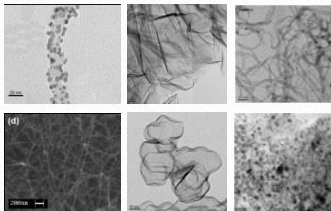


## About the course

This course is intended for the students, faculty and industry personnel who wish to acquire the practical knowledge of Raman spectroscopic measurement technique. The Raman spectroscopy is extensively used to understand the nature of bonding, structural disorder, crystallinity, and to study the effects of physical and chemical stresses on materials' properties. It offers a precise spectral fingerprint, unique to a molecule or molecular structure. Further, it is a non-destructive measurement technique with ease of sampling. Raman measurements are very useful in all sectors of industries – nanomaterials, semiconductors, polymers, life sciences, petrochemicals, agrochemicals, pharmaceuticals, paints and dyes, etc.

## Course Content

- Introduction to Spectroscopic Measurements
- Basics of Raman Spectroscopy and its Applications
- Instrumentation – Raman Spectrometer
- Sample Preparation Techniques
- Standard Measurements
- Characterization of Materials – Carbon Nanotubes, Graphene, Graphene Oxide, Metal Oxide Nanomaterials, Polymers and Composites
- Hands-on Experience with Raman Spectrometer



## Eligibility

M.Sc. (Chemistry/ Physics/ Materials Science)  
B.Tech./ M.Tech. (Chemical Engineering/  
Material Science/ Metallurgical Engineering/  
Nanotechnology/ Biotechnology)

## Course Fee

Students : Rs. 5000  
Faculty : Rs. 10,000  
Industry Participants : Rs. 15,000  
(Fee includes breakfast and lunch.)

## Accommodation Charges

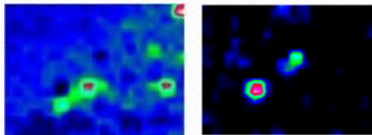
Students : Rs. 500  
Faculty/ Professional : Rs. 1000

For application form and other details, please visit  
(<http://www.ncl-india.org/files/SDP/Default.aspx>)

## MAILING ADDRESS FOR SENDING APPLICATIONS

**Coordinator**  
**CSIR-NCL Skill Development Program**  
**CMC Division**  
**CSIR- National Chemical Laboratory**  
**Dr. Homi Bhabha Road, PUNE-411008**

Email: [ncl.sdtc@ncl.res.in](mailto:ncl.sdtc@ncl.res.in)



Council of Scientific and Industrial Research  
**National Chemical Laboratory**

## CSIR – Integrated Skill Initiative



## Skill Development Course

## Raman Spectroscopic Measurements

Course Code–SDP\_NCL05

**(06 – 10 Dec 2021)**

