# CSIR Integrated Skill Initiative

## Basic Training in Electron Microscopy Techniques for Life Sciences

## CSIR-CDRI

This course is aimed at enhancing the knowledge and skill-set of students, research fellows, faculty and staff working in the area of biological electron microscopy. It will help participants to plan future studies in cell biology and nanotechnology involving EM techniques. The focus would be on various techniques, applications and specimen preparation methods with intensive hands-on practical sessions. The course would also cover basic TEM/SEM operation and maintenance/troubleshooting issues. The course will improve their job prospects as thereis limited expertise available in India while there is a great demand for trained manpower in this area. Trained candidates will also have an edge while applying for positions in EM labs in various research institutes requiring practical experience in these techniques. Candidates should find suitable positions such as Scientists, Technicians, Research assistants, etc in various institutes, research/diagnostic laboratories and applications/marketing positions in various companies, etc. This training at a state-of-the-art facility will equip candidates to apply for these positions with the requisite theoretical and practical knowledge and experience.

CSIR-CDRI invites applications for the following course:

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| **Title of the Course** | **: Basic Training in Electron Microscopy Techniques for Life Sciences** |
| **Duration** | **: 3 Weeks (09th November 2022 to 30th November 2022)** |
| **No. of Seats** | **: 10** |
| **Educational Qualification** | **: B.Sc./M.Sc./B.Tech/M.Tech/B.Pharm/M.Pharm/Ph.D./B.V.Sc,M.V.Sc; (Basic knowledge of optical microscopy is essential)** |
| **Age Group** | **: 21-45 years (relaxation for SC/ST/OBC as per GoI rules and Industry sponsored persons)** |
| **Venue of the course** | **: CSIR-CDRI, Lucknow** |
| **Course Fee** | **: Rs. 15,000** |
| **Nodal Officer** | **: Dr Kalyan Mitra (E-mail: k_mitra@cdri.res.in)** |

**TRAINING CURRICULUM:**
**Electron Microscopy (TEM, SEM)**

- How to work in the electron microscopy laboratory, safety procedures, maintenance of EMs and ancillary equipment, handling of toxic reagents
- Transmission Electron Microscopy (TEM): principles, magnification and resolution, aspects of image formation, components of TEM, physical basis of contrast; Applications of TEM in biology.
- Biological specimen preparation for TEM: Preparation of coated grids, Negative staining and Embedding techniques (adherent/suspension cells, tissues)
- Visualizing nanostructures; Characterization of viruses and virus like particles by TEM for optimization of vaccines and diagnostic virology
- Obtaining thin sections using ultramicrotomy, contrasting of thin sections
- Demonstration of TEM operation/handling, alignments, aberration corrections, and imaging; Visualizing and understanding cellular ultrastructure
- Scanning Electron Microscopy (SEM): principles of SEM, applications in biology and medicine, components of SEM
- Specimen preparation methods for SEM (powder specimens, adherent/suspension cells, tissues, etc.), critical point drying, sputter coating
- Demo of specimen preparation equipments like sputter coater, critical point dryer, high vacuum evaporator, ultramicrotome

- Characterization of drug formulations and nano delivery systems using EM
- Demonstration of SEM operation/handling, astigmatism correction, optimizing parameters for imaging depending on type of specimen and imaging
- Basic principles of CryoEM
- Discussion and troubleshooting

**SALIENT FEATURES OF THE TRAINING**

- About 25% Theory and 75% Practical hands-on sessions as per course curriculum
- Small batch size for effective training
- Understanding basic principles
- Lectures assisted with multimedia aids
- Interactive session
- Exposure to diverse sample preparation techniques
- Demonstrations of working of state-of-the-art equipments
- Planning experiments for obtaining meaningful results
- Troubleshooting

**EVALUATION OF TRAINEES**

Evaluation will consist of the following components

**Theory Courses (50 Marks)**

(a) Continuous assessment through assignments
(b) Term and examination

**Practical Courses (50 Marks)**

(a) Guided Experiments
(b) Unguided Experiments

**CERTIFICATION**

Certificate will be issued to the successful candidates for the course

**For more details and registration, kindly visit the link;**
**https://www.cdri.res.in/skilldevelopment.aspx**

Contact:
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