



SCHEME OF STUDIES & EXAMINATIONS
Department: Aeronautical Engineering – 5th Semester

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credit	Duration of Exam
			L	T	P		Theory	Practical			
1	AER-301B	AIRCRAFT PROPULSION-I	3	1	-	25	75	-	100	4	3
2	AER-303B	HELICOPTER DYNAMICS	3	1	-	25	75	-	100	4	3
3	AER-305B	AIRCRAFT STRUCTURE-I	3	1	-	25	75	-	100	4	3
4	AER-307B	ADVANCE AERODYNAMICS	3	1	-	25	75	-	100	4	3
5	ME307B	INTERNAL COMBUSTION ENGINES & GAS TURBINES (AER ,ME)	3	1	-	25	75	-	100	4	3
6	AER-309B	AIRCRAFT DESIGN	3	2	-	25	75	-	100	5	3
7	AER-311B	AERODYNAMICS LAB	-	-	3	20	-	30	50	1.5	3
8	AER-313B	AIRCRAFT STRUCTURE LAB	-	-	3	20	-	30	50	1.5	3
9	ME315B	INTERNAL COMBUSTION ENGINES LAB (AER , ME)	-	-	2	20	-	30	50	1	3
10	AER-315B	PROFESSIONAL TRAINING-I	-	-	2	50	-	-	50	2	3
Total			18	7	10	260	450	90	800	31	

Note:

- 1 Every student has to participate in the sports activities. Minimum one hour is fixed for sports activities either in the morning or evening. Weightage of Sports is given in General Proficiency & Ethics Syllabus.
- 2 The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
- 3 Electronics gadgets including Cellular phones are not allowed in the examination



SYLLABUS: B Tech (Aero)

Department: Aeronautical Engineering– 5th Semester

Subject: Aircraft Propulsion – I (Theory)

Subject Code: AER 301B

Detailed Content

UNIT NO 1: Aircraft Piston Engines:

- Topic No.1: The internal combustion engine process, brief historical sketch
- Topic No.2: Spark ignition and compression ignition, (SI and CI) engines
- Topic No.3: 4-stroke and 2-stroke engines.
- Topic No.4: Combustion processes, various types of arrangements for multi cylinder aircraft engines
- Topic No.5: Intake and Exhaust manifolds. IHP, BHP and SHP Engine performance
- Topic No.6: Effect of altitude and speed, power required and power available
- Topic No.7: Super charging, types of super chargers.

UNIT NO.2 Propellers:

- Topic No.8: Ideal Froude Momentum theory
- Topic No.9: Blade element theory, vortex theory
- Topic No.10: Relative merits, numerical problems, use of propeller charts
- Topic No.11: Selection and choice of propellers
- Topic No.12: Fixed/variable pitch and constant speed propellers, Relative merits and applications
- Topic No.13: Ducted propellers, prop-fan, Helicopter Rotor in Hover and climbing
- Topic No.14: Materials for propellers

UNIT NO.3 Elements of Heat Transfer:

- Topic No.15: Conduction: Heat Transfer process, Heat conduction, Thermal conductivity
- Topic No.16: General equation of heat conduction in 1-D and 2-D.
- Topic No.17: Convection and Radiation Heat Transfer: Convection process
- Topic No.18: Free convection heat transfer from vertical flat plate, planes, cylinder and sphere
- Topic No.19: Thermal Radiation and Emissive power.
- Topic No.20: The Plank distributive law, Radiation properties

UNIT NO.4 Aircraft Gas Turbine Engine:

- Topic No.21: Compressor and Turbine work, compressor and turbine efficiencies
- Topic No.22: General layout, gas flow diagram. Engine intake and Exhaust nozzles
- Topic No.23: After burner arrangements for thrust augmentation.
- Topic No.24: Gas Turbine Systems and Components: Fuel system components, various types of fuel systems
- Topic No.25: Lubricating oils and lubricating systems. Secondary air systems
- Topic No.26: Arrangements of bleeding of compressor air for aircraft pressurization and oxygen systems. Engine starting systems.
- Topic No.27: Compressors; centrifugal and axial types of compressors, Materials of Construction.
- Topic No.28: Combustion chambers : Various arrangements, simplex and Duplex type of Burners. Materials for combustion chambers
- Topic No.29: Expansion process : Turbine and its action
- Topic No.30: Constructional details of turbine. Materials of construction
- Topic No.31: General arrangement of turbo-prop and turbo-shaft engines
- Topic No.32: High and Low by pass ratio, turbo-fan engines
- Topic No.33: Dual shaft gas turbine engines, its merits over single shaft engines.

Study Scheme				Evaluation Scheme			Total Marks
L	T	P	Credits	Internal Assessment	External Assessment (Examination)		
				Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100



PM

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Text Books:

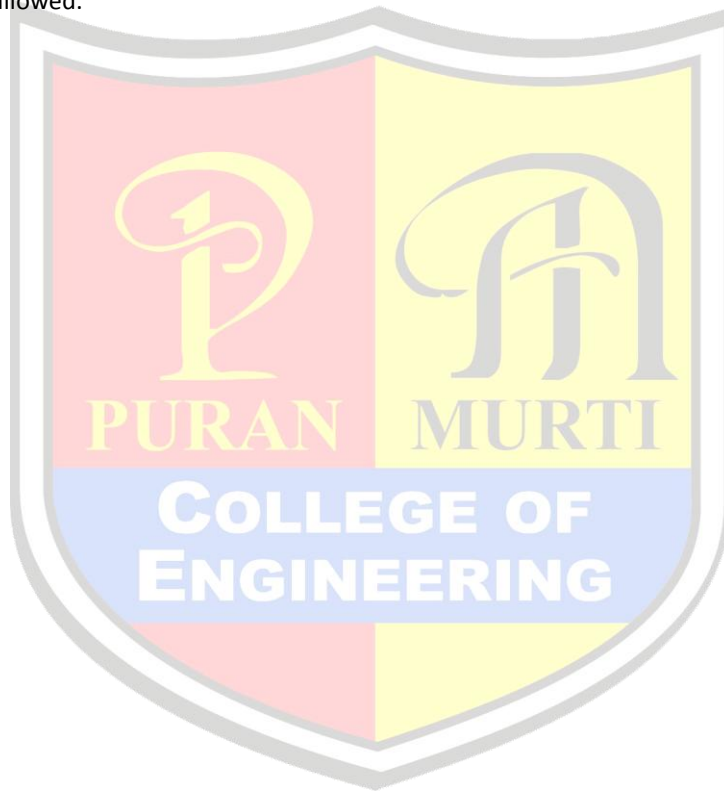
1. J P Holman, Heat Transfer, 2nd Ed., McGraw Hill
2. J D Mattingly, Elements of Gas Turbine Propulsion, McGraw Hill, 1997
3. H. Cohen, G F C Rogers and H I H Sarvanmatto, Gas Turbine Theory, Longman 1987

Reference Books:

1. B Gebhart, Heat Transfer, 2nd Ed., McGraw Hill
2. J L Kerrebrock, Aircraft Engine and Gas Turbine, MIT Press, 1991
3. Gordon C Oates, Aircraft Propulsion, System Technology & Design, AIAA Publications

Note:

1. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmablecalculator and cellular phone will not be allowed.





SYLLABUS: B Tech (Aero)

Department: Aeronautical Engineering– 5TH Semester

Subject: Helicopter Dynamics (Theory)

Subject Code: AER 303B

Detailed Content

UNIT NO.1: INTRODUCTION TO HELICOPTER DYNAMICS:

- Topic No.34: Helicopter as an aircraft, Basic features, Layout, Generation of lift
- Topic No.35: Main rotor, Gearbox, tail rotor, power plant, drive to main and tail rotor
- Topic No.36: Considerations on blade, flapping and feathering
- Topic No.37: Rotor controls various types of rotor, Geometry of the rotor, Blade loading
- Topic No.38: Effect of solidity, profile drag, compressibility etc
- Topic No.39: Blade area required, number of Blades, Blade form
- Topic No.40: Power losses, Rotor efficiency.

UNIT NO.2 Aerodynamics of Rotor Blade & Flight Performance:

- Topic No.41: Aerofoil characteristics in forward flight
- Topic No.42: Hovering and Vortex ring state, Blade stall
- Topic No.43: Maximum lift of the helicopter, calculation of Induced Power
- Topic No.44: High speed limitations
- Topic No.45: Parasite drag, power loading, ground effect.
- Topic No.46: Piston engines, Gas turbines, Ramjet principle
- Topic No.47: Comparative performance, Horsepower required
- Topic No.48: Range and Endurance, Rate of Climb, Best Climbing speed
- Topic No.49: Ceiling in vertical climb, Autorotation

UNIT NO.3 Dynamic Stability and Control:

- Topic No.50: Physical description of effects of disturbances
- Topic No.51: Longitudinal dynamic stability
- Topic No.52: stick fixed dynamic stability
- Topic No.53: Longitudinal stability characteristics
- Topic No.54: Lateral dynamic stability, lateral stability characteristics, control response.
- Topic No.55: Differences between stability and control of airplane and helicopter

UNIT NO.4 Rotor Vibrations & Rotor Blade Design:

- Topic No.56: Dynamic model of the rotor, Motion of the rigid blades
- Topic No.57: flapping motion, lagging motion, feathering motion
- Topic No.58: Properties of vibrating system, phenomenon of vibration
- Topic No.59: Fuselage response, vibration absorbers, Measurement of vibration in flight.
- Topic No.60: Rotor Blade Design:General considerations, Airfoil selection
- Topic No.61: Blade construction, Materials
- Topic No.62: Factors affecting weight and cost
- Topic No.63: Design conditions, Stress analysis.

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

Text Books:

1. John Fay, The Helicopter and How It Flies, Himalayan Books 1995
2. Lalit Gupta, Helicopter Engineering; Himalayan Books New Delhi 1996

Reference Books:

1. Joseph Schafer, Basic Helicopter Maintenance, Jeppesen 1980
2. R W Prouty, Helicopter Aerodynamics



SYLLABUS: B Tech (Aero)

Department: Aeronautical Engineering– 5TH Semester

Subject: Aircraft Structures - I (Theory)

Subject Code: AER 305B

Detailed Content

UNIT NO 1: Basic Elasticity:

- Topic No.1: V-n diagram for the loads acting on the aircraft, salient features of the V-n diagram
- Topic No.2: Flight envelope for different flying conditions.
- Topic No.3: Analysis of statically indeterminate structures: planar and space trusses
- Topic No.4: Deflection of Beams; Area moment Method
- Topic No.5: Slope-deflection method, moment distribution method
- Topic No.6: Basic elasticity, stresses and strains
- Topic No.7: Equations of equilibrium, Plane stress and plane strain problems
- Topic No.8: Compatibility equations, stress - strain relations.

UNIT NO.2 Virtual Work & Energy Method:

- Topic No.9: Strain energy and complementary energy
- Topic No.10: Total potential energy, Principle of virtual work
- Topic No.11: Principle of the stationary value of the total potential energy and total complementary energy
- Topic No.12: Application to deflection problems
- Topic No.13: Application to statically indeterminate problems
- Topic No.14: Rayleigh Ritz and Galerkin techniques

UNIT NO.3 Bending, Shear & Torsion of thin walled beams:

- Topic No.15: Bending of open and closed section thin walled beams
- Topic No.16: Shear of open section and closed section beams
- Topic No.17: Shear centre and centre of twist
- Topic No.18: Torsion of closed and open section beams, Membrane analogy
- Topic No.19: Deflection of open and close section beams.
- Topic No.20: Aircraft materials-properties of flight vehicle materials importance of strength to weight ratio, temperature variations
- Topic No.21: Factors affecting choice of materials for different part of airplane

UNIT NO.4 Aircraft materials:

- Topic No.22: Light metal alloys: heat treatment
- Topic No.23: High temperature and corrosion resistant alloys
- Topic No.24: Aircraft steels, Effect of alloying elements, heat treatment
- Topic No.25: Selection of steel for aircraft application composite materials
- Topic No.26: Classification and characteristics of composite materials
- Topic No.27: Strength to weight comparison with metals
- Topic No.28: Fiber reinforced and particulate composites.

Study Scheme				Evaluation Scheme			Total Marks
L	T	P	Credits	Internal Assessment	External Assessment (Examination)		
				Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

Text Books:

1. T H G Megson, Aircraft Structures for Engineering Students, Edward Arnold, U.K.
2. R M Rivello, Theory and Analysis of Flight Structures, McGrawHill Book Co.
3. E F Bruhn, Analysis and Design of Flight Vehicle Structures, Tri State offset Co. USA.

Reference Books :

1. G F Titterton, Aircraft Materials and Processes, Himalayan Books, New Delhi
2. E T Hill, The Materials for Aircraft Construction, Pitman, London



SYLLABUS: B Tech (Aero)

Department: Aeronautical Engineering– 5TH Semester

Subject: Advance Aerodynamics (Theory)

Subject Code: AER 307B

Detailed Content

UNIT NO 1: Conformal Transformation & Incompressible Flow:

- Topic No.64: Complex potential function
- Topic No.65: Blasius theorem
- Topic No.66: principles of conformal transformation
- Topic No.67: Kutta - Juokowski transformation of a circle into flat plate, airfoils & ellipses.
- Topic No.68: Glauert's thin airfoil theory
- Topic No.69: Symmetrical airfoil, cambered airfoil, flapped airfoil
- Topic No.70: Determination of mean camber line shapes for uniform & linear distribution of circulation
- Topic No.71: Description of flow about multi-element airfoils.

UNIT NO.2 Incompressible Flow Over Finite Wings:

- Topic No.72: Downwash & induced drag
- Topic No.73: Biot-Savart's law and Helmholtz's theorem
- Topic No.74: Prandtl's classical lifting line theory, fundamental equations
- Topic No.75: Elliptic and general lift distribution over finite unswept wings
- Topic No.76: Effect of aspect ratio, Drag polar
- Topic No.77: Correlation of Cl distribution over other aspect ratios
- Topic No.78: Lifting Surface theory
- Topic No.79: Formation Flying, Ground effect

UNIT NO.3 Delta Wing Aerodynamics:

- Topic No.80: Polhamus theorem
- Topic No.81: Leading edge suction analogy
- Topic No.82: Calculations of lift coefficient
- Topic No.83: Flow field, aspect ratio effect, leading edge extension
- Topic No.84: HAA aerodynamics
- Topic No.85: Shock Waves: Introduction and problems related to Normal Shock waves,
- Topic No.86: Oblique Shock waves
- Topic No.87: Expansion waves
- Topic No.88: Lift and drag in supersonic flows

UNIT NO.4 Compressible Subsonic Flows Over Airfoils:

- Topic No.89: The derivation of velocity potential equation
- Topic No.90: Linearization
- Topic No.91: Prandtl-Glauert compressibility correction
- Topic No.92: Karman –Tsien correction
- Topic No.93: Critical Mach number, Whitcomb's area rule, Super critical airfoil.
- Topic No.94: Elements of Compressible Flow : Compressible flow properties
- Topic No.95: Total Enthalpy, Total Temperature, Temperature and Pressure ratios as a function of Mach No.
- Topic No.96: Mass Flow Parameter (MFP)
- Topic No.97: Isentropic Area ratio (A/A^*), Velocity-Area variations.



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Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

Text Books:

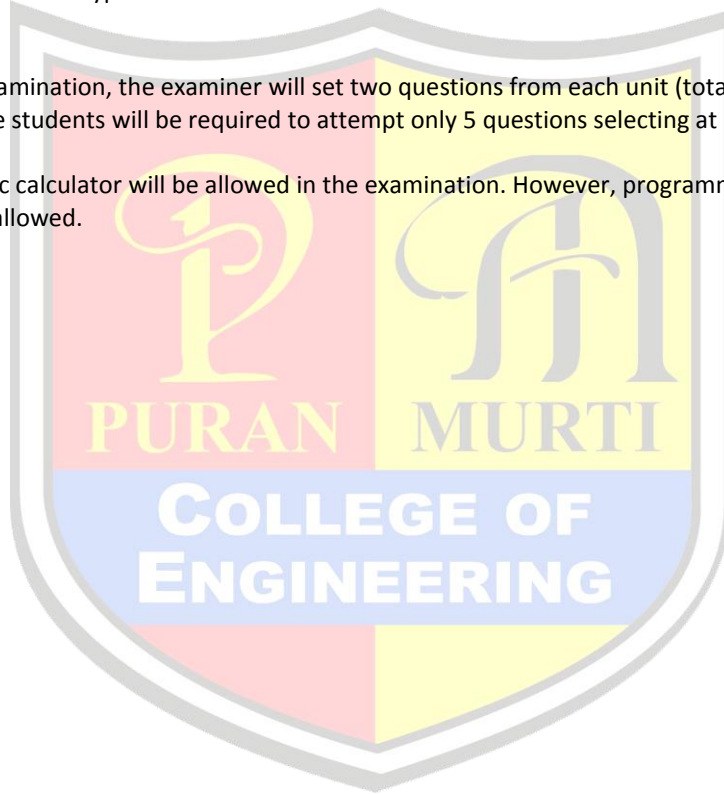
1. Fundamentals of Aerodynamics : John D.Anderson,2nd Ed. McGraw Hill,1991
2. Elements of Gas Dynamics : Lieppmann and Rosheko ,John Wiley 1957.

Reference Books :

3. Aerodynamics for Engineers : Bertin and Smith,Prentice Hall,1989
4. Modern compressible Flow with historical perspective: John D. Anderson
5. Experimental Methods in Hypersonic flows: J. Lucasiewicz

Note:

3. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
4. The use of scientific calculator will be allowed in the examination. However, programmablecalculator and cellular phone will not be allowed.





SYLLABUS: B Tech (Aero)

Department: Aeronautical Engineering– 5th Semester

Subject: Internal Combustion Engines And Gas Turbines

Subject Code: ME 307B

Detailed Content

UNIT I Air Standard Cycles:

- Topic no 1: Internal and external combustion engines; classification of I.C. Engines,
- Topic no 2: Cycles of operation in four stroke and two stroke I.C. Engines, Wankel Engines
- Topic no 3: Assumptions made in air standard cycle
- Topic no 4: Otto cycle; diesel cycle, dual combustion cycle
- Topic no 5: Comparison of Otto, diesel and dual combustion cycles
- Topic no 6: Sterling and Ericsson cycle
- Topic no 7: Air standard efficiency, specific work output, specific weight; work ratio; mean effective pressure
- Topic no 8: Deviation of actual engine cycle from ideal cycle. Problems.

Carburetion, Fuel Injection And Ignition Systems:

- Topic no 9: Mixture requirements for various operating conditions in S.I. Engines; elementary carburetor
- Topic no 10: Requirements of a diesel injection system; types of injection systems; petrol injection
- Topic no 11: Requirements of ignition system; types of ignition systems ignition timing; spark plugs. Problems.

UNIT II Combustion In I.C. Engines :

- Topic no 12: S.I. engines; Ignition limits; stages of combustion in S.I. Engines; Ignition lag
- Topic no 13: Velocity of flame propagation; detonation
- Topic no 14: Effects of engine variables on detonation; theories of detonation; octane rating of fuels
- Topic no 15: Pre-ignition; S.I. engine combustion chambers
- Topic no 16: Stages of combustion in C.I. Engines; delay period; variables affecting delay period; knock in C.I. engines
- Topic no 17: Cetane rating; C.I. engine combustion chambers.

Lubrication And Cooling Systems:

- Topic no 18: Functions of a lubricating system, Types of lubrication system; mist, wet sump and dry sump systems
- Topic no 19: Properties of lubricating oil; SAE rating of lubricants, engine performance and lubrication
- Topic no 20: Necessity of engine cooling; disadvantages of overcooling; cooling systems; air-cooling, water cooling; radiators.

UNIT–III Engine Testing And Performance:

- Topic no 21: Performance parameters: BHP, IHP, mechanical efficiency
- Topic no 22: Brake mean effective pressure and indicative mean effective pressure
- Topic no 23: Torque, volumetric efficiency; specific fuel consumption (BSFC, ISFC), thermal efficiency
- Topic no 24: Heat balance; Basic engine measurements; fuel and air consumption
- Topic no 25: Brake power, indicated power and friction power
- Topic no 26: Heat lost to coolant and exhaust gases; performance curves. Problems.

Air Pollution From I.C. Engines And Its Remedies:

- Topic no 27: Pollutants from S.I. and C.I. Engines, Methods of emission control
- Topic no 28: Alternative fuels for I.C. Engines; the current scenario on the pollution front

UNIT–IV Rotary Compressor

- Topic no 29: Root and vane blowers; Static and total head values
- Topic no 30: Centrifugal compressors- Velocity diagrams, slip factor, ratio of compression, pressure coefficient,
- Topic no 31: Pre-whirl; Axial flow compressor- Degree of reaction, polytropic efficiency
- Topic no 32: Surging, choking and stalling, performance characteristics, Problems.

Gas Turbines:

- Topic no 33: Brayton cycle; Components of a gas turbine plant; open and closed types of gas turbine plants
- Topic no 34: Optimum pressure ratio; Improvements of the basic gas turbine cycle
- Topic no 35: Multi stage compression with inter-cooling; multi stage expansion with reheating between stages
- Topic no 36: Exhaust gas heat exchanger, Applications of gas turbines. Problems



Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

TEXT BOOKS:

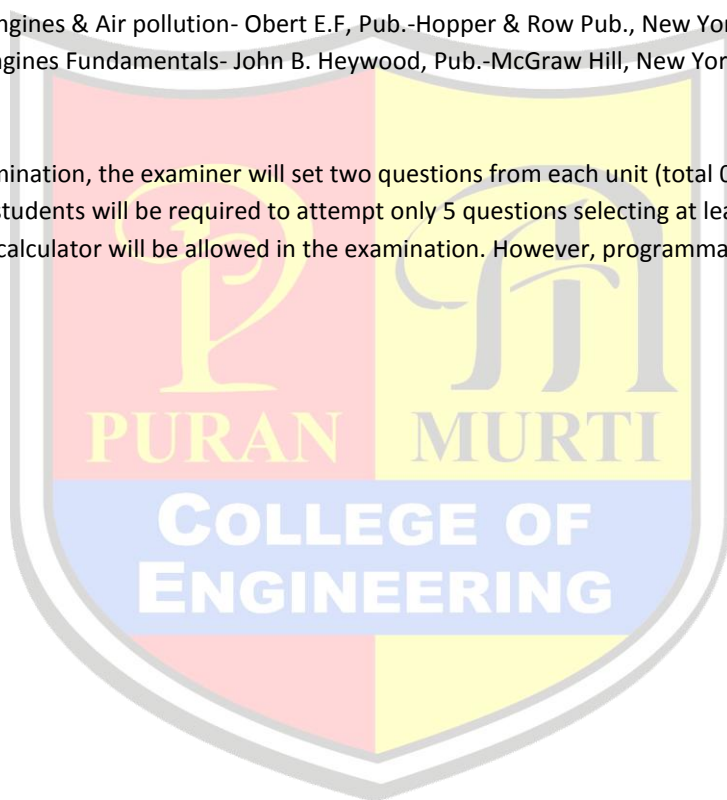
1. Internal Combustion Engines –V. Ganesan, Pub.-Tata McGraw-Hill.
2. Gas Turbines - V. Ganesan, Pub.- Tata McGraw Hill.
3. Engineering fundamental of the I. C. Engines – Willard W. Pulkrabek Pub.-PHI,India

REFERENCE BOOKS:

1. Internal Combustion Engines & Air pollution- Obert E.F, Pub.-Hopper & Row Pub., New York
2. Internal Combustion Engines Fundamentals- John B. Heywood, Pub.-McGraw Hill, New York

Note:

5. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
6. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.





SYLLABUS: B Tech (Aero)

Department: Aeronautical Engineering– 5th Semester

Subject: Aircraft Design (Theory)

Subject Code: AER 309B

Detailed Content

UNIT NO 1: Basics of Aircraft Design:

- Topic No.98: Preliminaries: Aircraft Design Requirements, specifications, role of users
- Topic No.99: Aerodynamic and Structural Consideration
- Topic No.100: Importance of weight
- Topic No.101: Airworthiness requirements and standards
- Topic No.102: Classifications of airplanes
- Topic No.103: Special features of modern airplane.
- Topic No.104: Air Loads in Flight: Symmetrical measuring loads in flight
- Topic No.105: Basic flight loading conditions, Load factor
- Topic No.106: Velocity - Load factor diagram
- Topic No.107: Gust load and its estimation, Structural limits.
- Topic No.108: Airplane Weight Estimation: Weight estimation based on type of airplane
- Topic No.109: Trends in wing loading
- Topic No.110: Weight-estimation based on mission requirements, iterative approach.

UNIT NO.2 Basics of Wing Design:

- Topic No.111: Selection of airfoil selection
- Topic No.112: Influencing factors
- Topic No.113: Span wise load distribution and planform shapes of airplane wing
- Topic No.114: Stalling, take off and landing considerations
- Topic No.115: Wing drag estimation
- Topic No.116: High lift devices
- Topic No.117: Structural Design: Cockpit and aircraft passenger cabin layout for different categories, types of associated structure
- Topic No.118: Features of light airplanes using advanced composite materials.
- Topic No.119: Structural aspects of design of airplane
- Topic No.120: Bending moment and shear force diagram
- Topic No.121: Design principles of all metal stressed skin wing for civil and military applications

UNIT NO.3 Landing Gears:

- Topic No.122: Different kinds of landing gears, and associated arrangement for civil and military airplanes
- Topic No.123: Preliminary calculations for locating main and nose landing gears
- Topic No.124: Integration of Structure and Power Plant: Estimation of Horizontal and Vertical tail volume ratios.
- Topic No.125: Choice of power plant and various options of locations
- Topic No.126: Considerations of appropriate air –intakes
- Topic No.127: Integration of wing, fuselage, empennage and power plant
- Topic No.128: Estimation of centre of gravity

UNIT NO.4 Introduction to advanced concepts:

- Topic No.129: Supercritical Wings
- Topic No.130: Relaxed static Stability
- Topic No.131: Controlled configured vehicles
- Topic No.132: V/STOL aircraft and, rotary wing vehicles
- Topic No.133: Design and layout of flying controls and engine controls



Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

Text Books:

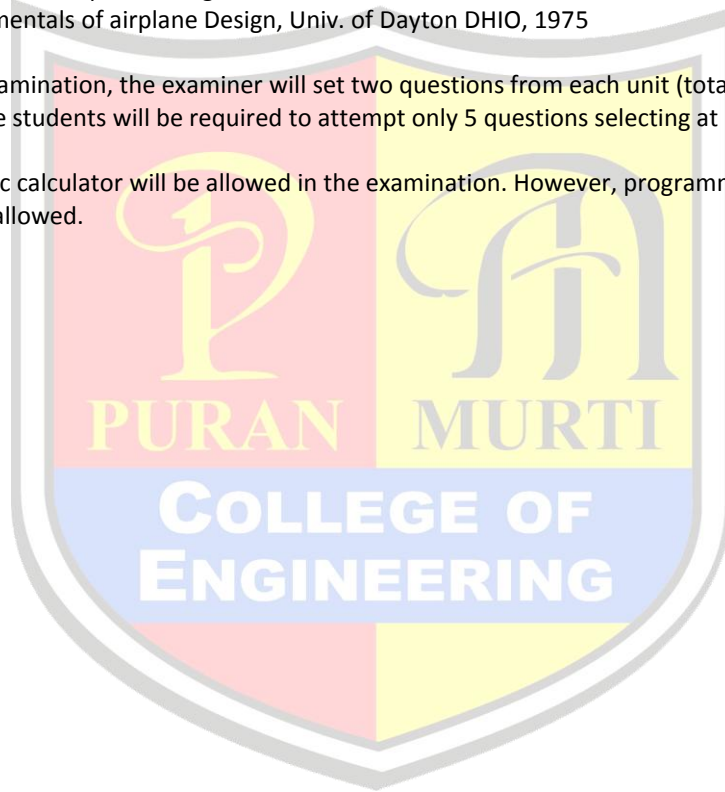
1. Daniel P Raymer, Aircraft Design: A conceptual approach, AIAA Series, 1992
2. D Stinton, The Design of Airplane, GRANADA, UK 1983
3. John D Anderson (Jr.), Airplane Performance and Design, McGraw Hill 1999.

Reference Books :

1. E Torenbeek, Synthesis of Airplane Design
2. L M Nicholai, Fundamentals of airplane Design, Univ. of Dayton DHIO, 1975

Note:

7. In the semester examination, the examiner will set two questions from each unit (total 08 questions in all), covering the entire syllabus. The students will be required to attempt only 5 questions selecting at least one question from each unit.
8. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.





SYLLABUS: B Tech (AERO)

Department: Aeronautical Engineering – 5th Semester

Subject: Aircraft Instrumentation Lab

Subject Code: AER-311B

Detailed Content

List of Experiments:

1. Use of Anemometer for measuring velocity.
2. Measurement of velocity profile in favourable and adverse pressure gradient.
3. Pressure distribution over a 2D cylinder and to find lift and drag.
4. Pressure distribution over an airfoil and to find lift and drag.
5. Experiments on potential flow Analogy (Hele-Shaw flow).
6. To study shocks using a water table.
7. To find the displacement thickness for the given aerofoil at low Reynolds number.
8. To plot C_p vs angle of attack for a pitching aerofoil.

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
		3	1.5	20	30	3 hours	50

Reference Books:

1. Low speed wind tunnel testing, Allen Pope, John Willey & sons
2. Low speed wind tunnel testing, W.E. Rae & Allen Pope, John Willey & sons

Note:

1. At least eight experiments are to be performed in the semester.
2. At least six experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the concerned institute as per the scope of the syllabus.



SYLLABUS: B Tech (AERO)

Department: Aeronautical Engineering – 5th Semester

Subject: Aircraft Structure Lab

Subject Code: AER-313B

Detailed Content

List of Experiments:

1. Study the construction of fuselage and identify the primary load carrying members
2. Study the construction of wings, ailerons, flaps, slits, slats and spoilers.
3. Study the construction of empennage, stabilizers, rudders adjusting tabs etc with detail of honeycomb structure.
4. Study the construction of landing gears and wheel turning mechanism
5. Study of aileron control linkages including artificial feel mechanism, booster and manual controls and their adjustments
6. Study the measurement techniques with strain gauges
7. Study checks on airframe for life extension
9. Dye penetrant testing for surface crack detection
10. Measurement of deflection of truss using DTI
11. Measurement of deflection of simply supported beam
12. Determination of compressive strength of thin plates

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week		Internal Assessment		External Assessment (Examination)			
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
		3	1.5	20	30	3 hours	50

NOTE

1. At least ten experiments are to be performed in the semester
2. At least six experiments are to be performed from above list. Remaining two experiments may either be performed from above list or designed and set by concerned institute as per the scope of the syllabus



SYLLABUS: B Tech (AERO)

Department: Aeronautical Engineering – 5th Semester

Subject: I.C.Engines Lab

Subject Code: ME 315B

Detailed Content

List of Experiments:

1. To study the constructional details & working principles of two-stroke/ four stroke petrol engine.
2. To study the constructional detail & working of two-stroke/ four stroke diesel engine.
3. Analysis of exhaust gases from single cylinder/multi cylinder diesel/petrol engine by Orsat Apparatus.
4. To prepare heat balance sheet on multi-cylinder diesel engine/petrol engine.
5. To find the indicated horse power (IHP) on multi-cylinder petrol engine/diesel engine by Morse Test.
6. To prepare variable speed performance test of a multi-cylinder/single cylinder petrol engine/diesel engine and prepare the curves (i) bhp, ihp, fhp, vs speed (ii) volumetric efficiency & indicated specific fuel consumption vs speed.
7. To find fhp of a multi-cylinder diesel engine/petrol engine by Willian's line method & by motoring method.
8. To perform constant speed performance test on a single cylinder/multi-cylinder diesel engine & draw curves of (i) bhp vs fuel rate, air rate and A/F and (ii) bhp vs mep, mech efficiency & sfc.
9. To measure CO & Hydrocarbons in the exhaust of 2- stroke / 4-stroke petrol engine.
10. To find intensity of smoke from a single cylinder / multi-cylinder diesel engine.
11. To draw the scavenging characteristic curves of single cylinder petrol engine.
12. To study the effects of secondary air flow on bhp, sfc, Mech. Efficiency & emission of a two-stroke petrol engine.

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
		2	1	20	30	3 hours	50

Note:

1. At least Ten experiments are to be performed in the Semester.
2. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or as designed & set by the department as per the scope of the syllabus (ME307B)



SYLLABUS: B Tech (Aero)

Department: Aeronautical Engineering– 5th Semester

Subject: Professional Training I

Subject Code: AER-315B

Detailed Content

At the end of 4th semester each student would undergo four weeks Professional Training in an Industry/ Institute/ Professional Organization/ Research Laboratory etc. with the prior approval of the Training and Placement Officer of the University and submit in the department a typed report along with a certificate from the organization.

The typed report should be in a prescribed format.

The report will be evaluated in the V Semester by a Committee consisting of three teachers from different specialization to be constituted by the Chairperson of the department. The basis of evaluation will primarily be the knowledge and exposure of the student towards different processes and the functioning of the organization.

The student will interact with the committee through presentation to demonstrate his/her learning.

Teachers associated with evaluation work will be assigned 2 periods per week load.

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
-	-	2	2	50	-	-	50