Course Title	**Electronic Instrumentation**
Course Code	**EE5331**
No. of Credit Hrs (Lecture + Tutorial + Lab)	**3 (2+0+1)**
No. of Contact Hrs (Lecture + Tutorial + Lab)	**4 (2+0+2)**
Level-Year	**9/10-5**
Prerequisite (if any)	**EE3404, EE3305**

1) Course Objectives:

To familiarize with various components, devices and techniques used in the electronic instrumentation systems. After the completion of this course, the students will gain a good understanding of working principles and applications of electronic instrumentation systems.

2) Expected Learning Outcomes:

By the end of this course the student will:

1. Explain the working principles of transducers and measurement systems. PLO1 [1]
2. Compare and differentiate different types of recorders and display systems. PLO1 [1]
3. Illustrate and operate digital meters for electrical measurements. PLO1 [1]
4. Analyze waveforms using digital storage oscilloscopes, CROs, wave analyzers, and spectrum analyzers. PLO3 [6]
5. Employ and perform laboratory experiments with PC-based data acquisition systems and other instrumentation tools. PLO3 [6]
6. Communicate experimental results effectively through structured laboratory reports. PLO8 [3]

3) Course Contents:

1. Digital multimeters, digital frequency meters, and digital Voltmeters (DVMs).
2. Oscilloscopes; block diagram, applications of oscilloscopes, storage-type digital oscilloscopes.
3. Signal generators.
4. Wave analyzer and spectrum analyzer.
5. Instrumentation amplifiers.
6. Electrical transducers: Linear variable differential transformer (LVDT), Strain gauges, Electromagnetic flow meter, Temperature transducers and pressure measurement.
7. Analog recorders and digital recorders.
8. Display systems.
9. Data acquisition (DAQ) systems.

4) Lab Experiments

1. Setting up of spectrum analyzer for waveform analysis.
2. Displacement measurement using LVDT: Study of operating characteristics.
3. Measurement of strain using strain gauge: Study of operating characteristics.
4. Temperature measurement using thermocouple and thermistor: Studying the operating characteristics.
5. Design and implementation of Instrumentation amplifier.
6. Interfacing the electrical transducers to microcontroller/development-boards/ displays.
7. Acquisition of physical phenomena using DAQ systems.

5) Teaching Methods:

- Lectures and Discussion
- Videos

- Self-learning
- Laboratory demonstrations

6) Mode of Evaluation: Course Assessment Methods

- Quizzes , Assignment, Homeworks, Reports, Presentations etc.
- Lab Work
- Mid Exam
- Final Exam

Evaluation

No	Assessment Activities *	Percentage
1.	Assignments/Quizzes/HomeWorks/Mini-Projects/Presentations/Reports+Quizzes	15%
2.	Mid Exam	25%
3.	Lab/Tutorial (Lab Exam)	10%
4.	Lab/Tutorial (Lab Reports)	10%
5.	Final Exam	40%

7) Textbook(s):

- "Electrical and Electronics Measurements and Instrumentation" Prithwiraj Purkait et al, McGraw Hill Education Private Limited (2013).

8) References:

- K. Sawhney – A Course in Electrical electronic measurement in instrumentation.
- Kalsi, H.S., Electronic Instrumentation, Tata McGraw Hill (2007).