 - 7.49	B+	
7.50 - 8.19	A	First Class with Distinction*
8.20 - 8.99	A+	
9.00 - 10.00	O	First Class - Outstanding*

RANKING

- The students who have passed in the first appearance and within the prescribed semester of the UG Program (Major, Allied and Elective courses only) are eligible.
- Students who pass all the examinations prescribed for the Program in the **FIRST APPEARANCE ITSELF ALONE** are eligible for Ranking / Distinction.
- The case of Students who pass all the examinations prescribed for the Program with a break in the First Appearance is only eligible for Classification.
- Students qualifying during the extended period shall not be eligible for RANKING.

MAXIMUM PERIOD FOR COMPLETION OF THE PROGRAMS TO QUALIFY FOR A DEGREE

A Student who for whatever reason is not able to complete the programs within the normal period (N) or the Minimum duration prescribed for the program, maybe allowed two years period beyond the normal period to clear the backlog to be qualified for the degree. (Time Span = N + 2 years for the completion of program)

In exceptional cases like major accidents and childbirth an extension of one year is considered beyond the maximum period (Time Span= N + 2 + 1 years for the completion of program).

7.12. REVISION OF REGULATIONS, CURRICULUM AND SYLLABI

The University may from time-to-time revise, amend or change the Regulations, Curriculum, Syllabus and Scheme of examinations through the Academic Council with the approval of the Board of Management.

Structure of Courses in BSc. Aircraft Maintenance

The B.Sc. The Aircraft Maintenance program consists of 140 credits based on the Choice Based Credit System (CBCS) approved by the UGC with 1 hour for each credit for theory/tutorials and 2 hours for each credit for laboratory work. The 140-credit course comprises 88 credits of Core courses (CC) and 4 credits of Ability Enhancement Compulsory Courses (AECC) which are mandatory as well as 33 credits of Discipline-specific courses (DSE), 12 credits of Skilled Enhancement courses (SEC) and 03 credits of Generic Elective. A student must take 140 credits in total to qualify for the grant of the BSc degree after completing them successfully as per rules and regulations of the HEI.

A detailed list of Core Courses, Discipline Specific Courses (DSE), Discipline Elective Course (DE), Generic Elective Courses (GEC), Skill Enhancement Courses (SEC) and Ability Enhancement Compulsory Courses (AECC) are given in Section 6.2.

Structure of UG Courses in BSc Aircraft

Maintenance Distribution of different Courses in each semester with their credits for BSc Aircraft Maintenance

Semester	Compulsory Core Courses (CC)	Discipline Specific Elective (DSE) each with 05 credit	Ability Enhancement Compulsory Courses (AECC) each with 04 credit	Skill Enhancement Course (SEC) each with 02 credit	Generic Elective (GE) each with 02 credit	Total Credits
Sem I	CC – 1		AECC-1			24
	CC – 2					
	CC – 3					
	CC – 4					
	CC – 5					
	CC – 6					
	CC – 7					
Sem II	CC – 8			SEC – 1		24
	CC – 9					
	CC – 10					
	CC – 11					
	CC – 12					
	CC – 13					
	CC – 14					
Sem III	CC – 15		AECC-2	SEC – 2		24
	CC – 16					
	CC – 17					
	CC – 18					
	CC – 19					
	CC – 20					
Sem IV	CC – 21			SEC – 3		24
	CC – 22			SEC – 4		
	CC – 23					
	CC – 24					
	CC – 25					
	CC – 26					
	CC – 27					
SEM V	CC – 28	DSE – 1		SEC – 5		22
		DSE – 2				
		DSE – 3				
		DSE – 4				
		DSE – 5				
		DSE – 6				
SEM VI		DSE - 7		SEC – 6	GE – 1	22
		DSE – 8		SEC – 7		
		DSE – 9 & DE – 1				
Total Credits	88	33	4	12	3	140

*Language and English are treated as core papers in the SEM I and SEM II

Vels Institute of Science and Technology and Advanced studies (VISTAS)

B.Sc. Aircraft Maintenance

Courses of Study and Scheme of Assessment

(Minimum Credits to be earned :140)

B.Sc Aircraft Maintenance Course Components

Component	I Sem	II Sem	III Sem	IV Sem	V Sem	VI Sem	Total Credits
Core Courses & Languages	16 +6	16+6	14+6	15+6	3	-	88
Ability Enhancement Courses (AEC)	2	-	2	-	-	-	4
Discipline Specific Elective (DSE) & Generic Elective (GEC)	-	-	-	-	17	19	36
Skill enhancement Course (SEC)	-	2	2	3	2	3	12
Total Credits	24	24	24	24	22	22	140

**VELS INSTITUTE OF SCIENCE, TECHNOLOGY AND ADVANCED
STUDIES(VISTAS)**

B.Sc. Aircraft Maintenance

COURSES OF STUDY AND SCHEME OF ASSESSMENT

(MINIMUM CREDITS TO BE EARNED: 140)

Code No.	Course	Hours/Week			Credits	Maximum Marks		
		Lecture	Tutorial	Practical		CA	SEE	Total
SEMESTER 1								
LANG	Tamil I/ Hindi / French	3	0	0	3	40	60	100
ENG	English I	3	0	0	3	40	60	100
CORE	Aerodynamics	3	1	0	4	40	60	100
CORE	Air law	3	1	0	4	40	60	100
CORE	Human factors	4	0	0	4	40	60	100
CORE	Aerodynamics Lab	0	0	4	2	40	60	100
CORE	Workshop Practices	0	0	4	2	40	60	100
AECC	Communication Skills	1	0	2	2	40	60	100
SEC	Orientation/Induction program / Life skills	-	-	-	-	-	-	-
		17	2	10	24			
SEMESTER 2								
LANG	Tamil II/ Hindi / French	3	0	0	3	40	60	100
ENG	English II	3	0	0	3	40	60	100
CORE	Aircraft Electronics fundamentals and Digital techniques I	3	1	0	4	40	60	100
CORE	Aircraft material and hardware	3	1	0	4	40	60	100
CORE	Aircraft Electrical fundamentals I	4	0	0	4	40	60	100
CORE	Aircraft Electrical fundamentals lab	0	0	4	2	40	60	100
CORE	Aircraft Electronics fundamentals and Digital techniques lab	0	0	4	2	40	60	100
SEC	Soft Skills - I / Sector Skill Council Course	2	0	0	2	40	60	100
SEC	NSS / NCC / Swachh Bharat / Inplant Training	-	-	-	-	-	-	-
		18	2	8	24			
CA	- Continuous Assessment				SEE	- Semester End Examination		

**VELS INSTITUTE OF SCIENCE, TECHNOLOGY AND ADVANCED
STUDIES(VISTAS)**

B.Sc. Aircraft Maintenance

COURSES OF STUDY AND SCHEME OF ASSESSMENT

Code No.	Course	Hours/Week			Credits	Maximum Marks		
		Lecture	Tutorial	Practical		CA	SEE	Total
SEMESTER 3								
CORE	Aircraft Electrical fundamentals II	3	0	0	3	40	60	100
CORE	Aircraft Electronics fundamentals and Digital techniques II	3	0	0	3	40	60	100
CORE	Aircraft Maintenance practices I	4	0	0	4	40	60	100
CORE	Aircraft Systems I	4	0	0	4	40	60	100
CORE	Ground handling and support system	4	0	0	4	40	60	100
AECC	Environmental Studies	2	0	0	2	40	60	100
CORE	Aircraft Maintenance practices lab	0	0	4	2	40	60	100
SEC	Soft Skills - II / Sector Skill Council Course	2	0	0	2	40	60	100
SEC	Orientation/Induction program / Life skills	-	-	-	-	-	-	-
		22	0	4	24			
SEMESTER 4								
CORE	Aircraft Systems II	3	0	0	3	40	60	100
CORE	Piston engine and Propellers (Maintenances)	3	0	0	3	40	60	100
CORE	Gas Turbine Engine	4	0	0	4	40	60	100
CORE	Avionics	4	0	0	4	40	60	100
CORE	Aircraft structures and associated systems	3	0	0	3	40	60	100
CORE	Gas turbine Engine lab	0	0	4	2	40	60	100
CORE	Piston engine lab	0	0	4	2	40	60	100
SEC	Soft Skills III / Sector Skill Council Course	2	0	0	2	40	60	100
SEC	Internship / Capability Enhancement program	-	-	2	1	-	-	-
		19	0	10	24			
CA	- Continuous Assessment			SEE	- Semester End Examination			

**VELS INSTITUTE OF SCIENCE, TECHNOLOGY AND ADVANCED
STUDIES(VISTAS)**

B.Sc. Aircraft Maintenance

COURSES OF STUDY AND SCHEME OF ASSESSMENT

Code No.	Course	Hours/Week			Credits	Maximum Marks		
		Lecture	Tutorial	Practical		CA	SEE	Total
SEMESTER 5								
CORE	Aircraft Maintenance practices II	3	0	0	3	40	60	100
DSE	Turbine Helicopter Aerodynamics, Structures and Systems	3	0	0	3	40	60	100
DSE	Turbine Airplane Aerodynamics, Structures and Systems	4	0	0	4	40	60	100
DSE	Nondestructive Testing	3	0	0	3	40	60	100
DSE	Typical aircraft maintenance fixed wing heavy and light aircraft	3	0	0	3	40	60	100
DSE	Typical aircraft maintenance fixed wing heavy and light aircraft -Practical	0	0	4	2	40	60	100
DSE	Typical aircraft maintenance fixed/rotary wing avionics class cockpit - Practical	0	0	4	2	40	60	100
SEC	Internship / Mini Project / Sector Skill Council Course	0	0	4	2	40	60	100
SEC	Skill Enhancement Training / Student Club Activities	-	-	-	-	-	-	-
		16	0	12	22			
SEMESTER 6								
DSE	On Job Training	0	0	15	12	40	60	100
GE	Disaster Management	3	0	0	3	40	60	100
SEC	Entrepreneurship Development	2	0	0	2	40	60	100
DE	Project Work	0	0	8	4	40	60	100
SEC	Technical Seminar / Innovation Council / Start up Initiative	0	0	2	1	40	60	100
		5	0	25	22			
CA	- Continuous Assessment			SEE	- Semester End Examination			

LIST OF CORE COURSES

(Theory)

S.NO	COURSE CODE	COURSE TITLE
1		AERODYNAMICS
2		AIR LAW
3		HUMAN FACTORS
4		ELECTRONICS FUNDAMENTALS AND DIGITAL TECHNIQUES I
5		AIRCRAFT MATERIAL AND HARDWARE
6		AIRCRAFT ELECTRICAL FUNDAMENTALS I
7		AIRCRAFT ELECTRICAL FUNDAMENTALS II
8		ELECTRONICS FUNDAMENTALS AND DIGITAL TECHNIQUES II
9		AIRCRAFT MAINTENANCE PRACTICES
10		AIRCRAFT SYSTEMS I
11		GROUND HANDLING AND SUPPORT SYSTEM
12		AIRCRAFT SYSTEMS II
13		PISTON ENGINE AND PROPELLERS (MAINTENANCES)
14		GAS TURBINE ENGINE
15		AVIONICS
16		AIRCRAFT STRUCTURES AND ASSOCIATED SYSTEMS
17		NON-DESTRUCTIVE TESTING

LIST OF CORE COURSES

(Practical)

18		AERODYNAMICS LAB
19		WORKSHOP PRACTICES
20		AIRCRAFT ELECTRICAL FUNDAMENTALS LAB
21		ELECTRONICS FUNDAMENTALS AND DIGITAL TECHNIQUES LAB
22		AIRCRAFT MAINTENANCE PRACTICES LAB
23		GAS TURBINE ENGINE LAB
24		PISTON ENGINE LAB

<u>LIST OF DISCIPLINE SPECIFIC ELECTIVE COURSES (DSE)</u>		
(Theory)		
S.NO	COURSE CODE	COURSE TITLE
1		TYPICAL AIRCRAFT MAINTENANCE FIXED WING HEAVY AIRCRAFT
2		TYPICAL AIRCRAFT MAINTENANCE FIXED WING LIGHT AIRCRAFT
3		TYPICAL AIRCRAFT MAINTENANCE FIXED/ROTARY WING AVIONICS CLASS COCKPIT
4		TYPICAL AIRCRAFT MAINTENANCE PISTON ENGINE
5		TURBINE HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS
6		Turbine Airplane Aerodynamics, STRUCTURES AND SYSTEMS
7		AIRCRAFT MAINTENANCE PRACTICES II
8		DANGEROUS GOODS AND CARGO
9		RADIO TELEPHONY RESTRICTED
<u>LIST OF DISCIPLINE SPECIFIC ELECTIVE COURSES (DSE)</u>		
<u>(Practical)</u>		
1		TYPICAL AIRCRAFT MAINTENANCE FIXED WING HEAVY AND LIGHT AIRCRAFT -PRACTICAL
2		TYPICAL AIRCRAFT MAINTENANCE FIXED/ROTARY WING AVIONICS CLASS COCKPIT - PRACTICAL

<u>LIST OF DISCIPLINE ELECTIVE COURSES (DE)</u>		
S.NO	COURSE CODE	COURSE TITLE
1		PROJECT WORK

LIST OF ABILITY ENHANCEMENT COMPUSLORY COURSE (AECC)

S.NO	COURSE CODE	COURSE TITLE
1		COMMUNICATION SKILLS
2		ENVIRONMENTAL STUDIES

LIST OF SKILL ENHANCEMENT COURSE (SEC)

S.NO	COURSE CODE	COURSE TITLE
1		ORIENTATION / INDUCTION PROGRAMME / LIFE SKILLS
2		SOFT SKILLS –I
3		NSS / NCC / SWACHH BHARAT/ INPLANT TRAINING
4		SOFT SKILLS – II
5		SWAYAM / NPTEL / VALUE ADDED COURSE
6		SOFT SKILLS – III
7		INTERNSHIP
8		MINI PROJECT
9		SKILL ENHANCEMENT TRAINING / STUDENT CLUB ACTIVITIES
10		ENTREPRENUERSHIP DEVELOPMENT
11		TECHNICAL SEMINAR / INNOVATION COUNCIL / START UP INITIATIVE

LIST OF GENERIC ELECTIVE COURSES (GE)

(UGC Recommended)

S.NO	COURSE CODE	COURSE TITLE
1		CONSUMER AFFAIRS
2		DISASTER MANAGEMENT
3		UNIVERSAL HUMAN VALUES

TAMIL – I

Subject Code		IA Marks	40	
Number of Lecture Hours/Week	3	Exam Marks	60	
Total Number of Lecture Hours	45	L	T	P
Credits	3	3	0	0

COURSE OBJECTIVES:

இக்காலக் கவிதைகள் - உரைநடை - பண்பாடு - மொழித்திறன் பற்றி அறிந்து கொள்ளுதல்

அலகு 1	மரபுக்கவிதை	9 மணிநேரம்
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1. பாரதியார் - பாரத தேசம் என்னும் தலைப்பில் ஆறு பாடல்கள். (பாடல் எண்கள் 1, 6, 7, 9, 12, 13).
2. பாரதிதாசன் - தமிழுக்கும் அமுதென்று பேர் என்னும் தலைப்பிலான கவிதை.
3. தேசிக விநாயகம் பிள்ளை - உடல் நலம் பேணல் என்னும் தலைப்பிலான கவிதை.
4. முடியரசன் - காவியப் பாவை - "புண்படுமா" என்னும் கவிதை.

அலகு 2	புதுக்கவிதை	9 மணிநேரம்
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1. நா. காமராசன் - கறுப்பு மலர்கள் தொகுப்பில் காகிதப்பூக்கள் என்னும் தலைப்பிலான கவிதை.
2. அப்துல் ரகுமான் - ஆலாபனை தொகுப்பில் போட்டி என்னும் தலைப்பிலான கவிதை
3. ஈரோடு தமிழன்பன் - ஒரு வண்டி சென்றியு தொகுப்பில் தேர்ந்தெடுக்கப்பட்ட சென்றியு கவிதைகள்
4. ஆண்டாள் பிரியதர்ஷினி - முத்தங்கள் தீர்ந்துவிட்டன தொகுப்பில் 'இங்கே வரும் போது' என்னும் தலைப்பிலான கவிதை

அலகு 3	உரைநடை	9 மணிநேரம்
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1. மாணாக்கரும் தாய்மொழியும் - திரு.வி.க.,
2. மன வலிமை வேண்டும் - மு.வரதராசனார்
3. செம்மொழித் தமிழின் சிறப்புகள்
4. பண்டைத் தமிழரின் சாதனைச் சுவடுகள்

அலகு 4	தமிழர் வாழ்வும் பண்பாடும்	9 மணிநேரம்
பண்பாடு – வாழ்வியல் முறை – அகம், புறம் - உணவு முறை - விருந்தோம்பல் - நம்பிக்கைகள் – விழாவும் வழிபாடும் - கலைகள் - கட்டடம் - சிற்பம் - ஓவியம் - இசை – கூத்து – தொழிலும் வணிகமும் – அறிவியல் நோக்கு.		
அலகு 5	மொழித்திறன், இலக்கிய வரலாறு, இலக்கணம்	9 மணிநேரம்
<ol style="list-style-type: none"> 1. எழுத்துப் பிழை, தொடர்ப் பிழைகள் 2. வேற்றுமை இலக்கணம் 3. செய்யுள் நலம் பாராட்டல் 4. பாடம் தழுவிய இலக்கிய வரலாறு (மரபுக் கவிதை, புதுக்கவிதை, உரைநடை). 		
COURSE OUTCOMES:		
<p>CO 1: Recall and recognize heritage and culture of Tamils through History of Tamil Language.</p> <p>CO 2: Interpret the cultural life style of Ancient Tamils.</p> <p>CO 3: Evaluate social and individuals' moral value after studying Ethics In modern Literature.</p> <p>CO 4: Build the humanistic concept and moral life skills after studying divine and minor Literature.</p> <p>CO 5: Improve their own creativity and writing skills after studying history of Modern Tamil Literature.</p>		
பார்வைநூல்கள்		
<ol style="list-style-type: none"> 1. தமிழர்நாகரிகமும்பண்பாடும், டாக்டர் அ.தட்சிணாமூர்த்தி, ஐந்திணைப்பதிப்பகம் 2. தவறின்றித்தமிழ்எழுதுவோம், மா. நன்னன், ஏகம்பதிப்பகம் 3. தவறின்றித்தமிழ்எழுத-மருதூர்அரங்கராசன், ஐந்திணைப்பதிப்பகம் 4. தமிழ்இலக்கியவரலாறு, வரதராசன், மு., புதுதில்லி : சாகித்தியஅக்காடெமி , 5. புதியதமிழ்இலக்கியவரலாறு, நீல. பத்மநாபன், சிற்பிபாலகப்ரமணியம், சாகித்தியஅகாடெமி 6. செம்மொழிதமிழின்சிறப்பியல்புகள் - முனைவர்மறைமலைஇலக்குவனார்; 		
பாட நூல்தேடலுக்கானஇணையம்		
<ol style="list-style-type: none"> 1. https://www.youtube.com/watch?v=HHZnmJb4jSY 2. https://archive.org/ 		

HINDI - I

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	3	Exam Marks	60		
Total Number of Lecture Hours	45	L	T	P	C
Credits	03	3	0	0	3

COURSE OBJECTIVES:

- To enable the students to develop communication skills.
- To train students in official language.
- To enrich their knowledge in Hindi literature.
- To teach them human values & create awareness towards exploitation

UNIT I		9 Hours
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‘Ek atut kadi’ by shri Rajkishore. Letter writing (application), Technical words (prashasanik vakyansh:1-50).

UNIT II		9 Hours
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‘Devi singh’ by agyeya, Letter writing (bank A/C opening & closing), Technical words (prashasanik vakyansh:51-100).

UNIT III		9 Hours
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‘kabiraa ki kaashi ’by Kumar Ravindra

UNIT IV		9 Hours
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‘bharathiya vigyan ki kahaani - ‘hamne diyaa ,hamne liyaa’ ’By Gunakar mule, letter writing (shikayath pathra, gyapan) Technical words: takniki shabd-25.

UNIT V		9 Hours
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Letter writing (sarkari pathra, ardha sarkari pathra, kaaryalaya aadesh), Technical words: takniki shabd-25.

COURSE OUTCOMES:

At the end of this course students will be able to,

CO 1: Students will be familiar with official letter writing

CO 2: will understand their responsibility in the society

CO 3: students will be moulded with good character understand human values

CO 4: students will gain knowledge about ancient &, rich culture of India

CO 5: will know the equivalent Hindi words for scientific terms

Text / Reference books:

1. Agyeya ki sampurna kahaniyaa - Rajpal &sons, year 2017,
2. Yatraye our bhi, Kumar Ravindra Rashmi prakashan, Lucknow.
3. Bharathiya vigyan ki kahani, Hindi book centre, NewDelhi.
4. Gadya Khosh

WEBLINKS:

1. [http://www.hindisamay.com/content/1321/1/%E0%A4%B0%E0%A4%BE%E0%A4](http://www.hindisamay.com/content/1321/1/%E0%A4%B0%E0%A4%BE%E0%A4%A6%E0%A5%87%E0%A4%B5%E0%A5%80%E0)
2. <http://gadyakosh.org/gk/%E0%A4%A6%E0%A5%87%E0%A4%B5%E0%A5%80%E0>
3. <http://gadyakosh.org/gk/%E0%A4%A6%E0%A5%87%E0%A4%B5%E0%A5%80%E0>
4. <http://gadyakosh.org/gk/%E0%A4%A6%E0%A5%87%E0%A4%B5%E0%A5%80%E0>

FRENCH - I

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	3	Exam Marks	60		
Total Number of Lecture Hours	45	L	T	P	C
Credits	03	3	0	0	3

COURSE OBJECTIVES:

- To introduce French language.
- To enable the students to understand and to acquire the basic knowledge of French language with elementary grammar.

UNIT I	INTRODUCTION	09 Hours
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Introduction-Alphabet-comment prononcer, écrire et lire les mots-base: les prénoms personnel de 1er, 2eme et 3eme personnes-conjugaisons les verbes être et avoir en forme affirmative, negative Et interrogative.

UNIT II	LECON 1-3	09 Hours
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Leçon 1: Premiers mots en français- 2. Les hommes sont difficiles 3. Vive la liberté-Réponses aux questions tires de la leçon-Grammaire: Les adjectives masculines ou féminines-Les article définies et indéfinis-Singuliers et pluriels.

UNIT III	LECON 4-6	09 Hours
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Leçons 4. L'heure c'est l'heure 5.Elle va revoir sa Normandie 6.Mettez-vous d'accord groupe de nom- Réponses aux questions tires de la leçon-Grammaire :A placer et accorder l'adjectif en groupe de nom- Préposition de lieu-A écrire les nombres et l'heure en français.

UNIT IV	LECON 7-9	09 Hours
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Leçon 7. Trois visage de l'aventure, 8. A moi Auvergne 9. Recit de voyage-Réponses aux questions tires de la leçon- Grammaire : Adjectif processif- Les phrases au présent de l'indicatif-Les phrases avec les verbes pronominaux au présent.

UNIT V	COMPOSITION:	09 Hours
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A écrire une lettre a un ami l'invitant a une célébration différente ex: mariage-A faire le dialogue- A lire le passage et répondre aux questions.

COURSE OUTCOMES:

At the end of this course students will be able to,

CO1: The content of the unit 1 aids the students to explore the basics of the new foreign language.

CO2: The content of unit 2 to experience the basic formations of words and its basic grammar by differentiating with English.

CO3: This imparts the additional information in terms of general in the sense of geographical and culture.

CO4: Enable students for framing the basics sentence.

CO5: Making the students community to know the French format of letter writing and essay writing.

TEXT BOOKS:

1. Jack GIRARDER & Jean Marie GRIDLIG, <<Méthode de Français PANORAMA>>, Clé Internationale, Goyal Publication, New Delhi Edition 2014.

REFERENCE BOOKS:

1. DONDO Mathurin, “Modern French Course”, Oxford University Press, New Delhi Edition 2014.
2. Nithya Vijayakumar get ready French grammar-Elementary Goyal publications, New Delhi Edition 2014.

WEB LINKS:

1. <https://www.thoughtco.com/french-reading-tips-1369373>
2. <https://www.bnf.fr/fr>
3. <https://www.laits.utexas.edu/tex/>

ENGLISH - I

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	3	Exam Marks	60		
Total Number of Lecture Hours	45	L	T	P	C
Credits	03	3	0	0	3

COURSE OBJECTIVES:

- To enable students to develop their communication skills effectively. To make students familiar with usage skills in English Language.
- To enrich their vocabulary in English.
- To develop communicative competency.

UNIT I

09 Hours

1. Dangers of Drug Abuse - Hardin B Jones.
2. Tight Corners - E. V. Lucas

UNIT II

09 Hours

1. Futurology - Aldous Huxley.
2. If You are Wrong, Admit it - Dale Breckenridge Carnegie

UNIT III

09 Hours

1. Industry - Dr.M.Narayana Rao & Dr.B.G.Barki
2. Turning Point of My Life - A.J Cronin

UNIT IV

09 Hours

1. Excitement - Mack R. Douglas
2. The Kanda Man Eater - Jim Corbett

UNIT V

09 Hours

Vocabulary and Exercises under the Lessons

Note: Lessons prescribed are from various anthologies and respective exercises therein will be taught.

COURSE OUTCOMES:

At the end of this course the students will be able to,CO1:

Examine the language of prose.

CO2: Utilize instructions on fundamentals of grammar

CO3: Develop their own style of writing after studying diverse prose essays.

CO4: Classify different essays on the basis of their types.

CO5: Critically comment on the textual content of prose.

Books Prescribed:

1. English for Communication Enrichment: by Jeya Santhi June 2015.
2. Dr. M. Narayana Rao and Dr. B. G. Barki – Anu’s Current English for Communication (AnuChitra). June 2012.
3. Dr. Ananthan, R. Effective Communication. Ed. Chennai: Anu Chithra Pub.2010.

WEB LINKS:

1. <https://www.gradesaver.com/>
2. <https://www.enotes.com/>
3. <https://www.jstor.org/>
4. <https://www.sparknotes.com/>
5. <https://www.cliffsnotes.com/>

AERODYNAMICS

Subject Code		IA Marks	50		
Number of Lecture Hours/Week	4	Exam Marks	50		
Total Number of Lecture Hours	60	L	T	P	C
Credits	04	3	1	0	4

COURSE OBJECTIVES:

The aim of the course is to present theoretical aerodynamics with basic numerical applications of potential flow over basic configurations: airfoil, swept lifting surface, fixed and rotating, and over body of revolution. Furthermore, compressibility effects are considered as well as elementary analysis of the incompressible boundary layer including boundary layer transition and turbulent layer.

UNIT I	PHYSICS OF THE ATMOSPHERE & AERODYNAMICS	12 Hours
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International Standard Atmosphere (ISA), Application to Aerodynamics. Airflow Around A Body; Boundary Layer, Laminar And Turbulent Flow, Free Stream Flow, Relative Airflow, Upwash And Downwash, Vortices, Stagnation; The Terms: Camber, Chord, Mean Aerodynamic Chord, Aerodynamic Centre, Center Of Pressure, Stagnation Point, Profile (Parasite) Drags, Induced Drag, Angle Of Attack, Wash In And Wash Out, Fineness Ratio, Wing Shape And Aspect Ratio; Thrust, Weight, Aerodynamic Resultant; Generation Of Lift And Drag: Angle Of Attack, Lift Coefficient, Drag Coefficient, Polar Curve, Stall; Airfoil Contamination Including Ice, Snow, Frost.

UNIT II	THEORY OF FLIGHT; FLIGHT STABILITY AND DYNAMICS	12 Hours
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Relationship between lift, weight, thrust and drag; Glide ratio; Steady state flights, performance; Theory of the turn; Influence of load factor: stall, flight envelope and Structural limitations; Lift augmentation. Introduction to Stability, Controllability, Static Stability, The Degree of Stability, Dynamic Stability, Static Longitudinal Stability, Mathematical Representation of Static Longitudinal Stability, Factors Affecting Static Longitudinal Stability, Graphical Representation of Static Longitudinal Stability, The Effect of Elevator Deflection on Pitching Moments, Control Force Stability, Maneuvering Stability, Tailoring The Control Forces, Dynamic Longitudinal Stability, Pilot Induced Oscillations, Directional Static Stability, Graphical Representation of Static Directional Stability, The Factors Affecting Static Directional Stability Longitudinal, lateral and directional stability (active and passive), Lateral Static Stability, Graphical Representation of Static Lateral Stability, Factors Affecting Static Lateral Stability, Interaction Between Lateral and Directional Static Stability, Dutch Roll, Yaw Damper Systems, Speed Stability.

UNIT III	THEORY OF FLIGHT- AEROPLANE AERODYNAMICS AND FLIGHT CONTROLS	12 Hours
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Operation and Effect Of:

- Roll Control: Ailerons and Spoilers.
- Pitch Control: Elevators, Stabilators, Variable Incidence Stabilizers and Canards.
- Yaw Control, Rudder Limiters.

Control Using Elevons, Ruddervators; High Lift Devices, Slots, Slats, Flaps, Flaperons; Drag Inducing Devices, Spoilers, Lift Dumpers, Speed Brakes; Effects of Wing Fences, Saw Tooth Leading Edges; Boundary Layer Control Using, Vortex Generators, Stall Wedges or Leading-Edge Devices; Operation and Effect Of Trim Tabs, Balance And Anti-Balance (Leading) Tabs, Servo Tabs, Spring Tabs, Mass Balance, Control Surface Bias, Aerodynamic Balance Panels.

UNIT IV

BASIC INSTRUMENT SYSTEMS AND HIGH-SPEED FLIGHT

12 Hours

Classification; Atmosphere; Terminology; Pressure Measuring Devices And Systems; Pitot Static Systems; Altimeters; Vertical Speed Indicators; Airspeed Indicators; Machmeter; Altitude Reporting/Alerting Systems; Air Data Computers; Rate Of Climb / Vertical Speed Indicator, Cabin Pressure Indicator, Pneumatic Systems Instruments; Speed Of Sound, Subsonic Flight, Transonic Flight, Supersonic Flight, Mach Number, Critical Mach Number, Compressibility Effect, Buffet, ShockWave, Aerodynamic Heating, Area Rule; Factors Affecting Airflow In Engine Intakes Of High Speed Aircraft; Effects of Sweepback On Critical Mach Number.

UNIT V

ROTARY WING AERODYNAMICS

12 Hours

Elementary Rotary Wing and Aerodynamic Terminology; Basic Operation and Effect of Cyclic, Collective, And Anti-Torque Controls. Terminology, Effects of Gyroscopic Precession; Torque Reaction and Directional Control; Dissymmetry of Lift, Blade Tip Stall; Translating Tendency and Its Correction; Coriolis Effect and Compensation; Vortex Ring State, Power Settling, Overpitching; Auto-Rotation; Ground Effect. Flight Control Systems Cyclic Control; Collective Control; Swashplate; Yaw Control: Anti-Torque Control, Tail Rotor, Bleed Air; Main Rotor Head: Design and Operation Features; Trim Control, Fixed and Adjustable Stabilizers; Balancing and Rigging.

COURSE OUTCOMES:

At the end of this course the students will be able to,

CO1: Determine aerodynamic forces and moments on airfoil, wing and body of revolution in subsonic flow, including compressibility effect.

CO2: Analyze boundary layer: velocity profile, thickness and friction coefficient.

CO3: Determine basic aerodynamic characteristics of propeller.

CO4: Apply presented numerical implementations to basic elements of aircraft configurations.

CO5: Critically analyze about the rotary wing aerodynamics.

TEXT BOOKS:

1. Anderson, J.D., "Introduction to Flight", 8th edition, McGraw-Hill Higher Education, 2015.
2. Clancy, "Aerodynamics", Shroff (1 January 2006).
3. A. C. KERMODE, "Mechanics of Flight", Pearson Education Limited, 11th Edition, 2006.
4. Steven Brandt, "Introduction to Aeronautics: A Design Perspective" 3rd edition, AIAA Education series, 2015.

REFERENCE BOOKS:

1. CAE Oxford Aviation Academy, "PRINCIPLES OF FLIGHT", Singapore by KHL Printing Co. Pte Ltd, 2014.
2. Jeppesen, EASA ATPL Training, "Principles of Flight Aeroplanes", Jeppesen Gmbh (1 January 2014).
3. William Rees Sears, "Introduction to Theoretical Aerodynamics and Hydrodynamics" AIAA Education series, 2011.

WEB LINKS:

1. <https://www.ksu.lt/wp-content/uploads/2017/06/M8-Selected-pages-Basic-Aerodynamics.pdf>
2. https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/media/07_phak_ch5.pdf
3. <https://nptel.ac.in/courses/101/104/101104062/>
4. <https://nptel.ac.in/courses/101/105/101105059/>

AIR LAW

Subject Code		IA Marks	40			
Number of Lecture Hours/Week	4	Exam Marks	60			
Total Number of Lecture Hours	60	L	T	P	C	
Credits	04	3	1	0	4	

COURSE OBJECTIVES:

The air law course aims to enable the students to understand Civil Aviation Administrations, Civil Aviation Authorities, Airports and Air Navigation Service Providers to support their organization in compliance with national and international air law, through application of appropriate knowledge and advocacy.

UNIT I	REGULATORY FRAMEWORK, CAR-66 CERTIFYING STAFF – MAINTENANCE	12 Hours
<p>Role of International Civil Aviation Organization; The Aircraft Act and Rules made there under Role of the DGCA; Relationship between CAR-21, CAR-M, CAR-145, CAR-66, CAR 147 The Aircraft Rules (Applicable to Aircraft Maintenance and Release) Aeronautical Information Circulars (Applicable to Aircraft Maintenance and Release), CAR Sections 1 and 2, Detailed understanding of CAR-66.</p>		
UNIT II	AIRCRAFT OPERATIONS AND CAR-145 — Approved Maintenance Organizations	12 Hours
<p>Commercial Air Transport/Commercial Operations, Air Operators Certificates; Operators Responsibilities, in particular regarding continuing airworthiness and maintenance; Documents to be carried on board; Aircraft Placarding (Markings), Detailed understanding of CAR-145 and CAR M Subpart F.</p>		
UNIT III	AIRCRAFT CERTIFICATION AND CAR M	12 Hours
<p>General Certification rules: such as FAA & EACS 23/25/27/29; Type Certification; Supplemental Type Certification; CAR-21 Design/Production Organization Approvals. Aircraft Modifications and repairs approval and certification Permit to fly requirements, Documents - Certificate of Airworthiness; Certificate of Registration; Noise Certificate; Weight Schedule; Radio Station License and Approval. Detail understanding of CAR M provisions related to Continuing Airworthiness. Detailed understanding of CAR-M.</p>		
UNIT IV	NATIONAL AND INTERNATIONAL REQUIREMENTS	12 Hours
<p>Maintenance Program, Maintenance checks and inspections; Master Minimum Equipment Lists, Minimum Equipment List, Dispatch Deviation Lists; Airworthiness Directives; Service Bulletins, manufacturers service information; Modifications and repairs; Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc.; Continuing</p>		

airworthiness; Test flights; ETOPS /EDTO, maintenance and dispatch requirements; RVSM, maintenance and dispatch requirements RNP, MNPS Operations All Weather Operations, Category 2/3 operations and minimum equipment requirements.

UNIT V

SAFETY MANAGEMENT SYSTEM, FUEL TANK SAFETY

12 Hours

State Safety Program, Basic Safety Concepts, Hazards & Safety Risks, SMS Operation, SMS Safety performance, Safety Assurance, Special Federal Aviation Regulations (SFARs) from 14 CFR SFAR 88 of the FAA and of JAA TGL 47, Concept of CDCCL, Airworthiness Limitations Items (ALI).

COURSE OUTCOMES:

Upon completion of the course, participants will be able to accomplish the following:

CO1: Analyze about CAR-66 certifying staff – maintenance.

CO2: Examine about aircraft operations and CAR-145 — Approved Maintenance Organizations.

CO3: Explain about aircraft certification and CAR M.

CO4: Write about national and international requirements for Maintenance Program.

CO5: Describe about safety management system, fuel tank safety

TEXT BOOKS:

1. The Aircraft Act, 1934
2. The Aircraft Rules, 1937 VOL 1
3. The Aircraft Rules, 1937 VOL 3
4. ICAO Annex – 8 to the convention on international civil aviation
5. International standards and recommended practices

REFERENCE BOOKS:

1. Air law Airworthiness (DGCA)
2. Aeronautical Information Circular
3. CAR - Section - 1, 2, & 8 SMS
4. CAR - 21, M, 145, 66 & 147
5. Special Federal Aviation Regulations (SFARs) - 14 CFR, SFAR 88 & JAA TGL 47

WEBLINKS

1. [http://164.100.60.133/misc/draft%20cars/CAR%2066_Draft\(Dec2015\).pdf](http://164.100.60.133/misc/draft%20cars/CAR%2066_Draft(Dec2015).pdf)
2. <https://soaneemrana.org/onewebmedia/CAR%20145.pdf>
3. http://164.100.60.133/ftppub/CAR_M.pdf
4. https://www.easa.europa.eu/sites/default/files/dfu/ws_prod-g-doc-Agency_Mesures-Agency_Decisions-2007-R-2007-002-R-Fuel-Tank-Safetv-Part-145.pdf

HUMAN FACTORS

Subject Code		IA Marks	40
Number of Lecture Hours/Week	4	Exam Marks	60
Total Number of Lecture Hours	60	L	T
		P	C
Credits	4	4	0
		0	4

COURSE OBJECTIVES:

The air regulation course aims to enable the students to understand Civil Aviation Administrations, Civil Aviation Authorities, Airports and Air Navigation Service Providers to support their organization in compliance with national and international air law, through application of appropriate knowledge and advocacy.

UNIT I	GENERAL; HUMAN PERFORMANCE AND LIMITATION; SOCIAL PSYCHOLOGY	12 Hours
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The Need to Take Human Factors into Account; Incidents Attributable to Human Factors/Human Error; ‘Murphy’s’ Law. 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 II	FACTORS AFFECTING PERFORMANCE; PHYSICAL ENVIRONMENT; TASKS	12 Hours
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Fitness/health; Stress: domestic and work related; Time pressure and deadlines; Workload: overload and under-load; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse. Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment. Physical work; Repetitive tasks; Visual inspection; Complex systems.

UNIT III	COMMUNICATION; HUMAN ERROR; HAZARDS IN THE WORKPLACE	12 Hours
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Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information; 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.

UNIT IV	HUMAN FACTORS IN AIRCRAFT MAINTENANCE AND INSPECTION	12 Hours
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Human Factors — Aircraft Maintenance And Inspection; Contemporary Maintenance Problems; The SHELL Model; The Reason Model; Human Error; Human Error In Aircraft Maintenance And Inspection (An Organizational Perspective); Human Error In The Maintenance Environment; Human Factors Issues Affecting Aircraft Maintenance And Dirty Dozen; Information Exchange And Communication; Training; Aircraft Maintenance Technician Facilities And Work Environment.

UNIT V	TEAMS AND ORGANIZATIONAL ISSUES IN AIRCRAFT MAINTENANCE	12 Hours
<p>Team Work; Job Design; Reward Systems; Selection And Staffing; Training; Automation And Advanced Technology System; Automation And Computerization; Advanced Job Aid Tools; Error Prevention, Considerations And Strategies.</p>		
<p>COURSE OUTCOMES:</p>		
<p>After the course the students are expected to be able to</p> <p>CO1: Apply the knowledge of human performance limitation and social psychology in workplace.</p> <p>CO2: Apply the basic knowledge of effect of factors like visual, auditory and cognitive on performance to design suitable work systems.</p> <p>CO3: Identify the human error and hazardous in the work place.</p> <p>CO4: Illustrate the roll of human factors in aircraft maintenance and inspection.</p> <p>CO5: Use the techniques, skills, and modern human factors and workplace ergonomics tools necessary for Aircraft maintenance practice.</p>		
<p>TEXT BOOKS:</p>		
<ol style="list-style-type: none"> 1. CAP 715 - An Introduction to Aircraft Maintenance Engineering Human Factors for JAR 66, Civil Aviation Authority, UK. 2. CAP 718 - Human Factors in Aircraft Maintenance and Inspection, Civil Aviation Authority, UK. 3. FAA-H-8083-30 - Aircraft Maintenance Technician Handbook - General, US. 4. Department of Transportation, Federal Aviation Administration ICAO Doc 9806. 		
<p>REFERENCE BOOKS:</p>		
<ol style="list-style-type: none"> 1. Eduardo Salas, Dan Maurino Captain, "Human Factors in Aviation", Academic Press; 2nd edition (26 March 2010). 2. Demetris Yiannakides, Charalampos Sergiou, "Human Factors in Aircraft Maintenance", CRC Press, 2019. 3. John A. Wise, V. David Hopkin, Daniel J. Garland, "Handbook of Aviation Human Factors", 2nd Edition, CRC Press, 2010. 4. Monica Martinussen, David R. Hunter, "Aviation Psychology and Human Factors", 2nd Edition, CRC Press, 2017. 		
<p>WEB LINKS:</p> <ul style="list-style-type: none"> • https://www.faa.gov/files/gslac/courses/content/258/1097/AMT_Handbook_Addendum_Human_Factors.pdf • https://soaneemrana.org/onewebmedia/HUMAN%20FACTOR.pdf • https://www.faa.gov/about/initiatives/maintenance_hf/library/documents/media/human_factors_maintenance/hf_ops_manual_2014.pdf • https://HumanFactorsInt_2ndrun.qxd (aviationlearning.net) • https://youtu.be/wrJstFphalk • https://www.slideshare.net/wmughni/human-factors-in-aviation-62599359 		

AERODYNAMICS LAB

Laboratory Code		IA Marks	40		
Numb of Practical Hours/Week	4	Exam Marks	60		
Total Number of Practical Hours	45	L	T	P	C
Credits	2	0	0	4	2

COURSE OBJECTIVES:

The practical sessions assigned to this course are intended to perform aerodynamic tasks to help students understand the basic principles of aerodynamics and improve their experimental skills. The course includes identifying different airfoil sections; primary and secondary flight controls; studying the nature of airflow around aerodynamic bodies; Determining the optimum angle of attack (AoA) and the stall angle of airfoil sections.

Exp no	EXPERIMENTS	Number of Hours
01	Flow around various objects in a 'Water Channel' - Square, Cylinder, airfoil, Understanding laminar flow, turbulent flow, stagnation point, flow separation, boundary layer	3
02	Fabricate airfoil Model - Understanding associated terms	3
03	Water Channel - Effect of vortex generator on boundary layer control	3
04	Effect of angle of attack and airflow velocity on lift and Stalling	3
05	Study of flow over streamlined bodies with different angle of attack by flow visualization technique	3
06	Identification of flight control surfaces and their effect on flight control - Aircraft Model	3
07	Identifying High lift devices and practical understanding of their effect on lift with respect to aircraft speed (Air flow)	3
08	Practical understanding of lift spoiling devices	3
09	Removal / installation of Pitot Static Instruments	3
10	Calibration of a Pitot Static System using a Pitot Static Leak tester	3
11	Fabrication of model - high speed flight	3
12	Practical study of various factors affecting lift and drag on an aerofoil	3
13	Factors affecting flow of fluid over an aerofoil surface and demonstrate the Venturi effect	3
14	Identify various type of flap surfaces and their effect on high lift and high drag characteristic	3
15	Identification of various parts of Rotary wing	3

COURSE OUTCOMES:

On completion of the course students will be able to

CO1: Explain the nature of aerodynamic forces.

CO2: Define the aerodynamic center and the center of pressure for an airfoil.

CO3: Calculate aerodynamic forces and moments on bodies.

CO4: Use flow similarity to design wind tunnel tests.

CO5: Describe and perform flow visualization tests to study the characteristics of the flow around aerodynamic bodies.

REFERENCES:

1. John Anderson Jr., "Fundamentals of Aerodynamics", McGraw Hill Education; 5th edition (6 July 2010).
2. R. K. Goyal & Kamal Kishore Khatri, "Fundamentals of Aerodynamics", Neelkanth Publishers (1 January 2012).
3. https://www.youtube.com/watch?v=ewMJuzqK58s&ab_channel=AnsysLearning
4. https://www.youtube.com/watch?v=edLnZgF9mUg&ab_channel=MITOpenCourseWare
5. https://www.youtube.com/watch?v=eCH8UNG_4qc&ab_channel=NPTELIIITGuwahati
6. https://www.youtube.com/watch?v=eCH8UNG_4qc&list=RDCMUCCDzHkpuIuD1ZC0wsCXUuPQ&start_radio=1&rv=eCH8UNG_4qc&t=14&ab_channel=NPTELIIITGuwahati

WORKSHOP PRACTICES LAB

Laboratory Code		IA Marks	40		
Number of Practical Hours/Week	4	Exam Marks	60		
Total Number of Practical Hours	48	L	T	P	C
Credits	2	0	0	4	2

COURSE OBJECTIVES:

1. To provide exposure to the students with hands on experience on various basic engineering practices.
2. To Study and practice the various operations that can be performed in lathe, shaper, drilling, milling machines etc. and to equip with the practical knowledge required in the core industries.
3. To Study and acquire knowledge on various basic machining operations in special purpose machines and its applications in real time manufacturing of components in the industries.

Exp no	EXPERIMENTS	Number of Hours
1	Sheet metal marking, cutting, sheet metal structural defects	4
2	Practice of 1st model. Butt Joint and inspect	4
3	Practice of 2nd model. Lap Joint and inspect	4
4	Practice of 3rd model. V-Joint and inspect	4
5	Practice of 3rd model. T-Joint and inspect	4
6	Demonstration of 1st model – Dovetail	4
7	Demonstration of 2nd model- Radius Gauge	4
8	Inspection of various welded samples with / without defects and record Observation	4
9	Soldering Exercises, inspection and defects	4
10	Cable splicing and swaging	4
11	Pipe bending and inspection of pipe assembly	4
12	Taps and dies, thread cutting and inspection	4

COURSE OUTCOMES:

Upon the completion of this course the students will be able to

1. Use sheet metal fabrication tools and make simple models as per the given diagram.
2. Fabricate carpentry components and pipe connections including plumbing works.
3. Use welding equipment to join the structures.
4. Utilize different machine tools like Surface Grinding Cylindrical Grinding etc,
5. Inspect Taps, Dies and Thread cutting components.

REFERENCES:

1. Sk Hajra Choudhury, Ak Hajra Choudhury, Nirjhar Roy, “Elements of Workshop Technology”, Media Promoters & Pub Pvt Ltd, 2015.
2. Sathish.D, “Engineering Workshop Practices Laboratory Manual”, Notion Press; 1st edition (1 January 2019).
3. James Anderson, “Shop Theory”, McGraw Hill Education; 6th edition (1 July 2017).

COMMUNICATION SKILLS

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	2	Exam Marks	60		
Total Number of Lecture Hours	30	L	T	P	C
Credits	02	2	0	0	2

COURSE OBJECTIVES:

- This course is to subject the students to practise the components in various units.
- To make students ready for placement interviews within campus.
- To infuse confidence to face job situations.

UNIT I

06 Hours

- Resume and CV Writing
- Complaint Letter
- Social Correspondence
- Letter of Enquiry

UNIT II

06 Hours

Short Essay Writing

UNIT III

06 Hours

Explaining Proverbs

UNIT IV

06 Hours

Use of Prepositions

UNIT V

06 Hours

Synonymous Words

COURSE OUTCOMES:

At the end of the course the student will be able to,

CO1: To enhance learners' confidence level.

CO2: To make learners' feel the assimilation of skills.

CO3: To engage in a conversation with others to exchange ideas.

CO4: To impart leadership qualities among the participants.

CO5: To express opinions to enhance their social skills.

BOOKS PRESCRIBED:

1. For Unit I – V Effective Communication For You – V. Syamala Emerald Publishers, Chennai.
2. Cameron, David. Mastering Modern English, Hyderabad: Orient Blackswan, 1978 (rpt. 1989, 1993, 1995,1998).
3. Freeman, Sarah. Written Communication in English, Hyderabad: Orient Blackswan, 1977 (21st Impression,2007).
4. Singh, Vandana R. The Written Word. New Delhi: Oxford university Press, 2003 (3rd Impression, 2007).
5. Seely, John. Oxford Guide to Effective Writing and Speaking. New Delhi: Oxford University Press, 2000 (4thImpression,2008).

WEB LINK:

1. <https://www.myperfectresume.com/career-center/resumes/how-to/write>
2. <https://www.englishgrammar.org/>
3. <https://www.thesaurus.com/browse/>

TAMIL – II

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	3	Exam Marks	60		
Total Number of Lecture Hours	45	L	T	P	C
Credits	3	3	0	0	3

COURSE OBJECTIVES:

அற இலக்கியம் - சிற்றிலக்கியம் - சிறுகதை - பயன்பாட்டுத் தமிழ் பற்றி அறிந்து கொள்ளுதல்.

அலகு 1	அற இலக்கியங்கள்	10 மணிநேரம்
<ol style="list-style-type: none"> 1. திருக்குறள் - வான் சிறப்பு(அறம்), ஊக்கமுடைமை(பொருள்), குறிப்பறிதல்(இன்பம்) - மூன்று அதிகாரங்கள் முழுமையும். 2. நாலடியார் - மூன்று பாடல்கள். (2, 3, 5) 3. பழமொழி நானூறு - மூன்று பாடல்கள் (74, 75, 78) 4. திரிகடுகம் - மூன்று பாடல்கள் (10, 12, 22) 5. இனியவை நாற்பது - மூன்று பாடல்கள் (1, 12, 16) 		

அலகு 2	சிற்றிலக்கியம்	10 மணிநேரம்
<ol style="list-style-type: none"> 1. முத்தொள்ளாயிரம் <ul style="list-style-type: none"> சேரன் - வீரம் 14, 15 பாடல்கள் சோழன் - காதல் 23, 24 பாடல்கள் பாண்டியன் - நாடு 87, 88 பாடல்கள் 2. தமிழ்விடு தூது - முதல் 20 கண்ணிகள் 3. திருக்குற்றாலக் குறவஞ்சி - மலைவளம் கூறுதல் - முதல் 5 பாடல்கள் 4. முக்கூடற்பள்ளு - மூத்த பள்ளி நாட்டு வளம் கூறுதல் 3 பாடல்கள், இளைய பள்ளி நாட்டு வளம் கூறுதல் 3 பாடல்கள். 5. கலிங்கத்துப் பரணி - பாலை பாடியது - முதல் 5 பாடல்கள் 		

அலகு 3	சிறுகதை	9 மணிநேரம்
<ol style="list-style-type: none"> 1. அறிஞர் அண்ணா - செவ்வாழை 2. புதுமைப்பித்தன் - கடவுளும் கந்தசாமிப் பிள்ளையும் 3. ஜெயகாந்தன் - யுகசந்தி 4. கு.அழகிரிசாமி - காற்று 5. அம்பை - காட்டில் ஒரு மான் 		

அலகு 4	பேச்சுத் தமிழ்	8 மணிநேரம்
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பேச்சுத் திறன் - விளக்கம் - பேச்சுத்திறனின் அடிப்படைகள் - வகைகள் - மேடைப்பேச்சு - உடையாடல் - பயிற்சிகள்

அலகு 5	எழுத்துத் தமிழ், இலக்கிய வரலாறு, இலக்கணம்	8 மணிநேரம்
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1. கலைச் சொல்லாக்கம் - தேவைகள் - கலைச்சொற்களின் பண்புகள் - அறிவியல் கலைச் சொற்கள் - கடிதம் - வகைகள் - அலுவலகக் கடிதங்கள் - உறவுமுறைக் கடிதங்கள்.
2. பாடம் தழுவின இலக்கிய வரலாறு (அற இலக்கியம், சிற்றிலக்கியம், சிறுகதை)
3. அணி இலக்கணம்
4. விண்ணப்பக் கடிதம் எழுதுதல்

COURSE OUTCOMES:

At the end of this course the students will be able to,

CO 1: Measure human mind through the studying of Tamil charity Literature in the aspect of moral value.

CO 2: Justify the contemporary social issues through studying Tamil Epics.

CO 3: Build the life skills after studying of the poetry.

CO 4: Develop narrative skill after reading short stories.

CO 5: Improve their own style of writing after studying Terminology methods.

பார்வைநூல்கள்

1. பேசும்கலை, முனைவர்கு. ஞானசம்பந்தன்விஜயாபதிப்பகம்
2. தமிழ்இலக்கியவரலாறு, வரதராசன், மு., சாகித்திய அக்காடெமி, புதுதில்லி
3. தமிழ்நடைக்கையேடு, மொழிஅறக்கட்டளை
4. பயன்பாட்டுத்தமிழ், முனைவர் அரங்கிராமலிங்கம், முனைவர் ஒப்பிலாமதிவாணன், சென்னை பல்கலைக்கழகம், 2007
5. மொழிபெயர்ப்பியல் அடிப்படைகள், கா.பட்டாபிராமன், யமுனைப்பதிப்பகம், திருவண்ணாமலை

பாடநூல்தேடலுக்கான இணையம்

1. <http://www.tamilvu.org/library>
2. <https://archive.org/>

HINDI - II

Subject Code		IA Marks	40			
Number of Lecture Hours/Week	3	Exam Marks	60			
Total Number of Lecture Hours	45	L	T	P	C	
Credits	03	3	0	0	3	

COURSE OBJECTIVES:

- To train students in translation.
- To develop reading & writing skills.
- To create interest towards reading different types of literature.

UNIT I		9 Hours
'idgah' by Premchand' (kahani), Translation- Definition,Types		
UNIT II		9 Hours
'pitha ' by gyanranjan (kahani), Translation - Anuvadak ke gun		
UNIT III		9 Hours
jamun ka ped by Krishna chander ' (kahani) , Translation Practice		
UNIT IV		9 Hours
adhi rath ke baad by Shankar shesh (naatak), Translation Practice		
UNIT V		9 Hours
adhi rath ke baad by Shankar shesh (naatak), Translation Practice		

COURSE OUTCOMES:

At the end of this course students will be able to,

CO 1: Students will know the importance & process of translation

CO 2: understand the values of elders in a family & extend their support

CO 3: will know the different writing skills of authors

CO 4: gain knowledge in Hindi literature

CO 5: will acquire knowledge in Hindi Sahithya

Text / Reference books:

1. Adhi rath ke baad ,by Shankar shah ,kitabghar prakashan ,2000
2. Idgah by Premchand,Bharathiya gyan peeth ,NewDelhi ,
3. Jamun ka ped by Krishna Chandra, Deepak publishers, Nov. 2019
4. Pitha by gyan ranjan,Rajkamal publication,Jan 2018.
5. Glossary of Administrative terms, Commission for scientific terms & Technical Terminology,2007.
6. Patralekhan kala by Dr.Shivshankar Pandey,2018.
7. Gadya khosh

WEBLINKS:

1. <https://premchandstories.in/eidgaah-story-munshi-premchand-pdf/>
2. <https://www.google.com/search?q=pita+by+gyan+ranjan&oq=pitha+by+gya&aqs=chrome.1.69i57j0i13j0i22i30.10387j0j4&sourceid=chrome&ie=UTF-8>
3. <http://db.44books.com/2020/04/%e0%a4%86%e0%a4%a7%e0%a5%80-%e0%a4%b0%e0%a4%be%e0%a4%a4-%e0%a4%95%e0%a5%87-%e0%a4%ac%e0%a4%be%e0%a4%a6.html>
4. <http://gadyakosh.org/gk/%E0%A4%A6%E0%A5%87%E0%A4%B5%E0%A5%80%E0%A4%B8%E0%A4%BF%E0%A4%82%E0%A4%B9 / %E0%A4%85%E0%A4%9C%E0%A5%8D%E0%A4%9E%E0%A5%87%E0%A4%AF>

FRENCH - II

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	3	Exam Marks	60		
Total Number of Lecture Hours	60	L	T	P	C
Credits	03	3	0	0	3

COURSE OBJECTIVES:

- To fortify the grammar and vocabulary skills of the students.
- To enable the students, have an idea of the French culture and civilization

UNIT I	LECON 10-11	09Hours
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Leçons :10 Les affaires marchent,11 un repas midi a problèmes- Réponses aux questions tires de la leçon-grammaire ;présent progressif passe récent ou future proche-complément d'Object directe-complément d'objet

UNIT II	LECON 12-13	09 Hours
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Leçons 12: tout est bien qui fini bien,-13 aux armes citoyens-réponses aux questions tires de la leçon-grammaire :les pronoms<<en ou y>> rapporter des paroles-Les pronoms relatifs que, qui ou ou.

UNIT III	LECON 14-15	09 Hours
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Leçons 14.Qui ne risque rien n'a rien-15.la fortune sourit aux audacieux-réponses aux questions tires de la leçon-grammaire : comparaison-les phrases au passe compose.

UNIT IV	LECON 16-18	09 Hours
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Leçons 16 la publicité et nos rêves 17 la France la monde 18 campagne publicitaire réponses aux questions tires de la leçon-grammaire :les phrases a l'imparfait-les phrases au future

UNIT V	COMPOSITION:	09 Hours
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A écrire une lettre de regret//refus a un ami concernant l'invitation d'une célébration reçue-a écrire un essaie sur un sujet générale-a lire le passage et répondre aux questions.

COURSE OUTCOMES:

At the end of this course students will be able to,

CO 1: This enables students to learn the language without any grammatical errors.

CO 2: As a result of the content makes the students to known about the types of pronouns and their usage.

CO 3: This imparts the students in order to develop their basic writing skills.

CO 4: Enable students for framing the basics sentence.

CO 5: Making the students community to know the French format of letter writing and essay writing.

TEXT BOOKS:

1. Jack GIRARDER & Jean Marie GRIDLIG, <<Méthode de Français PANORAMA>>, Clé Internationale, Goyal Publication, New Delhi Edition 2014.

REFERENCE BOOKS:

1. DONDO Mathurin, “Modern French Course”, Oxford University Press, New Delhi Edition 2014.
2. Nithya Vijayakumar get ready French grammar-Elementary Goyal publications, New Delhi Edition 2014.

WEB LINKS:

1. <https://www.thoughtco.com/french-reading-tips-1369373>
2. <https://www.bnf.fr/fr>
3. <https://www.laits.utexas.edu/tex/>

ENGLISH - II

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	3	Exam Marks	60		
Total Number of Lecture Hours	45	L	T	P	C
Credits	03	3	0	0	3

COURSE OBJECTIVES:

- To enable students to develop their communication skills effectively.
- To enrich their vocabulary in English
- To develop communicative competency.

UNIT I

09 Hours

1. Growing Old - Winston Farewell
2. Ecology - A. K. Ramanujan

UNIT II

09 Hours

1. Stopping by Woods on a Snowy Evening - Robert Frost
2. Our Casuarina Tree - Toru Dutt

UNIT III

09 Hours

1. Goodbye Party for Miss Pushpa T.S. - Nissim Ezekiel
2. The Bull - Ralph Hodgson

UNIT IV

09 Hours

1. If - Rudyard Kipling
2. The Drowned Children - Louise Glück

UNIT V

09 Hours

1. Australia - A.D.Hope
2. A Far Cry from Africa - Derek Walcott

COURSE OUTCOMES:

At the end of this course the students will be able to,

CO1: Learn to employ Poetic expressions in the course of daily speech.

CO2: Prove their better communicative ability.

CO3: Prove their skill in writing sentences with poetic impact.

CO4: Develop different sensibilities in approaching life.

CO5: Solve life's problems as highlighted in the selections.

Books Prescribed:

1. Selections from Caribbean Literature. Mahaam Publishers, Chennai.
2. Our Casuarina Tree - Vasan Publication By Dr.A Shanmugakani

WEB LINKS:

1. <https://www.gradesaver.com/>
2. <https://www.enotes.com/>
3. <https://www.jstor.org/>
4. <https://www.sparknotes.com/>
5. <https://www.cliffsnotes.com/>

Aircraft Electronics Fundamentals and Digital techniques I

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	4	Exam Marks	60		
Total Number of Lecture Hours	60	L	T	P	C
Credits	04	3	1	0	4

COURSE OBJECTIVES:

- To impart more knowledge on electric machines of principles and operations of semiconductors and transistors.
- To introduce the basic building blocks of linear integrated and printed circuit boards.
- To learn the theory on servomechanisms and numbering system.
- To gain more knowledge on operation and applications data conversion and data buses and logic circuits.
- To enable the students to understand various microcontroller architectures.

UNIT I	SEMICONDUCTORS AND TRANSISTORS	12 Hours
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Diode symbols; Diode characteristics and properties; Diodes in series and parallel; Main characteristics and use of silicon-controlled rectifiers (thyristors), light emitting diode, photo conductive diode, varistor, rectifier diodes; Functional testing of diodes. Materials, electron configuration, electrical properties; P and N type materials: effects of impurities on conduction, majority and minority characters; PN junction in a semiconductor, development of a potential across a PN junction in unbiased, forward biased and reverse biased conditions; Operation and function of diodes in the following circuits: clippers, clampers, full and half wave rectifiers, bridge rectifiers, voltage doublers and triplers; Detailed operation and characteristics of the following devices: silicon controlled rectifier (thyristor), light emitting diode, Schottky diode, photo conductive diode, varactor diode, varistor, rectifier diodes, Zener diode. Transistor symbols; Component description and orientation; Transistor characteristics and properties. Construction and operation of PNP and NPN transistors; Base, collector and emitter configurations; Testing of transistors. Basic appreciation of other transistor types and their uses. Application of transistors: classes of amplifier (A, B, C); Simple circuits including: bias, decoupling, feedback and stabilization; Multistage circuit principles: cascades, push-pull, oscillators, multi-vibrators, flip-flop circuits.

UNIT II	INTEGRATED CIRCUITS AND PRINTED CIRCUIT BOARDS	12 Hours
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Description and operation of logic circuits and linear circuits/operational amplifiers. Description and operation of logic circuits and linear circuits; Introduction to operation and function of an operational amplifier used as: integrator, differentiator, voltage follower, comparator; Operation and amplifier stages connecting methods: resistive capacitive, inductive (transformer), inductive resistive (IR), direct;

Advantages and disadvantages of positive and negative feedback Operation and use of encoders and decoders., functions of encoders type. Uses of medium, large and very large-scale integration. Description and use of printed circuit boards.

UNIT III	SERVOMECHANISMS AND NUMBERING SYSTEMS	12 Hours
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Understanding of the following terms: Open and closed loop systems, feedback, follow up, analogue transducers; Principles of operation and use of the following synchro system components/features: resolvers, differential, control and torque, transformers, inductance and capacitance transmitters. Understanding of the following terms: Open and closed loop, follow up, servomechanism, analogue, transducer, null, damping, feedback, dead band; Construction operation and use of the following synchro system components: resolvers, differential, control and torque, E and I transformers, inductance transmitters, capacitance transmitters, synchronous transmitters; Servomechanism defects, reversal of synchro leads, hunting. Numbering systems: binary, octal and hexadecimal; Demonstration of conversions between the decimal and binary, octal and hexadecimal systems and vice versa.

UNIT IV	DATA CONVERSION, DATA BUSES AND LOGIC CIRCUITS	12 Hours
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Analogue Data, Digital Data; Operation and application of analogue to digital, and digital to analogue converters, inputs and outputs, limitations of various types. Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications. (a) Identification of common logic gate symbols, tables and equivalent circuits; Applications used for aircraft systems, schematic diagrams. (b) Interpretation of logic diagrams.

UNIT V	MICROPROCESSORS AND FIBER OPTICS	12 Hours
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Functions performed and overall operation of a microprocessor; Basic operation of each of the following microprocessor elements: control and processing unit, clock, register, arithmetic logic unit. Advantages and disadvantages of fiber optic data transmission over electrical wire propagation; Fiber optic data bus;Fiber optic related terms; Terminations; Couplers, control terminals, remote terminals; Application of fiber optics in aircraft systems.

COURSE OUTCOMES:

- At the end of this course the students will be able to,
- CO1: Explain the principles and operations of semiconductors and transistors
 - CO2: Analyze integrated circuit and printed circuit board.
 - CO3: Examine about the servomechanisms and numbering systems
 - CO4: Develop data conversion, data buses and logic circuits.
 - CO5: List the application of microprocessors and fiber optics in aircraft.

TEXT BOOKS:

1. Bernard Grob, "Grob: Basic Electronics", McGraw-Hill Education; 8th edition (16 May 1997).
2. Donald P. Leach, "Digital Principles and Applications", McGraw-Hill Education; 5th edition (30 April 1994).
3. V.K Mehta, Rohit Mehta, "Principles of Electronics", S Chand; 7th Revised edition (3 February 2014).

REFERENCE BOOKS:

1. Albert D. Helfrick, "Modern Aviation Electronics", Pearson; 2nd edition (15 April 1994).
2. Dale Crane, "Basic Electronics and Radio Installation", Jeppesen Sanderson (1 March 1977).
3. Hughes, "Hughes Electrical and Electronic Technology", Pearson Education India; 10th edition (1 January 2010).
4. John M. Ferrara, "Every Pilot's Guide to Aviation Electronics", El-Jac Publishing, 1976 (January 1, 1976).
5. Keith W. Bose, "Aviation Electronics", Howard W Sams, U.S. (1 January 1982).

WEB LINKS:

1. <https://www.ksu.lt/wp-content/uploads/2017/06/M5-Selected-pages.pdf>
2. http://eng.sut.ac.th/me/box/1_54/437306/ebooksclub.pdf
3. <https://www.youtube.com/watch?v=dIQi8ulQfXY>
4. <https://www.youtube.com/watch?v=AfQxyVuLeCs&list=PL9F74AFA03AA06A11>

AIRCRAFT MATERIALS AND HARDWARE

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	4	Exam Marks	60		
Total Number of Lecture Hours	60	L	T	P	C
Credits	04	3	1	0	4

COURSE OBJECTIVES:

The objective of this course is to develop students' understanding and skills on the aircraft materials hardware and develop hands-on practices on using bolts, screws, cables, gears, belts, etc.

UNIT I	AIRCRAFT MATERIALS – FERROUS AND NON- FERROUS	12 Hours
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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. 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 II	AIRCRAFT MATERIALS COMPOSITE AND NON- METALLIC AND WOODEN STRUCTURE	12 Hours
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characteristics, properties and identification of common composite and nonmetallic 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. construction methods of wooden airframe structures; characteristics, properties and types of wood and glue used in airplanes; preservation and maintenance of wooden structure; types of defects in wood material and wooden structures; the detection of defects in wooden structure; repair of wooden structure.

UNIT III	FABRIC COVERING & NON-METALS; FASTNERS, SCREWTHREADS	12 Hours
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Characteristics, properties and types of fabrics used in Aeroplan; inspections methods for fabric; types of defects in fabric; repair of fabric covering. composite and non- metallic bonding practices; environmental conditions, inspection methods, screw nomenclature; thread forms, dimensions and tolerances for standard threads used in aircraft; measuring screw threads;

UNIT IV	BOLTS, STUDS AND SCREWS; LOCKING DEVICES	12 Hours
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Bolt types: specification, identification and marking of aircraft bolts, international standards; nuts: self-locking, anchor, standard types; machine screws: aircraft specifications; studs: types and uses, insertion and removal; self-tapping screws, dowels. tab and spring washers, locking plates, split pins, palnuts, wire locking, quick release fasteners, keys, circlips, and cotter pins and techniques.

UNIT V	AIRCRAFT RIVETS; RIVETING, SPRINGS, BEARINGS, TRANSMISSION, CONTROL CABLES, ELECTRICAL CABLE CONNECTORS	09 Hours
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Types of solid and blind rivets: specifications and identification, heat treatment. riveted joints, rivet spacing and pitch; tools used for riveting and dimpling. inspection of riveted joints. identification of, and types of rigid and flexible pipes and their connectors used in aircraft; standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes. springs types of springs, materials, characteristics and applications. bearing's purpose of bearings, loads, material, construction; types of bearings and their application. transmissions gear types and their application; gear ratios, reduction and multiplication gear systems, driven and driving gears, idler gears, mesh patterns; belts and pulleys, chains and sprockets control cables types of cables; end fittings, turnbuckles and compensation devices; pulleys and cable system components; bowden cables; aircraft flexible control systems. electrical cables and connectors cable types, construction and characteristics;

COURSE OUTCOMES:

At the end of this course the students will be able to,

CO1: Explain about the materials used in aircraft construction.

CO2: Identify the application of non-metallic and composite materials in aircraft construction.

CO3: Examine about the procedure to repair of fabric covering.

CO4: Identify the various bolts, studs and screws; locking devices used in aircraft.

CO5: Inspect aircraft rivets; riveting, springs, bearings, transmission, control cables, electrical cable connectors

TEXT BOOKS:

1. Aircraft handbook FAA (AC 65-15 A).
2. Civil Aircraft Inspection Procedures (CAIP 459-Part I, Basic)
3. Airframe & Powerplant Mechanics (General Handbook EA-AC 65-9A) FAA
4. CAIP 562

REFERENCE BOOKS:

1. Titterton, George F, "Aircraft Materials & Processes", 1937.
2. A. C. Parkinson, "Machine Drawing", Pitman, January 1, 1958
3. Jones, R.M, "Mechanics of Composite Materials" Mc Graw-Hill Kogakusha Ltd, Tokyo, 1915.

WEB LINKS:

1. <https://www.flight-mechanic.com/basic-aviation-maintenance/aircraft-materials-processes-and-hardware/>
2. <https://www.ksu.lt/wp-content/uploads/2017/06/M6-Selected-pages-Materials-and-Hardware.pdf>
3. <https://soaneemrana.org/onewebmedia/MATERIAL%20&%20HARDWARE.pdf>
4. <https://www.slideshare.net/ShangoGratien/aircraft-materials-and-hardware>

AIRCRAFT ELECTRICAL FUNDAMENTALS I

Subject Code		IA Marks	40
Number of Lecture Hours/Week	4	Exam Marks	60
Total Number of Lecture Hours	75	L	T
Credits	4	4	0

COURSE OBJECTIVES:

To understand the fundamental principles of electricity and concept of Aircraft electrical system.

UNIT I	ELECTRON THEORY, STATIC ELECTRICITY AND CONDUCTION AND DC CIRCUITS	15 Hours
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Structure and distribution of electrical charges within: An atom, molecules, ions, compound's Molecular structure of conductors, semiconductors and insulators. Static Electricity and Conduction Static electricity and distribution of electrostatic charges; Electrostatic laws of attraction and repulsion; Units of charge, Coulomb's Law; Conduction of electricity in solids, liquids, gases and a vacuum. Electrical Terminology The following terms, their units and factors affecting them: potential difference, electromotive force, voltage, current, resistance, conductance, charge, conventional current flow, electron flow. DC Circuits Ohms Law, Kirchhoff's Voltage and Current Laws; Calculations using the above laws to find resistance, voltage and current; Significance of the internal resistance of a supply.

UNIT II	RESISTANCE/RESISTOR, CAPACITANCE/CAPACITOR	15 Hours
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Resistance and affecting factors; Specific resistance; Resistor color code, values and tolerances, preferred values, wattage ratings; Resistors in series and parallel; Calculation of total resistance using series, parallel and series parallel combinations; Operation and use of potentiometers and rheostats; Operation of Wheatstone Bridge. (b) Positive and negative temperature coefficient conductance; Fixed resistors, stability, tolerance and limitations, methods of construction; Variable resistors, thermostats, voltage dependent resistors; Construction of potentiometers and rheostats; Construction of Wheatstone Bridge; Capacitance/Capacitor Operation and function of a capacitor; Factors 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 color coding; Calculations of capacitance and voltage in series and parallel circuits; Exponential charge and discharge of a capacitor, time constants; Testing of capacitors.

UNIT III	MAGNETISM, INDUCTANCE/INDUCTOR	15 Hours
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Magnetism: Theory of magnetism; Properties of a magnet Action of a magnet suspended in the Earth's magnetic field; Magnetization and demagnetization; Magnetic shielding; Various types of magnetic material; Electromagnet's construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor. Magneto motive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents; Precautions for care and

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

UNIT IV	AC THEORY, RESISTIVE (R), CAPACITIVE (C) AND INDUCTIVE (L) CIRCUITS	15 Hours
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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. Resistive (R), Capacitive (C) and Inductive (L) Circuits Phase relationship of voltage and current in L, C and R circuits, parallel, series and series parallel; Power dissipation in L, C and R circuits; Impedance, phase angle, power factor and current calculations; True power, apparent power and reactive power calculations.

UNIT V	TRANSFORMERS, FILTERS	15 Hours
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Transformers: Transformer construction principles and operation; Transformer losses and methods for overcoming them; Transformer action under load and no-load conditions; Power transfer, efficiency, polarity markings; Calculation of line and phase voltages and currents; Calculation of power in a three- phase system; Primary and Secondary current, voltage, turns ratio, power, efficiency; Auto transformers. Filters: Operation, application and uses of the following filters: low pass, high pass, band pass, band stop.

COURSE OUTCOMES:

- After the course the students are expected to be able to
- CO1:** Explain the electron theory, electrical terminology and DC circuits.
 - CO2:** Analyze the characteristics of resistor and capacitor.
 - CO3:** Comprehend the characteristics & properties of magnetism and interrelation with electricity.
 - CO4:** Design the AC circuits, comprehend the characteristics and the principle of each component.
 - CO5:** Analyze the working of Transformers and Filters in electrical system.

TEXT BOOKS:

1. B L Theraja and AK Theraja, "A Textbook of Electrical Technology - Vol I", S Chand; Twenty Third edition, 1959.
2. E. H. J. Pallett, "Aircraft electrical systems", Pearson Education, Third Edition, 2006.

REFERENCE BOOKS:

1. Aircraft Technical Book Company LLC, "EASA Electrical Fundamentals Aviation Maintenance Technician Certification Series, Module 03", 2016.
2. David Wyatt and Mike Tooley, "Aircraft Electrical and Electronic Systems", Routledge; 2nd edition (29 May 2018).
3. Hughes, "Hughes Electrical and Electronic Technology", Pearson Education India; 10th edition (1 January 2010).

WEB LINKS:

1. <https://soaneemrana.org/onewebmedia/COMPLETE%20MODULE%203%201.pdf>
2. http://eng.sut.ac.th/me/box/1_54/437306/ebooksclub.pdf
3. <https://www.ksu.lt/wp-content/uploads/2017/04/KSU-M3-Selected-pages.pdf>

AIRCRAFT ELECTRICAL FUNDAMENTALS – LAB

Laboratory Code		IA Marks	40		
Number of Practical Hours/Week	4	Exam Marks	60		
Total Number of Practical Hours	45	L	T	P	C
Credits	2	0	0	4	2

COURSE OBJECTIVES:

The course objectives are,

1. Impart a basic knowledge of electrical quantities such as current, voltage, power, energy and frequency to understand the impact of technology in a global and societal context.
2. Provide working knowledge for the analysis of basic DC and AC circuits used in electrical and electronic devices.
3. To explain the working principle, construction, applications of DC machines, AC machines & measuring instruments.
4. Highlight the importance of transformers in transmission and distribution of electric power.

Exp no	EXPERIMENTS	Number of Hours
1	Simple experiments with static electricity and the coulomb's law	3
2	Application of Electromotive forces and Potential difference Ballistic Galvanometer: (i) Measurement of charge and current sensitivity	3
3	Measuring (a) Resistances, (b) AC and DC Voltages, (c) DC Current, and (d) checking electrical fuses and connection	3
4	Use of a range of test meters to measure volts, amps and resistance	3
5	Resistor colour codes - Calculation of resistance value using colour codes	3
6	Potentiometer, rheostat and wheat stone bridges and determine unknown resistance	3
7	Use a Multimeter for measuring Resistances, checking electrical fuses Identify various types of resistance	3
8	Identify various types of capacitances	3
9	Measurement of magnetic field strength. Magnetic field density and permeability using flux meter.	3
10	Production of electricity by inductance methods.	3
11	Single phase and three phase power supply distribution using star and delta connection	3

12	Construct series LCR circuit and determine its (a) Resonant Frequency, (b) Quality Factor,	3
13	Construct parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor Q	3
14	Use of transformer in power distribution and measurements.	3
15	Make filters circuit to study function of low pass, high pass, band pass and band stop.	3

COURSE OUTCOMES:

On completion of the course students will be able to

1. Predict the behavior of any electrical and magnetic circuits.
2. Formulate and solve complex AC, Dc circuits.
3. Identify various types of electrical components (resistance, capacitance)
4. Identify the type of electrical machine used for that particular application.
5. Realize the requirement of transformers in transmission and distribution of electric power and other applications.

REFERENCES:

1. B L Theraja and AK Theraja, "A Textbook of Electrical Technology - Vol I", S Chand; Twenty Third edition, 1959.
2. E. H. J. Pallett, "Aircraft electrical systems", Pearson Education, Third Edition, 2006.
3. Aircraft Technical Book Company LLC, "EASA Electrical Fundamentals Aviation Maintenance Technician Certification Series, Module 03", 2016.
4. David Wyatt and Mike Tooley, "Aircraft Electrical and Electronic Systems", Routledge; 2nd edition (29 May 2018).
5. Hughes, "Hughes Electrical and Electronic Technology", Pearson Education India; 10th edition (1 January 2010).

Aircraft Electronics fundamentals and Digital techniques LAB

Laboratory Code		IA Marks	40		
Number of Lecture Hours/Week	4	Exam Marks	60		
Total Number of Lecture Hours	60	L	T	P	C
Credits	2	0	0	4	2

COURSE OBJECTIVES:

This course intends to develop students' knowledge and skills in the area of digital techniques, microprocessor, flip flop circuits and elementary gates.

Exp no	EXPERIMENTS	Number of Hours
1	Identification of basic electronic components (diodes, transistors), digital Multimeter, Function Generator and Oscilloscope.	4
2	Practical on I-V Characteristics of (a) p-n junction Diode, and (b) Zener diode.	4
3	Study of Clipping and Clamping circuits.	4
4	Conversion of AC Voltage using (a) Half wave rectifier and (b) Full wave rectifier (FWR).	4
5	Uses of basic electronic components (diodes, transistors), digital Multimeter, Function Generator and Oscilloscope.	4
6	Construct a model to study fixed Bias and Voltage divider bias configuration for CE transistor.	4
7	Construct a model to study Single Stage CE amplifier of given gain.	4
8	Construct a model to study correlation between different numbering systems.	4
9	Construct a model to study digital to analogue converters	4
10	Construct a model to study typical data buses used in aircraft system.	4
11	Functions performed and overall operation of a microprocessor.	4
12	Demonstrate fiber optic data transmission over electrical wire propagation.	4
13	Construct a Universal Gates and test.	4
14	Construct a flip flop circuit using elementary gates.	4
15	Construct a seven-segment display driver.	4

COURSE OUTCOMES:

On completion of the course students will be able to

CO1: Identify basic electronic components

CO2: Convert ac voltage

CO3: Construct universal gates CO4: Construct flip flop gates

CO5: Construct a seven-segment display driver.

REFERENCES:

1. Bernard Grob, "Grob: Basic Electronics", McGraw-Hill Education; 8th edition (16 May 1997).
2. Donald P. Leach, "Digital Principles and Applications", McGraw-Hill Education; 5th edition (30 April 1994).
3. V.K Mehta, Rohit Mehta, "Principles of Electronics", S Chand; 7th Revised edition (3 February 2014).
4. Albert D. Helfrick, "Modern Aviation Electronics", Pearson; 2nd edition (15 April 1994).
5. Dale Crane, "Basic Electronics and Radio Installation", Jeppesen Sanderson (1 March 1977).
6. Hughes, "Hughes Electrical and Electronic Technology", Pearson Education India; 10th edition (1 January 2010).
7. John M. Ferrara, "Every Pilot's Guide to Aviation Electronics", El-Jac Publishing, 1976 (January 1, 1976).
8. Keith W. Bose, "Aviation Electronics", Howard W Sams, U.S. (1 January 1982).

AIRCRAFT ELECTRICAL FUNDAMENTALS II

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	3	Exam Marks	60		
Total Number of Lecture Hours	55	L	T	P	C
Credits	03	3	0	0	3

COURSE OBJECTIVES:

This course is designed to improve the students understanding of aircraft electrical systems and DC Source of electricity, DC motor, AC Generator and AC Motors. This course also designed to repair, inspect the aircraft cables, connectors and electronic system components which are sensitive to electrostatic discharges.

UNIT I	GENERATION OF ELECTRICITY AND DC SOURCES OF ELECTRICITY	09 Hours
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Elementary knowledge on generation of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion, 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.

UNIT II	DC MOTOR/GENERATOR THEORY AND AC GENERATORS	12 Hours
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Basic motor and generator theory; Construction and purpose of components in DC generator; Operation of, and factors affecting output and direction of current flow in DC generators; Operation of, and factors affecting output power, torque, speed and direction of rotation of DC motors; Series wound, shunt wound and compound motors; Starter Generator construction. Rotation of loop in a magnetic field and waveform produced; Operation and construction of revolving armature and revolving field type AC generators; Single phase, two phase and three phase alternators; Three phase star and delta connections advantages and uses; Permanent Magnet Generators.

UNIT III	AC MOTORS AND POWER	12 Hours
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Construction, principles of operation and characteristics of: AC synchronous and induction motors both single and polyphase; Methods of speed control and direction of rotation; Methods of producing a rotating field: capacitor, inductor, shaded or split pole. Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and energy

UNIT IV	AIRCRAFT ELECTRICAL CABLES AND CONNECTORS	12 Hours
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Cable types, construction and characteristics; High tension and co-axial cables; Crimping; Connector types, pins, plugs, sockets, insulators, current and voltage rating, coupling, identification codes. Electrical Wiring Interconnection System (EWIS) Continuity, insulation and bonding techniques and

Testing; Use of crimp tools: hand and hydraulic operated; testing of crimp joints; Connector pin removal and insertion; Co-axial cables: testing and installation Precautions; Identification of wire types, their inspection criteria and damage tolerance Wiring protection techniques: Cable looming and loom support, cable clamps, and protective Sleeving techniques including heat shrink wrapping, shielding. EWIS installations, Inspection, repair, maintenance and cleanliness standards

UNIT V	ELECTROMAGNETIC ENVIRONMENT AND ELECTRO SENSITIVE DEVICES	10 Hours
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Influence of the following phenomena on maintenance practices for electronic system: EMC-Electromagnetic Compatibility; EMI-Electromagnetic Interference; HIRF-High Intensity Radiated Field; Lightning/lightning protection. Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices.

COURSE OUTCOMES:

1. Explain the generation of electricity by light, heat, friction, pressure, chemical action, magnetism and motion.
2. Examine Construction and purpose of components in DC motors and AC Generators.
3. Calculate dissipation of power by a resistor using power formula.
4. Inspect and repair aircraft electrical cables and connectors.
5. Decide special handling of components which are sensitive to Electrostatic discharge.

TEXT BOOKS:

1. B L Theraja and AK Theraja, “A Textbook of Electrical Technology - Vol I”, S Chand; Twenty Third edition, 1959.
2. E. H. J. Pallett, “Aircraft electrical systems”, Pearson Education, Third Edition, 2006.

REFERENCE BOOKS:

1. Aircraft Technical Book Company LLC, “EASA Electrical Fundamentals Aviation Maintenance Technician Certification Series, Module 03”, 2016.
2. David Wyatt and Mike Tooley, “Aircraft Electrical and Electronic Systems”, Routledge; 2nd edition (29 May 2018).
3. Hughes, “Hughes Electrical and Electronic Technology”, Pearson Education India; 10th edition (1 January 2010).
4. Eismin, Thomas K., McKinley, James L., Bent, Ralph D, “Aircraft Electricity and Electronics (Aviation Technology Series)”, Gregg Division McGraw-Hill; 4th edition (January 1, 1709).

Aircraft Electronics fundamentals and Digital techniques II

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	3	Exam Marks	60		
Total Number of Lecture Hours	56	L	T	P	C
Credits	3	3	0	0	3

COURSE OBJECTIVES:

This course is intended to develop student knowledge and skills in the area of digital techniques. The course is a continuation of Digital Techniques I covering an advanced level with emphasis put on basic computer structure, fiber optics, electronic displays, electromagnetic environment and typical digital aircraft systems.

UNIT I	BASIC COMPUTER STRUCTURE AND MULTIPLEXING	12 Hours
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(a) Computer terminology (including bit, byte, software, hardware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems).

(b) Computer related terminology; Operation, layout and interface of the major components in a microcomputer including their associated bus systems; Information contained in single and multi- address instruction words; Memory associated terms; Operation of typical memory devices; Operation, advantages and disadvantages of the various data storage systems. Operation, application and identification in logic diagrams of multiplexers and demultiplexers.

UNIT II	ELECTRONIC DISPLAYS AND INSTRUMENT SYSTEMS	12 Hours
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Principles of operation of common types of displays used in modern aircraft, including Cathode Ray Tubes, Light Emitting Diodes and Liquid Crystal Display. Electronic Flight Instrument Systems; Typical systems arrangements and cockpit layout of electronic instrument systems ECAM-Electronic Centralized Aircraft Monitoring; EFIS-Electronic Flight Instrument System; EICAS-Engine Indication and Crew Alerting System Instrument warning systems including master warning systems and centralized warning panels;

UNIT III	TYPICAL ELECTRONIC/DIGITAL AIRCRAFT SYSTEMS	12 Hours
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General arrangement of typical electronic/digital aircraft systems and associated BITE (Built in Test Equipment) testing such as: ACARS-ARINC Communication and Addressing and Reporting System; Integrated modular Avionics;

UNIT IV	INTEGRATED MODULAR AVIONIC (IMA)	10 Hours
<p>Functions that may be typically integrated in the Integrated Modular Avionic (IMA) modules are, among others: Bleed Management, Air Pressure Control, Air Ventilation and Control, Avionics and Cockpit Ventilation Control, Temperature Control, Air Traffic Communication, Avionics Communication Router, Electrical Load Management, Circuit Breaker Monitoring, Electrical System BITE, Fuel Management, Braking Control, Steering Control, Landing Gear Extension and Retraction, Tyre Pressure Indication, Oleo Pressure Indication, Brake Temperature Monitoring, etc.; Core System; Network Components.</p>		
UNIT V	CABIN SYSTEMS (ATA 44)	10 Hours
<p>The units and components which furnish a means of entertaining the passengers and providing communication within the aircraft (Cabin Intercommunication Data System) and between the aircraft cabin and ground stations (Cabin Network Service) - Includes voice, data, music and video transmissions; The Cabin Intercommunication Data System provides an interface between cockpit/ cabin crew and cabin systems. These systems support data exchange of the different related LRU's and they are typically operated via Flight Attendant Panels. The Cabin Network Service typically consists on a server, typically interfacing with, among others, the following systems: Data/Radio Communication; In-Flight Entertainment System; The Cabin Network Service may host functions such as: — Access to pre-departure/departure reports; E-mail/intranet/Internet access; Passenger database; Cabin Core System; In-flight Entertainment System; External Communication System; Cabin Mass Memory System; Cabin Monitoring System; Miscellaneous Cabin System.</p>		
COURSE OUTCOMES:		
<p>On completion of this course the student will be able to understand about</p> <ol style="list-style-type: none"> 1. Basic computer structure and multiplexing 2. Electronic displays and instrument systems 3. Typical electronic/digital aircraft systems 4. Integrated modular avionic (IMA) 5. Cabin systems (ATA 44) 		
TEXT BOOKS:		
<ol style="list-style-type: none"> 1. Bernard Grob, “Grob: Basic Electronics”, McGraw-Hill Education; 8th edition (16 May 1997). 2. Donald P. Leach, “Digital Principles and Applications”, McGraw-Hill Education; 5th edition (30 April 1994). 3. V.K Mehta, Rohit Mehta, “Principles of Electronics”, S Chand; 7th Revised edition (3 February 2014). 		

REFERENCE BOOKS:

1. Albert D. Helfrick, "Modern Aviation Electronics", Pearson; 2nd edition (15 April 1994).
2. Dale Crane, "Basic Electronics and Radio Installation", Jeppesen Sanderson (1 March 1977).
3. Hughes, "Hughes Electrical and Electronic Technology", Pearson Education India; 10th edition (1 January 2010).
4. John M. Ferrara, "Every Pilot's Guide to Aviation Electronics", El-Jac Publishing, 1976 (January 1, 1976).
5. Keith W. Bose, "Aviation Electronics", Howard W Sams, U.S. (1 January 1982).

AIRCRAFT MAINTENANCE PRACTICES I

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	4	Exam Marks	60		
Total Number of Lecture Hours	60	L	T	P	C
Credits	04	4	0	0	4

COURSE OBJECTIVES:

The objective of this course is to enable students to demonstrate competence in working effectively and safely in an aircraft maintenance organization. The course includes an introduction to Safety Precautions for aircraft and workshops; basic understanding of First Aid at work; the safe use, care and control of tools; standards of workmanship; use of workshop materials, lubrication equipment and methods; precision measuring tools.

UNIT I	SAFETY PRECAUTIONS-AIRCRAFT WORKSHOP PRACTICES, TOOLS & WORKSHOP.	12 Hours
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Aspects of safe working practices including precautions to take when working with electricity, gases especially oxygen, oils and chemicals; Instructions on the remedial action to be taken in the event of a fire or another accident with one or more of these hazards including knowledge on extinguishing agents. Care of tools, control of tools, use of workshop materials; Dimensions, allowances and tolerances, standards of workmanship; Calibration of tools and equipment, calibration standards. Common hand tool types; Common power tool types; Operation and use of precision measuring tools; Lubrication equipment and methods.

UNIT II	ENGINEERING DRAWINGS, DIAGRAMS AND STANDARDS, TYPES OF CORROSION	12 Hours
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Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying title block information; Microfilm, microfiche and computerized presentations; Specification 100 of the Air Transport Association (ATA) of America; Aeronautical and other applicable standards including ISO, AN, MS, NAS and MIL; Wiring diagrams and schematic diagrams. 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. Chemical fundamentals; Formation by, galvanic action process, microbiological stress. Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.

UNIT III	WELDING, BRAZING, SOLDERING AND BONDING, MAINTENANCE PROCEDURES	12 Hours
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Soldering methods; inspection of soldered joints. Welding and brazing methods; Inspection of welded and brazed joints; Bonding methods and inspection of bonded joints. Types of defects and visual inspection techniques. Corrosion removal, assessment and re-protection. General repair methods, Structural Repair Manual; Ageing, fatigue and corrosion control programs. Non-destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and borescope methods.

Disassembly and re-assembly techniques. Trouble shooting techniques. Maintenance planning; Modification procedures; Stores procedures; Certification/release procedures; Interface with aircraft operation; Maintenance Inspection/Quality Control/Quality Assurance; Additional maintenance procedures; Control of life limited components

UNIT IV	BEARINGS, TRANSMISSION, CONTROL CABLES	12 Hours
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Purpose of bearings, loads, material, construction; Types of bearings and their application. Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes. Gear types and their application; Gear ratios, reduction and multiplication gear systems, driven and driving gears, idler gears, mesh patterns; Belts and pulleys, chains and sprockets. Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets; Inspection of screw jacks, lever devices, push-pull rod systems.

UNIT V	PIPES AND UNIONS, HOSES, SPRINGS	12 Hours
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Identification of, and types of rigid and flexible pipes and their connectors used in aircraft. Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes. Bending and belling/flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes. Types of springs, materials, characteristics and applications. Inspection and testing of springs.

COURSE OUTCOMES:

The students should be able to understand

1. Safety precautions-aircraft & workshop, workshop practices, tools.
2. Engineering drawings, diagrams and standards, types of corrosion.
3. Welding, brazing, soldering and bonding, maintenance procedures.
4. Bearings, transmission, control cables
5. Pipes and unions, hoses, springs

TEXT BOOKS:

1. Airframe and Powerplant Mechanics (AC 65-15A)-Airframe Hand Book FAA
2. Civil Aircraft Inspection Procedure (CAP 459) Part II Aircraft
3. Aircraft Maintenance and Repair By Kroes, Watkin and Delph

REFERENCE BOOKS:

1. Acceptable Methods, Techniques and practices (FAA)-EA-AC 43.13-1 A&2A
2. Aviation Maintenance Technician Hand book by FAA

AIRCRAFT SYSTEMS I

Subject Code		IA Marks		40	
Number of Lecture Hours/Week	4	Exam Marks		60	
Total Number of Lecture Hours	60	L	T	P	C
Credits	4	4	0	0	4

COURSE OBJECTIVES:

1. To assure the basic calculations of aircraft weighing and working principles of aircraft handling system.
2. To impart the knowledge of the pneumatic and air conditioning and cabin pressurization systems components and types of instruments.
3. To describe the principle and working of flight systems and instruments.
4. To impart the principals of hydraulic fuel system and operating procedures.
5. To explain the landing gear and Ice protection system in aircrafts.

UNIT I	AIRCRAFT WEIGHT AND BALANCE, AIRCRAFT HANDLING AND STORAGE	12 Hours
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(a) Centre of Gravity/Balance limits calculation: use of relevant documents; (b) Preparation of aircraft for weighing; Aircraft weighing; Aircraft taxiing/towing and associated safety precautions; Aircraft jacking chocking, securing & associated safety precautions; Aircraft storage methods; Refueling / defueling procedures; De-icing / anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies. Effects of environmental conditions on aircraft handling and operation.

UNIT II	PNEUMATIC/VACUUM (ATA 36), AIR CONDITIONING AND CABIN PRESSURIZATION (ATA 21)	12 Hours
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System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure control; Distribution; Indications and warnings; Interfaces with other systems. Air supply- Sources of air supply including engine bleed, APU and ground cart; Air Conditioning- Air conditioning systems; Air cycle and vapour cycle machines Distribution systems; Flow, temperature and humidity control system. Pressurization - Pressurization systems; Control and indication including control and safety valves; Cabin pressure controllers. Safety and warning devices; Protection and warning devices.

UNIT III	EQUIPMENT AND FURNISHINGS (ATA 25), FLIGHT CONTROLS (ATA 27)	12 Hours
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Emergency equipment requirements; Seats, harnesses and belts, electronic emergency equipment requirements Cabin lay-out, cargo retention; Equipment lay-out; Cabin Furnishing Installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs. Lifting system; Emergency flotation systems; Primary controls: aileron, elevator, rudder, spoiler; Trim control; Active load control; High lift devices; Lift dump, speed brakes; System operation: manual, hydraulic, pneumatic, electrical, fly-by-wire; Artificial feel, Yaw damper, Mach trim, rudder limiter, gust locks systems; Balancing and rigging; Stall protection/warning system.

UNIT IV	FUEL SYSTEMS (ATA 28), HYDRAULIC POWER (ATA 29)	12 Hours
<p>System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross feed and transfer; Indications and warnings; Refueling and defueling; Longitudinal balance fuel systems. System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical, pneumatic; Emergency pressure generation; Filters; Pressure Control; Power distribution; Indication and warning systems; Interface with other systems.</p>		
UNIT V	ICE AND RAIN PROTECTION (ATA 30), LANDING GEAR (ATA 32) AND ABNORMAL EVENTS (ATA 05)	12 Hours
<p>Ice formation, classification and detection; Anti-icing systems: electrical, hot air and chemical; De-icing systems: electrical, hot air, pneumatic and chemical; Rain repellent; Probe and drain heating; Wiper systems. Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and auto-braking; Tyres; Steering; Air-ground sensing; Skids, floats. (a) Inspections following lightning strikes and HIRF penetration. (b) Inspections following abnormal events such as heavy landings and flight through turbulence.</p>		
COURSE OUTCOMES:		
<ol style="list-style-type: none"> 1. Assure the basic calculations of aircraft weighing and working principles of aircraft handling system. 2. Understand the basic principles of pneumatic and Air-conditioning pressurization system. 3. Understand the systems available in the aircraft engines. 4. Understand the basics of fuel system and refueling techniques. 5. Know the basics of Ice-protection system and landing gear instruments. 		
TEXT BOOKS:		
<ol style="list-style-type: none"> 1. Airframe and Powerplant Mechanics (AC 65-15A) -Airframe Hand Book FAA 2. Civil Aircraft Inspection Procedure (CAP 459) Part II Aircraft 3. Jeppesen, "A & p Technician Airframe Textbook", Jeppesen Sanderson; Illustrated edition (30 May 2003). 4. Aircraft Repair Manual (FAA-AC-43.13)-By Larry Reithmaier 		

REFERENCE BOOKS:
<ol style="list-style-type: none"> 1. Aviation Maintenance Technician Hand book by FAA. 2. M. Guillon, "Hydraulic Servo Systems", Butterworth & Co Publishers Ltd (1 January 1969). 3. Ian Moir, Allan Seabridge, Malcolm Jukes, "Civil Avionics Systems".

GROUND HANDLING AND SUPPORT SYSTEMS

Subject Code		IA Marks	40			
Number of Lecture Hours/Week	4	Exam Marks	60			
Total Number of Lecture Hours	60	L	T	P	C	
Credits	04	4	0	0	4	

COURSE OBJECTIVES:

The course aims to educate students on Passenger handling, cargo handling, airport/ aircraft security, Load control, airside safety and deicing operations.

UNIT I	PASSENGER HANDLING PROCEDURES	12 Hours
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Passenger departure check in and boarding, passenger security, passenger arrival and transit, special categories of passenger, passenger documentation, passenger irregularities, transport of animals, condition of carriage, conduct of customer services, FBO/GSP lounge requirements.

UNIT II	BASICS OF GROUND HANDLING	12 Hours
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General knowledge of ground handling of Aircraft, Aircraft Safety; Mooring, Jacking, Levelling, hoisting of aircraft, Towing, Mooring of an a/c during adverse conditions. Aircraft cleaning and maintaining. Ground signaling/marshalling of aircraft in day & night time.

UNIT III	BAGGAGE AND AIRCRAFT HANDLING PROCEDURES	13 Hours
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Baggage discrepancies, hold baggage acceptance, hold baggage prohibited items, baggage reconciliation, cabin baggage- prohibited items, baggage security, mishandled baggage, and dangerous goods. Aircraft handling procedures – general requirements, ramp safety in aircraft handling, portable water servicing, fueling, defueling- firefighting, adverse weather condition, safety cones, chocks and aircraft & GSE. Hand signals, aircraft arrivals, doors, aircraft loadings, a/c departure, a/c towing and pushing a/c hangar parking and maneuvers, FOD & ramp cleaning, air side driving safety, aircraft parking.

UNIT IV	LOAD CONTROL & DISPATCH	09 Hours
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Load control principles, regulatory requirements, load control process, aircraft dispatch and turn around procedures, the aircraft dispatch process, flight documents.

UNIT V	AIRSIDE SAFETY & SECURITY DESCRIPTIONS	14 Hours
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De- icing & winter operations & security Description, de- icing fluids, general precaution during winter ops, anti- icing definitions, anti-icing application, de- icing applications, post de-icing checks, fluid- data concentration tables, hold over time, Aircraft security, security threats, potentially disruptive/ unruly passengers, reporting to local law enforcement/police.

COURSE OUTCOME:

- CO1:** Illustrate the concept of passenger facilitation.
- CO2:** Explain about the basics of ground handling
- CO3:** Illustrate the importance of baggage and check in procedure.
- CO4:** Discuss about the load control and dispatch.
- CO5:** Explain the airside safety.

TEXT BOOKS:

1. IATA Ground Operations Manual (IGOM).
2. IATA Airport Handling Manual (AHM)
3. Subash S Narayanan, "Aircraft Ground Handling", Austin Macauley (31 May 2019).
4. Norman Ashford, Pierre Coutu, John Beasley, "Airport Operations", McGraw-Hill Education, 3rd Edition, 2012.

WEB LINKS:

1. https://www.skybrary.aero/index.php/Ground_Operations
2. <https://www.sciencedirect.com/science/article/pii/S0968090X21001480>
3. <https://www.youtube.com/watch?v=zuijZHpPNck>

ENVIRONMENTAL STUDIES

Subject Code		IA Marks	40			
Number of Lecture Hours/Week	2	Exam Marks	60			
Total Number of Lecture Hours	30	L	T	P	C	
Credits	02	2	0	0	2	

COURSE OBJECTIVES:

To inculcate the importance of environmental pollution, preservation of nature and environmental management for human welfare.

UNIT I	MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES, NATURAL RESOURCES	06 Hours
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Definition, scope and importance, need for public awareness. Renewable and non-renewable resources - Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest 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, environmental 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 sources. Case studies. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification - Role of an individual in conservation of natural resources- Equitable use of resources for sustainable lifestyles.

UNIT II	ECOSYSTEMS, BIODIVERSITY AND ITS CONSERVATION	06 Hours
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Concept of an ecosystem. - Structure and function of an ecosystem Producers, consumers and decomposers. -Energy flow in the ecosystem. Ecological succession. - Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) Introduction-Definition, genetic, species and ecosystem diversity. Biogeographical 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 III	ENVIRONMENTAL POLLUTION	06 Hours
<p>Definition, Cause, 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. Solid waste Management. Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management- floods, earthquake, cyclone and landslides.</p>		
UNIT IV	SOCIAL ISSUES AND THE ENVIRONMENT	06 Hours
<p>From Unsustainable to Sustainable development, Urban problems related to energy - Water conservation, rain water harvesting, watershed management- Resettlement and rehabilitation of people; its problems and concerns. Case Studies - Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act - Issues involved in enforcement of environmental legislation. Public awareness.</p>		
UNIT V	HUMAN POPULATION AND THE ENVIRONMENT	06 Hours
<p>Population growth, variation among nations. Population explosion – Family Welfare Programme. Environment and human health. Human Rights. Value Education. HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health. Case Studies. Field work - Visit to a local area to document environmental assets river/forest/grassland/hill/mountain, Visit to a local polluted site-Urban/Rural/Industrial/Agricultural, Study of common plants, insects, birds, Study of simple ecosystems-pond, river, hill slopes, etc.</p>		
COURSE OUTCOMES:		
<p>At the end of the course the student will be able to,</p> <p>CO1: Explain the various types of natural resources.</p> <p>CO2: To find and implement scientific, technological, economic solutions to environmental problems.</p> <p>CO3: To know about the interrelationship between living organisms and environment.</p> <p>CO4: To understand the integrated themes and biodiversity, natural resources, pollution control and waste management.</p> <p>CO5: To appreciate the importance of environment by assessing its impact on the human world.</p>		

TEXT BOOKS:

1. De AK, Environmental Chemistry, Wiley Eastern Ltd.
2. Bharucha Erach, 2003. The Biodiversity of India, Mapin Publishing Pvt. Ltd, India.
3. Brunner RC, 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480pgs.
4. Clark RS, Marine Pollution, Clarendon Press, Oxford (TB).

REFERENCE BOOKS:

1. Agarwal KC, 2001. Environmental Biology, Nidi Publishers Ltd. Bikaner.
2. Gleick HP, 1993. Water in Crisis, Pacific Institute for Studies in Development, Environment and Security. Stockholm Environmental Institute, Oxford University Press, 473pgs.
3. Heywood VH, and Watson RT, 1995. global Biodiversity Assessment. Cambridge University Press 1140pgs.
4. Jadhav H and Bhosale VM, 1995. Environmental Protection and Laws. Himalaya Publishing House, Delhi 284pgs.
5. Miller TG, Jr. Environmental Science, Wadsworth Publishing CO. (TB).

WEB LINKS:

1. https://en.wikipedia.org/wiki/Environmental_studies#:~:text=Environmental%20studies%20is%20a%20multidisciplinary,address%20complex%20contemporary%20environmental%20issues.
2. <https://nptel.ac.in/courses/120/108/120108004/>
3. <https://www.youtube.com/watch?v=mIPBPG-5dUw>

AIRCRAFT MAINTENANCE PRACTICES LAB

Laboratory Code		IA Marks	40		
Number of Lecture Hours/Week	4	Exam Marks	60		
Total Number of Lecture Hours	60	L	T	P	C
Credits	2	0	0	4	2

COURSE OBJECTIVES:

The objective of this course is to develop practical skills, hand-on experience and professional understanding of Aircraft Maintenance Practices, also to introduce students to basic engineering drawings, diagrams and standards, and to apply ATA 100 specifications, common systems of fits and clearances. The course covers the basic concepts of Engineering Drawings, Diagrams and Standards: drawing types and diagrams, their symbols, dimensions, tolerances and projections. To improve the students' Hands-on and Practical Skills related to various types of electrical cables and connectors, and to apply the techniques used to repair such cables and connectors. The course includes the practical tasks related to Avionics general test equipment; Aircraft Electrical Wiring Interconnect System (EWIS); Use of hand- and hydraulic- operated crimp tools; Testing of crimp joints; Connector pin removal and insertion; Testing and installation precautions of Co-axial cables; and Wiring protection techniques.

Exp no	EXPERIMENTS	Number of Hours
1	Draw different projections of a given object – Three View Diagram simple object, structural member, and joints	4
2	Fit and remove thread inserts.	4
3	Use of precision measuring instruments, selection, handling of instruments and marking	4
4	Removal and installation of hydraulic system pressurized / unpressurized components – safety, handling precautions, selection of appropriate tools and manuals. Use zonal numbers to record location. Use parts catalog & component location manual to locate components. Identify pipes and hoses	4
5	Removal and installation of pneumatic system pressurized / unpressurized components – safety, handling precautions, selection of appropriate tools and manuals. Use zonal numbers to record location. Use parts catalog & component location manual to locate components. Identify pipes and hoses	4
6	Removal and installation of oxygen system components – safety, handling precautions, selection of appropriate tools and manuals. Use zonal numbers to record location. Use parts catalog & component location manual to locate components. Identify pipes and hoses	4
7	Visual inspection of various types of surface defects of aircraft structure using simple aids like magnifying glass, light and mirror. Use zonal and station numbers to record defect location	4
8	Visual inspection of various types of surface defects of aircraft structure and system components like bearings, gears, chain, pulley, spring and cables using simple aids like magnifying glass, light and mirror and record defects.	4

9	Selection and use of lubrication technique of bearings, flight / engine / propeller controls and undercarriages. Identifying lubricants.	4
COURSE OUTCOMES:		
<p>On completion of the course students will be able to</p> <p>CO1: Draw different projections of a given object.</p> <p>CO2: Fit and remove thread inserts.</p> <p>CO3: Identify various precision measuring instruments.</p> <p>CO4: Remove and install the various system (Hydraulic, pneumatic and oxygen system) components.</p> <p>CO5: Inspect Various types of surface defects of aircraft structure and system components.</p>		
REFERENCES:		
<ol style="list-style-type: none"> 1. Airframe and Powerplant Mechanics (AC 65-15A)-Airframe Hand Book FAA Civil. 2. Aircraft Inspection Procedure (CAP 459) Part II Aircraft. 3. Aircraft Maintenance and Repair By Kroes, Watkin and Delph. 4. Acceptable Methods, Techniques and practices (FAA)-EA-AC 43.13-1 A&2A. 5. Aviation Maintenance Technician Hand book by FAA 6. Michael Kroes, William Watkins, Frank Delp, Ronald Sterkenburg, "Aircraft Maintenance and Repair, Seventh Edition", McGraw-Hill Education, 30 March 2013. 7. Michael J. Kroes, William Alfred Watkins, Frank Delp, "Aircraft Maintenance and Repair", McGraw-Hill Education, 1993. 		

AIRCRAFT SYSTEM II

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	3	Exam Marks	60		
Total Number of Lecture Hours	45	L	T	P	C
Credits	3	3	0	0	3

COURSE OBJECTIVES:

The objective of this course is to develop the students' knowledge and skills in aircraft electrical power and their systems, oxygen and pneumatic systems and aircraft water and waste systems. The objective of the course is to develop student understanding and skills in fundamental concepts relating to aircraft instruments, avionics, communication and navigation systems

UNIT I	AIRCRAFT ELECTRICAL POWER (ATA 24) AND LIGHT SYSTEM (ATA 33)	9 Hours
<p>Batteries Installation and Operation; DC power generation; AC power generation; Emergency power generation; Voltage regulation; Power distribution; Inverters, transformers, rectifiers; Circuit protection; External/Ground power; External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency Lights.</p>		
UNIT II	INSTRUMENT SYSTEM (ATA 34)	9 Hours
<p>Direct reading pressure and temperature gauges; Temperature indicating systems; Fuel quantity indicating systems; Gyroscopic principles; Artificial horizons; Attitude director, direction indicator, horizontal situation indicator, turn and slip indicators, turn coordinator; Directional gyros; Ground Proximity Warning Systems; Compass systems: direct reading, remote reading; Flight Data Recording systems; Stall warning systems and angle of attack indicating systems; Vibration measurement and indication; Glass cockpit.</p>		
UNIT III	OXYGEN SYSTEM (ATA 35), FIRE PROTECTION (ATA 26), WATER/WASTE (ATA 38) SYSTEM	9 Hours
<p>System lay-out: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings; (a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests. (b) Portable fire extinguisher. Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing; Corrosion aspects.</p>		
UNIT IV	INTEGRATED MODULAR AVIONICS (ATA42)	9 Hours

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

UNIT V	DOOR AND DOOR WARNING	9 Hours
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Type of Doors. Sensors, Escape Slides, Door warning systems, Inspection's techniques

COURSE OUTCOMES:

On completion of this course the student will gain knowledge in the

1. Aircraft electrical power (ATA 24) and light system (ATA 33)
2. Instrument system (ATA 34)
3. Oxygen system (ATA 35), fire protection (ATA 26), water/waste (ATA 38) system
4. Integrated modular avionics
5. Door warning System.

TEXT BOOKS:

1. Keith W. Bose, "Aviation Electronics", Howard W Sams, U.S. (1 January 1982).
2. E.H.J. Pallett, "Aircraft Instruments", Pearson Education; Second edition (1 January 2009).
3. C.A. Williams, "Aircraft Instruments", Shroff Publishers & Distributors (P) Ltd (January 1, 2007).
4. James W Wasson, "Avionics Systems operation & Maintenance", Iap (November 1, 1995).

REFERENCE BOOKS:

1. Aviation Maintenance Technician Hand book by FAA.
2. Civil Aircraft Inspection Procedure (CAP 459) -Part II Aircraft.
3. The Mechanism of Inertial Position and Heading Indication by Winston Merkey John Hovorka

PISTON ENGINE & PROPELLER

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	3	Exam Marks	60		
Total Number of Lecture Hours	45	L	T	P	C
Credits	3	3	0	0	3

COURSE OBJECTIVES:

This course intends to develop students' knowledge and skills in construction, operation of Piston engine and, this course is intended to provide students with the fundamental principles of propeller construction, systems and operation.

UNIT I	ENGINE CONSTRUCTION, PERFORMANCE AND FUEL SYSTEMS	9 Hours
<p>Mechanical, thermal and volumetric efficiencies operating principles — 2 stroke, 4 stroke, Otto and Diesel, Piston displacement and compression ratio; Engine configuration and firing order. Power calculation and measurement; Factors affecting engine power; Mixtures/leaning, pre-ignition. Crank case, crank shaft, cam shafts, sumps; Accessory gearbox; Cylinder and piston assemblies; Connecting rods, inlet and exhaust manifolds; Valve mechanisms; Propeller reduction gearboxes. Carburetors Types, construction and principles of operation; Icing and heating.</p>		
UNIT II	FUEL INJECTION, ELECTRONIC ENGINE CONTROL, STARTING, IGNITION, INDUCTION, EXHAUST AND COOLING SYSTEMS	9 Hours
<p>Types, construction and principles of operation. Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components. Starting systems, pre heat systems; Magneto types, construction and principles of operation; Ignition harnesses, sparkplugs; Low-andhigh-tension systems. Construction and operation of: induction systems including alternate air systems; Exhaust systems, engine cooling systems — air and liquid.</p>		
UNIT III	SUPERCHARGING/TURBOCHARGING, LUBRICATION AND ENGINE INDICATION SYSTEM	9 Hours
<p>Principles and purpose of supercharging and its effects on engine parameters. Construction and operation of supercharging/ turbocharging systems; System terminology; Control systems; System protection. Properties and specifications; Fuel additives; Safety precautions, System operation/lay-out and components, Engine speed; Cylinder head temperature; Coolant temperature; Oil pressure and temperature; Exhaust Gas Temperature; Fuel pressure and flow; Manifold pressure.</p>		
UNIT IV	POWERPLANT INSTALLATION, ENGINE MONITORING AND GROUND OPERATION, AIRCRAFT PROPELLER.	9 Hours
<p>Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti- vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains, Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Inspection of engine and components: criteria, tolerances, and data specified by engine manufacturer. Preservation and de-preservation for the engine and accessories/ systems, Fundamentals; Blade element theory; High/low</p>		

blade angle, reverse angle, angle of attack, rotational speed; Propeller slip; Aerodynamic, centrifugal, and thrust forces; Torque; Relative airflow on blade angle of attack; Vibration and resonance. Construction methods and materials used in wooden, composite and metal propellers; Blade station, blade face, blade shank, blade back and hub assembly; fixed pitch, controllable pitch, constant speed propeller; Propeller/spinner installation.

UNIT V	PROPELLER PITCH CONTROL, SYNCHRONISING, ICE PROTECTION AND MAINTENANCE	9 Hours
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Speed control and pitch change methods, mechanical and electrical/electronic; Feathering and reverse pitch; Over speed protection. Synchronizing and synchrophasing equipment. Fluid and electrical de-icing equipment. Static and dynamic balancing; Blade tracking; Assessment of blade damage, erosion, corrosion, impact damage, delamination; Propeller treatment/repair schemes; Propeller engineer running. Propeller preservation and de-preservation.

COURSE OUTCOMES:

On completion of this course student will gain knowledge

1. ENGINE CONSTRUCTION, PERFORMANCE AND FUEL SYSTEMS
2. FUEL INJECTION, ELECTRONIC ENGINE CONTROL, STARTING, IGNITION, INDUCTION, EXHAUST AND COOLING SYSTEMS
3. SUPERCHARGING/TURBOCHARGING, LUBRICATION AND ENGINE INDICATION SYSTEM
4. POWERPLANT INSTALLATION, ENGINE MONITORING AND GROUND OPERATION, AIRCRAFT PROPELLER
5. PROPELLER PITCH CONTROL, SYNCHRONISING, ICE PROTECTION AND MAINTENANCE

TEXT BOOKS:

1. Herschel Smith, "Aircraft Piston Engines", McGraw Hill Higher Education (1 July 1981).
2. Ralph D Bent and Mckinley James L, "Aircraft Power Plants", McGraw-Hill; Revised Ed. Edition (January 1, 1955).
3. Frank Delp, "Aircraft Propellers and Controls", Aviation Maintenance Pub; First Edition (June 1, 1979).
4. Dale Crane, "Aviation Maintenance Technician: General", Aviation Supplies & Academics Inc; 3rd edition (17 January 2008).

REFERENCE BOOKS:

1. Civil Aircraft Inspection Procedure (CAP 459) Part II Aircraft
2. AIRCRAFT TECH BOOK CO., "EASA Module-17 A Propeller"
3. Airframe and Power plant Mechanics (EA-AC 65- 12A) -Power Plant Handbook FAA Powerplant Section Text book- (EA-ITP-P)

GAS TURBINE ENGINE

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	4	Exam Marks	60		
Total Number of Lecture Hours	60	L	T	P	C
Credits	4	4	0	0	4

COURSE OBJECTIVES:

This course is intended to develop students' understanding and skills in Gas Turbine Engine lay-out, operation and functioning of engine systems, safety procedures, ground operations, and thrust augmentation systems.

UNIT I	ENGINE PERFORMANCE, INLET AND COMPRESSORS	12 Hours
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Potential energy, kinetic energy, Newton's laws of motion, Brayton cycle; The relationship between force, work, power, energy, velocity, acceleration; Constructional arrangement and operation of turbojet, turbofan, turbo shaft, turboprop. 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; Pressure, temperature and velocity of the gas flow; Engine ratings, static thrust, influence of speed, altitude and hot climate, flat rating, limitations. Compressor inlet ducts; Effects of various inlet configurations; Ice protection. Axial and centrifugal types; Constructional features and operating principles and applications; Fan balancing; Operation: Causes and effects of compressor stall and surge; Methods of air flow control: bleed valves, variable inlet guide vanes, variable stator vanes, rotating stator blades; Compressor ratio.

UNIT II	COMBUSTION & TURBINE SECTION, LUBRICANTS AND FUELS	12 Hours
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Constructional features and principles of operation. Operation and characteristics of different turbine blade types; Blade to disk attachment; Nozzle guide vanes; Causes and effects of turbine blade stress and creep. Constructional features and principles of operation; Convergent, divergent and variable area nozzles; Engine noise reduction; Thrust reversers. Constructional features and principles of operation and handling Properties and specifications; Fuel additives; Safety precautions System operation/lay-out and components

UNIT III	FUEL AND AIR SYSTEM, STARTING AND IGNITION SYSTEM	12 Hours
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Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components. Operation of engine air distribution and anti-ice control systems, including internal cooling, sealing and external air services. Operation of engine air distribution and anti-ice control systems, including internal cooling, sealing and external air services. Operation of engine start systems & components; Ignition systems and components; Maintenance safety requirements.

UNIT IV	ENGINE INDICATION SYSTEMS, POWER AUGMENTATION SYSTEMS	12 Hours
<p>Exhaust Gas Temperature/Inter-stage Turbine Temperature; Engine Thrust Indication: Engine Pressure Ratio, engine turbine discharge pressure or jet pipe pressure systems; Oil pressure and temperature; Fuel pressure and flow; Engine speed, Propeller Speed; Vibration measurement and indication; Torque; Power. Operation and applications; Water injection, water methanol; Afterburner systems. Gas coupled/free turbine and gear coupled turbines; Reduction gears; Integrated engine and propeller controls; Over-speed safety devices. Arrangements, drive systems, reduction gearing, couplings, control systems.</p>		
UNIT V	AUXILIARY POWER UNITS (APUS), ENGINE STORAGE AND PRESERVATION	12 Hours
<p>Purpose, operation, protective systems. Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains. Operation of detection and extinguishing systems. Operation of detection and extinguishing systems. Preservation and de preservation for the engine and accessories/ systems.</p>		
COURSE OUTCOMES:		
<p>On completion of this course the student will gain knowledge in</p> <ol style="list-style-type: none"> 1. Engine performance, inlet and compressors 2. Combustion & turbine section, lubricants and fuels 3. Fuel and air system, starting and ignition system 4. Engine indication systems, power augmentation systems 5. Auxiliary power units (apus), engine storage and preservation 		
TEXT BOOKS:		
<ol style="list-style-type: none"> 1. Irwine Treager, "Aircraft Gas Turbine Technology by", McGraw Hill Education; Third edition (1 July 2017). 2. The Jet Engine' by ROLLSROYCE 3. Power plant Section Text book- (EA-ITP-P) 4. Aviation Maintenance Technician Series by Dale Crane 5. Jet Aircraft power Systems by JACK V. CASAMASSA and RALPHD.BENT 		
REFERENCE BOOKS:		
<ol style="list-style-type: none"> 1. Gas Turbine Engines' by Turbomeca, Bordes, France. 2. Hydraulic Servo Systems' by M.GUILLON 3. Introduction to Flight by JOHN ANDERSON: 4. Civil Aircraft Inspection Procedure (CAP459) Part- II Aircraft 5. Aircraft Power Plants by M.J.KROES, T.W.Wild, R.D.Bent and J.L.McKINLEY; 		

AVIONICS

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	4	Exam Marks	60		
Total Number of Lecture Hours	60	L	T	P	C
Credits	4	4	0	0	4

COURSE OBJECTIVES:

1. To briefly explain the working principles and types of communication system.
2. To explain the various types of navigation system and their operating procedures.
3. To describe the controls and operation of an aircraft.
4. To gain more knowledge on board maintenance system of avionics.
5. To explain the needs of information system and various use of general test equipment.

UNIT I	COMMUNICATION (ATA 23)	12 Hours
<p>Fundamentals of radio wave propagation, antennas, transmission lines, communication, receiver and transmitter; Working principles of following systems: Very High Frequency (VHF) communication; High Frequency (HF) communication; Audio; Emergency Locator Transmitters; Cockpit Voice Recorder; ARINC communication and reporting.</p>		
UNIT II	NAVIGATION (ATA 34)	12 Hours
<p>Very High Frequency omnidirectional range (VOR); Automatic Direction Finding (ADF); Instrument Landing System (ILS); Microwave Landing System (MLS); Distance Measuring Equipment (DME); Very Low Frequency and hyperbolic navigation (VLF/Omega); Doppler navigation; Area navigation, RNAV systems; Flight Management Systems; Global Positioning System (GPS), Global Navigation Satellite Systems (GNSS); Inertial Navigation System; Air Traffic Control transponder, secondary surveillance radar; Traffic Alert and Collision Avoidance System (TCAS); Weather avoidance radar; Radio altimeter; IRS-Inertial reference system; TCAS - Traffic Collision Avoidance system;</p>		
UNIT III	AUTO-FLIGHT (ATA 22)	12 Hours
<p>Fundamentals of automatic flight control including working principles and current terminology; Flight Director System; Command signal processing; Modes of operation: roll, pitch and yaw channels; Yaw dampers; Auto-throttle systems; Automatic Landing Systems: principles and categories, modes of operation, Approach, glideslope, land, go-around, system monitors and failure conditions. FBW-Flyby Wire.</p>		
UNIT IV	ON BOARD MAINTENANCE SYSTEMS (ATA 45)	12 Hours
<p>Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring). Software management control: Awareness of restrictions,</p>		

airworthiness requirements and possible catastrophic effects of unapproved changes to software programs.

UNIT V

INFORMATION SYSTEMS (ATA46) AND AVIONIC GENERAL TEST EQUIPMENT

12 Hours

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

COURSE OUTCOMES:

1. Understand the working principles and types of communication system.
2. Understand the various types of navigation system and operating procedures.
3. Understand the controls and operation of an aircraft.
4. Understand the aircraft systems are maintained by on board maintenance system.
5. Know the needs of information system and various use of general test equipment.

TEXT BOOKS:

1. E.H.J.Pallett, "Micro Electronics Aircraft System", FT Prentice Hall (1 December1984).
2. James W Wasson, "Avionics Systems operation & Maintenance", Iap (November 1,1995).
3. Eismen, Thomas K., McKinley, James L., Bent, Ralph D, "Aircraft Electricity and Electronics (Aviation Technology Series)", Gregg Division McGraw-Hill; 4th edition (January 1,1709).
4. Civil Aircraft Inspection Procedure (CAP 459) -Part II Aircraft
5. Borje Forssell, "Radionavigation Systems", Artech House Publishers; Reprint edition (1 February2008).

REFERENCE BOOKS:

1. Jacob Millman, Christos Halkias, Chetan Parikh, "Millman's Integrated Electronics -Analog and Digital Circuit and Systems", McGraw Hill Education; 2nd edition (1 July2017).
2. J Powell, "Aircraft Radio Systems", Pitman (March 1,1986).
3. George Kennedy, Brendan Davis, Srm Prasanna, "Kennedy's Electronic Communication Systems", McGraw Hill Education; 5th edition (13 June2011).
4. Myron Kayton, Walter R. Fried, "Avionics Navigation Systems", Wiley-Inter science;2nd edition (21 April 2008).

AIRCRAFT STRUCTURE AND ASSOCIATED SYSTEMS

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	3	Exam Marks	60		
Total Number of Lecture Hours	45	L	T	P	C
Credits	3	3	0	0	3

COURSE OBJECTIVES:

Students undergoing this course are expected:

1. To understand the general term and vocabulary in aeronautical science, structural behavior of different types of structural components, fasteners used on aircraft and structural assembly of aircraft.
2. To provide the knowledge of various failure theories.

UNIT I	INTRODUCTION TO GENERAL TERM AND VOCABULARY IN AERONAUTICAL SCIENCE	9 Hours
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Introduction to aircraft technical literature. Introduction to ATA system. Introduction to aircraft, major aircraft components, aircraft systems and their functions, reference lines, station and zone identification Systems.

UNIT II	AIRFRAME STRUCTURES — GENERAL CONCEPTS	9 Hours
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Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage tolerance concepts; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Lightning strike protection provision. Drains and ventilation provisions, System installation provisions Aircraft bonding and continuity. Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning, anti-corrosive protection, wing, empennage and engine attachments; Describe current practice in aircraft design related to load transfer, load path continuity and reduction of stress raisers in pressurized fuselages.

UNIT III	FASTENERS USED ON AIRCRAFT	9 Hours
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Fasteners, Screw threads Screw nomenclature; Thread forms, dimensions and tolerances for standard threads used in aircraft; measuring screw threads; Bolts, studs and screws Bolt types: specification, identification and marking of aircraft bolts, international standards; Nuts: self-locking, anchor, standard types; Machine screws: aircraft specifications; Studs: types and uses, insertion and removal; Self tapping screws, dowels. Aircraft rivets Types of solid and blind rivets: specifications and identification, heat treatment. Riveting Riveted joints, rivets spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.

UNIT IV	STRUCTURAL ASSEMBLY AND AIRFRAME STRUCTURES — AEROPLANE	9 Hours
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Structural assembly techniques: riveting, bolting, bonding methods of surface protection, such as chromating, anodizing, painting; Surface cleaning. Airframe symmetry: methods of alignment and symmetry checks. Complete

airframe for symmetry fuselage for twist and bending, vertical stabilizer for alignment wings and horizontal stabilizers for dihedral and incidence, Fuselage (ATA 52/53/56): 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; Windows and windscreen construction and mechanisms.

UNIT V	WINGS (ATA 57), FLIGHT CONTROL SURFACES (ATA 55/57) AND NACELLES/PYLONS (ATA 54)	9 Hours
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Anhedral, dihedral incidence angle interplane struts longitudinal dihedral rigging position, stagger, wash in, washout Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments. Stabilizers, Construction; Control surface attachment. Flight Control Surfaces (ATA 55/57), Construction and attachment; Balancing — mass and aerodynamic. Nacelles/Pylons (ATA 54) Construction; Firewalls; Engine mounts.

COURSE OUTCOMES:

1. Explain the general term and vocabulary in aeronautical science.
2. Explain the Airworthiness requirements for airframe structures.
3. Identify different fasteners used on aircraft
4. Explain the structural assembly techniques and airframe for airplane.
5. Examine the Anhedral, dihedral incidence angle, flight Control Surfaces construction and attachment, Firewalls and engine mounts.

TEXT BOOKS:

1. Dale Crane, “Dictionary of Aeronautical Terms”, Aviation Book Co (1 June 1989).
2. Joe Christy, “Aircraft Construction, Repair, and Inspection”, Tab Books; 1st edition (March 1, 1984).
3. Federal Aviation Administration (FAA)/Aviation Supplies & Academics (ASA), “Aviation Maintenance Technician Handbook – General: FAA-H-8083-30 (FAA Handbooks)”, Aviation Supplies & Academics Inc; 2013th edition (21 March 2013).
4. Ralph D. Bent, “Aircraft Maintenance and Repair (Aviation Technology Series)”, McGraw-Hill Inc., US; 5th edition (1 January 1987).

REFERENCE BOOKS:

1. Aircraft handbook FAA (AC 65-15 A).
2. Aircraft structure Ch. 01 (FAA)
3. AC 43.13-1B - Acceptable Methods, Techniques, and Practices - Aircraft Inspection and Repair
4. EASA-part-66-module-13, Aircraft tech book co.

GAS TURBINE ENGINE LAB

Laboratory Code		IA Marks		40	
Number of Lecture Hours/Week	4	Exam Marks		60	
Total Number of Lecture Hours	60	L	T	P	C
Credits	2	0	0	4	2

COURSE OBJECTIVES:

The practical sessions assigned to this course are intended to perform practical tasks on gas turbine engines to help students understanding the basic concepts of gas turbine systems, assembly and operation and improve their inspection and maintenance skills on Gas Turbine Engines.

Exp no	EXPERIMENTS	Number ofHours
1	Identify engine types, modules and subassemblies and components of turbine engines.	2
2	Identify various parts of thrust management and bypass system of turbine engine.	2
3	Identification and inspection of compressors stages.	2
4	Engine compressor surge and stall management components and control.	2
5	Identification various components of combustion systems and methods of cooling's.	2
6	Identification of exhaust system and methods of noise reduction	2
7	Identification and inspection of components of thrust reversal system.	2
8	Identify normal & electronic fuel control, monitoring and indication system	6
9	Familiarization with methods of engine starting and ignition systems.	4
10	Operation check of Engine indicating systems.	4
11	Familiarization of APU starting and shutdown procedure	4
12	Familiarization with power plant removal & installation	8
13	Visual Inspection of engines	4
14	Typical engine control rigging.	6
15	Familiarization with engines and airframe interface.	4
16	Testing of engine fire monitoring and extinguishing operation	4
17	Study engine storage and preservation.	2

COURSE OUTCOMES:

The students will perform

1. Visual inspection of engines.
2. Testing of engine fire monitoring and extinguishing operation.
3. Study engine storage and preservation.
4. Operation check of Engine indicating systems.
5. Identification of various parts of thrust management and bypass system of turbine engine.

TEXT BOOKS:

1. Irwine Treager, "Aircraft Gas Turbine Technology", McGraw Hill Education; Third edition (1 July 2017).
2. The Jet Engine' by ROLLSROYCE
3. Power plant Section Text book- (EA-ITP-P)
4. Aviation Maintenance Technician Series by Dale Crane
5. 'Jet Aircraft power Systems' by JACK V. CASAMASSA and RALPH D. BENT

REFERENCE BOOKS:

1. Gas Turbine Engines' by Turbomeca, Bordes, France.
2. Hydraulic Servo Systems' by M. GUILLON
3. Introduction to Flight by JOHN ANDERSON:
4. Civil Aircraft Inspection Procedure (CAP459) Part- II Aircraft.
5. Aircraft Power Plants by M.J. KROES, T.W. Wild, R.D. Bent and J.L. McKINLEY;

PISTON ENGINE & PROPELLER LAB

Laboratory Code		IA Marks	40		
Number of Lecture Hours/Week	4	Exam Marks	60		
Total Number of Lecture Hours	60	L	T	P	C
Credits	2	0	0	4	2

COURSE OBJECTIVES:

The aim of the course is to familiarize with constructions and functions of piston engines, subassemblies of piston engine, various systems of engine, and to make the students to identify and inspect the components of piston engine.

Exp no	EXPERIMENTS	Number of Hours
1	Familiarize with constructions and functions of piston engines	3
2	Identification and inspection of various subassemblies of piston engines	3
3	Identification and inspection of cylinder and piston assemblies.	3
4	Inspection of accessory gear box valve mechanism.	3
5	Identification and inspection of various components of piston engines.	3
6	Identification and inspection of engine fuel system and function of carburetor.	3
7	Identification and inspection of engine fuel injection system and electronic fuel control.	3
8	Function check of magneto.	3
9	Various methods of engine starting and ignition systems and Engine indicating systems.	3
10	Identification and inspection of components and function of lubrication system.	3
11	Engine control system and rigging.	4
12	Familiarization with engines and airframe interface.	3
13	Testing of engine fire warning and extinguishing operation	3
14	Preparation for engine/ propeller storage and preservation.	3
15	Familiarize with propeller construction	3
16	Methods of propeller pitch control and its effect on engine power. Feathering and reverse pitch control. Propeller synchrophasing system.	4
17	Check Propeller track.	3
18	Engine monitoring and ground operation	4
19	Spark plug cleaning and testing	3

COURSE OUTCOMES:

1. Identify and inspect various components of piston engine
2. Inspect engine fuel system
3. Check Propeller track.
4. List the procedure for Engine monitoring and ground operations
5. Inspect the components and functions of fuel injection system, ignition system and lubrication system,

TEXT BOOKS:

1. Herschel Smith, "Aircraft Piston Engines", McGraw Hill Higher Education (1 July 1981).
2. Ralph D Bent and Mckinley James L, "Aircraft Power Plants", McGraw-Hill; Revised Ed. edition (January 1, 1955).
3. Frank Delp, "Aircraft Propellers and Controls", Aviation Maintenance Pub; First Edition (June 1, 1979).
4. Dale Crane, "Aviation Maintenance Technician: General", Aviation Supplies & Academics Inc; 3rd edition (17 January 2008).

REFERENCE BOOKS:

1. Civil Aircraft Inspection Procedure (CAP 459) Part II Aircraft
2. AIRCRAFT TECH BOOK CO., "EASA Module-17 A Propeller"
3. Airframe and Power plant Mechanics (EA-AC 65- 12A) -Power Plant Handbook FAA.
4. Powerplant Section Text book- (EA-ITP-P)

AIRCRAFT MAINTENANCE PRACTICES -2

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	3	Exam Marks	60		
Total Number of Lecture Hours	45	L	T	P	C
Credits	3	3	0	0	3

COURSE OBJECTIVES:

The objective of this course is to enable students to demonstrate competence in working effectively and safely in an aircraft maintenance organization. The course includes an introduction to Aircraft Handling and Storage procedures; Disassembly, Inspection, Repair, Assembly and Disassembly techniques; Aircraft weight and balance procedures; Abnormal events –inspection procedures; EWIS procedures; Maintenance procedures and certification

UNIT I	Aircraft Handling and Storage	09 Hours
<p>Aircraft taxiing/towing and associated safety precautions; Aircraft jacking, chocking, securing and associated safety precautions; Aircraft storage methods; Refueling/ defueling procedures; De-icing/anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies; Effects of environmental conditions on aircraft handling and operation</p>		
UNIT II	Aircraft Weight and Balance & Abnormal events inspections	09 Hours
<p>Centre of Gravity/Balance limits calculation: use of relevant documents; Preparation of aircraft for weighing; Aircraft weighing Inspections following lightning strikes; and HIRF penetration; Inspections following abnormal events such as heavy landings and flight through turbulence</p>		
UNIT III	Inspection, Repair, Assembly Disassembly techniques;	09 Hours
<p>Types of defects and visual inspection; techniques; Corrosion removal; assessment and re-protection; General repair methods, Structural Repair Manual; Ageing, fatigue and corrosion control programs; Non-destructive inspection techniques including, penetrant, radiographic, eddycurrent, ultrasonic and boroscope methods; Non-destructive inspection techniques including, penetrant, radiographic, eddycurrent, ultrasonic and boroscope methods Disassembly and re-assembly techniques</p>		
UNIT IV	Electrical Wiring Interconnection System (EWIS)	09 Hours
<p>Continuity, insulation and bonding techniques and testing; Use of crimp tools: hand and hydraulic operated; Testing of crimp joints; Connector pin removal and insertion; Co-axial cables: testing and installation precautions; Identification of wire types, their inspection criteria and damage tolerance. Wiring protection techniques: Cable looming and loom support, cable clamps, protective sleeving, techniques including heat shrink wrapping, shielding; EWIS installations, inspection, repair, maintenance and cleanliness standards</p>		

UNIT V	Maintenance Procedures	09 Hours
<p>Maintenance planning; Modification procedures;Stores procedures; Certification/release procedures;Interface with aircraft operation; Maintenance Inspection/QualityControl/Quality Assurance; Additional maintenance procedures;Control of life limited components</p>		
COURSE OUTCOMES:		
<ol style="list-style-type: none"> 1. The students should be able to understand Aircraft Handling and Storage procedures; 2. Aircraft weight and balance procedures; 3. Disassembly, Inspection, Repair, Assembly and Disassembly techniques; 4. Electrical Wiring Interconnection System Procedures Abnormal events inspection procedures; 5. Maintenance procedures and certification 		
TEXT BOOKS:		
<ol style="list-style-type: none"> 1. Airframe and Powerplant Mechanics (AC 65-15A)-Airframe Hand Book FAA 2. Civil Aircraft Inspection Procedure (CAP 459) Part II Aircraft 3. Aircraft Maintenance and Repair By Kroes, Watkin and Delph 4. Maintenance practices (module7) 		
REFERENCE BOOKS:		
<ol style="list-style-type: none"> 1. Acceptable Methods, Techniques and practices (FAA)-EA-AC 43.13-1 A&2A 2. Aviation Maintenance Technician Hand book by FAA 		

TURBINE HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	3	Exam Marks	60		
Total Number of Lecture Hours	60	L	T	P	C
Credits	04	3	0	0	3

COURSE OBJECTIVES:

This course provides explanations of aerodynamics and all the main systems applicable to rotary wing aircraft: airframe, flight control systems, blade tracking & vibration analysis, transmission (gear boxes, clutches etc), air conditioning, instruments, electrical power, equipment & furnishings, fire protection, fuel systems, hydraulic power, ice & rain protection, landing gear, lights, pneumatics, integrated modular avionics (IMA), onboard maintenance systems and information systems.

UNIT I	THEORY OF FLIGHT (ROTARY WING AERODYNAMICS)	12 Hours
Theory of Flight — Rotary Wing Aerodynamics - Flight Control Systems - Blade Tracking and Vibration Analysis – Transmissions.		
UNIT II	ATA 21 AND ATA24	12 Hours
Airframe Structures - Air Conditioning (ATA 21) - Instruments/Avionic Systems - Electrical Power (ATA 24).		
UNIT III	ATA 25, ATA 26, ATA 28 and ATA 29	12 Hours
Equipment and Furnishings (ATA 25) - Fire Protection (ATA 26) - Fuel Systems (ATA 28) -Hydraulic Power (ATA 29)		
UNIT IV	ATA 30, ATA 32, ATA 33 and ATA 36	12 Hours
Ice and Rain Protection (ATA 30) - Landing Gear (ATA 32) - Lights (ATA 33) - Pneumatic/Vacuum (ATA 36).		
UNIT V	ATA 42, ATA 45and ATA 46	12 Hours
Integrated Modular Avionics (ATA42) - On Board Maintenance Systems (ATA45) - Information Systems (ATA46).		

COURSE OUTCOMES:

- CO1: Explain about the rotary wing aerodynamics.
- CO2: demonstrate the working of electrical system in helicopter

CO3: Analyze the fire production system in rotary wing aircraft.

CO4: State the various methods for ice and rain protection in rotary wing aircraft.

CO5: Explain about the integrated modular avionics in helicopter.

TEXT BOOKS:

1. EASA-part-66-module-12, Aircraft tech book co.
2. Federal Aviation Administration, "Airplane Flying Handbook (FAA-H-8083-3A)", Skyhorse Publishing, 2011.
3. Ethirajan Rathakrishnan, "Helicopter Aerodynamics", PHI Learning, 30 December 2018

REFERENCE BOOKS:

1. John Thomas, "Turbine Aerodynamics Structures & Systems", 19 August 2021.
2. Wayne Johnson, "Helicopter Theory", Dover Publications Inc., 17 March 2003.

WEBLINKS:

1. <https://ocw.mit.edu/courses/aeronautics-and-astronautics/16-687-private-pilot-ground-school-january-iap-2019/class-videos/lecture-8-helicopter-aerodynamics/>
2. <https://www.youtube.com/watch?v=9dmu2sm0CJM>
3. https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/helicopter_flying_handbook/media/hfh_ch04.pdf

Turbine Airplane Aerodynamics, STRUCTURES AND SYSTEMS

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	4	Exam Marks	60		
Total Number of Lecture Hours	60	L	T	P	C
Credits	04	4	0	0	4

COURSE OBJECTIVES:

This course provides explanations of aerodynamics and all the main systems applicable to aircraft: airframe, flight control systems, blade tracking & vibration analysis, transmission (gear boxes, clutches etc), air conditioning, instruments, electrical power, equipment & furnishings, fire protection, fuel systems, hydraulic power, ice & rain protection, landing gear, lights, pneumatics, integrated modular avionics (IMA), onboard maintenance systems and information systems.

UNIT I	Air frame Structure & Hydraulic system	12 Hours
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Theory of Flight - Airframe Structures — General Concepts - Airframe Structures — Airplanes, Hydraulic Power (ATA 29)

UNIT II	Pneumatic systems and cabin system	12 Hours
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Air Conditioning and Cabin Pressurization (ATA 21), Equipment and Furnishings (ATA 25)
Pneumatic/Vacuum (ATA 36) Cabin Systems (ATA44)

UNIT III	Protection system and flight controls	12 Hours
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Fire Protection (ATA 26) Ice and Rain Protection (ATA 30) Flight Controls (ATA 27)

UNIT IV	Landing gear, lights, Oxygen fuel and water system	12 Hours
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Landing Gear (ATA 32) Lights (ATA 33) Oxygen (ATA 35) Fuel Systems (ATA 28) Water/Waste (ATA 38)

UNIT V	Avionics systems	12 Hours
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Instruments/Avionic Systems, Electrical Power(ATA 24), On Board Maintenance Systems (ATA 45)
Integrated Modular Avionics (ATA42)

COURSE OUTCOMES:

Student will gain familiarizations and understanding about the following system.

1. Air frame Structure & Hydraulic system
2. Pneumatic systems and cabin system
3. Protection system and flight controls
4. Landing gear, lights, Oxygen fuel and water system
5. Avionics systems

TEXT BOOKS:

1. EASA-part-66-module-12, Aircraft tech book co.
2. Federal Aviation Administration, “Airplane Flying Handbook (FAA-H-8083-3A)”, Skyhorse Publishing, 2011.
3. Ethirajan Rathakrishnan, “Helicopter Aerodynamics”, PHI Learning, 30 December 2018

REFERENCE BOOKS:

1. John Thomas, “Turbine Aerodynamics Structures & Systems”, 19 August 2021.
2. Wayne Johnson, “Helicopter Theory”, Dover Publications Inc., 17 March 2003.

WEBLINKS:

1. <https://ocw.mit.edu/courses/aeronautics-and-astronautics/16-687-private-pilot-ground-school-january-iap-2019/class-videos/lecture-8-helicopter-aerodynamics/>
2. <https://www.youtube.com/watch?v=9dmu2sm0CJM>
3. https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/helicopter_flying_handbook/media/hfh_ch04.pdf

NON-DESTRUCTIVE TESTING

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	3	Exam Marks	60		
Total Number of Lecture Hours	45	L	T	P	C
Credits	3	3	0	0	3

COURSE OBJECTIVES:

To study and understand the various Non-Destructive Evaluation and Testing methods, theory and their industrial applications.

UNIT I	OVERVIEW OF NDT	09 Hours
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NDT Versus Mechanical testing, Overview of the Non-Destructive Testing Methods for the detection of manufacturing defects as well as material characterization. Relative merits and limitations, Various physical characteristics of materials and their applications in NDT., Visual inspection – Unaided and aided.

UNIT II	SURFACE NDE METHODS	09 Hours
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Liquid Penetrant Testing - Principles, types and properties of liquid penetrants, developers, advantages and limitations of various methods, Testing Procedure, Interpretation of results. Magnetic Particle Testing- Theory of magnetism, inspection materials Magnetization methods, Interpretation and evaluation of test indications, Principles and methods of demagnetization, Residual magnetism.

UNIT III	THERMOGRAPHY AND EDDY CURRENT TESTING (ET)	09 Hours
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Thermography- Principles, Contact and non-contact inspection methods, Techniques for applying liquid crystals, Advantages and limitation - infrared radiation and infrared detectors, Instrumentations and methods, applications. Eddy Current Testing-Generation of eddy currents, Properties of eddy currents, Eddycurrent sensing elements, Probes, Instrumentation, Types of arrangement, Applications, advantages, Limitations, Interpretation/Evaluation.

UNIT IV	ULTRASONIC TESTING (UT) AND ACOUSTIC EMISSION (AE)	09 Hours
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Ultrasonic Testing-Principle, Transducers, transmission and pulse-echo method, straight beam and angle beam, instrumentation, data representation, A/Scan, B-scan, C-scan. Phased Array Ultrasound, Time of Flight Diffraction. Acoustic Emission Technique – Principle, AE parameters, Applications.

UNIT V	RADIOGRAPHY (RT)	09 Hours
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Principle, interaction of X-Ray with matter, imaging, film and film less techniques, types and use of filters and screens, geometric factors, Inverse square, law, characteristics of films - graininess, density, speed,

contrast, characteristic curves, Penetrometers, Exposure charts, Radiographic equivalence. Fluoroscopy-Xero-Radiography, Computed Radiography, Computed Tomography

COURSE OUTCOMES:

After the course the students are expected to be able to

CO1: Explain the fundamental concepts of NDT

CO2: Discuss the different methods of NDE

CO3: Explain the concept of Thermography and Eddy current testing

CO4: Explain the concept of Ultrasonic Testing and Acoustic Emission

CO5: Explain the concept of Radiography

TEXT BOOKS:

1. Baldev Raj, T.Jayakumar, M.Thavasimuthu “Practical Non-Destructive Testing”, Narosa Publishing House, 2014.
2. Ravi Prakash, “Non-Destructive Testing Techniques”, 1st revised edition, New Age International Publishers, 2010.

REFERENCE BOOKS:

1. ASM Metals Handbook,” Non-Destructive Evaluation and Quality Control”, American Society of Metals, Metals Park, Ohio, USA, 200, Volume-17.
2. ASNT, American Society for Non Destructive Testing, Columbus, Ohio, NDT Handbook, Vol. 1, Leak Testing, Vol. 2, Liquid Penetrant Testing, Vol. 3, Infrared and Thermal Testing Vol. 4, Radiographic Testing, Vol. 5, Electromagnetic Testing, Vol. 6, Acoustic Emission Testing, Vol. Ultrasonic Testing.
3. Charles, J. Hellier, “Handbook of Nondestructive evaluation”, McGraw Hill, New York 2001.
4. Paul E Mix, “Introduction to Non-destructive testing: a training guide”, Wiley, 2nd Edition NewM Jersey, 2005.

WEB LINKS:

1. <https://nptel.ac.in/courses/113/106/113106070/>
2. https://onlinecourses.nptel.ac.in/noc20_mm07/preview
3. https://www.iare.ac.in/sites/default/files/lecture_notes/IARE_NDT_LECTURE_NOTES.pdf

Typical Aircraft maintenance fixed wing light & heavy aircraft

Subject Code		IA Marks	40
Number of Lecture Hours/Week	3	Exam Marks	60
Total Number of Lecture Hours	45	L	T
Credits	03	3	0

COURSE OBJECTIVES:

The main objective of this course is to understand

- a) Ground handling –safety precautions during typical aircraft maintenance of fixed wing light /heavy planes
- b) Familiarization and use of aircraft tools and calibration
- c) Fire safety &precautions during maintenance
- d) Maintenance, inspection and servicing procedures of various systems and components
- e) Maintenance documents and manuals familiarization and check intervals

UNIT I	GROUND HANDLING- SAFETY AND PRECAUTIONS	09 Hours
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General knowledge of ground handling of Aircraft, Aircraft Safety; Mooring, Jacking, Levelling, Hoisting of aircraft, Towing, Mooring of an a/c during adverse conditions. Aircraft cleaning and maintaining. Ground signaling / marshalling of aircraft in day & night time.

UNIT II	AIRCRAFT TOOLS AND HANDLING –FIRE SAFETY	10 Hours
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General Purpose Tools, Hummers and Mallets, Screwdrivers, Pilers and Plier-Type Cutting Tools. Punches Wrenches, Special Wrenches, Torque Wrench, Strap Wrenches. Impact Drivers, Metal Cutting Tools. Hand Snips, Hacksaws, Chisels, Vices, Files, Files—care and Use, Most CommonlyUsed Files, Care of files. Drills. Twist Drills, Reamers, Countersink, Taps and Dies, Layout and Measuring Tools, Rules. Combination Sets, Scribe, Dividers and Pencil Compasses, Calipers, Micrometer Calipers, Micrometer Parts. Reading a Micrometer, Vernier Scale, Using a Micrometer, Vernier Scale, Using a Micrometer, calipers.

FIRE SAFETY: Different Types & class of fire, Different types of fire-extinguishers, Procedure of use of fire extinguishers, fire-alarm bell.

UNIT 3	SAFETY PRECAUTIONS DURING MAINTENANCE	09 Hours
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Knowledge of safety and fire precautions to be observed during maintenance including refuelling, defueling & engine start. Maintenance of hydraulic accumulators, reservoirs and filters: Rigging of flight control surfaces and duplicate inspection; Rigging checks-Angular alignment checks and symmetry checks, Knowledge and use of Tensiometers, Protractors etc. Rigging of engine and propeller control

UNIT 4	MAINTENANCE, INSPECTION AND SERVICING-HYDRAULIC, FUEL, OIL, LANDING GEAR, WHEELS, BRAKES, FLIGHT	12 Hours
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	CONTROLS SYSTEM ETC	
<p>Maintenance of landing gear (L/G), Shock strut charging and bleeding, Maintenance of L/G brakes i.e., Dragging, Grabbing, Fading, Brakes and excessive brake pedal travel. Maintenance on wheels, engine oil servicing and precautions, hydraulic servicing, landing gear servicing, accumulator, pneumatic charging, flight controls, balancing and rigging, fuel servicing, component replacement procedures.</p>		
UNIT V	MAINTENANCE MANUALS, DOCUMENTS, INSPECTION CHECKS	10 Hours
<p>Familiarization of aircraft documents – maintenance manuals, SBs, ADs, IPCs, log book entries, NRC etc, Inspection procedures- types of inspections- preflight inspections Daily – weekly –monthly checks- check intervals- Check-A, B, C, D Light maintenance – base maintenance checks Certificate of release – mechanic certification Task cards, log books</p>		
COURSE OUTCOMES:		
<p>Upon completion of this course, the student would have gained knowledge about</p> <ol style="list-style-type: none"> 1. GROUND HANDLING- SAFETY AND PRECAUTIONS 2. AIRCRAFT TOOLS & HANDLING –FIRE SAFETY 3. SAFETY PRECAUTIONS DURING MAINTENANCE 4. MAINTENANCE, INSPECTION AND SERVICING-HYDRAULIC, FUEL, OIL, LANDING GEAR, WHEELS, BRAKES, FLIGHT CONTROLS SYSTEM 5. MAINTENANCE MANUALS, DOCUMENTS, INSPECTION CHECKS 		
Text Books:		
<ol style="list-style-type: none"> 1. Airframe and Powerplant Mechanics (AC 65-15A)-Airframe Hand Book FAA Civil. 2. Aircraft Inspection Procedure (CAP 459) Part II Aircraft. 3. Aircraft Maintenance and Repair By Kroes, Watkin and Delph. 4. Acceptable Methods, Techniques and practices (FAA)-EA-AC 43.13-1 A&2A. 5. Aviation Maintenance Technician Hand book by FAA 		
REFERENCE BOOKS:		
<ol style="list-style-type: none"> 1. Michael Kroes, William Watkins, Frank Delp, Ronald Sterkenburg, “Aircraft Maintenance and Repair, Seventh Edition”, McGraw-Hill Education, 30 March 2013. 2. Michael J. Kroes, William Alfred Watkins, Frank Delp, “Aircraft Maintenance and Repair”, McGraw-Hill Education, 1993. 		

TYPICAL AIRCRAFT MAINTENANCE-PRACTICAL

Laboratory Code		IA Marks	40		
Number of Lecture Hours/Week	4	Exam Marks	60		
Total Number of Lecture Hours	60	L	T	P	C
Credits	4	0	0	4	2

COURSE OBJECTIVES:

The objective of this course is to develop practical skills, hand-on experience and professional understanding of Aircraft Maintenance Practices, also to introduce students to basic engineering drawings, diagrams and standards, and to apply ATA 100 specifications, common systems of fits and clearances. The course covers the basic concepts of Engineering Drawings, Diagrams and Standards: drawing types and diagrams, their symbols, dimensions, tolerances and projections. To improve the students' Hands-on and Practical Skills related to various types of electrical cables and connectors, and to apply the techniques used to repair such cables and connectors. The course includes the practical tasks related to Avionics general test equipment; Aircraft Electrical Wiring Interconnect System (EWIS); Use of hand- and hydraulic- operated crimp tools; Testing of crimp joints; Connector pin removal and insertion; Testing and installation precautions of Co-axial cables; and Wiring protection techniques.

Exp no	EXPERIMENTS	Number of Hours
1	Draw different projections of a given object – Three View Diagram simple object, structural member, and joints	4
2	Fit and remove thread inserts.	4
3	Use of precision measuring instruments, selection, handling of instruments and marking	4
4	Removal and installation of hydraulic system pressurized / unpressurized components – safety, handling precautions, selection of appropriate tools and manuals. Use zonal numbers to record location. Use parts catalog & component location manual to locate components. Identify pipes and hoses	4
5	Removal and installation of pneumatic system pressurized / unpressurized components – safety, handling precautions, selection of appropriate tools and manuals. Use zonal numbers to record location. Use parts catalog & component location manual to locate components. Identify pipes and hoses	4
6	Removal and installation of oxygen system components – safety, handling precautions, selection of appropriate tools and manuals. Use zonal numbers to record location. Use parts catalog & component location manual to locate components. Identify pipes and hoses	4
7	Visual inspection of various types of surface defects of aircraft structure using simple aids like magnifying glass, light and mirror. Use zonal and station numbers to record defect location	4
8	Visual inspection of various types of surface defects of aircraft structure and system components like bearings, gears, chain, pulley, spring and cables using simple aids like magnifying glass, light and mirror and record defects.	4

9	Selection and use of lubrication technique of bearings, flight / engine / propeller controls and undercarriages. Identifying lubricants.	4
COURSE OUTCOMES:		
<p>On completion of the course students will be able to</p> <p>CO1: Draw different projections of a given object.</p> <p>CO2: Fit and remove thread inserts.</p> <p>CO3: Identify various precision measuring instruments.</p> <p>CO4: Remove and install the various system (Hydraulic, pneumatic and oxygen system) components.</p> <p>CO5: Inspect Various types of surface defects of aircraft structure and system components.</p>		
REFERENCES:		
<ol style="list-style-type: none"> 1. Airframe and Powerplant Mechanics (AC 65-15A)-Airframe Hand Book FAA Civil. 2. Aircraft Inspection Procedure (CAP 459) Part II Aircraft. 3. Aircraft Maintenance and Repair By Kroes, Watkin and Delph. 4. Acceptable Methods, Techniques and practices (FAA)-EA-AC 43.13-1 A&2A. 5. Aviation Maintenance Technician Hand book by FAA 6. Michael Kroes, William Watkins, Frank Delp, Ronald Sterkenburg, "Aircraft Maintenance and Repair, Seventh Edition", McGraw-Hill Education, 30 March 2013. 7. Michael J. Kroes, William Alfred Watkins, Frank Delp, "Aircraft Maintenance and Repair", McGraw-Hill Education, 1993. 		

DISASTER MANAGEMENT

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	3	Exam Marks	60		
Total Number of Lecture Hours	45	L	T	P	C
Credits	3	3	0	0	3

COURSE OBJECTIVES:

1. To Understand basic concepts in Disaster Management
2. To Understand Definitions and Terminologies used in Disaster Management
3. To Understand Types and Categories of Disasters
4. To Understand the Challenges posed by Disasters
5. To understand Impacts of Disasters

UNIT I	INTRODUCTION TO DISASTERS	10 Hours
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Concepts and definitions (Disaster, Hazard, Vulnerability, Resilience, Risks).

UNIT II	DISASTERS: CLASSIFICATION CAUSES, IMPACTS	10 Hours
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(Including social, economic, political, environmental, health, psychosocial etc.). Differential impacts - in terms of caste, class, gender, age, location, disability Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change.

UNIT III	APPROACHES TO DISASTERS RISK REDUCTION	10 Hours
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Disaster cycle – its analysis, Phases, Culture of safety, prevention, mitigation and preparedness, community based DRR, Structural – nonstructural measures, roles and responsibilities of community, Panchayat Raj Institutions/Urban Local Bodies (PRIs/ULBs), states, Centre and other stake-holders.

UNIT IV	INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT	10 Hours
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Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc. Climate Change Adaptation. Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT V	DISASTER RISK MANAGEMENT IN INDIA	05 Hours
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Hazard and Vulnerability profile of India - Components of Disaster Relief: Water, Food, Sanitation,

Shelter, Health, Waste Management Institutional arrangements (Mitigation, Response and Preparedness, DM Act and Policy, Other related policies, plans, programmes and legislation).

COURSE OUTCOMES:

At the end of the course the student will be able to,

CO1: Explain the concepts and associated terms with disaster.

CO2: Identify the causes and impacts of disasters.

CO3: Formulate the action plan for disaster management.

CO4: Illustrate the relationship between disaster and development.

CO5: Evaluate the disaster risk management in India.

TEXT BOOKS:

1. Alexander David, "Introduction in 'Confronting Catastrophe'", Oxford University Press, 5th edition, 2000.
2. Andharia J. "Vulnerability in Disaster Discourse", JTCDM, Tata Institute of Social Sciences Working Paper no. 8, 2008.
3. Blaikie, P, Cannon T, Davis I, Wisner B. "At Risk Natural Hazards, Peoples' Vulnerability and Disasters", Routledge, 1997.

REFERENCE BOOKS:

1. Coppola P Damon, "Introduction to International Disaster Management", Bullock & Hadow LLC, Third edition, 2007.
2. Carter, Nick, "Disaster Management: A Disaster Manager's Handbook. Asian Development Bank", Manila Philippines, 1st edition, 1991.

WEB LINKS:

1. <https://www.emdat.be/classification>
2. <http://www.odpm.gov.tt/node/162>
3. <https://www.slideshare.net/brissomathewarackal/disaster-preparedness-brisso>
4. <https://www.slideshare.net/pramodgpramod/disaster-management-system-in-india>

ENTREPRENEURSHIP DEVELOPMENT

Subject Code		IA Marks	40		
Number of Lecture Hours/Week	2	Exam Marks	60		
Total Number of Lecture Hours	30	L	T	P	C
Credits	02	2	0	0	2

COURSE OBJECTIVES:

- To develop and strengthen entrepreneurial quality and motivation in students
- To impart basic entrepreneurial skills and understanding to run a business efficiently and effectively.
- To understand the concept and process of entrepreneurship and its contribution in and role in the growth and development of individual and the nation.

UNIT I	ENTREPRENEURSHIP	06 Hours
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Entrepreneur – Personality characteristics of successful entrepreneur– Types of Entrepreneurs – Knowledge and skills required for an entrepreneur –Difference between Entrepreneur and Intrapreneur.

UNIT II	BUSINESS	06 Hours
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Definition, Classification – Characteristics, Ownership Structures – Project Formulation – Steps involved in setting up a Business –Market Survey and Research–Techno Economic Feasibility Assessment.

UNIT III	BUSINESS PLAN PREPARATION	06 Hours
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Sources of product for business – Pre-feasibility study – Criteria for selection of product– Ownership – Capital – Budgeting project profile preparation – Matching entrepreneur with the project – Feasibility report preparation and evaluation criteria.

UNIT IV	SUPPORT TO ENTREPRENEURS	06 Hours
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Sickness in small Business – Concept, Magnitude, Causes and Consequences, Corrective Measures – Business Incubators – Government Policy for Small Scale Enterprises – Growth Strategies in small industry.

UNIT V	ENTERPRENEURSHIP DEVELOPMENT PROGRAMME	06 Hours
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Meaning, Objectives–Phases of EDP– steps in EDP–Strategies for Entrepreneurship development– Institutions in aid of Entrepreneurship Development Program –Use of IT enabled services in entrepreneurship - E Licensing, E filing.

COURSE OUTCOMES:

At the end of the course, a student will be able to

CO1: Understand the concept of Entrepreneurship

CO2: Identify, create and analyze entrepreneurial opportunities.

CO3: Assess techno economic feasibility of a Business Plan

CO4: Create Business Plans

CO5: State various statutory institutions involved in the process of Entrepreneurship development

TEXT BOOKS:

1. Hisrich R D, Peters M P, "Entrepreneurship" 8th Edition, Tata McGraw-Hill, 2016
2. Khanka S.S., "Entrepreneurial Development" S Chand & Company; edition, 2016

REFERENCE BOOKS:

1. Sharma, "Entrepreneurship Development", PHI LEARNING PVT LTD, (2017).
2. Abhinav Ganpule&Aditya Dhobale, "Entrepreneurship Development", Kindle Edition, Jatayu Publication; 1 edition ,2018.
3. Sangeeta Sharma, "Entrepreneurship Development", 10th Edition, Kindle Edition PHI Learning, 2018.

WEB LINKS:

1. <http://www.simplynotes.in/e-notes/mbabba/entrepreneurship-development/>
2. <https://openpress.usask.ca/entrepreneurshipandinnovationtoolkit/chapter/chapter-1-introduction-to-entrepreneurship/>
3. <https://articles.bplans.com/10-great-websites-for-entrepreneurs/>
4. <https://www.entrepreneur.com/article/272185>

ON JOB TRAINING

Subject Code		IA Marks	40		
Number of Hours/Week	15	Exam Marks	60		
Total Number of Hours	300	L	T	P	C
Credits	12	0	0	15	12

Course Objective:

To provide basic knowledge about the aircraft systems in the stream (B1/B2) of their choice and provide adequate knowledge and prepare the student industry ready

DETAILS OF THE MAINTENANCE TASKS TO BE PERFORMED BY THE TRAINEE- B1 **MECHANICAL STREAM - TOTAL HOURS =300**

Part 1	FAMILIRIZATION	Total 40 HRS
1	Leading particulars and construction details of aircraft.	5
2	a) Aircraft systems <ol style="list-style-type: none"> 1. Fuel system 2. Hydraulic system 3. Flight controls 4. Landing gear wheel and brake 5. Pressurization and air-conditioning system 	10
3	b) Engine and its systems	10
4	c) Ground Handling <ol style="list-style-type: none"> 1. Pre -flight inspection of aircraft. 2. Starting and running of engines; observation of instrument readings. 3. Use of ground equipment for moving, lifting or servicing aircraft. 4. Familiarize with tools and test equipment. 5. Picketing, Towing, Refueling, Cleaning and Jacking 	15
Part 2	PRACTICALS	TOTAL 230 HRS
1.	a) Line Maintenance <ol style="list-style-type: none"> 1. Transit/Preflight inspection of aircraft 2. Wheel change of aircraft 3. Defect Rectification /unscheduled maintenance. 	30 HRS
2.	b) Major Maintenance <ol style="list-style-type: none"> 1. 100 hrs Inspection for heavy aircraft. 2. 6 months inspection for heavy aircraft. 3. 300 hrs inspection for heavy aircraft. 4. 12 months inspection for heavy aircraft. 5. Major checks for heavy aircraft. 	90 HRS

3.	c) Special Inspection Schedules 1. Retraction Test-L/G 2. Operation check of system –FLIGHT CONTROLS 3. Heavy Landing checks 4. Engine change-REMOVAL &INSTALLATION 5. Hydraulic system - FILTER INSPECTION &SERVICING	40 HRS
4.	d) Defect Rectification and Component change (unscheduled work) 1. Brake change 2. Brake Bleeding 3. Hydraulic pump change 4. Control rigging 5. Flight control change	30 HRS
5.	a) Aircraft controls rigging &adjustment test	10 HRS
	b) Engine run-up	10 HRS
	c) Engine control rigging	10 HRS
	d) Practices in removal, installation, inspection, servicing, operational check, decision making regarding repair or replacement and function testing of fault-finding equipment	20 HRS
	e) Practices in manual and inspection skills covering representative cross section of maintenance tasks on aircraft, Assessment of damage, corrosion and determination of appropriate repair/rectification action	10 HRS
Part 3	MAINTENANCE LOGGING &DOCUMENTATION	Total 30 HRS
1.	1.QC Records	10 HRS
	2. Life limited components records and its monitoring	10 HRS
	3. Practices in manual and diagnostic skills, compilation of necessary job cards, and understanding of flight crew entries in technical logs, correct use of Manuals.	10 HRS

COURSE OUTCOMES:

At the end of the course, a student will be

1. Thoroughly familiarized with the various systems of the engine and ground handling of the aircraft
2. Understand the various maintenance practice related to the mechanical stream of aircraft maintenance.
3. Will have knowledge deep knowledge about how to maintain the documents and how to keep logging of the aircraft current.

**DETAILS OF THE MAINTENANCE TASKS TO BE PERFORMED BY THE TRAINEE- B2
AVIONICS STREAM (TOTAL HRS:300)**

Part 1	FAMILIRIZATION	Total 40 HRS
1	a) Leading particulars of Avionics Components, their location & Functional details	5 HR
2	b) Aircraft Avionics Systems 1. Electrical system 2. Instrument system 3. Radio navigation system 4. Radio communication system	15HR
3	c) Aircraft batteries 1. Removal of aircraft batteries. 2. Charging of aircraft batteries. 3. Installation of aircraft batteries.	15HR
4	d) Ground handling 1. Picketing 2. Towing 3. Refueling 4. Cleaning Jacking	5 HR
Part 2	PRACTICALS	TOTAL 230 HRS
1.	a) Line Maintenance 1. Transit/Pre-flight inspection of aircraft. 2. Defect rectification .	30 HRS
2.	b) Major maintenance 1. 100 Hrs Inspection for heavy aircraft. 2. 6 Months inspection for heavy aircraft. 3. 300hrs inspection for heavy aircraft. 4. 12 months inspection for heavy aircraft. 5. Major checks for heavy aircraft.	90HRS
3.	c) Special inspection schedule i. Operations check of systems a. Electrical System b. Instrument System c. Radio Navigation / Communication system ii. Battery Compartment and safety of aircraft battery iii. Safety and security of avionics compounds	60 HRS
4.	d) Defect rectification and component change 1. Replacement of Starter motor/generator 2. Replacement of aircraft instruments and calibration 3. Aircraft radio components checks and rectification	50 HRS

Part 3	MAINTENANCE LOGGING & DOCUMENTATION	Total 30 HRS
1.	1. QC Records	10 HRS
	2. Life limited components records and its monitoring	10 HRS
	3. Practices in manual and diagnostic skills, compilation of necessary job cards, and understanding of flight crew entries in technical logs, correct use of Manuals.	10 HRS

COURSE OUTCOMES:

At the end of the course, a student will be

1. Thoroughly familiarized avionics system and about ground operations of the aircraft
2. Understand the various maintenance practice related to the avionics of aircraft maintenance.
3. Will have knowledge deep knowledge about how to maintain the documents and how to keep logging of the aircraft current.