Engineering Metrology

Swayam Prabha Course Code – M74

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COURSE OUTLINE	Engineering metrology is the use of measurement science in manufacturing. The study of metrology is highly valuable for the students and practitioners, specifically from mechanical and allied engineering stream. For a product to be successful it needs to be manufactured according to metrological specifications, otherwise heavy costs are incurred to comply with the specifications in the later stage. Also, the role played by measurements in the day today life makes it essential to study metrology. This course is designed to impart the knowledge to develop measurement procedures, conduct metrological experiments, and obtain and interpret the results. A laboratory demonstration are also induced to enhance the learning process. The course would be useful in many areas in the traditional and modern high technology viz. manufacturing, industrial, scientific research, defense, and many others.

COURSE DETAILS

S. No	Module ID/ Lecture ID	Lecture Title/Topic
1.	M1_L1	Introduction
2.	M1_L2	Instruments - I
3.	M1_L3	Instruments - II
4.	M1_L4	Definitions
5.	M1_L5	Standards
6.	M2_L6	Limits, Fits, and Tolerances - I
7.	M2_L7	Limits, Fits, and Tolerances - II

8.	**M2_L8**	Limits, Fits, and Tolerances - III
9.	**M2_L9**	Limits, Fits, and Tolerances - IV
10.	**M3_L10**	Linear Measurements - I
11.	**M3_L11**	Linear Measurements - II
12.	**M3_L12**	Laboratory Demonstration: Vernier Caliper
13.	**M3_L13**	Laboratory Demonstration: Dial Gauge and Vernier, Micrometer, Surface Plate, Feeler Gauge
14.	**M4_L14**	Angular Measurements - I
15.	**M4_L15**	Angular Measurements - II
16.	**M4_L16**	Laboratory Demonstration: Vernier Height Gauge
17.	**M4_L17**	Laboratory Demonstration: Thread Gauge, Spirit Level
18.	**M4_L18**	Laboratory Demonstration: Combination Set, Slip Gauges, Sine Bar
19.	**M5_L19**	Comparators - I
20.	**M5_L20**	Comparators - II
21.	**M5_L21**	Transducers - I
22.	**M5_L22**	Transducers - II
23.	**M6_L23**	Screw Thread Metrology
24.	**M6_L24**	Gears Metrology - I
25.	**M6_L25**	Gears Metrology - II
26.	**M6_L26**	Laboratory Demonstration: Gear Vernier
27.	**M7_L27**	Surface Metrology
28.	**M7_L28**	Temperature Measurements
29.	**M7_L29**	Pressure Measurements - I
30.	**M7_L30**	Pressure Measurements - II
31.	**M8_L31**	Strain Measurements - I
32.	**M8_L32**	Strain Measurements - II
33.	**M8_L33**	Optical Measurements and Nanometrology - I

34.	**M8_L34**	Optical Measurements and Nanometrology - II
35.	**M8_L35**	Optical Measurements and Nanometrology - III
36.	**M9_L36**	Statistics in Metrology, an Introduction - I
37.	**M9_L37**	Statistics in Metrology, an Introduction - II
38.	**M9_L38**	Data and scales in Measurements
39.	**M9_L39**	Discrete and Continuous Data
40.	**M10_L40**	Statistics for Metrology, Fundamental Concepts - I
41.	**M10_L41**	Statistics for Metrology, Fundamental Concepts - II
42.	**M10_L42**	Statistics for Metrology, Fundamental Concepts - III
43.	**M11_L43**	Probability Distributions
44.	**M11_L44**	Normal Distribution
45.	**M11_L45**	Statistics for Proportions
46.	**M11_L46**	Chi Square Distribution and Data Outlier Detection
47.	**M12_L47**	Quality Control,Introduction
48.	**M12_L48**	Quality Control, Control Charts for Variables
49.	**M12_L49**	Quality Control, Control Charts for Attributes
50.	**M12_L50**	Quality Control, Critical Aspects
51.	**M12_L51**	3D Measurements, Coordinate Measuring Machine (CMM)
52.	**M12_L52**	Laboratory Demonstration, Coordinate Measuring Machine (CMM)
53.	**M13_L53**	Live Session

List of reference material/ books:

Name and contact details of two referees for the course: