Course Type	Course Code	Name of Course	L	T	P	Credit
OE 2	MEO 301	Mechanical Measurement	3	0	0	9

Course Objective
• To provide knowledge of various measuring instruments, highly accurate and precise instruments.
Learning Outcomes
Upon successful completion of this course, students will: Learn use of measuring instruments, errors and sources of errors,

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1.	Introduction to measurement, definition, purpose and structure of measurement systems, linear and angular measurements, Errors in measuring instruments, sources of errors, types of errors and quantification of different types of errors in measurement; principle of calibration.	8	Introduction to measuring systems.
2.	Static and dynamic performance characteristics of measuring instruments, Limits, fits and tolerances; comparators. Interferometry, form and surface finish measurement.	9	Behavior of measuring instruments under different measuring conditions.
3.	Alignment and testing methods for machine tools; tolerance analysis in manufacturing and assembly.	6	Able to perform testing of machine tool alignment.
4.	Introduction to sensors, transducer and actuator, sensing elements: working principles of resistive, capacitive, inductive, thermoelectric, piezoelectric, piezoresistive, hall effect sensors, optical sensors and encoders, charge coupled devices.	10	Knowledge about different electronic sensing elements.
5.	Principle of measurement of pressure, strain, force, temperature. Introduction to virtual instrumentation.	9	Knowledge about measurements of different mechanical parameters.

Text Books

1. Experimental Methods for Engineers, J. P Hollman, Tata McGraw-Hill Education, 8E,2011.

Reference Books:

1. Bentley John, P. Principle of Measurement system, Pearson education, 2005.
2. Measurement and Instrumentation in Engineering: Principles and Basic Laboratory Experiments, Francis L. S. Tse, Ivan E. Morse, Marcel Dekker Inc, New York.
3. Mechanical Measurement, Beckwith Thomas G, Narosa Publishing House .
4. Measurement systems, Application design, E.O. Doeblein, McGraw Hill.
5. Instrumentation, Measurement and Analysis (2/e), Nakra& Chowdhury.