

BHUBANANANDA ODISHA SCHOOL OF ENGINEERING, CUTTACK
DEPARTMENT OF MECHANICAL ENGINEERING



LESSON PLAN

SUBJECT: METROLOGY AND MEASUREMENT(TH-1)
BRANCH- MECHANICAL ENGG.
FACULTY: MANORAMA SARABU(Sr. Lect)

ACCADEMIC SESSION: 2026-27(W)

SEMESTER: 5TH

SEC: A

Manorama Sarabu
01/7/26

H O D (Mech. Engg.)

[Signature]
01.7.26



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COURSE OUTCOMES

- **C301.1:** Explain the principles, standards, methods, and errors involved in engineering measurements and measuring instruments.
- **C302.2:** Apply various precision measuring instruments, gauges, comparators, and surface finish measuring devices for dimensional inspection.
- **C303.3:** Describe the working principles and applications of transducers, strain gauges, and instruments used for force, torque, pressure, speed, flow, and temperature measurements.
- **C304.4:** Analyze limits, fits, tolerances, and gauge design principles used in mechanical engineering measurements and inspection systems.
- **C305.5:** Perform angular and screw thread measurements using precision instruments and standard measurement techniques.
- **C306.6:** Evaluate gear measurement methods and machine tool testing procedures for assessing accuracy, alignment, and performance of mechanical systems

LESSON PLAN

Discipline: Mechanical Engineering	Semester: 5TH (A)	Name of the Teaching faculty: Ms. MANORAMA SARABU
Subject: METROLOGY AND MEASUREMENT (TH-1)	No. of Days/ per week class allotted: 03 Periods per week	Semester From Date: 01-07-2026 To Date: 05-11-2026 No. of weeks: 17 weeks
Week	Class Day	No of periods available
1 st	1 st (1/07/26)	Unit-I Introduction to measurements: Definition of measurement; Significance of measurement; Methods of measurements:
	2 nd (06/07/26)	Direct & Indirect; Generalized measuring system; Standards of measurements: Primary & Secondary
	3 rd (07/07/26)	Factors influencing selection of measuring instruments; Terms applicable to measuring instruments:
2 nd	1 st (08/07/26)	Precision and Accuracy, Sensitivity and Repeatability,
	2 nd (13/07/26)	Range, Threshold, Hysteresis, calibration; Errors in Measurements
	3 rd (14/07/26)	Classification of errors, Systematic and Random error. Measuring instruments
3 rd	1 st (15/07/26)	Introduction; Thread measurements: Thread gauge micrometer
	2 nd (20/07/26)	Angle measurements: Bevel protractor, Sine Bar; Gauges: plain plug gauge, ring Gauge, snap gauge, limit gauge
	3 rd (21/07/26)	Comparators: Characteristics of comparators, Types of comparators;
4 th	1 st (27/07/26)	Surface finish: Definition, Terminology of surface finish, Talysurf surface roughness tester; Co-ordinate measuring Machine.
	2 nd (28/07/26)	UNIT-II Transducers and Strain gauges: Introduction; Transducers: Characteristics,
	3 rd (29/07/26)	classification of transducers, two coil self-inductance transducer
5 th	1 st (03/08/26)	Piezoelectric transducer; Strain Measurements: Strain gauge,
	2 nd (04/08/26)	Classification, mounting of strain gauges, Strain gauge rosettes two and three elements.
	3 rd (05/08/26)	Measurement of force, torque, and pressure



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6 th	1 st	(10/08/26)	Introduction; Force measurement: Spring Balance,
	2 nd	(11/08/26)	Proving ring, Load cell;
	3 rd	(12/08/26)	Torque measurement: Prony brake,
7 th	1 st	(17/08/26)	Eddy current, Hydraulic dynamometer;
	2 nd	(18/08/26)	Pressure measurement: Mcloed gauge.
	3 rd	(19/08/26)	CLAASS TEST-1
8 th	1 st	(24/08/26)	UNIT-III Applied mechanical measurements: Speed measurement: ;
	2 nd	(25/08/26)	Classification of tachometers, Revolution counters, Eddy current tachometers;
	3 rd	(26/08/26)	Displacement measurement: Linear variable Differential transformers (LVDT)
9 th	1 st	(31/08/26)	Flow measurement: Rotometers, Turbine meter
	2 nd	(1/09/26)	Temperature measure ment: Resistance thermometers, Optical Pyrometer.
	3 rd	(2/09/26)	Miscellaneous measurements: Humidity measurement: hair hygrometer;
10 th	1 st	(7/09/26)	Density measurement: hydrometer; Liquid level measurement: sight glass,
	2 nd	(8/09/26)	Float gauge; Biomedical measurement: Sphygmo monometer
	3 rd	(9/09/26)	INTERNAL-1
11 th	1 st	(15/09/26)	UNIT-IV: Limits, Fits & Tolerances: Concept of Limits, Fits, and Tolerances;
	2 nd	(16/09/26)	Selective Assembly; Interchangeability; Hole and Shaft Basis System
	3 rd	(21/09/26)	Taylor's Principle; Design of Plug; Ring Gauges; IS 919-1993 (Limits, Fits & Tolerances,
12 th	1 st	(22/09/26)	Gauges} IS 3477-1973; concept of multi gauging and inspection.
	2 nd	(23/09/26)	Angular Measurement: Concept; Instruments for Angular Measurements;
	3 rd	(28/09/26)	Working and Use of Universal Bevel Protractor, Sine Bar, Spirit Level;
13 th	1 st	(29/09/26)	Principle of Working of Clinometers; Angle Gauges (With Numerical on Setting of Angle Gauges).
	2 nd	(30/09/26)	Screw thread Measurements: ISO grade and fits of thread; Errors in threads;