Course Syllabi: UEE403: Measurement and Transducers (L : T : P :: 3 : 0 : 2)

1. **Course number and name**: UEE403: Measurement and Transducers

2. **Credits and contact hours**: 4.0 and 5

3. **Text book, title, author, and year**

Text Books / Reference Books

- *Golding, E.W., and Widdis, F.C., Electrical Measurements and Measuring Instruments, Pitman (2003).*
- *Sawhney, A.K., a Course in Electrical and Electronic Measurements and Instrumentation, DhanpatRai and Co. (P) Ltd. (2007).*
- *Nakra, B. C. and Chaudhry, K. K., Instrumentation Measurement and Analysis, Tata McGraw–Hill (2003).*
- *Murthy, D.V.S., Transducers and Instrumentation, Prentice–Hall of India Private Limited (2003).*
- *Doeblin, E.O., Measurement systems, Applications and Design, McGraw–Hill (1982).*

a. Other supplemental materials
   - Nil

4. **Specific course information**

a. Brief description of the content of the course (catalog description)

Units, Systems and Standards: SI units, Classification of standards, Time and frequency standards, Electrical standard.

Electromechanical Indicating Instruments: PMMC galvanometer, Ohmmeter, Electrodynamometer, Moving iron meter, Rectifier and thermo-instruments, Comparison of various types of indicating instruments.

Power and Energy Measurement: Electrodynamometer type of wattmeter and power factor meter, Single-phase induction and Electronic energy meters.

Bridges for Measurement: Kelvin double bridge, AC bridges: Maxwell's bridge, Hay's bridge, Schering bridge, Wien's bridge, Low and High resistance measurement.

Electronic Instruments: Electronic multi-meter, Quantization error, Digital frequency meter, Q meter, Spectrum Analyzer, Digital Storage Oscilloscopes.

Sensors and Transducers: Basic principle and applications of Resistive, Inductive, Capacitive and, Piezoelectric sensors, Synchros and Resolvers, Fiber optic sensors, Hall-Effect, Photo transducer, Photovoltaic, Digital transducers, Tacho-generators, shaft parameters measurement in rotating shafts.

5. **Specific goals for the course**

After the completion of the course, the students will be able to:

- Select various types of instruments for measurement of variables.
- Select and use various types of sensors in different conditions.
- Select and use various types of bridge circuits with different sensors.
- Explain the working of electronic instruments.
- Explain the working of sensors and transducers.

6. **Brief list of topics to be covered**
    - Units, Systems and Standards
    - Electromechanical Indicating Instruments
    - Power and Energy Measurement
    - Bridges for Measurement
    - Electronic Instruments
    - Sensors and Transducers