



### SCHEME OF STUDIES & EXAMINATIONS

#### Department: Aeronautical Engineering – 4<sup>th</sup> 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- B) OR ENVIRONMENTAL STUDIES (Common for all branches) (Gr-A)	3	-			75*		75*	-	
2	AER-202B	AIRCRAFT PRODUCTION	3	1		25	75		100	4	3
3	AER-204B	AIRCRAFT MATERIAL	3	1		25	75		100	4	3
4	AER-206 B	AEROPLANE PERFORMANCE, STABILITY AND CONTROL	3	1		25	75		100	4	3
5	AER-208B	MAINTENANCE OF RADIO & COMMUNICATION SYSTEMS	3	1		25	75		100	4	3
6	AER-210B	AIRCRAFT INSTRUMENTATION	3	1		25	75		100	4	3
7	AER-212B	AIRCRAFT INSTRUMENTATION LAB	-	-	2	20		30	50	1	3
8	ME 218B	MANUFACTURING PRACTICE (AER ,ME)	-	-	3	20		30	50	1.5	3
9	GES 203 B	ENVIRONMENTAL STUDIES FIELD WORK (Common for all branches) (Gr-A)	-	-	-	-		25*	25*	-	
10	GPAER 202B	GENERAL PROFICIENCY & ETHICS	1	-	-	-		75	75	2	3
<b>Total</b>		<b>Gr-B</b>	<b>20</b>	<b>5</b>	<b>5</b>	<b>190</b>	<b>450</b>	<b>135</b>	<b>775</b>	<b>28.5</b>	
		<b>Gr-A</b>	<b>19</b>	<b>5</b>	<b>5</b>	<b>165</b>	<b>375</b>	<b>135</b>	<b>675</b>	<b>24.5</b>	

**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
- Each students has to undergo Professional Training of at least 4 weeks from the industry, institute, research lab, training center etc during summer vacation and its evaluation shall be carries out in the V semester
- All the branches are to be divided into group 'A' and 'B' as per the suitability of the institute/college, so that thereis an equitable distribution of teaching load in odd and even semesters.



**SYLLABUS: B Tech (Aero)**

Department: Aeronautical Engineering – 4<sup>th</sup> 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		P	Credits	Internal Assessment	External Assessment (Examination)		
L	T			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 – 4<sup>th</sup> 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	

### 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– 4<sup>th</sup> Semester

Subject: Aircraft Production (Theory)

Subject Code: AER 202B

#### Detailed Content

##### **UNIT NO 1: Basic Concepts:**

- Topic No.1 Introduction: Function of process planning (Methods)
- Topic No.2 Organizing for process planning - place in production planning and control
- Topic No.3 Relationship with other departments, Tool engineering.
- Topic No.4 Heat Treatment: Final and intermediary heat treatment operations carried out on aircraft materials (both ferrous and non-ferrous) and the equipment used
- Topic No.5 The importance of test pieces, Finishing by anodizing.

##### **UNIT NO.2 Workshop Technology:**

- Topic No.6 General activities: carried out in manufacturing and assembly shops, machine shop, sheet metal shop, welding shop, plastic shop and assembly shop
- Topic No.7 Jigs and Fixtures: Importance of special production tools used in manufacturing activity of various types of jigs and fixtures used in aircraft industry
- Topic No.8 Difference between jigs and fixtures, Design consideration, Choice of materials
- Topic No.9 Types of assembly fixtures such as table box, picture-frame, next and so on. Typical jigs for wings, fuselage and control surfaces
- Topic No.10 Jigs and fixtures for turning, milling and drilling, Universal tooling

##### **UNIT NO.3 Production Tools & Equipments:**

- Topic No.11 Cutting Tools: Theory of metal cutting
- Topic No.12 Typical types of cutting tools used in the manufacturing shops, the advantages of tipped tools
- Topic No.13 Ceramic tools, tool life, optimum cutting speeds and feeds, factors limiting speeds, feeds and cuts
- Topic No.14 New development in cutting tools, use of DBN Diamond, ceramics and coating on cutting tools
- Topic No.15 Inspection Gauges and Equipment: Various inspection gauges in the manufacturing shops and their applications
- Topic No.16 Fits, limits and tolerances, engineering reference systems, station and datum lines, chord and fuselage reference lines
- Topic No.17 Lofting aerofoil, use of templates, test equipment used in aircraft production
- Topic No.18 Necessity for and importance of interchangeability media, application of inter-change-ability media viz acceptance gauges, reference gauges, aperture gauges. Use of digital read out on measuring tools

##### **UNIT NO.4 Process Planning:**

- Topic No.19 Process Planning : Definition of mass and batch production, various types of charting techniques viz. operation process chart, flow process chart etc.
- Topic No.20 Definition of planning breakdown and its importance, factors to be considered for process planning
- Topic No.21 Comparison of methods, simple exercise on process planning – simple machine shop and sheet metal components
- Topic No.22 Different approaches in process planning during pre-production and production phases.
- Topic No.23 Process Shop: Theory of planting, finishing processes carried on aircraft materials - planting and finishing equipment

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



# PM

## COLLEGE OF ENGINEERING

A Unit of Puran Murti Educational Society  
Approved by AICTE, Ministry of HRD, Govt. of India,  
Affiliated to Deenbandhu Chhotu Ram University of Science & Technology

### Text Books:

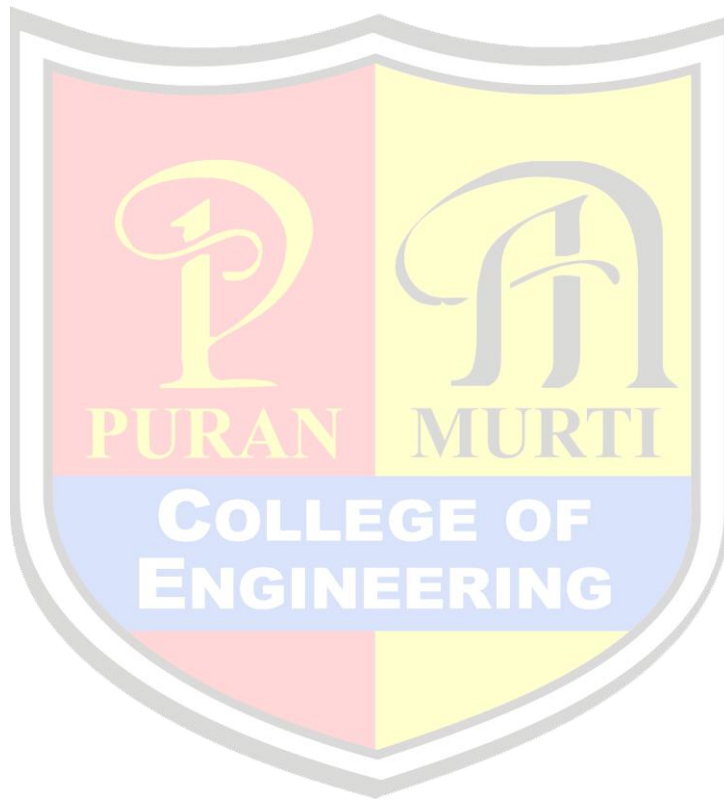
1. M L Begman. Manufacturing process, Media Promoters
2. ASTM, Tooling for Aircraft and Missile Manufacture

### Reference Books :

3. Sachs, Sheet Metal Fabrication
4. S C Keshu and K K Ganapathy, Aircraft Production Technology and Management, Interline 1993

### 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– 4<sup>th</sup> Semester

Subject: Aircraft Materials (Theory)

Subject Code: AER 204B

#### Detailed Content

#### UNIT NO 1: Engineering Materials & Their Properties:

- Topic No.24 Engineering Materials, Structural properties of materials
- Topic No.25 Atomic and lattice structure, Bonding in Solids
- Topic No.26 Imperfections in crystals, Solid phase and phase diagrams
- Topic No.27 Mechanical properties and testing
- Topic No.28 Terms & Definitions: Isotropy, Orthotropy, True stress and strain, Strength and elasticity
- Topic No.29 Stiffness, Resistance, Plasticity, Ductility, Toughness and Hardness of materials.

#### UNIT NO.2 Mechanical Behaviour & Heat Treatment:

- Topic No.30 Concept of Fatigue and Creep
- Topic No.31 Mechanical Testing
- Topic No.32 Factors Affecting Strength
- Topic No.33 Deformation, Plasticity and Viscoelasticity, Fracture
- Topic No.34 Heat treatment
- Topic No.35 Chemical, thermal and Technological Properties
- Topic No.36 Board classification of aircraft materials
- Topic No.37 Ferrous materials, nonferrous materials and alloys
- Topic No.38 Ceramic materials and fiber reinforced composite materials
- Topic No.39 Polymers, metal matrix particulate

#### UNIT NO.3 Material Specifications:

- Topic No.40 Furnishing Materials: Plastic, wood, plywood;
- Topic No.41 Glue, dopes and rubber used in aircraft manufacture
- Topic No.42 Methods of testing and storage
- Topic No.43 Paints, surface finishes and materials
- Topic No.44 Specifications: Indian Standard, British, American, French, German, and International specifications

#### UNIT NO.4 Material Testing & Applications:

- Topic No.45 Corrosion, its detection and prevention, Protective finishes
- Topic No.46 Testing: Destructive and non - destructive testing techniques
- Topic No.47 Crack detection
- Topic No.48 Inspection of parts by hot oil and chalk, dye-penetrant
- Topic No.49 Fluorescent and magnetic particles
- Topic No.50 X-ray, ultrasonic
- Topic No.51 Eddy current and acoustic emission methods.

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

#### Text Books:

1. S K Hajra Chowdhary, Materials, Science and Engineering Processes, Media Promoters
2. George E. F. Titterton, Aircraft Materials, English Book Stores, Delhi
3. M L Begman, Manufacturing Processes, Asia Publishing House, Bombay.

#### Reference Books :

1. King and Butler, Principles of Engineering Inspection, Clever Humes Press.
2. C G K Nair, Aircraft Materials, Interline



**SYLLABUS: B Tech (Aero)**

**Department: Aeronautical Engineering– 4<sup>th</sup> Semester**

**Subject: Airplane Performance, Stability And Control (Theory)**

**Subject Code: AER 206B**

**Detailed Content**

**UNIT NO 1: Atmosphere, Aerodynamic characteristics:**

- Topic No.52 Atmosphere : ISA, Geopotential and Geometric altitude
- Topic No.53 Troposphere and Stratosphere, Stability of atmosphere
- Topic No.54 Aerodynamic characteristics: Drag Aerodynamics
- Topic No.55 Drag polar, Estimation of drag.
- Topic No.56 Forces and moments from dimensional analysis
- Topic No.57 Pressure distribution over airfoils, variation with angle of attack
- Topic No.58 Aerodynamic centre, centre of pressure - related problems.
- Topic No.59 Estimation of CL, CD and CM from pressure distribution
- Topic No.60 Variation of aerodynamic coefficients with Reynolds no.and Mach nO. , Effect of span, aspect ratio
- Topic No.61 Planform, sweep, taper and twist on aerodynamic characteristics.
- Topic No.62 High lift devices. V/STO configurations.

**UNIT NO.2 A/P Perfo. in Steady and Level Flight:**

- Topic No.63 A/P Perfo. in Steady and Level Flight : Equations of motion of aircraft
- Topic No.64 Variation of drag with flight
- Topic No.65 Power required and power available, min. drag and min. power conditions
- Topic No.66 Climbing and gliding performance.
- Topic No.67 A/P Performance in Accelerated Flight: Take off and landing distances,
- Topic No.68 Jet Assisted Take off, Range and Endurance.
- Topic No.69 Turning flight performance

**UNIT NO.3 Static longitudinal stability, Maneuvering flight:**

- Topic No.70 Static longitudinal stability : Stick fixed static longitudinal stability,
- Topic No.71 Neutral point, power effects,
- Topic No.72 Stick free static longitudinal stability.
- Topic No.73 Hinge moments, Aerodynamic Balancing, Static Margin.
- Topic No.74 In flight measurement of stick fixed and stick free neutral points.
- Topic No.75 Maneuvering flight : Elevator angle per g and stick force per g maneuver margin

**UNIT NO.4 Lateral and Directional Stability and Control, Dynamic Stability:**

- Topic No.76 Lateral and Directional Stability and Control
- Topic No.77 Assymmetric flight, Weather cock stability
- Topic No.78 Rudder fixed and Rudder free static directional stability – Rudder lock, Dihedral effect.
- Topic No.79 Control in Roll, Aileron control power. Cross coupling of lateral and directional effects. Numerical problems.
- Topic No.80 Dynamic Stability : Equations of motion of airplane
- Topic No.81 Stability derivatives, Split-up of equations in symmetrical and non-symmetric groups of motion.
- Topic No.82 Analysis of short period and phugoid mode, Analysis of roll and Analysis spiral modes, Dutch Roll.

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

**Text Books:**

4. 1. John D Anderson Jr., Introduction to Flight, McGraw Hill
5. 2. R C Nelson, Flight Stability & Automation Control, McGraw Hill.

**Reference Books :**

3. B Etkins, Dynamics of Flight, John Wiley
4. 2. E L Houghton and N B Caruthers, Aerodynamics for Engineers, Edward Arnold





**SYLLABUS: B Tech (Aero)**

**Department: Aeronautical Engineering– 4<sup>th</sup> Semester**

**Subject: Maintenance Of Radio & Communication Systems (Theory)**

**Subject Code: AER 208B**

**Detailed Content**

**UNIT NO 1: Basics of Aircraft Electrical Cables:**

- Topic No.1 Basics of the application and identification of electrical cables used in Aircraft radio installation
- Topic No.2 Crimping and soldering techniques
- Topic No.3 Bonding continuity and insulation tests.
- Topic No.4 Composition, performance (stability and tolerance) and,
- Topic No.5 Limitations of the fixed resistors and varistors (carbon composition, carbon film, wire wound and metallic film).

**UNIT NO.2 AC and DC measuring instruments:**

- Topic No.6 Electrical power distribution systems, The operation and construction of static inverters
- Topic No.7 Rotary inverters and transformer rectifier units.
- Topic No.8 Basics of interference caused by electrical and ignition system to radio apparatus
- Topic No.9 Methods of minimizing or suppressing such interference Bonding and screening

**UNIT NO.3 Construction and Identification of antennas:**

- Topic No.10 Construction and Identification of various types of antennas
- Topic No.11 The voltage and current distribution along antenna of various length
- Topic No.12 Characteristics of ground planes.
- Topic No.13 Very high frequency (VHF) & high frequency (HF) airborne communications
- Topic No.14 Frequency bands allocation
- Topic No.15 The methods of propagation and the ranges expected, both day and night
- Topic No.16 Calculation of approximate range of communication (line of sight) with given data

**UNIT NO.4 Performance of communication systems:**

- Topic No.17 The performance levels expected and specifications of typical airborne HF and VHF communication systems
- Topic No.18 The principle of operation, installation practices and procedures
- Topic No.19 Functioning of the operating controls and indications and maintenance of typical HF and VHF communication transceivers.
- Topic No.20 Theory of operation, Performance level and specifications of an Audio Integration System
- Topic No.21 Working principles and testing of Lead Acid and Nickel Cadmium and Silver Zinc batteries Principles
- Topic No.22 Characteristics and operation of the under mentioned systems: Automatic Direction Finder (ADF) Systems
- Topic No.23 Very High Frequency (VHF) Omn
- Topic No.24 Directional Range System, Instrument Landing Systems, Weather Radar Systems
- Topic No.25 Omega Navigation System, Radio Altimeter Systems, Cockpit Voice Recorder
- Topic No.26 Principles of Satellite Communications and its application to aircraft.

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. RF Hansforde, Heywood and Company London: Radio Aids to Civil Aviation.
2. George Kannedy: Electronic Communication System, McGraw Hill

**Reference Books :**

1. Dennis Reddy and John Cooler: Electronic Communication, Prentice Hall of India, New Delhi.
2. J. Powell: Aircraft Radio Systems, Himalayan Books



**SYLLABUS: B Tech (Aero)**

**Department: Aeronautical Engineering– 4<sup>th</sup> Semester**

**Subject: Aircraft Instrumentation (Theory)**

**Subject Code: AER 210B**

**Detailed Content**

**UNIT NO 1: Measurement Systems:**

- Topic No.1 Measurement of circuit Units and Standards, Theory of measurement
- Topic No.2 Functional analysis of measurements, Errors and error estimation
- Topic No.3 Measurement of voltage and current in DC and AC
- Topic No.4 VTVM digital voltmeter, Measurement of power, phase angle, power factor
- Topic No.5 Extension of range by instrument transformers
- Topic No.6 Fluxmeter, measurement of frequency
- Topic No.7 Heterodyne techniques and digital frequency counters, Signal generators.

**UNIT NO.2 General Methods & Analysis:**

- Topic No.8 LCR direct and bridge methods, Waveform analysis, Cathode ray oscilloscopes
- Topic No.9 Measurement of harmonic and Inter-modulation distortion, Distortion analyzers, spectrum analyzer
- Topic No.10 Configurations and performance characteristics of instruments
- Topic No.11 Motion requirement, relative displacement and velocity
- Topic No.12 Translational and seismic displacement
- Topic No.13 Velocity and acceleration measurements
- Topic No.14 Torque measurement and rotating shaft
- Topic No.15 Pressure and flow measurements
- Topic No.16 Temperature based on expansion
- Topic No.17 Electric resistance and radiation methods
- Topic No.18 Problems involved in temperature measurements, Compensation techniques

**UNIT NO.3 Electrostatic Sensitive Devices:**

- Topic No.19 Electromagnetic Environment Requirements for airborne equipment
- Topic No.20 Sensors for the measurement of altitude
- Topic No.21 Air speed, acceleration, temperature, fuel flow and quantity
- Topic No.22 Instrument displays, Panels and cockpit layout
- Topic No.23 Flight instruments, Gyroscopic instruments, Power plant instruments, Navigation instruments

**UNIT NO.4 Display Instruments:**

- Topic No.24 Moving map displays, Multifunction displays
- Topic No.25 Head-up displays, glass cockpit, Cockpit lighting, panels: integral, glopanels
- Topic No.26 Typical Electronic/ Digital Aircraft Systems: ECAM, (Electronic Centralised Aircraft Monitoring), EFIS (Electronic Flight Instrument Systems)
- Topic No.27 EICAS (Engine Indicating & Crew Alerting Systems), FMS (Flight Management Systems)

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. E H J Pallet: Aircraft Instruments - Principles and Applications, Himalayan Books
2. E H J Pallet, Automatic Flight Control, Blackwell
3. Leach Malvino, Digital Principles and Applications, Tata McGraw Hill.

**Reference Books :**

1. A K Sawhney: Electrical Measurements and Measuring Instruments.
2. C.A. Williams: Aircraft Instruments, Galgotia



**SYLLABUS: B Tech (AERO)**

**Department: Aeronautical Engineering – 4<sup>th</sup> Semester**

**Subject: Aircraft Instrumentation Lab**

**Subject Code: AER-212B**

**Detailed Content**

**List of Experiments:**

1. Charging and discharging of batteries.
2. VTVM digital voltmeter.
3. Load test on dc generator
4. Synchronization of two generators.
5. Study of rectifier.
6. Measurement of power using ammeter, voltmeter method
7. Measurement of power using wattmeter.
8. Study of cables and relays.
9. Measurement of power using instrument transformer
10. Study of oscilloscope
11. Study of starters

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 have to be performed in the semester.
2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus of AER-308B



### SYLLABUS: B Tech (AERO)

Department: Aeronautical Engineering – 4<sup>th</sup> Semester

Subject: MANUFACTURING PRACTICE LAB

Subject Code: ME 218B

### Detailed Content

#### List of Experiments:

1. To make a pattern for a given casting with all the necessary allowances, parting line, running system details. Prepare the mold and make the casting. Investigate the casting defects and suggest the remedial measures.
2. To make a component involving horizontal and vertical position welding and study the welding defects and suggests their remedies.
3. To prepare a job on surface grinder/cylindrical grinder and measure the various parameters of the finished piece.
4. To cut external threads on a lathe.
5. Manufacture and assembly of a unit consisting of 2 to 3 components to have the concept of tolerances and fits (shaft and bush assembly or shaft, key and bush assembly or any suitable assembly).
6. Leveling of machine tools and testing their accuracy.
7. Disassembly and assembly of small assemblies such as tail stock, bench vice, screw jack etc.
8. Development and manufacture of complex sheet-metal components such as funnel etc.
9. Multi slot cutting on milling machine by indexing.
10. Drilling and boring of a bush.
11. Modeling of 3D runner system and creation of drawing for manufacturing of the casting patterns.
12. Development of blank size for complex sheet metal components using drawing software and compare results with manual calculation method.

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	

#### 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 (ME 202B).





### SYLLABUS: B Tech (Aero)

Department: Aeronautical Engineering-4<sup>th</sup> Semester

Subject: Environmental Studies Field Work

Subject Code: GES 203B

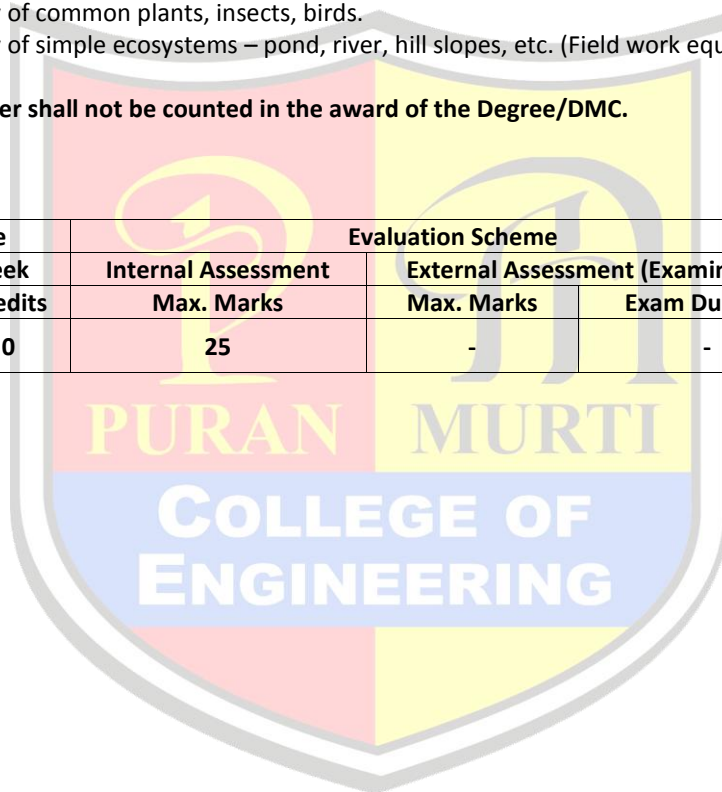
### Detailed Content

#### 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-4<sup>th</sup> Semester**

**Subject: General Proficiency**

**Subject Code: GPAER- 202B**

**Detailed Content**

The purpose of this course is to inculcate a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook. The student efforts will be evaluated on the basis of his/ her performance / achievements in different walks of life.

A Faculty Counselor will be attached to a group of students which will remain associated with him /her during the entire period of the degree program in the University. Each faculty member will serve as a faculty counselor. They will act like a local guardian for the students associated with him / her and will help them in terms of career guidance, personal difficulties.

A. The student will present a written report before the committee with following in view:

The student will present before the committee his/her achievements during the current academic session in the form of a written report highlighting followings:

- |     |                                                                    |            |
|-----|--------------------------------------------------------------------|------------|
| I.  | Academic Performance                                               | -----      |
| II. | Extra Curricular Activities / Community Service, Hostel Activities | (8 Marks)  |
| III | Technical Activities / Industrial, Educational tour                | (8 Marks)  |
| IV  | Sports/games                                                       | (14 Marks) |
| V   | Moral values & Ethics                                              | (15 Marks) |

**NOTE: Report submitted by the students should be typed on both sides of the paper.**

B. A student will support his/her achievement and verbal & communicative skill through presentation before the Committee. (30 Marks)

C. Moral values & Ethics

Syllabus - Process for Value Education, self-evaluation concept and process.

A minor test will be conducted during the semester and It will be the duty of the concerned teacher assigned to teach Moral values & Ethics to submit the awards to respective chairman of the department / Director/Principal.

The evaluation of this course will be made by the following Committee.

**University Departments:**

- |   |                               |          |
|---|-------------------------------|----------|
| 1 | Chairperson of the Department | Chairman |
| 2 | Senior Most Faculty Counselor | Member   |
| 3 | Vice- Chancellor's Nominee    | Member   |

**Affiliated Colleges:**

- |   |                                                     |          |
|---|-----------------------------------------------------|----------|
| 1 | Director/Principal                                  | Chairman |
| 2 | Head of the Department/Sr. Faculty                  | Member   |
| 3 | External Examiner to be appointed by the University | Member   |

**Note: Remuneration will be paid to the external examiner only (at par with the other practical examinations).**

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	-	75	-	75