



# GUJARAT TECHNOLOGICAL UNIVERSITY

Syllabus for Bachelor of Vocation (B.Voc), 1<sup>st</sup> Semester

Branch: Production Technology

Subject Name: Mechanical Metrology-I

Subject Code: 21110304

With effective  
from academic  
year 2021-22

**Type of course:** Engineering Science

**Prerequisite:** Zeal to learn the subject

**Rationale:** Measurement and Metrology deals with the application of science in Mechanical Engineering. It provides a means of assessing the suitability of measuring instruments, their calibration, and the quality control of manufactured products.

**Teaching and Examination Scheme:**

Teaching Scheme			Credit C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA(M)	ESE(V)	PA(I)	
3	0	0	3	50	0	0	0	50

L- Lectures; P- Practical; OJT- On Job Training; C- Credit; ESE- End Semester Examination;  
PA- Progressive Assessment

**Content:**

Sr. No.	Topic	No. of Hours	% Weightage
01	<b>Introduction to Metrology</b> Meaning and scope of metrology in field of engineering, need of inspection, Accuracy and Precision, Objective of Metrology and Measurement, General Measurement Concept, Errors in Measurement, methods of measurement, Principle and Classification of measuring instruments.	4	10
02	<b>Linear Measurement</b> Graduated Scale, Scaled Instruments, Venier caliper, Venier depth gauge, Venier height gauge, Micrometer Instruments, Slip Gauges, Gauge Block Shapes, Grades, and Sizes, Calibration of Slip Gauge, method of selection of slip gauge, stack of slip gauge, adjustable slip gauge, wringing of slip gauge, care of slip gauge, slip gauge accessories, problems on slip gauges	12	30
03	<b>Angular Measurement</b> Measurement of angles, Protector, Sine Bar, Setting the Sine bars to desired angle, Measuring unknown angle with sine bar, Sine block, Sine Center, Angle gauges, Spirit Level, Optical instruments for angular measurements, Auto collimator application.	12	30
04	<b>Comparator</b> Characteristics of comparators, use of comparators, difference between comparators, limit gauges and measuring instruments. Classification of comparators, Mechanical comparator, Mechanical-Optical comparator, Electrical and electronic comparator, Pneumatic comparators.	8	20



# GUJARAT TECHNOLOGICAL UNIVERSITY

Syllabus for Bachelor of Vocation (B.Voc), 1<sup>st</sup> Semester

Branch: Production Technology

Subject Name: Mechanical Metrology-I

Subject Code: 21110304

With effective  
from academic  
year 2021-22

05	<b>Machine Tool Metrology</b> Straightness, Flatness, Parallelism, Squareness, Roundness, Cylindricity, and Runout, Acceptance Tests for Machine Tools, Geometrical tests on lathe, geometrical tests on pillar type drilling machine	4	10
----	--	---	----

### Distribution of marks weightage for cognitive level:

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	20	10	-	-	-

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

### Reference Books

- Engineering Metrology and Measurement, N V Raghavendra and Krishnamurthy, Oxford University Press
- Mechanical Measurement and Metrology by R K Jain, Khanna Publisher Mechanical Measurement & Control by D.S. Kumar.
- Engineering Metrology and Measurements, Bentley, Pearson Education

### Course Outcomes:

Students will be able to:

Sr. No.	CO statement	Marks % weightage
CO-1	Summarize various methods and terms used in mechanical measurements and metrology.	10
CO-2	Demonstration of Verier instruments, Micrometer instruments, slip gauge and sine bar	50
CO-3	Concepts of Comparator	20
CO-4	Concept of Machine Alignment, straightness, flatness, squareness, etc	20

### List of Open Source Software/learning website:

<https://nptel.ac.in>,