Tulsiramji Gaikwad-Patil College of Engineering and Technology
Wardha Road, Nagpur-441 108
NAAC Accredited (A+ Grade)

B. Tech. Aeronautical Engineering

BAEXX18: Aircraft Systems and Instrumentations

Teaching Scheme	
Lectures	**03 Hrs/Week**
Tutorials	**00 Hrs/Week**
Total Credits	**03**

Examination Scheme	
CT-1	15 Marks
CT-2	15 Marks
CA	10 Marks
ESE	60 Marks
Total	100 Marks
Duration of ESE: 03 Hrs	

Course Contents

Unit I	**Airplane Control Systems** Conventional Systems, Power assisted and fully powered flight controls, Power actuated systems, Engine control systems, Push pull rod system, flexible push pull rod system, Modern control systems, Digital fly by wire systems, Auto pilot system, Active control Technology, Communication and Navigation systems, Instrument landing systems, VOR - CCV case studies.
Unit II	**Aircraft Hydraulic Systems** Hydraulic systems, Study of typical workable system, components, Hydraulic system controllers, Modes of operation.
Unit III	**Pneumatic and Hybrid Systems** Pneumatic systems, Advantages, Working principles, Typical Air pressure system, Brake system, Typical Pneumatic power system, Components, Landing Gear systems, Classification, Shock absorbers, Retraction mechanism.
Unit IV	**Engine Systems** Fuel systems for Piston and jet engines, Components of multi engines. Lubricating systems for piston and jet engines, Starting and Ignition systems, Typical examples for piston and jet engines.
Unit V	**Auxiliary System** Basic Air cycle systems, Vapour Cycle systems, Boost-Strap air cycle system, Evaporative vapour cycle systems, Evaporative air cycle systems, Oxygen systems, Fire protection systems, Deicing and anti-icing systems. **Aircraft Instruments** Flight Instruments and Navigation Instruments, Gyroscope, Accelerometers, Air speed Indicators, TAS, EAS, Mach Meters, Altimeters, Principles and operation, Study of various types of engine instruments, Tachometers, Temperature gauges, Pressure gauges, Operation and Principles.

Text Books

1	McKinley, J.L., and Bent, R.D., "Aircraft Maintenance & Repair", McGraw-Hill, 1993.
2	"General Hand Books of Airframe and Power plant Mechanics", U.S. Dept. of Transportation, Federal Aviation Administration, The English Book Store, New Delhi1995.

Reference Books

1	Allan G. Seabridge and Ian Moir, "Design and Development of Aircraft Systems: An Introduction ", (AIAA Education Series), 2004.

Useful Links

1	https://nptel.ac.in/courses/101/104/101104071/
2	https://nptel.ac.in/courses/101/104/101104071/

	Course Outcomes	CL	Class Sessions
BAEXX18.1	**Describe** the working principles of control systems in an aircraft.	2	9
BAEXX18.2	**Summarize** the operations of Hydraulic, Pneumatic and Landing gear systems.	2	9
BAEXX18.3	**Illustrate** the concepts of starting, ignition, fuel and lubricating systems of typical aircraft power plants.	3	9
BAEXX18.4	**Discuss** the ideas of air cycle systems along with fire protection, deicing and anti-icing systems.	3	9
BAEXX18.5	**Explain** the technical aspects of aircraft instruments and their working principle.	2	9

Head Of Department
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29/08/23

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