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:

<table>
<thead>
<tr>
<th></th>
<th>2 Days Course</th>
<th>3 Days Course</th>
<th>4 Days Course</th>
<th>5 Days Course</th>
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<tbody>
<tr>
<td>Indian Participants</td>
<td>₹16,000</td>
<td>₹24,000</td>
<td>₹32,000</td>
<td>₹40,000</td>
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<tr>
<td>Foreign Participants</td>
<td>US $ 300</td>
<td>US $ 450</td>
<td>US $ 600</td>
<td>US $ 750</td>
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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

<table>
<thead>
<tr>
<th>S.N o.</th>
<th>Title of Training Programme</th>
<th>Date &amp; Duration</th>
<th>Content of Programme</th>
<th>Technical Coordinator(s) with Contact Details</th>
</tr>
</thead>
</table>
| 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. | Dr. Ranjana Mehrotra ranjana@nplindia.org 011-4560 8315  
Mr. V.K. Jaiswal jaiswalvk@nplindia.org 011-4560 8228  
Dr. Parag Sharma sharmap2@nplindia.org 011-4560 8228  
Dr. Shibu Saha 011-45609470 saha.shibu@nplindia.org |
| 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 | Dr. Rina Sharma rina@nplindia.org  
Dr. Sanjay Yadav syadav@nplindia.org 011-4709 1206  
Dr. S S K Titus titus@nplindia.org 011-4560 8680  
Dr. D.D. Shivagan shivagand@nplindia.org |
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<tr>
<th>Training Programme</th>
<th>Date/Duration</th>
<th>Details</th>
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<tbody>
<tr>
<td>4. Training Programme on Air Quality Measurements</td>
<td>August 28-30, 2019 (3 days)</td>
<td>National ambient air quality standards (NAAQS), Quality Infrastructure, general definitions, gas measurement techniques (greenhouse and pollution gases), PM$<em>{10}$ and PM$</em>{2.5}$ 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).</td>
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</table>
|   | 5. Fluid Flow, Force and Pressure & Vacuum Metrology | Sept., 4-6, 2019 (3 Days) | 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.).

Precision measurement of force, torque and hardness, primary and secondary methods, Calibration of force proving instruments, torque measuring devices

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 |
|---|---|---|---|
|   | 6. Humidity, Dew/Frost Point, Air Temperatures, Moisture, &Infra-Red Pyrometers and Blackbody Metrology | September 19-20, 2019 (2 Days) | 1. Introduction on humidity, air temperature, moisture (solids & Liquids), dew point/ frost point and radiation pyrometry. Basic concepts, NMI measurement methods, importance for Indian industries, Role of precession measurement of moisture in Indian economy.


Dr. D. D. Shivagan
shivagand@nplindia.org
011-4709 1379/1693

Dr. KomalBapna
Komal.bapna@nplindia.org
011-4709 1249/1693
asish@nplindia.org  
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 | Dr. Ranjana Mehrotra  
ranjana@nplindia.org  
011-4560 8315  
Mr. V.K. Jaiswal  
jaiswalvk@nplindia.org  
011-4560 8228  
Dr. Parag Sharma  
sharmap2@nplindia.org  
011-4560 8228  
Dr. Shibu Saha  
saha.shibu@nplindia.org |
| 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. | Dr. D. D. Shivagan  
shivagand@nplindia.org  
011-4709 1379/1693  
Dr. Komal Bapna  
Komal.bapna@nplindia.org  
011-4709 1249/1693 |
| 10 | Fluid Flow, Force and Pressure & Vacuum Metrology | Jan., 12-14, 2020 (3 Days) | 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.).

Precision measurement of force, torque and hardness, primary and secondary methods, Calibration of force proving instruments, torque measuring devices

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 |

Dr. Sanjay Yadav
syadav@nplindia.org
011-4709 1206

Dr. S S K Titus
titus@nplindia.org
011-4560 8680

Dr. S.K. Jaiswal
skjaiswal@nplindia.org
011-4560 9426 |
<table>
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<tr>
<th>11</th>
<th>AC Power &amp; Energy and AC High Voltage &amp; High Current Metrology</th>
<th>Feb. 4, 2020 (1 Day)</th>
<th>Presentations on electrical AC power and energy, AC high voltage &amp; high current metrology. Technical training on measurements of electrical AC power and energy, AC high voltage and high current.</th>
<th>Mr. J.C. Biswas  <a href="mailto:jcbiswas@nplindia.org">jcbiswas@nplindia.org</a>  011-42342427  Mr. M. A. Ansari  <a href="mailto:ansari@nplindia.org">ansari@nplindia.org</a>  011-45608597 / 9317</th>
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<tr>
<td>12</td>
<td>Ultrasonic Metrology and Non-Destructive Testing</td>
<td>Feb., 13-14, 2020 (2 Days)</td>
<td>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. Ultrasonic Flaw Detector (UFD), need for calibration, Calibration of UFD according to ASTM E 317 standard.</td>
<td>Dr. Sanjay Yadav  <a href="mailto:syadav@nplindia.org">syadav@nplindia.org</a>  011-4709 1206  Dr. P. K. Dubey  <a href="mailto:dubeypk@nplindia.org">dubeypk@nplindia.org</a>  011-45608380, 011-45609302</td>
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