Manufacturing Technology Training
An IMTMA initiative

Hands-on training in Operation and Programming of CNC Co-ordinate Measuring Machines (CMMs)
Date : 9 to 13 January, 2023
Venue : IMTMA Technology Centre, Bengaluru

INTRODUCTION

In the modern manufacturing environment, process control and quality assurance depend increasingly on the performance of Co-ordinate measuring machines. Today CMMs have replaced traditional methods of inspection with gages and fixtures thus reducing the time and manpower required in quality control operations. However, thorough understanding of concepts, measuring uncertainty, GD&T, right probing method are very crucial for getting reliable results from any CMM.

Rapid growth of CMM population all over India has subsequently generated enormous demand of Trained / Skilled engineers for successful & meaningful handling inspection challenges. This can be achieved only if the CMM engineer possesses basic engineering knowledge, Inspection skills and has a logical and analytical approach to fulfill the task.

This course will cover in detail about all the aspects a practicing CMM engineer requires to know for effective use of CMM for reliable measurement results. Hands-on training in CMM with live measurement exercises of industry components will be given more emphasis.

FOCUS AREAS

- Introduction to CMM and Proper use of CMM
  - Types of CMMs – Cantilever, Bridge, Gantry & Portable CMMs.
  - Types of Probes, Probe Heads & Styli. Advantages & Limitations
  - Interpretation of Measuring Uncertainty; International Standards & Norms
  - Environmental conditions, specifications, their Importance and effect on measurements.
  - Calibration of a CMM, Frequency & Methods.
- GD&T - Geometric Dimensioning & Tolerancing
  - Specifying and Interpreting GD&T parameters in Engineering Drawing
  - Meaning of RFS, MMC and LMC conditions
  - Measurement of Form, Orientation, Location and Profile tolerances in CMM
  - Exercises and Sample drawings for arriving at right inspection procedure
- Using CMM for Dimensional checking and validation
  - Importance & Dynamics of Probing system; Selection of right probing system
  - Mounting probe head and fixing styli
  - Configuring probes (Styli), Calibration with Master Sphere
  - Basic Geometric Elements & their Classification.
  - Lines & Vectors (I, J, K), Directional Cosines their definitions and application in programming.
  - Computing geometric elements – Manually & in Auto Mode.
  - Understanding adequacy of number of points, effect on element computation & result output.
  - Methods of component alignment & Logical Approach
  - Hands-on practice / Group exercises in measuring Industry parts.
- User Interface – PCDMIS
  - Standard menus of the start up screen; Use of Edit, Graphics & Report windows.
  - Setting up inspection plan of a component.
  - Loading and Calibrating various probe combinations.
  - Setting up a New-Part Program, Defaults & Customised operations.
  - Using Manual, Auto & Constructed features / Elements and other tools.
  - Out put of Inspection report and interpreting reports
- Advanced options in using CMM
  - Programming and Using CMM in AUTO mode / DCC operations, movements & precautions
  - Importance of defining clearance planes for avoiding collision
  - Understanding Limitations of computing Form errors. (Flatness, Circularity, Cylindricity etc.)
  - Inserting & Using CAD Model for component programming.
- Usage of Interchangeable clamping systems for quick set up of parts
- Do's & Don'ts while using CMMs
- Case Studies & Group Discussions
- Hands – on practice and Group exercises on CMM.

KEY TAKE AWAYS

After undergoing the programme, the participants will be able to -

- Learn operation of CNC CMM for dimensional measurements through hands-on training
- Perform Part alignment and Probe calibration in CMM
- Understand the various GD&T parameters and interpret them as given in Drawing
- Inspect GD&T parameters in CMM and to generate part inspection reports
- Learn best measuring practices as well as Do’s and Don’ts while using CMMs

PARTICIPATION FEE

Rs. 12500/-
+18% GST
IMTMA Members/ Micro Companies/ Individuals/ Educational Institutions / Students/ IMTMA Non Members/ Others

USD 480/-
Overseas Participants

Group Concession : 10% for 3 to 5 and 20% for 6 and more delegates being nominated from the same company

PARTICIPANT PROFILE

This course will benefit Managers, Engineers & Supervisory personnel responsible for obtaining the best output from Co-ordinate Measuring Machines. Practicing engineers in quality and production functions from Machine Tool, Automobile, Tool room, General engineering and other capital goods manufacturing industries will immensely benefit from the contents. It will be specifically useful for Existing CMM engineers who may have faced significant problems in day to day applications And also for New CMM engineers who may have lot of doubts / grey areas on CMM applications and right ways of using CMM.

Pre-requisite: Participants should have basic knowledge of Engineering drawing and Geometric Dimensioning and Tolerance (GD & T).

FACULTY

Mr. Ravikumar is an Experienced Dimensional metrology expert with demonstrated experience of over 30 years in Sales, service, and application of Metrology systems. He is highly skilled in Quality Management, Account Management, and people management.

In his professional career, he was associated for over 20 years with CMTI, heading the Metrology division and providing solutions to the Industry for Measurement problems in Dimensional metrology, Surface metrology, Gear metrology, and guiding team to integrate metrology into production.

For 12 years, he was with Carl Zeiss India and is responsible for Technical Services, Application engineering, Tech-center management, Assembly, Software development, and software testing.

Mr. Preetham B. M. is having over 24 years of experience in the industry, in the field of manufacturing of precision components for Nuclear, Aerospace & Automation industry. He has acquired expertise in the application and use of GD&T principles in precision manufacturing of components as well as experience in conducting training programs. He has imparted training in CNC, CAD/CAM, CMM & GD&T for more than 1500 engineers. Has conducted more than 30 batch of Finishing school. Trained industry professionals from TVS, Ceratizit India, Ashok Leyland, Kennametal etc. Prior to working at IMTMA, he has worked at Avasarala Technologies Limited, as Assistant Manager, in the field of machining the precision components using CNC machines. Components manufactured for prestigious projects like Centre for Advanced Technology (BIGBANG test), ITER which is expected to be operational in the year 2030 at France. He was deputed to M/s Kimberly Clark Corporation’s KIMTECH plant at Neenah, Wisconsin state, United States of America for one year to understand their best manufacturing practices. At IMTMA, as Senior Executive officer, his role is to impart hands-on training for young engineers making them Industry ready.

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REGISTRATION : Prior registration for participation is necessary. Number of participants is limited and will be accepted on ‘First Come First Serve’ basis. A Certificate of participation will be issued to participants.
Important Information : Participation fee includes, course material, working lunch and tea / coffee. Interested companies are requested to register online by clicking on 'REGISTER' button and by filling up the nomination authority and participant's details in specified form.