Savitribai Phule Pune University

(Formerly University of Pune)

Three Year B.Sc. Degree Program in Aviation

(Faculty of Science & Technology)

S.Y.B.Sc. (Aviation)

Choice Based Credit System Syllabus

to be implemented from

Academic Year 2019-2020

Second Year BAV (Under Science & Technology Faculty) Semester III

Course code: BAV 301 **Course Title: Human Factor**

Total Contact Hours: 48 hrs **Total Credits: 04** **Total Marks: 100**

(60 Lectures)

Teaching Scheme: Theory – 05 Lectures/Weeks

Objectives:

1. To understand the concepts of human behavior and error.
2. To study human performance criteria and limitations.
3. To understand various factors affecting human performance and identify the requirements in aviation.
4. To study the importance of physical environment.
5. To understand the importance of effective communication and to develop communication skills of students.
6. To know the hazards in the workplace, identification of the causes and various medical measures.

Learning Outcomes:

Students will be able to:

1. Understand and analyse the causes of accidents and incidents attributable to human factor.
2. Learn about how teams work and role of a supervisor.
3. Learn about the side effects of Alcohol, wrong medication, drug abuse, substance abuse.
4. Understand the causes of human error and managing &avoiding errors.

Unit I: Human Factors & Errors [15 L]

General - The need to take human factors into account; Incidents attributable to human factors/human error; 'Murphy's' law.

Human Performance and Limitations - Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.

Unit II: Factors Affecting Performance [15 L]

Social Psychology - Responsibility: individual and group; Motivation and de-motivation; Peer pressure; 'Culture' issues; Team working; Management, supervision and leadership.

Factors Affecting Performance - Fitness/health; Stress: domestic and work related; Time pressure and deadlines; Workload: overload and under load; Sleep and fatigue, shift work; Alcohol, medication, drug abuse.

Unit III: Impact of environment on working conditions [15 L]

Physical Environment: Noise and fumes; Illumination; climate and temperature; motion and vibration; working environment.

Tasks - Physical work; Repetitive tasks; Visual inspection; Complex systems.

Communication: Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information.

Unit IV: Factors Affecting Human Error **[15 L]**

Human Error - Error models and theories; types of error in maintenance tasks; Implications of errors i.e accidents / incidents; Avoiding and managing errors.

Hazards in the Workplace - Recognizing and avoiding hazards; dealing with emergencies.

Reference Books

1. 9A_Human_Factors, by Nancey Gold.
2. Civil Aviation Inspection Procedures 715, by Civil Aviation Authority U.K.
3. Civil Aviation Inspection Procedures 716, by Civil Aviation Authority U.K.
4. Civil Aviation Inspection Procedures 717, by Civil Aviation Authority U.K.
5. ICAO 9683
6. Aircraft Safety. Accident Investigations, Analyses & Applications by Shari Stanford Krause. McGraw Hill

Second Year BAV (Under Science & Technology Faculty) Semester III

Course code: BAV 302 **Course Title: Fundamentals of Computer & Programming Languages**

Total Contact Hours: 48 hrs (60 Lectures) **Total Credits: 04** **Total Marks: 100**

Teaching Scheme: Theory – 05Lectures/Weeks

Course Objectives:

1. To acquire the fundamental principles, concepts and constructs of computer.
2. To build the programming skill using 'C.
3. To study, understand and hands on experience in Aircraft system related software.

Learning Outcomes:

Students who successfully complete this course will be able to:

1. To acquire concept of computer fundamentals.
2. Develop analyse the problem and select the most appropriate method to solve it.
3. Apply C language constructs for programme development and problem solving.

Unit I: Basic Computer Structure [12L]

Introduction, Characteristics of computers, Evolution of computers, Generation of Computers, Classification of Computers, the Computer System, Applications of Computers. 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).

Unit II: Computer Terminology [16 L]

Operation, layout and interface of the major components in a micro computer 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

Unit III: Programming Language 'C' [16 L]

Feature of C, Basic concepts, structure of a C program, declarations, constants, variables, data types, Operators and expressions, conditional expressions. Operators, Type conversions, Input and Output functions- Scanf and printf. Decision control structure: if else, nested if else, cascaded if else and switch statement. Problem solving with Decision control structures: largest of n numbers, GCD/LCM of two numbers, roots of quadratic equation,

Function in C: Definition, function call, call by value, return statement, standard library functions and user defined functions.

Unit IV: Software Management System in Aircraft Systems [16 L]

Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.

Reference Books:

1. Yashwant Kanetkar, Let us C, 8th edition. BPB Publication
2. Digital Principles and Applications by Malvino & Leech
3. Aircraft Digital Electronic and Computer Systems, 2nd edition by Mike Tooely
4. Gill Nasib Sing, Computing Fundamentals and Programming in C, Khanna P

Second Year BAV (Under Science & Technology Faculty) Semester III

Course code: BAV 303 **Course Title: Thermodynamics**

Total Contact Hours: 48 hrs (60 Lectures) **Total Credits: 04** **Total Marks: 100**

Teaching Scheme: Theory: 05 Lectures/Week

Course Objectives:

1. To acquire the basic ideas and understanding of Concepts and First Law of Thermodynamics.
2. To understand the concept of Second Law and Entropy.
3. To acquire the basic ideas and understanding of definitions and Laws pertaining to Ideal Gas Properties and process.
4. To acquire the Knowledge and understanding of Gas Power Cycles.

Learning Outcomes:

Students who successfully complete this course will be able to:

1. Demonstrate knowledge on Fundamentals concepts of thermodynamic.
2. Apply the First Law of Thermodynamics to Closed system and Open system with steady flow.
3. Evaluate heat and Work transfer for Ideal Gas Processes.
4. Understand of Air Standard cycles of gas turbine and to evaluate their performance.

Unit I: Basic Ideas and Definitions: [10 L]

Thermodynamic system, Boundary, Types of systems, State of systems, Properties of system, Classification of properties, Thermodynamic Process & cycle, Work transfer and Heat Transfer.

Unit II: Laws of Thermodynamics: [20L]

Joules Experiment and First Law of Thermodynamics, Application of First law to Closed system, Application of First law to Open system with Steady Flow, S.F.E.E., Application of SFEE to typical Engineering Devices, Kelvin Plank Statements of Second Law, Efficiency of Any Heat Engine, concept of Reversible process and cycle, Carnot theorem for Heat Engine, Efficiency of reversible cycle, Introduction to concept of Entropy, Carnot Cycle (T-s Diagram)

Unit III: Idea Gas Properties & Process: [15L]

Definition, Laws pertaining to Ideal Gas, Specific Heats, Various process (Const P/T/V/H and polytropic, p-v diagrams) Evaluation of Work transfer, Heat transfer, P-V diagram of Carnot Cycle with Ideal Gas.

Unit IV: Gas Power Cycles: [15L]

Air standard assumptions, Brayton cycle, Efficiency, Effect of regeneration, pressure ratio, inter cooling and reheating on Brayton Cycle, Ideal regenerative gas turbine cycle with inter cooling and reheat.

Reference Books

1. Y. Cengel & Boles: Thermodynamics- An Engineering Approach, Tata Mc Graw- Hill Publications
2. P.K.Nag, Engineering Thermodynamics, Tata Mc Graw- Hill Publications
3. Mahesh M. Rathore, Thermal Engineering, Tata Mc Graw- Hill Publications
4. Fundamental of Engineering Thermodynamics, Borgnakke C. And Sonntag R.E., John Wiley

Second Year BAV (Under Science & Technology Faculty) Semester III

Course code: BAV 304 **Course Title: Digital Electronics**

Total Contact Hours: 48 hrs (60 Lectures) **Total Credits: 04** **Total Marks: 100**

Teaching Scheme: Theory: 05Lectures/Week

Course Objectives:

1. To understand number representation in digital electronics circuit.
2. To acquire basic knowledge of digital logic levels.
3. To study and apply the Boolean algebra for simplification of digital circuits.
4. To study and analysis the basic combinational and sequential circuits.

Learning outcomes:

After learning this course, the students will be able to:

1. Understand the common form of number representation and to convert data in one number system to another.
2. Contrast and compare digital representation of information with the analog representation.
3. Simplify digital circuits.
4. Design combinational and sequential circuits.

Unit I: Number systems and arithmetic operations: [15 L]

Introduction to number systems: Decimal, Binary, Octal, Hexadecimal, Gray and their interconversions Binary arithmetic, 1's complement and 2's complement,

Introduction to digital and Analog signal, Logic levels, Positive and Negative logic.

Logic gates, their Boolean expressions and truth tables: AND, OR, EXOR, NOT, NOR, NAND Universal gates NAND and NOR. Representation of other gates in terms of universal gates

Unit II: Combinational Circuits: [15 L]

Demorgaon theorems and Boolean rules for conversions. Standard representations for logic functions, k map representation of logic functions (SOP & POS forms), minimization of logical functions for min-terms and max-terms (upto 4 variables), don't care conditions,

Adders and their use as subtractor, Parity generators/checkers, Multiplexers, De-multiplexers, Introduction to Encoders & Decoders.

Unit III: Sequential Logic Design: [15 L]

1 Bit Memory Cell, Clocked SR, JK, MS J-K flip flop,D and T flip-flops. Use of preset and clearterminals, Application of Flip flops: Counters, ripple counters, Shift registers and its applications, Bus standards, ARINC 429 bus, ARINC 629 bus.

Unit VI: Introduction to Microcontroller: [15 L]

History of Microcontroller, Introduction to 8051 architecture, 8051 Core microcontroller block diagram, program counter, Data pointer, A and B registers, Flags and PSW, internal RAM and ROM, stack and stack pointer, SFRs and Instruction set, Digital data transmission.

References Books:

1. Digital Computer Electronics by Albert Paul Mavino, Jerald A. Brown, Mc-Graw Hill 3rd Edition.
2. Digital fundamentals By Floyd, Thoms, Jain R.P., Pearson.
3. Digital logic: Applications & design by John M. Yarbrough, cengage Learning India (Thompson).
4. The 8051 Microcontroller Architecture, Programming and application [Second Edition] Kenneth J. Ayala, Penram International (1999).
5. The 8051 Microcontroller and Embedded Systems using Assembly and C M.A.Mazidi, J.G.Mazidi, R.D.Mckinlay. Pearson Education Second Edition 2009.

Second Year BAV (Under Science & Technology Faculty) Semester III

Course code: BAV 305 **Course Title: Lab-I (Digital Electronics Practical)**

Total Contact Hours: 48 hrs **Total Credits: 04** **Total Marks: 100**

Teaching Scheme: Practical – 06 Hours Practical/Week

Learning Outcomes:

After successfully completing this laboratory course, the students will be able to:

1. Identify the Digital IC's.
2. Understand the use and application of Combinational IC's.
3. Design & test the circuit using Hardware components.

Students will have to perform any 12 practicals from the following list:

List of Practicals:

1. Basic Logic gates using Diodes and transistors
2. Inter conversions and realizations of logic expressions using ICs
3. Build and Test 4 bit parity checker/generator using X-OR gate IC
4. Build and Test Half Adder, Full Adder and Subtract or using basic gate
5. Build and Test 2:1 Multiplexer and 1:2 De multiplexer using gates
6. Build and Test 3X4 matrix Keyboard Encoder
7. Build and Test a Debounce switch using NAND or NOR gate IC
8. Build and Test Diode matrix ROM
9. Study of RS, JK and D flip flops using NAND gates
10. Study of Up/Down Counter
11. Study of decade counter IC circuit on figurations
12. Study of 4-bit Shift register IC
13. Study of Four bit Universal Adder/ Subtractor /ALU
14. Basic exercises on arithmetic ,logical and data transfer operation ,largest, smallest of numbers
15. Programs on code conversion :Decimal to hexadecimal ,Hexadecimal to decimal, ASCII–Hexadecimal, Hexadecimal to ASCII,BCD–seven segment

Second Year BAV (Under Science & Technology Faculty) Semester III

Course code: BAV 306 **Course Title: Lab-II (Computer Programming)**
Total Contact Hours: 48 hrs **Total Credits: 04** **Total Marks: 100**

Teaching Scheme: 06 Hours Practical /Weeks

Learning Outcomes:

Students will be able to :

1. Develop a vocabulary of key terms related to the computer & demonstrate mouse and keyboard functions.
2. Demonstrate window and menu commands and how they are used.
3. Compose, format and edit a word document
4. Navigate and search through the internet

List of Practical's:

Student will have to perform minimum 12 practicals from the following list:

List of Practicals:

1. To Identify various Input/output devices, connections and peripherals of computer system
2. To Manage files and folders : Create, copy, rename, delete, move files and folder

Word Processing

3. To Create, edit and save document : apply formatting features on the text - line, paragraph
4. To Use bullets, numbering, page formatting
5. To Insert and edit images and shapes, sizing, cropping, color background, group/ungroup
6. To Insert and apply various table formatting features on it.
7. To Apply page layout features
    a. Themes, page background, paragraph, page setup
    b. Create multicolumn page
    c. Use different options to print the documents

Presentation Tool

8. Create slide presentation
    a. Apply design themes to the given presentation
    b. Add new slides and insert pictures/images, shapes
9. Create slide presentation
    a. Add tables and charts in the slides.
    b. Run slide presentation in different modes
    c. Print slide presentation as handouts
10. Apply animation effects to the text and slides.

Internet Basics

11. To configure Internet connection
12. To use internet for different web services.
13. To configure browser settings and use browsers.
14. Write a simple program in c.

Second Year BAV (Under Science & Technology Faculty) Semester IV

Course code: BAV 401 **Course Title: Aircraft Structure**

Total Contact Hours: 48 hrs **Total Credits: 04** **Total Marks: 100**

(60 Lectures)

Teaching Scheme: Theory: 05 Lectures/Week

Course Objectives:

1. To study the various concepts of Aircraft structure.
2. To study the various Airframe Structural parts
3. To know and understand of various Structural joining methods
4. To use of composite materials in Aircraft Structures.

Learning Outcomes:

After learning this course, students will be able to:

1. Understand loads and stresses acting on the structural parts of aircraft and how to analyze them
2. Compression, Tension, shear forces and stresses. Bending, Torsional forces and stresses
3. Learn about the types of construction of Airframe Structures.
4. Identify the various aircraft structural parts
5. Identify the composite, metallic and non-metallic material used in aircraft
6. Safe and fail safe philosophy of aircraft structures

Unit I: Airframe Structures General Concepts. [15 L]

Airworthiness requirements for structural strength; Structural classification, primary, secondary & tertiary; Fail safe, safe life, damage tolerance concepts; Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Drains and ventilation provisions; System installation provisions; Lightning strike protection provision. Aircraft bonding, Rotary Wing aerodynamics and structure concepts.

Unit II: Airframe Structures Construction method. [15 L]

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; Structure assembly techniques: riveting, bolting, bonding Methods of surface protection, such as chromating, anodising, painting; Surface cleaning. Airframe symmetry: methods of alignment and symmetry checks

Unit III: Airframe Structures Part — Aeroplanes [15 L]

Fuselage Construction and pressurisation sealing; Wing, stabiliser, pylon and undercarriage attachments; Seat installation and cargo loading system; Doors and emergency exits: construction, mechanisms, operation and safety devices; Windows and windscreen construction and mechanisms. Wings Construction; Fuel storage;Landing gear, pylon, control surface and high lift/drag attachments. Stabilisers Construction; Control surface attachment. Flight Control Surfaces Construction and attachment; Balancing — mass and aerodynamic, Nacelles/Pylons Construction; Firewalls; Engine mounts.

Unit IV: Airframe Structure- Composite and Non- Metallic [15 L]

Characteristics, properties and identification of common composite and nonmetallic materials used in Areoplane, Sealant and bonding agents

Reference Books –

1. Federal Aviation Administration (FAA) H 8083 30(9A) by USA Dept of transportation
2. Airframe-Volume-1& 2 Structures Dale Crane
3. FAA-H-8083-31 AMT_AIRFRAME_VOL 1 & 2by USA Dept of transportation
4. Jeppesen-021-01-Airframes-Systems
5. Advance Composite Material by Cindy foreman
6. Composite Material by Lalit Gupta
7. Elements of Strength of Materials by Timoshenko and Young, East West Press

Second Year BAV (Under Science & Technology Faculty) Semester IV

Course code: BAV 402 **Course Title: Basic Radar and Radio System**

Total Contact Hours: 48 hrs **Total Credits: 04** **Total Marks: 100**

(60 Lectures)

Teaching Scheme: Theory: 05 Lectures/Week

Course Objectives:

1. To understand Radar theory and explain its development from its beginning.
2. To calculate minimum usable signal and maximum usable range of radar signal.
3. To determine bandwidth requirement of radar receiver.
4. To recognize antenna scanning and tracking process.
5. To define MTI and Doppler effect and explain their uses.
6. To discuss the term Phrased array and its uses.

Learning outcome:

After learning this course, the students will be able to:

1. Understand Radar theory and explain its development from its beginning.
2. Calculate minimum usable signal and maximum usable range of radar signal.
3. Determine bandwidth requirement of radar receiver.
4. Recognize antenna scanning and tracking process.
5. Define MTI and Doppler Effect and explain their uses.

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Unit I: Introduction to radio systems [15 L]

Electromagnetic Spectrum, AM Transmitter, AM superheterodyne receiver, FM transmitter, FM receiver, fundamentals of wave propagation, Effects of the Environment, Propagation of Waves, Ground (Surface) Waves ,Sky Waves ,Space Waves, Tropospheric Scatter Propagation

Unit II: Basic principles of Radar System [15 L]

Introduction, The Origin of Radar, Block Diagram and Operation, Radar Frequencies, types of Radar, Radar performance factors, Maximum Unambiguous Range, Radar Waveforms, Definitions with respect to pulse waveform - PRF, PRI, Duty Cycle, Peak Transmitter Power, Average transmitter Power. Radar Range Equation, Prediction of Range Performance, Detection of signal in Noise, Minimum Detectable Signal, Receiver Noise, SNR, Range Ambiguities, Radar Pulses, Radar Cross Section of Targets, Cross section Fluctuations, Radar Clutter-surface clutter, sea clutter and land clutter ,weather clutter, Applications of Radar

Unit III: Pulsed Radar [15 L]

Principle, **Basic Pulsed Radar System** , Antennas and Scanning , Display Methods , Moving-Target Indication (MTI), Blind Speeds, Clutter Attenuation, MTI Improvement Factor, N- Pulse Delay-Line Canceller,Radar Beacons, Doppler Frequency Shift, Sweep to Sweep subtraction and Delay Line Canceller,

Tracking Radar: Tracking with Radar- Types of Tracking Radar Systems, Sequential lobing, conical scanning, Monopulse Tracking- Amplitude Comparison Monopulse (one-and two-coordinates), Phase Comparison Monopulse, Air surveillance radar, Introduction to Synthetic aperture radar(SAR)

Unit IV: CW Radar **[15 L]**

Doppler effect, CW Doppler Radar ,Frequency-Modulated CW Radar ,CW Radar Range equation ,multiple frequency ranging, Phased Array Radars, Planar Array Radars, difference between Pulsed and CW Radar, advantages & disadvantages of CW Radar,

References Books

1. Electronic communication system by Kennedy Davis.
2. Aircraft communication and navigation systems by Mike Tooley and David Wyatt.Aircraft Radio System, by J.P

Second Year BAV (Under Science & Technology Faculty) Semester IV

Course code: BAV 403 **Course Title: Communication and Navigation system**

Total Contact Hours: 48 hrs (60 Lectures) **Total Credits: 04** **Total Marks: 100**

Teaching Scheme: Theory: 05 Lectures/Week

Course Objectives:

1. To get familiar with basics of V.H.F. Communications ,H.F. Communications
2. To understand basics of V.H.F. omnidirectional range.
3. To get familiar with trans-receiver.
4. To understand the basics of Navigation systems.

Learning outcomes:

After learning this course, students will be able to:

1. Explore V.H.F and H.F communication with AIS.
2. Explain Aircraft Installation Controls and operation.
3. Explain the operation of basic Trans receiver system.
4. Explain Navigation systems development and Automatic direction finder

Unit I: Communication systems **[15 L]**

Introduction, V.H.F. Communications: Basic Principles, Installation, Controls and Operation, Block Diagram Operation (KY 196), Characteristics, Ramp Testing

H.F. Communications: Basic Principles, Installation, Controls and Operation, Block Diagram Operation, Characteristics, Ramp Testing and Maintenance

The selective calling (Selcal) system, Typical Selcal block diagram

Audio Integrating Systems (AIS) – Intercom: Introduction, Flight Interphone, Cabin Interphone, Service Interphone, Passenger Address, Passenger Entertainment System, Ground Crew Call System, Cockpit Voice Recorder, Testing and Trouble Shooting the Audio Systems

Unit II: V.h.f. omnidirectional range (VOR): **[15 L]**

Introduction, Basic Principles ,Ground station block diagram, v.o.r., Doppler VOR (DVOR), Aircraft Installation Controls and operation, Simplified Block Diagram Operation, Characteristics, Ramp Testing

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Unit III: Transmitter and Receiver: **[15 L]**

A simple radio system, Modulation and demodulation, AM transmitters, FM transmitters, Tuned radio frequency receivers, superhet receivers, Selectivity, Noise, Image channel rejection, Automatic gain control, Double superhet receivers

Unit IV: Navigation systems **[15 L]**

The earth and navigation, Dead reckoning, Position fixing, Maps and charts, Navigation terminology, Navigation systems development, Navigation, Automatic direction finder, Introducing ADF, ADF principles, ADF equipment, Operational aspects of ADF

References Books

1. Airframe &Power plant Mechanics Airframe Handbook EA-AC 65-15A)
2. Aircraft Electricity and electronics-by Bent McKinley and also by Eismin
3. Aircraft Radio System – by James Powell
4. Avionic Systems: Operations and Maintenance- by JEPPESEN

Second Year BAV (Under Science & Technology Faculty) Semester- IV

Course Code: BAV 404 **Course Title: Propulsion I**

Total Contact Hours: 48 **Total Credits: 04** **Total Marks: 100**

(60 Lectures)

Teaching scheme: Theory -05 lectures per week

Course Objectives:

1. To study various Propulsion systems.
2. To get familiar with the concepts of Thermodynamics of Gas Flow
3. To know operation of Compressor and Turbines
4. To understand the concepts of Compressible Fluid Flow

Learning Outcomes:

After learning this course, students will be able to:

1. Understand the Compressible Fluid Flow and effect of area variation on flow.
2. Understand the various propulsion systems and their applications.
3. Do thrust calculation for various propulsive systems
4. Understand the various aspects of Compressors and Gas Turbines

Unit I: Compressible fluid Flow and Thrust Calculation [15L]

Force, Work, Power, Energy, Speed, Velocity, Acceleration, Mass, Momentum, Newton's law of Motion, Gross thrust, Net Thrust, Thrust Distribution, Ram Effect, Speed Effect, Temperature Effect, Pressure Effect, Density Effect, Humidity Effect, The Brayton cycle, Efficiency's, Bernoulli s Theorem.

Definition, Speed of sound and Mach Number, Sonic, Subsonic and Supersonic flow, Effect of Area variation on one dimensional Steady isentropic compressible flow, Convergent -Divergent Nozzle

Unit II: Principle & Functioning of Basic Jet engine. [10 L]

Compressors, and its various type (centrifugal flow, axial flow), Performance Characteristics, diffuser section, combustion section, turbine section, Classification of Gas turbines, exhaust section.

Unit III: Types of Propulsion Systems [15 L]

Turbojet and its various types, turbofan and its types, Turboprop, turboshaft comparison, efficiency, Advantage & disadvantage, Applications.

Unit IV: Design and performance of Gas Turbine Engine [20 L]

Design and Performance Characteristics of Turbojet, Turbofan, Turboshaft, and Turboprop engines.

Effect of compression radio on thermal efficiency, effect of turbine inlet temperature on turbine bucket life; effect of outside air Temperature on thrust output. Effect of altitude on thrust output.

REFERENCE BOOKS:

1. Jet aircraft power system third edition – Ralphd.Bent
2. Aircraft gas turbine engine technology third edition – Treager
3. Airframe Powerplant mechanics powerplant handbook – FAA-AC65-12A
4. Aircraft Propulsion, S. Farokhi, Wiley, 2014, ISBN 978-0-470-03906-9
5. The Jet Engine, Rolls Royce , 5th Edition, Wiley

Second Year BAV (Under Science & Technology Faculty) Semester IV

Course code: BAV 405 **Course Title: Lab-I (Aircraft Maintenance)**
Total Contact Hours: 48 hrs **Total Credits: 04** **Total Marks: 100**

Teaching Scheme: Practical – 06 hours Practical /Week

Learning Outcomes:

Students will be able to:

1. Carry out visual inspection of structural members.
2. Learns about the internal of an aircraft structures.
3. Learn about accessing, removal and installation of components.
4. Know how to carryout routine inspections of structures.
5. Learns about the various components used for hydraulic & pneumatic system.
6. Understand the Landing Gear operation including wheel and brake system.

Students will have to perform minimum 12 Practicals from the following list:

List of Practicals:

1. Familiarization for visual inspection for corrosion on flying control surfaces.
2. To carry out the procedure of opening of various inspection panels and engine cooling.
3. To carry out removal & installation of Radome.
4. To carry out removal & Installation of various structural lights of Aircraft.
5. To carry out inspection check of moisture content in fuel.
6. To demostrate jacking of the aircraft.
7. To familiarization of nose wheel removal & installation.
8. To carry out tyre pressure check of Aircraft
9. To check the slackness of aircraft control cables with cable tensiometer.
10. Demonstration of various Aircraft Ground handling Procedures
11. To understand and demonstrate daily inspection check on aircraft.
12. Checking the movement of Aileron, Elevator and Rudder.
13. To study and perform upliftment of hydraulic oil and various fluids.
14. Composite material familiarization

Second Year BAV (Under Science & Technology Faculty) Semester IV

Course code: BAV 406 Course Title: Lab II (Communication & Navigation)
Total Contact Hours: 48 hrs Total Credits: 04 Total Marks: 100
Teaching Scheme: Practical – 06 hours Practical /Week

Learning outcome:
After successfully completing this laboratory course, the students will be able to:

1. Understand the fundamentals of modulation.
2. Demonstrate a basic understanding of the term bandwidth and it's application in communication.
3. Determine the bandwidth requirement of radar receiver.
4. Recognize antenna scanning and tracing processes.

Students will have to perform minimum 12 practicals from the following list:
List of Practicals:

1. To study of working of Signal Generator and measurement of frequency and amplitude using CRO.
2. To study of working of spectrum analyzer and measurement of frequency components of various waveforms.
3. To study the principle of frequency generation.
4. To study the class C Tuned amplifier and generate AM.
5. To study AM Generation (DSB-FC): Calculation of modulation index by graphical method, Power of AM Wave for different modulating signal.
6. To study Envelope Detector - Practical diode detector, Observe effect of change in RC time constant which leads to diagonal and negative clipping.
7. To study Frequency modulator & demodulator using IC 565 (PLL based), calculation of modulation index & BW of FM.
8. To study Doppler radar of Aircraft and its various parameters.
9. To study principle of Doppler radar of time and frequency measurement with the help of moving pendulum.
10. To study detection of vibration of different tuning fork.
11. To study the effect of different types of material on radar receiving or detection.
12. To study removal and installation of ADF transreceiver.
13. To study removal and installation of ATC transponder.
14. To study removal and installation of weather Radar of Aircraft.
15. To study removal and installation of ELT Battery.