



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) Scheme in light of NEP-2020
Generic Elective (Even Semester)
(2021-2025)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTMEGE25	GE	MECHANICAL MEASUREMENT TOOLS	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

***Teacher Assessment** shall be based following components: Quiz/Assignment/Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. Develop fundamental understanding of mechanical measurements
2. Impart knowledge of measurement concepts and their practice.
3. Develop knowledge of measurement errors and their causes.

Course Outcomes (COs):

After learning the course the students should be able to:

- (1). describe basic concepts of mechanical measurement
- (2). select linear measuring instrument for measurement of various components
- (3). select angular and taper measurement devices for measurement of various components
- (4). to measure various parameters such as force, torque, strain, velocity etc.
- (5). to measure temperature and pressure.

Syllabus

Unit – I

(9 Hrs)

Mechanical Measurement:

Need of mechanical measurement, Basic definitions: Hysteresis, Linearity, Resolution of measuring instruments, Threshold, Drift, Zero stability, loading effect and system response. Measurement methods, Generalized Measurement system, Static performance characteristics, Errors and their classification

Unit – II

(9 Hrs)

Linear and angular measurements:

Linear Measurement Instruments, Vernier calliper, Micrometer, Interval measurements: Slip gauges, checking of slip gauges for surface quality, Optical flat, Limit gauges, Problems on measurements with gauge.

Unit – III

(10 Hrs)

Measurement of Force, Torque and Strain:

Force measurement: load cells, cantilever beams, proving rings, differential transformers.

Measurement of torque: Torsion bar dynamometer, servo controlled dynamometer, absorption dynamometers. Power Measurements.

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Measurement of strain: Mechanical strain gauges, electrical strain gauges, strain gauge: materials, gauge factors, theory of strain gauges and method of measurement, bridge arrangement, temperature compensation.

Unit - IV

(8 Hrs)

Displacement, Velocity/Speed, and Acceleration, Measurement:

Working principal of Resistive Potentiometer, Linear variable differential transducers, Electro Magnetic Transducers, Mechanical, Electrical and Photoelectric Tachometers, Piezoelectric Accelerometer, Seismic Accelerometer

Unit – V

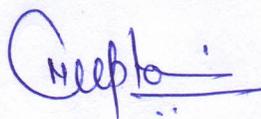
(9 Hrs)

Temperature and Pressure Measurement:

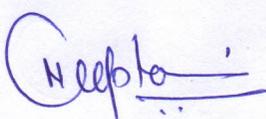
Temperature Measuring Devices: Thermocouples, Resistance Temperature Detectors, Thermistor, Liquid in glass Thermometers, Pressure Thermometers, Pyrometer, Bimetallic strip. Calibration of temperature measuring devices, Pressure measurement, Mechanical Gauges and Manometers

Text and Reference Books:

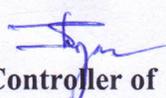
1. "Engineering Metrology and Measurement" by N V Raghavendra and Krishnamurthy, Oxford University Press, 2013.
2. "Metrology and Measurement" by Anand Bewoor & Vinay Kulkarni McGraw-Hill, 2017
3. "Instrumentation, Measurement and Analysis" by B.C. Nakra, K.K. Chaudhry McGraw-Hill, 2003.
4. "A course in Mechanical Measurements and Instrumentation" by A K Sawhney, Dhanpat Rai Publications, 2005.
5. "Mechanical Measurements and Instrumentations" by Er. R K Rajput, Kataria Publication (KATSON), 2005.
6. "Mechanical Measurement and Metrology" by R K Jain, Khanna Publisher, 2008
7. "Mechanical Measurement & Control" by D.S. Kumar, 2015



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