



I	SECTION CODE	MG
II	SECTION NAME	METROLOGY
III	COURSE CODE	MEI-01
IV	COURSE TITLE	METROLOGY AND ENGINEERING INSPECTION
V	DURATION	01 Week
IV	OBJECTIVES	
On completion of the course, the learner will be able to understand various measuring terms, measuring instruments & calibration test and able to work on the measuring instruments as stated in below contents.		

VI Course Content :

Theory topics	Practical Topics
Basic measuring principles, fundamentals and derived units. Characteristics of measuring instruments and source of errors. Measurement and its role in Quality control. Limits, Fits and Tolerances. Gear and thread terminology. Linear and Angular measurements. Calibration of measuring instruments. Geometrical tolerances and it's symbols. Surface texture and Roughness values. Introduction to CNC- CMM	a) Measurements and Practice on Height gauges. b) Measurements and Practice on different Vernier Calipers. c) Measurements and Practice on different Micrometers. d) Measurements and Practice on different Protractors. e) Taper measurement by Sine bar / Sine centre. f) Measurements and practice on Profile projectors. g) Measurements and practice on Optical Dividing Head. h) Flatness checking with monochromatic light source. i) Straightness measurement with Auto-colimeter. j) Thread and Gear Measurement. k) Basic practice on CNC-CMM.



I	SECTION CODE	MG
II	SECTION NAME	METROLOGY
III	COURSE CODE	MEI-02
IV	COURSE TITLE	APPLICATION OF CO-ORDINATE MEASURING MACHINE USING CNC – CMM
V	DURATION	01 Week
IV	OBJECTIVES	
On completion of the course, the learner will be able to understand operation procedure and its applications of CNC- CMM and able to operate CNC- CMM independently.		

VI Course Content :

Theory topics	Practical Topics
Basic measuring principles, fundamentals and derived units characteristics and errors. CNC- CMM- Need & introduction, Merits & demerits. Different probes and its calibration. Linear measurements using CN-CMM, Angular measurements using CNC-CMM, Geometrical measurements using CNC-CMM. Import of Inspection report.	a) Specification and introduction of CNC-CMM. b) Care and Maintenance of CNC-CMM. Calibration of probe. c) Different linear measurements of a specimen. d) Different angular measurements of a specimen. e) Different geometrical measurements of a specimen. f) Import of inspection report.



I	SECTION CODE	MG
II	SECTION NAME	METROLOGY
III	COURSE CODE	MEI-03
IV	COURSE TITLE	QUALITY CONTROL AND ENGINEERING INSPECTION
V	DURATION	01 Week
IV	OBJECTIVES	
<p>On completion of the course, the learner will be able to understand principles of quality management & sampling inspection and able to work in the measuring instruments as stated in below contents.</p>		

VI Course Content :

Theory topics	Practical Topics
<p>Characteristics of instruments and Measuring principles. Need of inspection and source of errors. Limits, Fits and tolerance. Quality Control, Process capability. Quality assurance and Quality management. Statistical Quality Control and its tools. Control charts for variables and attributes. Sampling inspection. Inspection techniques using Advanced Machined (CNC- CMM)</p>	<p>a) Linear measurements and Practice on Height gauges, Vernier Calipers, Micrometers.</p> <p>b) Measurements and Practice on different Protractors and Sine bar/centre.</p> <p>c) Measurements and practice on Profile projectors.</p> <p>d) Measurements and practice on Optical Dividing Head.</p> <p>e) Thread & Gear Measurement.</p> <p>f) Basic practice on CNC-CMM.</p> <p>~</p>



I	SECTION CODE	MG
II	SECTION NAME	METROLOGY
III	COURSE CODE	MEI-04
IV	COURSE TITLE	GEOMETRICAL MEASUREMENTS
V	DURATION	01 Week

OBJECTIVES

On completion of the course, the learner will be able to understand various geometry features and their measurements and independently resolve the assembly difficulties and also understand as stated in below contents.

VI Course Content :

Theory topics	Practical Topics
Importance of geometry and its application in the industry. Definitions and explanations of various symbols used for geometrical tolerances. Flatness checking. Measurement of straightness. Measurement of Circularity, Roundness, Concentricity, Eccentricity, Run-out and Total Run-out, etc. Checking of Perpendicularity, Angularity and Parallelism. Introduction to CNC-CMM.	a) Circularity and Roundness checking. b) Run-out and total Run-out checking. c) Perpendicularity, parallelism checking using square master. d) Flatness checking with monochromatic light source. e) Straightness checking. f) Geometrical measurements using CNC-CMM.



I	SECTION CODE	MG
II	SECTION NAME	METROLOGY
III	COURSE CODE	MEI-05
IV	COURSE TITLE	LIMITS AND FITS IN ENGINEERING
V	DURATION	01 Week
IV	OBJECTIVES	
On completion of the course, the learner will be able to understand various functional dimensions' limits and fits terminology used Engineering / Assembly drawings and independently design various components.		

VI Course Content :

Theory topics	Practical Topics
Introduction to limits and Fits Limits and Fits terminology with schematic diagram Types fits Maximum and Minimum material condition Interchangeability and Selective assembly in limits and fits. Hole & Shaft basis system and Unilateral & Bi-lateral systems. Taylor's principle Types of limit gauges and gauge design Finding the tolerances using IS books	No practicals but practice on IS:919-1963.