B SC (Honours) AM SEMESTER –V TEACHING & EXAMINATION SCHEME												
SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME				
								THEORY		PRACT		TOTAL
			L	T	P			CIE	ESE	CIE	ESE	
1	AM0531	Environmental Science	4	0	0	4	4	60	40	00	00	100
2	AM0532	Aircraft system 2	6	0	4	6	8	60	40	60	40	200
3	AM0533	Quality management system	6	1	0	6	6	60	40	00	00	100
4	AM0534	AEEC 1	4	0	8	4	8	00	00	60	40	100
TOTAL			**20**	**13**	**1**	12	26	**180**	**120**	**120**	**80**	**500**

Subject: **ENVIROMENTAL SCIENCE**								
Program: **B Sc (Honours) AM**				Subject Code:AM0531			Semester: **V**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	0	0	06	16/40	00	24/60	00	100

Course Objectives

1. Introduction to environmental studies & Ecosystems.
2. Study about Natural Resources : Renewable and Non-renewable Resources.
3. Study about Biodiversity and Conservation.
4. Study about Environmental Pollution.
5. Study about Environmental Policies & Practices.
6. Study about Human Communities and the Environment.

Course outcomes:

CO 1: Define the multi-disciplinary nature of the environment, itscomponents, and inter-relationship between man and environment.

CO 2: Perceive the relevance and importance of the natural resources in the sustenance of life on earth and living standard.

CO 3: Comprehend the importance of ecosystem, biodiversity and natural bio geo chemical cycle.

CO 4: Correlate the human population growth and its trend to the environmental degradation and develop the awareness about his/her role towards environmental protection and prevention.

CO 5: Identify different types of environmental pollution and control measures. CO 6: Analyze exploitation and utilization of conventional and non-conventional resources.

Course Content:

Unit 1	**Introduction to environmental studies** Multidisciplinary nature of environmental studies Scope and importance; Concept of sustainability and sustainable development **Ecosystems** What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	**15 Hrs.**
Unit 2	**Natural Resources : Renewable and Non-renewable Resources** Land resources and land use change; Land degradation, soil erosion and Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. Water: Use and over--exploitation of surface and ground water floods droughts conflicts over water (international & inter--state). Energy resources : Renewable and non-renewable energy sources, Use of alternate energy sources, growing energy needs, case studies. **Biodiversity and Conservation** Levels of biological diversity : genetic, species and ecosystem diversity; Biogeographic zones of India ; Biodiversity patterns and global biodiversity hot spots. India is a mega- biodiversity nation ; endangered and endemic species of India. Threats to biodiversity : Habitat loss, poaching of wildlife, man--wildlife conflicts, biological invasions; Conservation of biodiversity : In--situ and Ex--situ conservation of biodiversity. Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.	**15 Hrs.**

Unit 3	**Environmental Pollution** Environmental pollution : types, causes, effects and controls; Air, water, soil and noise pollution. Nuclear hazards and human health risks Solid waste management : Control measures of urban and industrial waste. Pollution case studies **Environmental Policies & Practices** Climate change, global warming, ozone layer depletion, acid rain and Impact on human communities & agricultural. Environmental Laws : Environment Protection Act; air (Preventation & Control of Pollution) Act; water (Preventation and control of pollution) Act; Environment Protection Act; air (Preventation Wildlife protection Act; Forest Conservation Act. International agreements : Montreal and Kyoto protocols and convention on biological diversity (CBD) Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context.	**15 Hrs.**
Unit 4	**Human Communities and the Environment** Human population growth: Impacts on environment, human health and welfare. Resettlement and rehabilitation of project affected persons; case studies Disaster management : floods, earthquake, cyclones and landslides. Environmental movements : Chipko, Silent valley, Bishnois of Rajasthan Environmental ethics: Role of Indian and other religions and cultures in environmental conservation. Environmental communication and public awareness, case studies (e.g.CNG vehicles in Delhi). **Field work** Visit to an area to document environmental assets: river/ forest/ flora/fauna. Visit to a local polluted site--Urban/Rural/Industrial/Agricultural. Study of common plants , insects, birds and basic principles of identification. Study of simple ecosystems--pond, river etc	**15 Hrs.**

Reference Books

1 Gadgil, M., & Guha, R.1993. This Fissured Land: An Ecological History of India. Univ. of California Press

2 Gilbert M.Masters, "Introduction to Environmental Engineering and Science", Pearson education Pvt., Ltd., second edition, ISBN 81-297-0277-0, 2004.

3 Miller T.G. JR., "Environmental Science", Wadsworth publishing co.

4 Odum, E.P., Odum, H.T. & Andrews, J. 1971.Fundamentals of Ecology. Philadelphia: Saunders.

5 Sengupta, R. 2003. Ecology and economics: An approach to sustainable development. OUP.

6 Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi

7 Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. Conservation Biology: Voices from the Tropics. John Wiley & Sons.

8 Thapar, V. 1998. Land of the Tiger: A Natural History of the Indian Subcontinent

9 Rao, M.N. & Datta, A.K. 1987. Waste Water Treatment. Oxford and IBH Publishing Co. Pvt. Ltd.

Program: **B Sc (honours) AM**				Subject Code:**AM0532**			Semester: **V**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	0	4	6	60	60	40	40	200

Course Objectives :

1. Aircraft Weight and Balance, Aircraft Handling and Storage
2. Aircraft taxiing/towing and associated safety precautions; Aircraft jacking,
3. Pneumatic/Vacuum (ATA 36),Air Conditioning and Cabin Pressurization (ATA 21)
4. Equipment and Furnishings (ATA 25),Flight Controls (ATA 27),Fuel Systems (ATA 28)
5. Hydraulic Power (ATA 29)
6. Ice and Rain Protection (ATA 30), Landing Gear (ATA 32), Abnormal Events (ATA 05)

Course Outcomes :

CO 1: Explain Aircraft Electrical Power systems. [BT-2]

CO 2: Compare Aircraft light systems for different aircrafts. [BT-5]

CO 3: Categorize different types of Instrument systems of Aircraft. [BT-4]

CO 4: Illustrate oxygen system of Aircraft with suitable layout. [BT-4]

CO 5: Describe Integrated Modular Avionics (IMA). [BT-2]

CO 6: Illustrate diagrammatically door and warning systems.[BT-3]

Course Content :

Unit 1	**Aircraft Weight and Balance** (a) Centre of Gravity/Balance limits calculation: use of relevant documents; (b) Preparation of aircraft for weighing; Aircraft weighing; **Aircraft Handling and Storage** **Aircraft taxiing/towing and associated safety precautions; Aircraft jacking,** chocking, securing and associated safety precautions; Aircraft storage methods; Refuelling /defueling procedures; De-icing/anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies. Effects of environmental conditions on aircraft handling and operation. **Pneumatic/Vacuum (ATA 36)** System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.	**15 Hrs.**
Unit 2	**Air Conditioning and Cabin Pressurization (ATA 21)** Air supply- Sources of air supply including engine bleed, APU and ground cart; Air Conditioning- Air conditioning systems; Air cycle and vapour cycle machines Distribution systems; Flow, temperature and humidity control system. Pressurization - Pressurization systems; Control and indication including control and safety valves; Cabin pressure controllers. Safety and warning devices; Protection and warning devices. **Equipment and Furnishings (ATA 25)** Emergency equipment requirements; Seats, harnesses and belts, electronic emergency equipment requirements Cabin lay-out, cargo retention; Equipment lay-out; Cabin Furnishing Installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs. Lifting system; Emergency flotation systems;	**15 Hrs.**
Unit 3	**Flight Controls (ATA 27)** Primary controls: aileron, elevator, rudder, spoiler; Trim control; Active load control; High lift devices; Lift dump, speed brakes; System operation: manual, hydraulic, pneumatic, electrical, fly-by-wire; Artificial feel, Yaw damper, Mach trim, rudder limiter, gust locks systems; Balancing and rigging; Stall protection/warning system. **Fuel Systems (ATA 28)** System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defueling; Longitudinal balance fuel systems. **Hydraulic Power (ATA 29)** System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical, pneumatic; Emergency pressure generation;Filters; Pressure Control; Power distribution; Indication and warning systems; Interface with other systems.	**15 Hrs.**
Unit 4	**Unit 4** **Ice and Rain Protection (ATA 30)** Ice formation, classification and detection; Anti-icing systems: electrical, hot air and chemical; De-icing systems: electrical, hot air, pneumatic and chemical; Rain repellant; Probe and drain heating; Wiper systems.	**15 Hrs.**

	Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and auto-braking; Tyres; Steering; Air-ground sensing; Skids, floats. **Abnormal Events (ATA 05)** (a) Inspections following lightning strikes and HIRF penetration. (b) Inspections following abnormal events such as heavy landings and flight through turbulence.	

Reference Books:

Airframe and Powerplant Mechanics (AC 65-15A) -Airframe Hand Book FAA Civil Aircraft Inspection Procedure (CAP 459) Part II Aircraft A & P technician Air Frame Text Book by Jeppesen

Aircraft Repair Manual (FAA-AC-43.13)-By Larry Reithmaier Aviation Maintenance Technician Hand book by FAA Hydraulic Servo Systems by M. GUILLON: Aircraft Instruments-by E.H.J.Pallett

Aircraft Electrical System-by E.H.J.Pallett

List of Practical:

1. Jacking and leveling of an aircraft. Record caution, warnings and procedure
2. Locate and inspect Bleed components installed on aircraft and use maintenance manual.
3. Locate and inspect components of air-conditioning system and indications and use maintenance manual.
4. Locate and inspect components of aircraft pressurization system and safety devises and use maintenance manual.
5. Replace passenger seats and Check seat belts for serviceability.
6. Identification and inspection of flight control system
7. Rigging and operational check flight control systems
8. Identification and inspection of landing gear systems. Wheel and Brake removal installation.
9. Identification and inspection of Fuel system
10. Quantity Indicating systems functional testing.
11. Inspection of aircraft hydraulic system and servicing
12. Inspection for lightning strike protection.

Subject: **Quality Management System**

Program: **B Sc (Honours) AM**			Subject Code:**AM0533**				Semester: **V**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
04	02	00	6	40	00	60	00	100

Course Objective :

1. Meaning of Quality and quality improvement
2. Module 2 :Quality Control
3. Module 3 :Production Control
4. Module 4: Quality Assurance
5. Module 5 : Aerospace certification.
6. Module 6: Regulatory Compliance

Course Outcomes:

CO 1: Explain Airfield lightning system, Aircraft rescue and fire fighting. [BT-2]

CO 2: Demonstrate maintenance and handling procedures of ground equipment. [BT-3]

CO 3: Perform experiment for different rigging procedures. [BT-3]

CO 4: Assemble and maintenance of Landing gear. [BT6]

CO 5: Identify the signals given by tower at Airport. [BT-1]

CO 6: Classify different types of Air conditioning and heating unit. [BT-4]

Course Content :

Unit 1	**MODULE I: INTRODUCTION** Descriptors/Topics Meaning of Quality and quality improvement, need of automobile & Aviation Quality, Introduction to Statistical methods for quality control, Process Capability for aerospace applications.	**15 Hrs.**
Unit 2	**MODULE II : QUALITY CONTROL** Statistical quality control , Ishikawa diagram, control charts, control charts for attributes & variables,Moving average chart for aviation quality systems. **MODULE III: PRODUCTION CONTROL** Acceptance sampling OC curve, sampling plan, Producer's risk, Consumers risk, Average quality level,AOQL,Design of single & double sampling plan.	**15 Hrs.**
Unit 3	**MODULE IV: QUALITY ASSURANCE** Need of Aerospace Quality Assurance, Quality Audit, total quality management, Concept of Zero defect, ISO-9001 quality systems, IAQG, AS-9100 Aerospace Standards. **MODULE V : AEROSPACE CERTIFICATION** DGCA, FAA, EASA and IATA Requirements and Standards Aerospace Quality manuals, aircraft airworthiness, documentation, Safety practices & standards. Quality Policy, Objective, Quality Requirements, Quality procedures and evidence retention ,	**15 Hrs.**
Unit 4	**MODULE VI: REGULATORY COMPLIANCE** Quality Standards / Regulatory Compliance – Compliance Records. **Audit and Surveillance** Auditing techniques, recording findings, communication, assessing compliance action and monitoring compliance. Statistical analysis and risk, assessment. Risk based surveillance.	**15 Hrs.**

LIST OF TUTORIALS :

1. Develop typical quality system for five specific activities of Aircraft maintenance industry.
2. Carryout audit of five specific activities of aircraft maintenance industry establish regulatory compliance and record recommendation.

Carryout audit of five specific activities of aircraft maintenance industry record findings, document evidence, communicate findings, verify action taken and root cause assessment and carryout risk assessment.

Reference Books

EL Grant & RS Leavenworth, "Statistical Quality Control", McGraw Hill Co. M.
Mahajan, "Statistical Quality Control", Dhanpat Rai & Co.
Kanishka Bedi "Quality Management", Oxford University Press

ISO 9001
AS 9100
DGCA – Civil Aviation Requirements
IATA – IOSA Standards Manual

Subject: **AEEC1**								
Program: **B Sc (Honours) AM**				Subject Code:**AM0534**			Semester: **V**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
00	0	8	4	0	40	60	00	100

SR NO	LIST OF ELECTIVES (FOR 5TH AND 6TH SEMESTER)	BARNCH
1	Typical Gas Turbine Engine Maintenance	MECHANICAL
2	Aircraft (Hydraulic) Component Maintenance	MECHANICAL
3	Aircraft (landing gear) Component Maintenance	MECHANICAL
4	Aircraft wheels and Breaks - Component Maintenance	MECHANICAL
5	Aircraft Electrical Component Maintenance	AVIONICS
6	Aircraft Instruments Maintenance	AVIONICS
7	Aircraft communication and navigation system component maintenance	AVIONICS
8	Typical Aircraft Maintenance – Avionics Fixed wing Aircraft - Fly by wire)	AVIONICS

Note: Student have to opt any one subject from above mentioned list of subjects