Course Title	Course Code	Credit Hours
Aerospace Instrumentation	AE-352	2 – 1

Textbooks:

- Alan S. Morris, “Measurement and Instrumentation Principles”, Elsevier Science
- Alan S. Morris and Reza Langari, “Measurement and Instrumentation: theory and Application”, Elsevier Science

Reference Books/Materials:

- Dominique Placko, “Fundamentals of Instrumentation and Measurement”, ISTE/Hermes Science Publishing
- Thomas G. Beckwith, Roy D. Marangoni and John H. Lienhard, “Mechanical Measurements”, Addison-Wesley
- Thomas Forenz, Aviation Maintenance Technician Certification Series, “Electrical Fundamentals”

Course Objectives:

This course aims to help students in:

- Understanding of Instrumentation Systems, Measurement Processes, Sensors, and Data Acquisition.
- Performance Characteristics, Time-Dependent Effects, Measurement Errors, and Uncertainty to Enhance Data Evaluation.

Course Outline:

- Overview of Measurement and Instrumentation Course Objectives and Assessment Methods
- Principles of Measurement, Units, and System Applications
- Elements of Measurement Systems and Choosing Appropriate Instruments
- Potentiometers, Wheatstone bridge, and Related Examples
- Static Characteristics: Precision, Accuracy, Repeatability, and Range
- Sensitivity, Linearity, Threshold, and Resolution in Static Instruments

- Operational Modes: Sensitivity Drift, Hysteresis, and Dead Space
- Zero-Order and First-Order Dynamic Instruments, Capacitive and Inductive Circuits
- Incremental and Absolute Encoders
- Principles of Temperature Measurement and International Practical Temperature Scale
- Thermocouples: Principles, Types, and Examples
- Varying Resistance Devices: Resistance Temperature Devices and Thermistors
- Introduction to LabVIEW: Virtual Instruments, VI Components, and Data Flow
- Developing VIs in LabVIEW: Numeric, Comparison, and Boolean Functions
- Loops, Shift Registers, and case Structures in LabVIEW
- Timing Functions, Local Variables, Sequential Programming, and Data Acquisition in LabVIEW
- Pressure Measurement Basics: Manometers, Barometers, Bourdon Tubes, and Sensors