



**CSIR- National Physical Laboratory**  
Dr. K. S. Krishnan Marg, New Delhi -110012

## Training Calendar 2019-20

### GENERAL INSTRUCTIONS

- In case of inadequate number of participants (**less than 10**), for a particular training programme, CSIR- NPL may drop the execution of that programme. In view of this, before sending the DD, the prospective participants are advised to confirm with the Head, HRD or the concerned Technical Coordinator about its dates and execution.
- For Technical Queries about a training course, the prospective participants may contact the concerned Technical Coordinator.

#### **Training Fee / Charges : Per Participant:**

	<b>2 Days Course</b>	<b>3 Days Course</b>	<b>4 Days Course</b>	<b>5 Days Course</b>
Indian Participants	₹16,000	₹24,000	₹32,000	₹40,000
Foreign Participants	US \$ 300	US \$ 450	US \$ 600	US \$ 750

#### **GST applicable**

**TDS** : CSIR-NPL is exempted from Tax Deduction at Source under Section 35(1)(ii) of the Income Tax Act, 1961

The Training Fee includes Course Material, Training Kit, Lunch, Tea/Coffee etc.

The Training fee should be sent at least two weeks prior to the commencement of the desired training programme, through a **Demand Draft** drawn in favour of the “**DIRECTOR**,”

**NATIONAL PHYSICAL LABORATORY**”, payable at “**NEW DELHI**”.

Online transfer is also acceptable through **Syndicate Bank Account No. 91002010030018**, NPL, PUSA, NPL Campus **IFSC Code SYNB0009100**. Kindly confirm the NEFT transfer details through e-mail. In remarks column of NEFT please mention “HRD, NPL”

• **Lodging & Boarding:**

Charges to be borne by the Trainees – As per prevailing rates in the NPL Guest House (**Subject to availability**)

• **For any Enquiries, the participants are advised to contact :**

Dr. Rina Sharma, Principal Scientist & Head, HRD,  
National Physical Laboratory, New Delhi – 110012  
Ph.: 91-11- 4560 9366, 4560 9361 (O)  
e-mail : [hrd@nplindia.org](mailto:hrd@nplindia.org)

S.No.	Title of Training Programme	Date & Duration	Content of Programme	Technical Coordinator(s) with Contact Details
1.	Optical Radiation Metrology	May 08-10, 2019 (3 Days)	Basics of photometry and colorimetry, especially goniophotometry, sphere photometry, measurement of luminous intensity, illuminance, correlated color temperature (CCT) and color coordinates. Introduction to Indian Standards, namely IS 16106:2012.	<b>Dr. Ranjana Mehrotra</b> <a href="mailto:ranjana@nplindia.org">ranjana@nplindia.org</a> 011-4560 8315 <b>Mr.V.K. Jaiswal</b> <a href="mailto:jaiswalvk@nplindia.org">jaiswalvk@nplindia.org</a> 011-4560 8228 <b>Dr. Parag Sharma</b> <a href="mailto:sharmap2@nplindia.org">sharmap2@nplindia.org</a> 011-4560 8228 <b>Dr. Shibu Saha</b> 011-45609470 <a href="mailto:saha.shibu@nplindia.org">saha.shibu@nplindia.org</a>
2.	Length & Dimension, Pressure & Vacuum, Temperature and Force Metrology	June 18-21, 2019 (4 Days)	Introduction to form metrology terms, Brief overview about the form tester and interferometers-applications and capabilities. Best measurement practices using with case study, sources of error and uncertainty evaluation.  Measurement of barometric, high vacuum, pneumatic and Hydraulic Pressures, Primary and Secondary Pressure and	<b>Dr. Rina Sharma</b> <a href="mailto:rina@nplindia.org">rina@nplindia.org</a>  <b>Dr. Sanjay Yadav</b> <a href="mailto:syadav@nplindia.org">syadav@nplindia.org</a> 011-4709 1206  <b>Dr. S S K Titus</b> <a href="mailto:titus@nplindia.org">titus@nplindia.org</a> 011-4560 8680  <b>Dr. D.D. Shivagan</b> <a href="mailto:shivagand@nplindia.org">shivagand@nplindia.org</a>

			<p>Vacuum Standards, Calibration Procedures of Industrial Pressure and Vacuum Gauges, Transducers and Dead Weight Testers.</p> <p>Precision measurement of force, torque and hardness, primary and secondary methods, Calibration of force proving instruments, torque measuring devices</p> <p>Introduction to ITS-90, Precision Calibration of RTDs, Thermocouples, pyrometers and Thermo-hygrometers by comparison calibration methods.</p>	
3.	Mass, Volume, Density and Viscosity Metrology	August 28-30, 2019 (3 Days)	<p>Procedures and methodology for calibration of weights, weighing balances, volumetric instruments, hydrometers, viscometers and viscosity oils.</p>	<p><b>Mr. Goutam Mandal</b> goutam@nplindia.org 011-4709 1139</p> <p><b>Dr. Nidhi Singh</b> singhnidhi@nplindia.org 011-4709 1139</p>
4.	Training Programme on Air Quality Measurements	August 28-30, 2019 (3 days)	<p>National ambient air quality standards (NAAQS), Quality Infrastructure, general definitions, gas measurement techniques (greenhouse and pollution gases), PM<sub>10</sub> and PM<sub>2.5</sub> measurements and their calibration (gravimetric sampler, BAM), gas standards and calibration of analyzers, primary techniques of gaseous pollutants, analysis of particulate bound chemicals using ICP-OES, measurement uncertainty estimations, data quality assurance and quality system (with hands-on training on most of the parameter of NAAQS).</p>	<p><b>Dr. (Mrs.) P. Johri</b> <a href="mailto:pjohri@nplindia.org">pjohri@nplindia.org</a> 011- 47091628</p> <p><b>Dr. S.G. Aggarwal</b> 011-45608331 <a href="mailto:aggarwalsg@nplindia.org">aggarwalsg@nplindia.org</a></p> <p><b>Dr. (Mrs.) D. Soni</b> 011-47091628 <a href="mailto:dsoni@nplindia.org">dsoni@nplindia.org</a></p>

5.	Fluid Flow, Force and Pressure & Vacuum Metrology	Sept., 4-6, 2019 (3 Days)	<p>Introduction to fluid flow measurements, types of fluid flow standards (primary, secondary, reference/transfer standards), various types of flow-meters and their applications, testing and calibration procedures of water meters, water flow-meters and gas flow-meters (as per IS 779, IS 6784, ISO 4064, ISO 4185, etc.).</p> <p>Precision measurement of force, torque and hardness, primary and secondary methods, Calibration of force proving instruments, torque measuring devices</p> <p>Measurement of Pneumatic and Hydraulic Pressures, Primary and secondary Pressure Standards, Calibration Procedures of Industrial Pressure Gauges, Transducers, Precision measurement of force, torque and hardness, primary and secondary methods, Calibration of force proving instruments, torque measuring devices</p>	
6.	Humidity, Dew/Frost Point, Air Temperatures, Moisture, & Infra-Red Pyrometers and Blackbody Metrology	September 19-20, 2019 (2 Days)	<p>1. Introduction on humidity, air temperature, moisture (solids &amp; Liquids), dew point/ frost point and radiation pyrometry. Basic concepts, NMI measurement methods, importance for Indian industries, Role of precision measurement of moisture in Indian economy.</p> <p>2. Hands on training on measurements and calibration process, uncertainty calculations &amp; report generation.</p>	<p><b>Dr. D. D. Shivagan</b>  <a href="mailto:shivagand@nplindia.org">shivagand@nplindia.org</a>  011-4709 1379/1693</p> <p><b>Dr. KomalBapna</b>  <a href="mailto:Komal.bapna@nplindia.org">Komal.bapna@nplindia.org</a>  011-4709 1249/1693</p>

7.	Time & Frequency Metrology	October 7-11, 2019 (5 Days)	91) SI system of Units, New SI System, Terminology (2) Fundamentals of Time and Frequency Standards (3) National Time Scale, Uncertainty and Stability (4) Time Synchronization Center (5) Time Dissemination Methods (6) Applications of Accurate Timing Systems	<b>Dr. Ashish Aragwal</b> <a href="mailto:ashish@nplindia.org">ashish@nplindia.org</a> 011-45608384
8.	Optical Radiation Metrology	Nov 06-08,2019 (3 Days)	Introduction to photometric and radiometric parameters, Standards of Optical Radiation, Photometric and radiometric parameters of industrial importance, e.g. Luminous intensity, illuminance, luminous flux, luminance, responsivity, CCT, spectral irradiance, spectral transmittance, absorbance etc. and their measurement and calibration	<b>Dr. Ranjana Mehrotra</b> <a href="mailto:ranjana@nplindia.org">ranjana@nplindia.org</a> 011-4560 8315 <b>Mr.V.K. Jaiswal</b> <a href="mailto:jaiswalvk@nplindia.org">jaiswalvk@nplindia.org</a> 011-4560 8228 <b>Dr. Parag Sharma</b> <a href="mailto:sharmap2@nplindia.org">sharmap2@nplindia.org</a> 011-4560 8228 <b>Dr. Shibu Saha</b> 011-45609470 <a href="mailto:saha.shibu@nplindia.org">saha.shibu@nplindia.org</a>
9.	Temperature & Humidity Metrology	December 04-06, 2019 (3 Days)	(1) Lectures on Basic concepts in temperature metrology, International Temperature Scale (ITS- 90), Realization of ITS- 90 defined Temperature Fixed Points using SPRT and Thermocouples. Primary and comparison calibrations of SPRT/PRT/RTDs, LIGTs, Thermocouples, Digital Thermometers, IR Pyrometers, Thermal Imagers, Blackbody sources, Single and Multi-point mapping, stability-uniformity evaluation of thermal sources. Thermo-hygrometers, RH, dew/frost point meters and moisture measurements. Instrumentation, Measurement techniques and procedures for uncertainty evaluation in the above Temperature and Humidity metrology parameters. (2) Practical Demonstration & Training on Calibrations, procedures, calculations, report preparations etc. on above items.	<b>Dr. D. D. Shivagan</b> <a href="mailto:shivagand@nplindia.org">shivagand@nplindia.org</a> 011-4709 1379/1693  <b>Dr. Komal Bapna</b> <a href="mailto:Komal.bapna@nplindia.org">Komal.bapna@nplindia.org</a> 011-4709 1249/1693

10	Fluid Flow, Force and Pressure & Vacuum Metrology	Jan., 12-14, 2020 (3 Days)	<p>Introduction to fluid flow measurements, types of fluid flow standards (primary, secondary, reference/transfer standards), various types of flow-meters and their applications, testing and calibration procedures of water meters, water flow-meters and gas flow-meters (as per IS 779, IS 6784, ISO 4064, ISO 4185, etc.).</p> <p>Precision measurement of force, torque and hardness, primary and secondary methods, Calibration of force proving instruments, torque measuring devices</p> <p>Measurement of Pneumatic and Hydraulic Pressures, Primary and secondary Pressure Standards, Calibration Procedures of Industrial Pressure Gauges, Transducers, Precision measurement of force, torque and hardness, primary and secondary methods, Calibration of force proving instruments, torque measuring devices</p>	<p><b>Dr. Sanjay Yadav</b> syadav@nplindia.org 011-4709 1206</p> <p><b>Dr. S S K Titus</b> <a href="mailto:titus@nplindia.org">titus@nplindia.org</a> 011-4560 8680</p> <p><b>Dr. S.K. Jaiswal</b> <a href="mailto:skjaiswal@nplindia.org">skjaiswal@nplindia.org</a> 011-4560 9426</p>
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11	<b>AC Power &amp; Energy and AC High Voltage &amp; High Current Metrology</b>	<b>Feb. 4, 2020 (1 Day)</b>	<p><b>Presentations on electrical AC power and energy, AC high voltage &amp; high current metrology.</b></p> <p><b>Technical training on measurements of electrical AC power and energy, AC high voltage and high current.</b></p>	<p>Mr. J.C. Biswas <a href="mailto:jcbiswas@nplindia.org">jcbiswas@nplindia.org</a> 011- 42342427</p> <p>Mr. M. A. Ansari <a href="mailto:ansari@nplindia.org">ansari@nplindia.org</a> 011-45608597 / 9317</p>
12	<b>Ultrasonic Metrology and Non-Destructive Testing</b>	<b>Feb., 13-14, 2020 (2 Days)</b>	<p>Introduction to Ultrasonic Metrology, Terms related to ultrasonic metrology, Primary standard of ultrasonic power measurement (radiation force balance method), calibration of ultrasonic power transducer for its power according to IEC 61161 Ultrasonic velocity and Thickness/depth metrology. Ultrasonic reference blocks (IIW-V1 and IIW-V2) and its Calibration according to IS 4904.</p> <p>Ultrasonic Flaw Detector (UFD), need for calibration, Calibration of UFD according to ASTM E 317 standard.</p>	<p><b>Dr. Sanjay Yadav</b> <a href="mailto:syadav@nplindia.org">syadav@nplindia.org</a> 011-4709 1206</p> <p><b>Dr. P. K. Dubey</b> <a href="mailto:dubeypk@nplindia.org">dubeypk@nplindia.org</a> 011-45608380, 011-45609302</p>

