

Greetings from CMTI

We are pleased to inform you that we are conducting a 02 day Non-Residential Training programme on **"Measurement Uncertainty for Chemical and Mechanical Parameters by Guide for Uncertainty Measurement (GUM) Method"** , course code 0860

### Highlights / Overview of the Program:

Every testing laboratory involving chemical & metallurgical testing needs to establish measurement uncertainty for all the parameters measured using various equipments. Attending the course benefits the laboratory technicians in learning the concepts of uncertainty and in turn helps in establishing the measurement uncertainty. The following aspects will be covered in the training course

- Fundamentals of measurement uncertainty concept. Types of uncertainty
- Benefits of establishing uncertainty, Parameters which influence uncertainty
- Description of various terminologies such as degrees of freedom, standard deviation, coverage factor, confidence level, distribution factors(Normal, Triangular, Rectangular)
- Understanding the terms such as precision, uncertainty, repeatability, reproducibility, least count & resolution
- Typical case studies for estimation uncertainty for chemical (spectro & wet analysis) & mechanical parameters (Hardness & Tensile test)

### Target Participants:

Laboratory Technicians & Chemists with qualifications BE/Diploma, M.Sc/B.Sc with or without experience

### Programme Schedule

It is 02 day Non Residential Training Programme scheduled during **16<sup>th</sup> – 17<sup>th</sup> May 2024**. The Programme will be held at Central Manufacturing Technology Institute, Bangalore

### Participation Fees

**Rs. 7,800/- plus GST @ 18%\*\*\*, per participant. This includes Course Kit, working veg lunch, midsession tea.**

Course Fee can be paid through **NEFT / RTGS / Demand Draft**. Demand Draft to be drawn in favor of "Central Manufacturing Technology Institute", payable at Bangalore and should reach CMTI one week before the actual date of commencement of the course.

### Beneficiary for RTGS/NEFT

- a) **Name : Central Manufacturing Technology Institute**
- b) **GST No: 29AAATC2085K1ZJ**
- c) **Account No :10521862015**
- d) **Bank Name & Branch: State Bank of India, Yeshwanthpur Branch**
- e) **IFSC Code :SBIN0003297**
- f) **MICR Code : 560002055**

### Additional Information:

1. A 10% rebate on course fee will be given to organizations nominating 3 or more participants for each programme, only if payment is made in advance, ten days before the commencement of the course.
2. Individuals/ Companies interested in participation are requested to fill in the enclosed Enrollment Form and submit at the earliest.
3. Participants are advised to proceed for the programme only after the nominations / Programme confirmed by us (by Fax / Letter / Phone / E-Mail).
4. Participants should report at CMTI on the day of commencement of the course. Participants are advised to reach Bangalore the previous day evening/ night.
5. Course will be conducted from 09:00 to 17:00 hrs. Participants may plan their return journey accordingly.
6. Participants will be given Certificate after the completion of the Training Programme
7. Enclosed are the tentative programme contents for ready reference
8. GST No. to be shared while sending your nomination / Registration (If a company is exempted from GST they have to provide GST Exemption certificate).
9. Please note that Course fee once paid will not be refunded. However, change in nomination will be permitted.

**Note: \*\*\* Taxes and other levies will be charged as per the prevailing rates at the time of Billing**

For further enquiries / registration / nominations, please contact:

**Mrs. Asha R Upadhyaya, Joint Director & Centre Head – AEAMT,**

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E-mail– training@cmti.res.in

# Central Manufacturing Technology Institute

Tumkur Road, Bangalore 560 022

Training Programme on

**"Measurement Uncertainty for Chemical and Mechanical Parameters by Guide for Uncertainty Measurement (GUM) Method"**

## Tentative programme Schedule

Day	Topics
Day 1	Description of basic terms (Systematic error, Random Error, Precision, Uncertainty, Linearity, Least Count, Resolution)
	Concept of Measurement Uncertainty Benefits of establishing Uncertainty
	Description of terminologies such as Degrees of Freedom, Standard Deviation, Coverage factor, Confidence level, Distribution Factors (normal, triangular, rectangular)
	Method of Estimation of Measurement Uncertainty by GUM and Briefing of MCS method of estimation of uncertainty.
	Typical Case Studies for Estimation Uncertainty for Chemical (Spectrometric – OES & Wet Analysis- Gravimetric)
Day 2	Typical Case Studies for Estimation Uncertainty for Chemical (Spectrometric - ICP& Wet Analysis- Volumetric) Contd.....
	Typical Case studies for Estimation Uncertainty for Mechanical Parameter (Hardness & Tensile test)
	Briefing of the proceedings on Estimation of Measurement Uncertainty
	Discussion (Question & answer session)
	Evaluation