

PROGRAM DETAILS

Sessions will be handled by experts from leading institutes and industries. Theoretical sessions will be followed by demonstration of the instruments.

DATE TO REMEMBER

Deadline for submitting DD, *20th January 2019.*

ELIGIBILITY

Persons from Industries, Academic and Research Institutions are eligible.

HOW TO REGISTER

Candidates have to register by sending the filled and scanned copy of Registration form along with the scanned copy of DD through email to ceesat.events@gmail.com and the originals by post.

Total number of participants is restricted to 40. (First come first serve basis).

REGISTRATION FEE

Research scholars and PG/UG students- Rs. 885/- *

Faculty members of academic institutions- Rs. 1770 /- *

Participants from Industries- Rs. 3540 /- *

Note: Registration fee must be paid in the form of DD in favor of "The Director, NIT Tiruchirappalli" payable at SBI, NIT- Tiruchirappalli

COURSE CO-ORDINATORS

Dr. N. Anantharaman, Professor & HoD

Dr. M. Premalatha, Professor

Dr. Ruben Sudhakar D, Assistant Professor

CORRESPONDENCE ADDRESS

Dr. N. Anantharaman

Head, Department of Energy and Environment

National Institute of Technology- Tiruchirappalli

Tamilnadu- 620015.

VENUE- DEE, NIT- TIRUCHIRAPPALLI

Contact Details

Mrs. G. Shanthi (+91 8056825182)

Mr. Dinesh Kumar S (+91 9566346567)

ACCOMMODATION

Limited rooms on sharing basis are available in the Institute guest house/hostels on payable basis. No TA/DA will be paid to the participants by NIT-Tiruchirappalli.

SELF-SPONSORED WORKSHOP ON

INSTRUMENTAL METHODS OF ANALYSIS

24TH TO 26TH JANUARY 2019

Registration form

1. Name:
2. Designation & Affiliation:
3. Male/Female:
4. Address:
5. Mobile No.:
6. E-mail ID:
7. Highest Academic Qualification:
8. Accomodation Required (Y/N):
9. Date of Birth & Age:
10. Registration fees DD/Cheque Number:

DD/Cheque should be drawn in favor of "the Director, NIT-Tirucirappalli", payable at SBI, NIT-Tiruchirappalli

Place:

Date:

Signature of the Applicant

Please send the completed application form together with the scanned copy of the demand draft to ceesat.events@gmail.com and by post on or before

20th January 2019



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24th to 26th
January
2019

**Department of Energy and Environment
National Institute of Technology
Tiruchirappalli - 620 015.**

THE INSTITUTE

The National Institute of Technology (formerly known as Regional Engineering College) Tiruchirappalli is situated in the heart of Tamilnadu on the banks of river Cauvery. Since its inception in 1964, it has established itself as a premier institute imparting quality technical education and engaged in research and development in different fields. The institute offers ten Undergraduate programmes and twenty-one Post Graduate programmes in Science, Engineering & Technology besides M.S. (by Research) and Ph.D. in all the departments. NIT Tiruchirappalli is located about 22 km from Tiruchirappalli Junction / Central Bus stand on the Trichy-Thanjavur Highway.

THE DEPARTMENT

DEE (formerly known as CEESAT) was established in 1995 under the UK India REC project. M.Tech. (Energy Eng.), an interdisciplinary full time programme is offered since 1996. The research and development activities of DEE include CO₂ capture and sequestration, effluent treatment using solar energy / phyco-remediation, energy modeling, wind energy, Solar PV/ Thermal systems, Energy efficient building and Energy storage devices. Apart from research, the department offers consultancy services on solid and liquid testing, calibration and energy auditing to other academic institutes and industries. The testing labs of the DEE are certified with ISO 9001:2008. The department is equipped with NABL accredited laboratory for calibration of temperature, pressure and electrical devices. The department is committed to convert its research into a real time technology transfer to the society and industry where it meet outs its ultimate objective.

SCOPE OF THE PROGRAM

The scope of the workshop is to introduce the sample preparation, basic principles of thermal and IR analysis, data interpretation and demonstration of the instruments. As an outcome of the workshop, one can characterize polymers, organic or inorganic chemicals, metals, semiconductors and other common classes of materials.

OUTCOMES OF THE PROGRAM

At the end of training program, the participants will be able to

- ☞ Explain the functioning of TGA, DSC, Ultimate analyser, TG-IR, FTIR, NIR and TOC.
- ☞ Apply the appropriate instrumentation technique for getting quality research outcome.
- ☞ Define the operating conditions required for sample analysis.
- ☞ Interpret the results obtained from the Instruments.

COURSE CONTENTS

- ☞ TGA and its research applications
- ☞ DSC studies on macro molecules
- ☞ Evolved gas analysis using TG-IR
- ☞ TOC and its applications
- ☞ Characterisation of samples using FTIR
- ☞ Analysis and Interpretation of IR spectra
- ☞ Ultimate analysis of samples using CHNSO analyser
- ☞ Organic & Inorganic carbon content analysis using TOC analyser

THERMO GRAVIMETRIC ANALYSIS (TGA)

TGA is the best tool to find the proximate analysis of any solid fuels. Other than fuel samples, it can also be used to find the thermal characteristics of any solid materials. The performance of the material varies with the environment, heating rate and temperature at which it is heated. This kind of information is highly required for fuel/ material research and also for industrial applications such as compositional analysis of materials, rate of degradation, product lifetime, oxidative stability, evaluation of polymer flammabilities, thermal stabilities, determination of rancidity of edible oils, competitive product evaluation, measurement of oil extender content in elastomers.

FOURIER TRANSFORM INFRARED SPECTROSCOPY

FTIR spectrometers (Fourier Transform Infrared Spectrometer) are widely used in organic synthesis, polymer science, pharmaceutical industry, polymer dielectrics, inorganic thin films, descuming, patterning, photolitho metallization, plasma etching, petrochemical engineering, sputtering, food analysis and rapid qualification of nutraceuticals. Also used in determination of oil content in membrane applied in compressed air sampling, hydrocarbons in environmental samples, estimation of oil and grease in water, biodiesel concentration measurements and analysis of bioethanol impurities.

TG-IR

The combination of a Thermo gravimetric Analyzer (TGA) with an Infrared Spectrometer (TG-IR) is the most common type of Evolved Gas Analysis (EGA) in use today. By heating a sample on the TGA, a sample will release volatile materials or generate combustion components as it burns. These gases are then transferred to the IR cell, where the components can be identified. Because of its ability to detect functional groups, IR analysis allows greater understanding of the processes seen in the TGA. The PerkinElmer TL8000 transfer line is a state-of-the-art system for TG-IR. Unlike systems that simply move the gas from TGA 4000, the TL8000 is designed to make sure every component evolved in the TGA is transported to the IR.

CHNS/O

Elemental composition is highly required to find the energy content of the material and in the assessment of quality of waste for safe disposal.

UV/VIS/NIR SPECTROSCOPY

Integrating spheres, in combination with UV/Vis/NIR spectrophotometers are versatile for reflectance and scattered transmittance measurements for solid or liquid. Double-beam, double-monochromator design provides the highest stability coupled with the highest accuracy. Extension of the measurement range into the Near-IR region provides richer and complementary spectral information for compounds and materials. Application areas range from surface characterization of solids to the photometric analysis of turbid, colloidal, transparent and translucent samples. Typical uses encompass quality assurance testing and product development measurements on textiles, dyes, paper & glass

DIFFERENTIAL SCANNING CALORIMETRY (DSC)

DSC is a thermo analytical technique in which the difference in the amount of heat required to increase the temperature of a sample and reference is measured as a function of temperature. Generally, the temperature program for a DSC analysis is designed such that the sample holder temperature increases linearly as a function of time. Applications of DSC include detection of impurity, study of polymorphism, degree of crystalline, study of phase diagram, drug excipient compatibility study.

TOTAL ORGANIC CARBON ANALYSIS (TOC)

TOC is a highly sensitive non-specific measurement of all organics present in a sample. It can be used to regulate the organic chemical discharge to the environment in a manufacturing plant. In addition, low TOC can confirm the absence of potentially harmful organic chemicals in water used to manufacture pharmaceutical products.