

CODE: AE305 Title: Measurements and Instrumentation										
L	T	P	Credit	Area		CWS	PRS	MTE	ETE	PRE
3	0	2	4	DCC		15	25	20	40	-

Objectives: To familiarize and analyze the instrument's performance, understand different types of measuring instruments, and apply their knowledge to measure physical quantities

Syllabus		Contact Hours
Unit-1	Basic concepts, Generalised Measurement System: definition of terms, calibration, standards and errors, static and Dynamic performance characteristics; analysis of experimental data	8
Unit-2	instrumentation for measurement of Position and displacement, force, Strain, pressure, temperature, proximity and range. Concept of feedback;	6
Unit-3	open and close loop systems: Loop control systems, transducers and devices for applications, digital readouts, data Acquisition and processing.	7
Unit-4	introduction, measuring instruments, measuring range, sensitivity, repeatability, precision and accuracy. Standards: definitions of line standard, end standard and wavelength standard, sub divisions of Standards. Slip gauges. Measurement of angles: introduction, bevel venire protractor, sine bar, angel gauges, spirit level, Autocollimator, angle dekkor, rotary tables, precision polygon, calibration of polygons. Measurement of internal and external tapers	7
Unit-5	Measurement of threads: introduction, screw thread terminology, pitch error, angle error, measurement of major and minor diameter, measurement of effective diameter by one wire, two wire and three wire Method. Best size wire. Measurement of surface finish: introduction, surface texture, surface roughness terminologies, methods of measuring surface finish, stylus probe instruments, taylor hobson talysurf, sample length or cut off Length, analysis of surface traces.	8
Unit-6	Gear measurements: introduction, terminology of gear tooth, errors in manufacturing gears, rolling Test, measurement of tooth thickness, Parkinson gear tester. Inspection of straightness, flatness, and alignment. Interferometry and use of optical flats. Measurement of coordinates using coordinate measuring machine	6
	Total	42

Reference Books:	
1	T.G.Beckwith,"Mechanical measurements", N. L. Buck and R. D. Marangoni, 3rd Ed, Narosa Publishing house.1993, ISBN 10: 0201004542 ISBN 13: 9780201004540
2	R. K. Jain,"Metrology",Khanna pub. 2002, ISBN-13978-81-7409-153/ISBN-1081- 7409-153
3	C. Dotson,"Fundamentals of dimensional metrology", R. Harlow and R. Thomson. Pub. 2003, ISBN-13: 978-1418020620/ISBN-10: 1418020621
4	B. C. Nakra and K. K. Chaudhari,"Instrumentation, measurement and analysis",Tata McGraw-Hill, 19855, ISBN 0070482969, 9780070482968
5	Turner and Hill,"Instrumentation for Engineers and Scientists", Oxford university Press, ISBN-10: 0198565178ISBN-13: 978-0198565178

Course Outcomes

CO1	To Study the basic concept of measurement and its performance characteristics.
CO2	To explain about open loop and close loop systems.
CO3	To describe the measurement calibration and it's all terms.
CO4	To analyze the performance characteristics of each instrument
CO5	To explain the concept of measurement for various practical problems.
CO6	To apply the knowledge of measurement for various case studies.

CO-PO/PSOMatrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	0	0	0	0	0	0	2	2	1	1
CO2	3	3	2	3	1	0	0	0	0	0	0	1	2	1	1
CO3	3	3	3	3	1	0	0	0	0	0	0	2	3	3	2
CO4	3	3	3	3	1	0	0	0	0	0	0	1	3	3	2
CO5	2	2	2	2	2	0	0	0	0	0	0	1	2	2	2