## About the Course :

Electron Microscopy is a fast evolving research tool in several advancing fields of science including, materials science, solid state physics, metallurgy including coating, corrosion, biology, pharmaceutical and formulation industries, dye and paint industry, polymer industries etc., specifically in the domain of nano science and nanotechnology. Particularly recent developments in the highly resolvable electron microscopy such as STEM, cryo-TEM, Environmental SEM enables a researcher to get the best information, for instance, details about lattice fringes, atomic positions at subnano meter scales and ability to analyse bio-samples at a near life conditions. Extended analyses such as EDS enables with high definition elemental mapping and even phase mapping possibilities at sub-micron to few nanometers scales.

This course introduces the basics of electron-matter interactions, introduction to SEM, TEM and HRTEM, various special modes of electron microscopy, possible scientific information from electron microscopy, data acquisition and analysis. On completion of the course, the participant would be able to know the fundamentals, various electron microscopic techniques, data collection and data analysis to interpret into scientific information needed for research and industry. Practical experience with our electron microscopes will ensure a complete learning experience.

## Course Curriculum:

Introduction to electromagnetic radiation with matter and electron microscopy, Scanning Electron Microscopy: Theoretical and practical aspects, Transmission Electron Microscopy: Theoretical and practical aspects, Advanced electron microscopic techniques, Associated techniques viz., EDS, SAED, elemental mapping etc., Applications of electron microscopy in research and industry, Case studies. Practical exposure to various electron microscopes (SEM, TEM) including (i) sample preparation, (ii) data acquisition (iii) data Analysis and (iv) data interpretation.

## Course Management :

Dr. K. Selvaraj, Dr. B. L. V. Prasad,
Dr. A. Nisal, Mr. R. S. Gholap

CSIR - National Chemical Laboratory, Pune

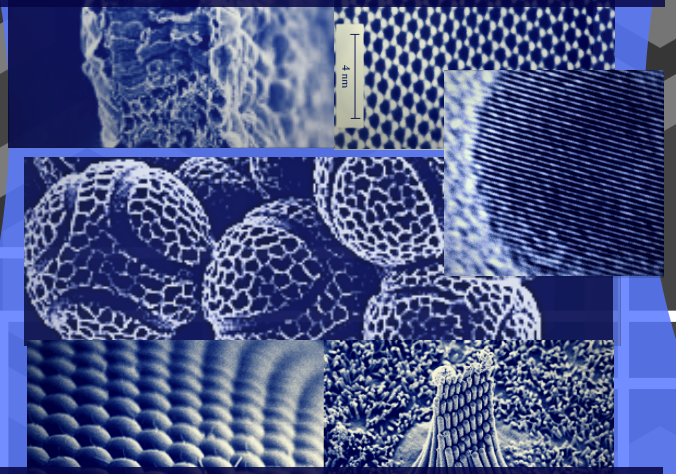
To

*Book post*

**Duration:** 13th to 31st Aug 2018, 3 Weeks
**No. of Participants:** 20-25
**Min. Eligibility:** M. Sc., M. Tech.,
**Course Fees:** *(Fee includes breakfast, tea & lunch)*
Students: Rs.10,000/-
Faculties: Rs. 25,000/-
Industry Participants: Rs. 50,000/-

**Accommodation :** (3 weeks + 2 days):
Students: Rs. 500/-
Faculty/Professionals: Rs. 1000/-

*Participants can make payment either by DD or Online Transfer. For details visit*
*http://www.ncl-india.org/files/SDP/Default.aspx*




## TO APPLY FOR THE COURSE CONTACT

**Coordinator**,
CSIR-NCL Skill Development Program
CSIR- National Chemical Laboratory,
Dr. Homi Bhabha Road, Pune-411008, India
Email: ncl.sdtc@ncl.res.in

*(Application will also be accepted by email)*

CSIR-NCL INTEGRATED SKILL INITIATIVE

SKILL DEVELOPMENT COURSE

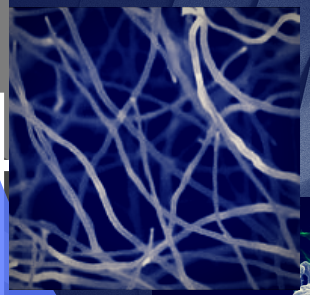
# ELECTRON MICROSCOPY ANALYST

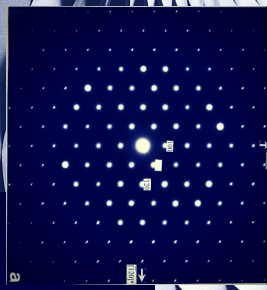
**BASIC TRAINING IN ELECTRON MICROSCOPY AND RESEARCH TECHNIQUES BASED ON IT**

## For Whom:

Young students, faculty members and staff from industries interested in learning Electron Microscopy for research and development

QUALIFICATION: MASTERS IN SCIENCE / ENGINEERING





**CSIR - NATIONAL CHEMICAL LABORATORY**

**Dr. Homi Bhabha road, pashan, Pune 411008**
**http://www.ncl-india.org**

# WHY

should you take this course?

Electron Micrscopy (EM) is a fundamental tool for Nanoscience & Nanotechnology. Global Science & technology experiences a paradigm shift by adopting nanotechnology in most applications. Taking course like this is a fundamental, strong and sure step to upgrade for the fast changing opportunities of the future.

# WHO

should take this course?

Are you,
**a fresher** with M.Sc., (Science), M.Tech (Science or Nanoscience & Nanotechnology) ?

Are you,
**a hunter** of research carrier or job in science / engineering areas that include Nanoscience or Nanotechnolgy (eg., pharma, electronics, polymers, catalysis, chemicals, textile, biomedical engineering etc.,?

Then you are best to benefit this.

# HOW

is the course going to be?

Course will be tought by scientists, Dr. Selvaraj, Dr Prasad, Dr Nisal and more experts with decade of experience in electron microscopy. Practical training will be provided by engineers Mr. Gholap and few more.

# WHAT

is the benefit of the course?

By taking this course, you
1. will be able to learn, experience and practice research based on EM,
2. will get a course completion certificate from the national laboratory,
3. will gain better chances to secure jobs in industries and institutions
4. will have chances to be hired for international jobs involving EM etc.,





# EM Facilities

at

## THE CENTRAL MICROSCOPY FACILITY

**CSIR - NATIONAL CHEMICAL LABORATORY**

### Tecnai T20

TEM working @ 200kV
TEM Imaging, EDS,
STEM etc.

### Tecnai TF30

HRTEM working @ 300kV
HR Imaging, EDS,
HR STEM etc.

### Quanta 200 3D

Environmental SEM @30kV
Imaging at Low & High vacuum,
EDS and FIB

### Nova NanoSEM 450

FESEM working @ 30kV
with FEG, HR Imaging, EDS,
HR STEM etc.

### JEM F200

HRTEM working @ 200 kV
Imaging (High Res) EDS, E-Mapping, HR STEM etc.

### Leica StereoScan 440

SEM working @ 20kV
SEM Imaging, EDS,
E-mapping etc.

**Sample preparatory facilities involving, Focused Ion Beam, sputter coaters, microtome and plasma cleaners etc.,**


**Central Microscopy Facility**

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