



SCHEME OF STUDIES & EXAMINATIONS
Department: Aeronautical Engineering – 3rd 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	MGT 201 B	ENGINEERING ECONOMICS (Common for all branches Except BT & BME)	4	-	-	25	75	-	100	4	3	
	GES 201 B	(Gr-A) OR ENVIRONMENTAL STUDIES (Common for all branches) (Gr- B)	3	-	-	-	75*	-	75*	--	3	
2	ME 201B	THERMODYNAMICS (AER, ME)	3	1	-	25	75	-	100	4	3	
3	ME 203B	STRENGTH OF MATERIALS-I (AER ,ME)	3	1	-	25	75	-	100	4	3	
4	ME205B	ENGINEERING MECHANICS (AER ,ME & AE)	3	1	-	25	75	-	100	4	3	
5	ME207B	FLUID MECHANICS (AER ME))	3	1	-	25	75	-	100	4	3	
6	AER-201B	INTRODUCTION TO AERONAUTICS	3	1	-	25	75	-	100	4	3	
7	AER-203B	INTRODUCTION TO AERONAUTICS LAB	-	-	2	20	-	30	50	1	3	
7	ME211B	STRENGTH OF MATERIALS- ILAB (AER ,ME)	-	-	2	20	-	30	50	1	3	
8	ME 215B	FLUID MECHANICS LAB (AER, ME)	-	-	2	20	-	30	50	1	3	
9	GES 203B	ENVIRONMENTAL STUDIES FIELD WORK (Common for all branches) Gr- B)	-	-	-	-	-	25*	25*	-		
10	ME 217B	WORKSHOP (Common for all branches Except BT, AE)	--	--	2	50	--	--	50	2	3	
Total												
			Gr-A	19	5	8	260	450	90	800	29	
			Gr-B	18	5	8	235	375	90	700	25	

Note:

- 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.
- * The Environmental studies (GES-201 B & Environment Studies Field work (GES-203B) are compulsory & qualifying courses only.
- The students will be allowed to use non-programmable scientific calculator. However, sharing/exchange of calculator is prohibited in the examination.
- Electronics gadgets including Cellular phones are not allowed in the examination
- All the branches are to be divided into group 'A' and 'B' as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters



SYLLABUS: B Tech (Aero)

Department: Aeronautical Engineering – 3rd Semester

Subject: Engineering Economics

Subject Code: MGT 201B

Detailed Content

UNIT NO.1 Different Economics With Inter Relations

- Topic No.1: Introduction to various definitions of Economic
- Topic No.2: Nature of Economic problem, Micro and macro economics- their feature and scope
- Topic No.3: Production possibility curve
- Topic No.4: Economic laws and their nature, Relation between Science
- Topic No.5: Engineering Technology and Economics
- Topic No.6: Concept and measurement of utility, Law of Diminishing Marginal Utility
- Topic No.7: Law of equi-marginal utility – its practical application and importance

UNIT NO.2 Demand And Costs

- Topic No.8: Meaning of Demand, Individual and Market demand schedule
- Topic No.9: Law of demand, & shape of demand curve
- Topic No.10: Elasticity of demand & measurement of elasticity of demand, Factors effecting elasticity of demand
- Topic No.11: Practical importance & application of the concept of elasticity of demand
- Topic No.12: Various concepts of cost-Fixed cost, Variable cost, average cost, Marginal cost, Money cost, real cost
- Topic No.13: Opportunity cost. Shape of average cost, Marginal cost, total cost etc. in short run and long run.

UNIT NO.3 Production, Economy & Market

- Topic No.14: Meaning of production and factors of production
- Topic No.15: Law of variable proportions, & Law of Return to Scale
- Topic No.16: Lubrication principles, Bearing lubrication
- Topic No.17: Functions of lubricating system
- Topic No.18: Internet and External economics and diseconomies of scale
- Topic No.19: Meaning of Market, Type of Marker
- Topic No.20: Perfect Competition, Monopoly, Oligopoly, Monopolistic competition

UNIT NO.4 Supply, Economy and Globe

- Topic No.21: Supply and Law of Supply, Role of Demand & Supply in Price Determination
- Topic No.22: Effect of changes in Demand and supply on prices
- Topic No.23: Nature and characteristics of Indian economy
- Topic No.24: privatization – meaning, merits and demerits
- Topic No.25: Globalization of India economy – merits and demerits
- Topic No.26: Elementary Concept of WTO & TRIPS agreement
- Topic No.27: Monetary Policy & Fiscal Policy

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. Ahuja H.L."Micro Economic Theory" S. Chand Publication, New Delhi
2. Dewett K.K "Modern Economic Theory" S. Chand Publication, New Delhi
3. Jain T.R, Grover M.L, Ohri V.K Khanna O.P,"Economics for engineers" V.K .Publication ,New Delhi

SUGGESTED BOOKS:

1. Jhingan M.L"Micro Economic Theory" S.Chand Publication ,New Delhi
2. Chopra P.N "Principle of Economics" Kalyani Publishers, Delhi
3. Mishra S.K "Modern Micro Economics" Pragati Publication Mumbai.
4. Dwivedi D.N "Micro Economics " Pearson Education, New Delhi.



SYLLABUS: B Tech (Aero)

Department: Aeronautical Engineering – 3rd Semester

Subject: Environmental Studies

Subject Code: GES 201B

Detailed Content

UNIT NO.1 Introduction To Environment

- Topic No.28: The Multidisciplinary nature of environmental studies
- Topic No.29: Definition, scope and importance
- Topic No.30: Need for Public awareness

UNIT NO.2 Natural Resources

- Topic No.31: Natural resources and associated problems
- Topic No.32: Renewable and Non-renewable resources
- Topic No.33: Forest resources: Use and over-exploitation
- Topic No.34: Deforestation, case studies, Timber exploitation, mining
- Topic No.35: Dams and their effects and forests tribal people
- Topic No.36: Water resources: Use and over-utilization of surface and ground water
- Topic No.37: Floods, Drought, conflicts over water ,Dams-benefits and problems
- Topic No.38: Mineral resources: Use and exploitation
- Topic No.39: Environmental effects of extracting ,And using mineral resources, case studies
- Topic No.40: Food resources: World food problems
- Topic No.41: Changes, caused by agriculture and Overgrazing
- Topic No.42: Effects of modern agriculture, fertilizer-pesticide problems
- Topic No.43: Water logging, salinity, case studies
- Topic No.44: Energy resources: Growing energy needs
- Topic No.45: Renewable and Non-renewable energy sources
- Topic No.46: Use of alternate energy sources; case studies
- Topic No.47: Land as a resource, land degradation
- Topic No.48: Man induced landslides
- Topic No.49: Soil erosion and desertification
- Topic No.50: Role of an individual in conservation of natural resources
- Topic No.51: Equitable use of resources for sustainable lifestyles

UNIT NO.3 Ecosystems

- Topic No.52: Concept of an ecosystem
- Topic No.53: Structure and function of an ecosystem
- Topic No.54: Producers, Consumers and decomposers
- Topic No.55: Energy flow in the ecosystem, Ecological Succession
- Topic No.56: Food chains, food webs and ecological pyramids
- Topic No.57: Introduction, types, characteristic features, structure and function of the Following eco-system:
 - A. Forest ecosystem
 - B. Grassland ecosystem
 - C. Desert Ecosystem
 - D. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans)

UNIT NO.4 Biodiversity And Its Conservations

- Topic No.58: Introduction – Definition: Genetic, species and ecosystem diversity
- Topic No.59: Biogeographically classification of India
- Topic No.60: Value of biodiversity: consumptive use, productive use
- Topic No.61: Social, Ethical aesthetic and option values
- Topic No.62: Biodiversity at global, National and local levels
- Topic No.63: India as a mega-diversity nation
- Topic No.64: Hot-spots of biodiversity, Threats : habitat loss, poaching of wildlife,Man-wildlife conflicts
- Topic No.65: Endangered and endemic species of India.

UNIT NO.5 ENVIRONMENTAL POLLUTION

- Topic No.66: Definition, causes, effects and control, measures of:Air pollution, Water pollution, Soil pollution
Marine pollution, Noise pollution, Thermal Pollution Nuclear hazards



Topic No.67: Solid waste management: Causes effects and control, measures of urban and Industrial wastes

Topic No.68: Role of an individual in prevention of pollution

Topic No.69: Pollution case studies

Topic No.70: Disaster management: Floods, earthquake, cyclone and landslides

UNIT NO.6 SOCIAL ISSUES AND THE ENVIRONMENT

Topic No.71: From unsustainable to sustainable development

Topic No.72: Urban problems related to energy

Topic No.73: Water conservation , rain water harvesting, watershed management

Topic No.74: Resettlement and rehabilitation of people; its problems and concerns

Topic No.75: Environmental ethics: Issues and possible solutions

Topic No.76: Climate change, global warming, acid rain, ozone layer depletion, Nuclear accidents & holocaust, Case std.

Topic No.77: Wasteland reclamation, Consumerism and waste products

Topic No.78: Environment Protection Act, Air (Prevention and Control of Pollution Act,

Water (Prevention and Control of Pollution) Act Wildlife Protection Act, Forest Conservation Act

Topic No.79: Issues involved in enforcement of environmental legislation Public awareness

UNIT NO.7 HUMAN POPULATION AND ENVIRONMENT

Topic No.80: Population growth, variation among nations

Topic No.81: Population explosion – Family Welfare Programme Environment and human health, Human Rights

Topic No.82: Value Education, HIV/ AIDS, Woman and Child Welfare

Topic No.83: Role of Information Technology in Environment and human health. Case Studies

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

REFERENCES:

1. Agarwal, K.C. 2001, Environmental Biology, Nidi Pub. Ltd. Bikaner.
2. Bharucha, Franch, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380013, India .
3. Brunner R.C. 1989, Hazardous Waste Incineration, Mc. Graw Hill Inc. 480p.
4. Clark R.S., Marine Pollution, Slanderson Press Oxford (TB).
5. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Pub. House, Mumbai. 1195p.
6. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment ®.
8. Gleick, H.P., 1993. Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security, Stockholm Env. Institute, Oxford Univ., Press 473p.
9. Hawkins R.E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R).
10. Heywood, V.H. & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
11. H & Bhosale, V.M. 1995, Environmental Protection and Laws, Himalaya Pub. House, Helhi 284p.
12. Mckinney, M.L. & Schoch, RM 1996, Environmental Sciences Systems & Solutions, Web enhanced Edition 639p.
13. Mhaskar A.K., Mater Hazardous, Tekchno-Sciences Publications (TB).
14. Miller T.G. Jr. Environmental Science, Wadsoworth Publishing Co. (TB).
15. Odum, E.P. 1971, Fundamentals of Ecology, W.B. Saunders Co. USA, 574p.
16. Rao M.N. & Dutta, A.K. 1987, Waste Water Treatment. Oxford & IBH Publ. Co. Pvt. Ltd., 345p
17. Sharma, B.K., 2001, Environmental Chemistry, Goel Publ. House, Meerut.

NOTE:

1. Examiner will set eight questions. Students will be required to attempt five Questions.
2. The awards of this paper shall not be counted in the award of the Degree/DMC.



SYLLABUS: B Tech (Aero)

Department: Aeronautical Engineering– 3rd Semester

Subject: Thermodynamics (Theory)

Subject Code: ME 201B

Detailed Content

UNIT NO 1: Basic Concepts:

- Topic No.1 Macroscopic and microscopic approaches, Definition of system and surrounding, Concept of control volume
- Topic No.2 Thermodynamic state, concepts of simple compressible substances
- Topic No.3 Process and cycle, thermodynamic processes and thermodynamic equilibrium
- Topic No.4 Zeroth law; thermodynamic properties and use of tables of thermodynamic properties
- Topic No.5 Thermodynamic concept of energy; Modes of work and heat transfer

First Law Of Thermodynamics:

- Topic No.6 The first law referred to cyclic and non-cyclic processes
- Topic No.7 Concept of internal energy of a system, Conservation of energy for simple compressible closed systems;
- Topic No.8 Definitions of enthalpy and specific heats
- Topic No.9 Free expansion process, Conservation of energy for an open system, Steady and transient processes

UNIT NO.2 Second Law Of Thermodynamics:

- Topic No.10 The directional constraints on natural processes
- Topic No.11 Kelvin- Planck and Clausius Statements and their Equivalence
- Topic No.12 Concept of reversibility; Carnot principle; Absolute thermodynamic temperature scale
- Topic No.13 Clausius Inequality, Entropy, change in entropy in various thermodynamic processes
- Topic No.14 T-ds relations, entropy balance for closed and open systems, Principle of increase-in-Entropy
- Topic No.15 Entropy generation, Third Law of Thermodynamics. Problems

Energy: Concept Of Reversible Work And Irreversibility;

- Topic No.16 Second law efficiency; Energy change of a system: closed and open systems
- Topic No.17 Energy transfer by heat, Work and mass, Energy destruction, Energy balance in closed and open systems.

UNIT NO.3 Pure Substance And Phase:

- Topic No.18 Phase Transformation, Solid-Liquid-Vapour Equilibrium,
- Topic No.19 Throttling and Measurement of Dryness Fraction of Steam, Idea of a generalized chart and the law of corresponding states; Concept of ideal gases and their equations of state. Problems

Introduction To Properties Of Mixtures And Phases:

- Topic No.20 Dalton's model, Equation of state, Properties of ideal gas mixtures
- Topic No.21 Change in entropy on mixing; Law of corresponding states and introduction to real-gas mixtures
- Topic No.22 Gibbs phase rule; Air/Water Mixtures, Psychometrics. Problems

UNIT NO.4 Thermodynamic Property Relations:

- Topic No.23 Maxwell relations; Clausius-Clapeyron equation; Difference in heat capacities
- Topic No.24 Ratio of heat capacities; Joule-Thompson coefficient and inversion curve.

Thermodynamics Of Reactive Systems:

- Topic No.25 First law analysis; Internal energy and enthalpy of reaction; Enthalpy of formation; Second law analysis;
- Topic No.26 Chemical equilibrium; Equilibrium constant for ideal-gas mixtures and its variation with temperature.

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



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Text Books:

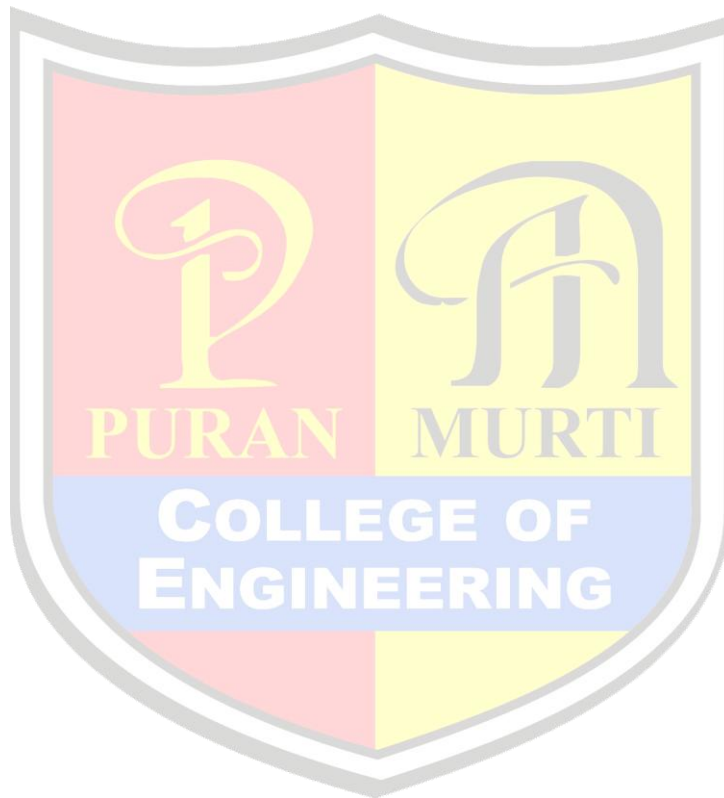
1. Engineering Thermodynamics – P K Nag, Tata McGraw Hill
2. Engineering Thermodynamics – Jones and Dugan, PHI, New Delhi.

Reference Books :

1. Dhar, P.L., Engineering Thermodynamics - a generalized approach Elsevier, New Delhi.

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, programmable calculator and cellular phone will not be allowed





SYLLABUS: B Tech (Aero)

Department: Aeronautical Engineering– 3rd Semester

Subject: Strength Of Materials –I (Theory)

Subject Code: ME 203B

Detailed Content

UNIT NO1 Simple and Compound Stresses & Strains:

- Topic no 1: Concept & types of Stresses and strains, Poisson's ratio,
- Topic no 2: Stresses and strain in simple and compound bars under axial loading,
- Topic no 3: Stress strain diagrams, Hooks law, Elastic constants & their relationships,
- Topic no 4: Temperature stress & strain in simple & compound bars under axial loading,
- Topic no 5: Concept of surface and volumetric strains, Two dimensional stress system,
- Topic no 6: Conjugate shear stress at a point on a plane,
- Topic no 7: Principal stresses & strains and principal- planes, Mohr's circle of stresses, Numerical.

UNIT NO2 Shear Force & Bending Moments:

- Topic no 8: Definitions, SF & BM diagrams for cantilevers,
- Topic no 9: Simply supported beams with or without over-hang and calculation of maximum BM & SF
- Topic no 10: The point of contra-flexure under (i) concentrated loads
- Topic no 11: (ii) uniformly distributed loads over whole span or a part of it,
- Topic no 12: (iii) combination of concentrated loads and uniformly distributed loads
- Topic no 13: (iv) uniformly varying loads and (v) application of moments, relation between the rate of loading
- Topic no 14: The shear force and the bending moments,

Fixed Beams:

- Topic no 15: Deflections, reactions and fixing moments with SF & BM calculations & diagrams for fixed beams under (i) concentrated loads, (ii) uniformly distributed load and (iii) a combination of concentrated loads & uniformly distributed load.

UNIT NO3 Torsion Of Circular Members:

- Topic no 16: Torsion of thin circular tube, Solid and hollow circular shafts,
- Topic no 17: Tapered shaft, Stepped shaft & composite circular shafts,
- Topic no 18: Combined bending and torsion, Equivalent torque, effect of end thrust. Numericals.

Columns & Struts:

- Topic no 19: Column under axial load, Concept of instability and buckling, Slenderness ratio,
- Topic no 20: Derivation of Euler's formulae for the elastic buckling load,
- Topic no 21: Eulers, Rankine, Gordon's formulae Johnson's empirical formula for axial loading columns and their
- Topic no 22: Eccentric compression of a short strut of rectangular & circular sections, Numericals.

UNIT NO4 Bending & Shear Stresses In Beams:

- Topic no 23: Bending stresses in beams with derivation & application to beams of circular, rectangular, I,T
- Topic no 24: Composite beams, Shear stresses in beams with combined bending,
- Topic no 25: Torsion & axial loading of beams. Numericals.

Slope & Deflection:

- Topic no 26: Relationship between bending moment, Slope & deflection, Mohr's theorem,
- Topic no 27: Moment area method, method of integration,
- Topic no 28: Macaulay's method, calculations for slope and deflection of (i) cantilevers and (ii) simply supported beams with or without overhang under concentrated load, Uniformly distributed loads or combination of Concentrated and uniformly distributed loads, Numericals.

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



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Text Books:

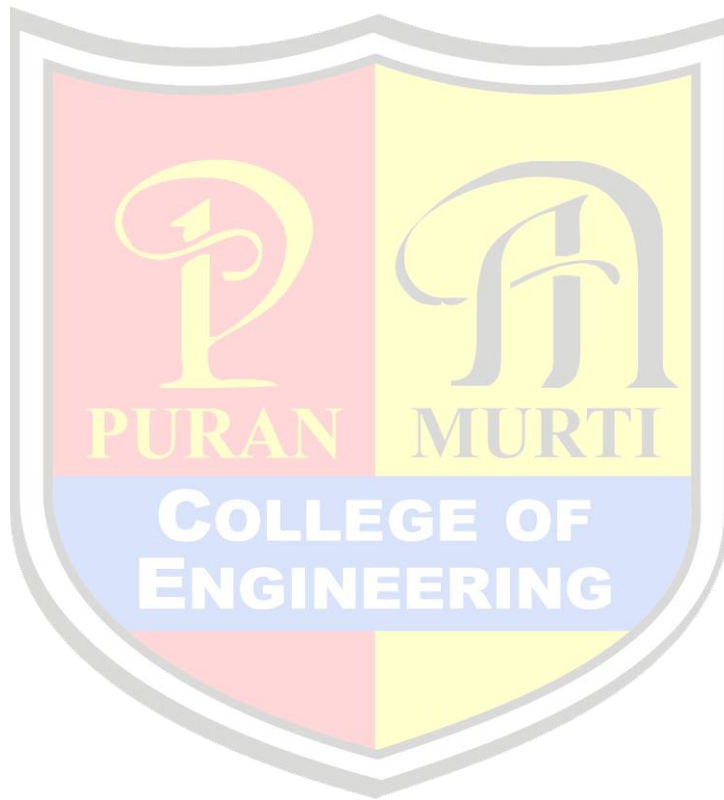
1. Strength of Materials – G. H. Ryder - Macmillan, India
2. Strength of Materials– Andrew Pytel and Fredinand L. Singer, Addison – Wesley

Reference Books:

1. Strength of Materials – Popov, PHI, New Delhi.
2. Strength of Materials - A Rudimentary Approach – M.A. Jayaram, Sapna Book House, Bangalore

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, programmable calculator and cellular phone will not be allowed.





SYLLABUS: B Tech (Aero)

Department: Aeronautical Engineering– 3rd Semester

Subject: Engineering Mechanics (Theory)

Subject Code: ME 205B

Detailed Content

UNIT NO1 Review Of Basic Force Systems:

- Topic no 1: Dimensions and units of mechanics
- Topic no 2: Idealization of mechanics, laws of mechanics
- Topic no 3: Vector algebra review, moment of a force about a point and axis
- Topic no 4: The couple and couple moment, addition and subtraction of couples
- Topic no 5: Moment of a couple about a line
- Topic no 6: Translation of a force to a parallel position, resultant of a force system, Problems.

Equilibrium:

- Topic no 7: Introduction, free body diagram, control volume
- Topic no 8: General equations of equilibrium
- Topic no 9: Two point equivalent loading, static in-determinacy
- Topic no 10: Simple truss
- Topic no 11: Method of joints, method of sections, Problem

UNIT NO2 Properties Of Surfaces, Moments And Products Of Inertia

- Topic no 12: First moment of an area and the centroid
- Topic no 13: Principal axes, formal definition of inertia quantities
- Topic no 14: Relation between mass-inertia terms and area-inertia terms
- Topic no 15: Translation of coordinate axes, transportation properties of the inertia terms
- Topic no 16: A brief introduction to tensors, the inertia of ellipsoid and principal moments of inertia, Problems.

UNIT NO 3 Kinematics Of Particles And Rigid Bodies:

- Topic no 17: Velocity and acceleration in path and cylindrical coordinates
- Topic no 18: Motion of a particle relative to a pair of translating axes
- Topic no 19: Translation and rotation of rigid bodies
- Topic no 20: Chasles theorem, moving references
- Topic no 21: Velocity and acceleration for different references, inertia and coriolis forces. Problems.

UNIT NO4 Particle Dynamics, Energy & Momentum Methods:

- Topic no 22: Newton's law for rectangular coordinates & cylindrical coordinates
- Topic no 23: Rectifier translation, central force motion
- Topic no 24: Newton's law for path variables
- Topic no 25: Work energy equations, work energy equations for a systems of particles
- Topic no 26: Linear and angular momentum equations for a systems of particles. 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 Book:

1. Engineering Mechanics - Statics & Dynamics by I.H. Shames, PHI, New Delhi.
2. Engineering Mechanics – Timoschenko.

Reference Books:

1. Statics & Dynamics by J.L. Meriam, JohnWiley & Sons (P) Ltd. New York.
2. Statics & Dynamics by Beer & Johnson, MGH, New Delhi.



SYLLABUS: B Tech (Aero)

Department: Aeronautical Engineering– 3rd Semester

Subject: Fluid Mechanics (Theory)

Subject Code: ME – 207B

Detailed Content

UNIT NO1: Fluid Properties And Fluid Statics:

- Topic no 1: Concept of fluid and flow, ideal and real fluids, properties of fluids, Newtonian and non-Newtonian fluids.
- Topic no 2: Pascal's law, hydrostatic equation, hydrostatic forces on submerged plane and curved surfaces
- Topic no 3: Stability of floating and submerged bodies, Metacentric height, relative equilibrium.

MANOMETERS:

- Topic no 4: Simple & differential manometers

VORTEX MOTION:

- Topic no 5: Free vortex flow, Forced vortex flow

UNIT NO2: Fluid Kinematics:

- Topic no 6: Eulerian and Lagrangian description of fluid flow
- Topic no 7: Stream, streak and path lines
- Topic no 8: Types of flows, flow rate and continuity equation
- Topic no 9: Differential equation of continuity in cylindrical and polar coordinates
- Topic no 10: Rotation, vorticity and circulation
- Topic no 11: Stream and potential functions, flow net

FLUID DYNAMICS:

- Topic no 12: Concept of system and control volume
- Topic no 13: Euler's equation, Bernoulli's equation
- Topic no 14: Venturimeter, orifices, orificemeter
- Topic no 15: Mouthpieces, Notches and weirs
- Topic no 16: Kinetic and momentum correction factors, Impulse momentum relationship and its applications.

UNIT NO3: VISCOUS FLOW:

- Topic no 17: Flow regimes and Reynold's number
- Topic no 18: Navier-Stokes equation of motion
- Topic no 19: Relationship between shear stress and pressure gradient
- Topic no 20: Uni-directional flow between stationary parallel plates
- Topic no 21: Parallel plates having relative motion
- Topic no 22: Movement of piston in a dashpot
- Topic no 23: Power absorbed in bearings.

FLOW THROUGH PIPES:

- Topic no 24: Major and minor losses in pipes, Hagen-Poiseuille law
- Topic no 25: Hydraulic gradient and total energy lines
- Topic no 26: Series and parallel connection of pipes, branched pipes; equivalent pipe, power transmission through pipes.

UNIT NO4: BOUNDARY LAYER FLOW:

- Topic no 27: Boundary layer concept, displacement, momentum and energy thickness
- Topic no 28: Von-Karman momentum integral equation
- Topic no 29: Laminar and turbulent boundary layer flows:
- Topic no 30: Boundary layer thickness, skin friction coefficient
- Topic no 31: Drag on a flat plate, boundary layer separation

FLOW AROUND IMMERSED BODIES:

- Topic no 32: Drag force, Lift & drag coefficient, streamlined and bluff bodies
- Topic no 33: Lift and drag on a cylinder and an airfoil.



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Study Scheme				Evaluation Scheme			Total Marks
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Text Books:

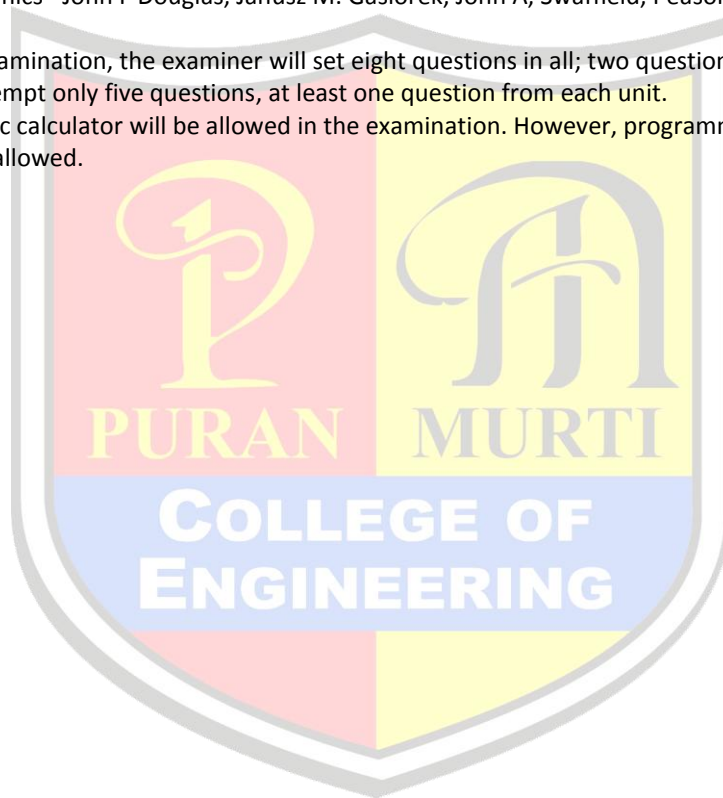
1. Fluid Mechanics and Machinery– CSP Ojha, R Berndthsson and P N Chandramouli, Oxford University Press
2. Mechanics of Fluids – I H Shames, Mc Graw Hill

References Books:

1. Introduction to Fluid Mechanics and Fluid Machines – S.K. Som and G. Biswas, TMH
2. Fluid Mechanics and Fluid Power Engineering – D.S. Kumar, S.K. Kataria and Sons
3. Fluid Mechanics– John F Douglas, Janusz M. Gasiorek, John A, Swaffield, Peason Education

NOTE:

1. In the semester examination, the examiner will set eight questions in all; two question from each unit & students will be required to attempt only five questions, at least one question from each unit.
2. 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– 3rd Semester

Subject: Introduction To Aeronautics (Theory)

Subject Code: AER 201B

Detailed Content

UNIT NO 1: Introduction To Space Dynamics:

- Topic No.1 Pre Wright Brothers era, Wright Flyer
- Topic No.2 Conventional airplane
- Topic No.3 Progress in airplane design and applications, Current status
- Topic No.4 Other kinds of heavier than air vehicles
- Topic No.5 Helicopter, VSTOL machines.
- Topic No.6 SPACE VEHICLES: Missile and its type
- Topic No.7 Space vehicles and its types, reusable space vehicles
- Topic No.8 Space shuttle, satellites, types of satellites and their functions.

UNIT NO.2 Aerodynamics:

- Topic No.9 Airfoil nomenclature
- Topic No.10 Symmetric & cambered airfoils and their aerodynamic characteristics, angle of attack
- Topic No.11 2-D and 3-D wing, wing as a lifting surface, types of wing plan forms and their aerodynamic characteristics
- Topic No.12 Centre of pressure and pressure coefficient, types of drag, lift to drag ratio as efficiency of a lifting surface
- Topic No.13 Different types of flows; laminar and turbulent
- Topic No.14 Effect of viscosity, concept of boundary layer, boundary layer control, high coefficient of lift device
- Topic No.15 Subsonic, transonic, supersonic and hypersonic mach no., critical mach no., drag divergence mach no.

UNIT NO.3 Airplane Propulsion:

- Topic No.16 Requirement of power to fly, balance of forces
- Topic No.17 Various means of producing power for forward flight
- Topic No.18 Piston engines, jet propulsion-thrust equation
- Topic No.19 Turbojet, turbofan, ramjet engines, Locations of such engines
- Topic No.20 Propeller and its use, Rocket engines.

UNIT NO.4 Airplane Structures And Materials:

- Topic No.21 Structural arrangement of the Wright Flyer
- Topic No.22 Structural details of landing gear, wing
- Topic No.23 Fuselage and tail planes
- Topic No.24 Functions of ribs, skin, spars, stringers, longerons
- Topic No.25 Monocoque and semi-monocoque structures, materials for main components
- Topic No.26 CONTROL SYSTEMS AND LEVEL FLIGHT: Various types of flaps
- Topic No.27 Function of rudder, elevator, ailerons, flaprons, elevons, types of tail planes
- Topic No.28 Condition for straight & level flight, flight path angle.
- Topic No.29 Air/Water Mixtures, Psychometrics. Problems

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

Text Books:

1. Fundamentals of Flight Richard S. Shevel , Prentice Hall
2. Introduction to flight- John D. Anderson
3. Mechanics of flight by A.C. Kermode

Reference Books :

1. Aircraft Basic Science :Ralph D. Bent & James L. Mackinley



SYLLABUS: B Tech (Aero)

Department: Aeronautical Engineering – 3rd Semester

Subject: Introduction To Aeronautics Lab

Subject Code: AER-203B

Detailed Content

List of Experiments:

1. To study various types of engines used for trainer aircraft.
2. To study Turbojet ,Turboprop,Turbofanused in Aeronautical Engineering
3. To study any trainer aircraft and its working.
4. To study high coefficient of lift devices.
5. To study monocoque and semi-monocoque structures
6. To study rudder, elevator, ailerons of the aircraft's control surfaces
7. To study Categorisation of various types of missiles.
8. To study, 2-D and 3-D wing.
9. To study of various types of military aircrafts.
10. To study the concept of boundary layer theory.

Study Scheme				Evaluation Scheme			Total Marks
L	T	P	Credits	Internal Assessment Max. Marks	External Assessment (Examination) 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 designed & set by the department as per the scope of the syllabus.



SYLLABUS: B Tech (AERO)

Department: Aeronautical Engineering – 3rd Semester

Subject: Strength Of Materials Lab

Subject Code: ME 211B

Detailed Content

List of Experiments:

1. To study the Brinell hardness testing machine & perform the Brinell hardness test.
2. To study the Rockwell hardness testing machine & perform the Rockwell hardness test.
3. To study the Vickers hardness testing machine & perform the Vickers hardness test.
4. To study the Erichsen sheet metal testing machine & perform the Erichsen sheet metal test.
5. To study the Impact testing machine and perform the Impact tests (Izod & Charpy).
6. To study the Universal testing machine and perform the tensile test.
7. To perform compression & bending tests on UTM.
8. To perform the shear test on UTM.
9. To study the torsion testing machine and perform the torsion test.
10. To draw shear Force, Bending Moment Diagrams for a simply Supported Beam under Point and Distributed Loads.

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:

3. At least ten experiments are to be performed in the semester.
4. At least eight experiments should be performed from the above list. Remaining two experiments may either be performed from the above list or designed & set by the department as per the scope of the syllabus.



SYLLABUS: B Tech (AERO)

Department: Aeronautical Engineering – 3rd Semester

Subject: Fluid Mechanics Lab

Subject Code: ME 215B

Detailed Content

List of Experiments:

1. To determine coefficient of discharge of an orifice meter.
2. To determine the coefficient of discharge of Notch (V / Rectangular types).
3. To determine the friction factor for the pipes.
4. To determine the coefficient of discharge of venturimeter.
5. To determine the coefficient of discharge, contraction & velocity of an orifice.
6. To verify the Bernoulli's Theorem.
7. To find critical Reynolds number for a pipe flow.
8. To determine the meta-centric height of a floating body.
9. To determine the minor losses due to sudden enlargement, sudden contraction.
10. To determine loss coefficient for valves and bends.
11. To show the velocity and pressure variation with radius in a forced vortex flow.
12. To determine the coefficient of discharge of mouthpiece.
13. Flow visualization demonstration.

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week		Internal Assessment	External Assessment (Examination)		Exam Duration		
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 designed & set by the department as per the scope of the syllabus (ME207B).



SYLLABUS: B Tech (Aero)

Department: Aeronautical Engineering–3rd Semester

Subject: Environmental Studies Field Work

Subject Code: GES 203B

Detailed Content

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. (Field work equal to 5 lectures hours).
-

Note: The awards of this paper shall not be counted in the award of the Degree/DMC.

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
-	-	-	0	25	-	-	



SYLLABUS: B Tech (AERO)

Department: Aeronautical Engineering – 3rd Semester

Subject: Workshop Lab

Subject Code: ME 217 B

Detailed Content

List of Experiments:

1. To study and prepare different types of jobs on machine tools (lathe, shaper, planer, slotter, milling, drilling machines).
2. To prepare lay out on a metal sheet by making and prepare rectangular tray, pipe shaped components e.g. funnel.
3. To prepare joints for welding suitable for butt welding and lap welding.
4. To study various types of carpentry tools and prepare simple types of wooden joints.
5. To prepare simple engineering components/ shapes by forging.
6. To prepare mold and core assembly, to put metal in the mold and fettle the casting.
7. To study of CNC lathe, CNC Milling and EDM Machines.
8. Any work assigned in electrical workshop, computer hardware/language lab, electronics workshop, biomedical hardware automobile workshop etc.

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	-	3 hours	50

This student will prepare job(s)/project as an individual or in a group using workshop in house infrastructure.

The student shall submit a typed report.

Training will be evaluated on the spot out of 20 marks.

The report will be evaluated in the III Semester by a Committee consisting of two teachers.

The student will interact with the committee through presentation to demonstrate his/her learning. The basis of evaluation will primarily be the knowledge and exposure of students on different kinds of Machines/instruments/tools/ skills etc. The committee will evaluate out of 30 marks.

The committee shall submit the awards out of 50 marks.