

# **Hands on Training on “Electron Microscopy-Why, How and What”**

**May 22 – June 01, 2018**

Organized by:

CSIR- National Physical Laboratory New Delhi -110012

## **Aim and Scope of the Training program:**

The “**Electron Microscopy: Why, how and what**” training is organized to provide graduate and postgraduate-level students and researchers in Physics, Chemistry, Materials Science and allied fields with basic knowledge of the capabilities and limitations of Electron Microscopes: Scanning electron microscope (SEM) and Transmission electron microscope (TEM). It includes lectures on theoretical aspects of Electron Microscopy followed by hands-on training sessions. The format and content of the training is tailored to suit the needs of practical microscopist routinely dealing with challenges of instrumental procedures, specimen preparation, data collection and quantification. This will provide a deeper understanding of the Physics underlying the electron microscopy, imaging and analysis.

This two-weeks training would focus on understanding the basics of SEM and TEM. The emphasis would be on operation of SEM, TEM, Diffraction imaging, and sample preparation techniques for SEM and TEM. Electron Microscopy group houses Zeiss EVO-MA10 SEM along with two HRTEM: JEM 2100F (JEOL) and Tecnai G2 F30 STWIN (FEI).

Practical session includes sample preparation, working on SEM and TEM, image analysis and alignment procedures. This will help young researches to make best use of electron microscopy. The participant will be competent in operating electron microscopes.

## **Objectives: Training on Electron microscope**

### **Course contents**

Provide an understanding of SEM and TEM theory and principles. This includes:

1. Electron-optics of SEM and TEM (lenses, lens aberrations)
2. Image formation and imaging modes in SEM and TEM
3. Diffraction theory and diffraction patterns
4. Image interpretation
5. High resolution microscopy and lattice imaging
6. SEM and TEM sample preparation

Provide "hands-on" training on operation of SEM and TEM. This includes:

1. Construction of SEMs and TEMs
2. Basic SEM and TEM alignment & troubleshooting
3. SEM and TEM imaging
4. High resolution and lattice image microscopy
5. Energy dispersive spectroscopy (EDS)
6. Interpretation of data

### **Course Coordinators:**

Dr. V.N. Singh  
Dr. R.P Pant

### **Team members:**

Mr. Dinesh Singh  
Mr. Praveen Tanwar  
Mr. J.S. Tawale

**Application Form for training on  
“Electron Microscopy: Why, How & What”  
CSIR- National Physical Laboratory, NPL Delhi-110012**

Kindly mail the completed forms to: Head, HRD Dr. K.S. Krishnan Marg, New Delhi -110012 Email: <a href="mailto:hrd@nplindia.org">hrd@nplindia.org</a> , <a href="mailto:singhvn@nplindia.org">singhvn@nplindia.org</a> , Phone: 01145609361	Affix passport size photograph
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1. Name of applicant (in block letters): Dr./Ms. /Mr.:

2. Educational qualification:

3. Age (years) and Sex:

4. Address for correspondence:

5. Sponsored or Individual:  
If sponsored then by whom

Tel:

Mobile:

Email:

Signature of Applicant

**Note:**

(i) Application should reach Office, HRD, National Physical Laboratory by 20<sup>th</sup> May, 2018. Scanned copy may be sent by e-mail to [singhvn@nplindia.org](mailto:singhvn@nplindia.org) and [hrd@nplindia.org](mailto:hrd@nplindia.org)

(ii) Kindly come to Delhi to attend the training program, only if you have received intimation.

**Fee Structure**

- ☐ Educational and R&D Institutions: Rs. 18,000/- + 18% GST
- ☐ Participants from Industries: Rs. 30,000/- + 18% GST

The fee in the form of a DD drawn in the name of Director, NPL Delhi payable at Delhi should be sent along with the application form. 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.

**Note:**

- ☐ Maximum number of participants will be limited to 20.
- ☐ Training material will be given in CD/DVD.
- ☐ Training certificates will be provided.