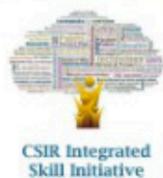




सीएसआईआर - राष्ट्रीय अंतर्विषयी विज्ञान  
तथा प्रौद्योगिकी संस्थान  
**CSIR - NATIONAL INSTITUTE FOR INTERDISCIPLINARY  
SCIENCE AND TECHNOLOGY (NIIST)**



## HANDS ON TRAINING ON UV-VIS, IR, AND FLUORESCENCE SPECTROSCOPIC TECHNIQUES

### OBJECTIVES AND SCOPE

Spectroscopy is the study of the absorption and emission of electromagnetic radiation by matter. Though unique to the kind of radiation used, spectroscopy is integral to a wide variety of disciplines. From providing theoretical backing to early quantum research in radiation and atomic structure, this field has evolved to be critical to the characterization of materials, structural elucidation, imaging, sensing and detection, and various other applications. Spectroscopy also provides a multi-utility tool kit for the development of new and improved materials with unprecedented properties. Among all spectroscopic techniques, UV-Vis, IR, and Fluorescence spectroscopy provide the basic understanding of light-matter interactions. This program is designed to provide attendees with a working knowledge of UV-Vis, IR, and Fluorescence spectroscopies, their fundamental aspects, advanced techniques and emerging applications, including hands-on training sessions on different spectroscopic modules.

### TOPICS COVERED

#### (A) THEORY

- Introduction to Spectroscopy
- Basic Theories in Spectroscopy
- Fundamentals of UV-Vis Spectroscopy: The electromagnetic spectrum, Ultra-violet and visible radiation, electronic transitions and the UV spectrum, Chromophores and auxochromes, Empirical rules for calculating absorption maxima, Shifts in absorption maxima, The Beer-Lambert Law, principles of data processing
- UV-Vis Spectrophotometer - Instrumentation
- UV-Vis Spectroscopy of organic, inorganic and hybrid materials
- Practical applications of UV-Vis Spectroscopy
- Introduction to FTIR spectroscopy: Molecular vibration and light absorption, interferometer: constructive and destructive interference, interferogram of monochromatic, polychromatic and broadband sources, advantages of FT-IR spectroscopy, principles of data processing: folding, apodization, zerofilling, phase errors, spectral resolution
- FT-IR Spectrophotometer - Instrumentation
- Practical applications of FT-IR Spectroscopy
- The fundamentals of fluorescence spectroscopy: The understanding of fluorescence, fluorescence anisotropy, fluorescence spectroscopy principle, fluorophores, solvent and environmental effects, kinetics of photophysical processes, quantum yields, lifetime, fluorescence quenching, energy transfer
- Fluorescence Spectrophotometer - Instrumentation
- Practical applications of fluorescence spectroscopy

#### ELIGIBILITY

Bachelors, Masters or PhD Degree in Science or Engineering

#### MODE

Offline

#### ACCOUNT DETAILS

The Director, CSIR-NIIST  
(Regional Research  
Laboratory (RRL)  
Account No: 67047723825  
IFSC Code: SBIN0070030  
Bank: State Bank of India (SBI)  
Address: Pappanamcode,  
Industrial Estate

#### CONTACT

PHONE:  
0471-2515326

E-mail:  
sdp@niist.res.in

#### COURSE DATE AND DURATION

23-28 March, 2026  
6 Days

#### APPLY ONLINE

<http://sdp.niist.res.in>

### (B) HANDS ON TRAINING ON UV-VIS, IR, AND FLUORESCENCE SPECTROPHOTOMETERS

- Instrumentation
- Sample Preparation
- Instrumental Analysis
- Data Collection
- Data analysis
- Data Validation and Interpretation
- Experimental Spectroscopy with regard to practical applications

### RESOURCE PERSONS

1. Dr. Sreejith Shankar
2. Dr. Joshy Joseph

### COURSE MATERIALS AND CERTIFICATE

1. The participants will receive a Certificate and Course material (soft copy)
2. Hands on training

**Number of students in a batch:  
20-25**

**Fee: Rs. 5,000**