

Central Instrumentation Center ( CIC)

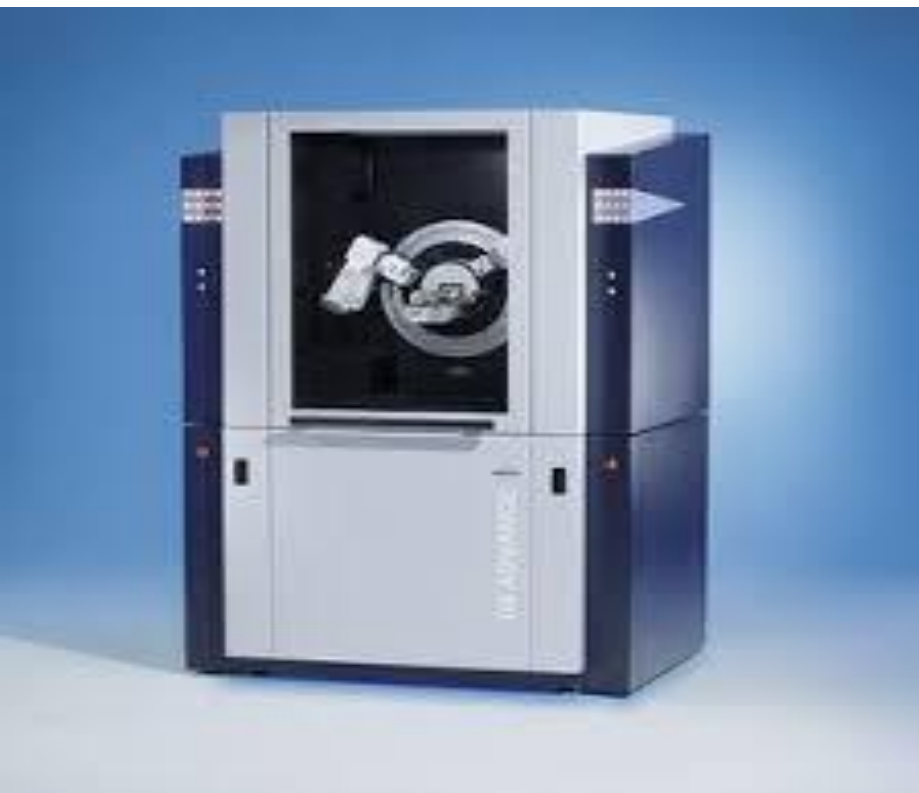


FT-IR (Frontier FT-IR/FIR, Perkin Elmer )

- Detection of Functional groups and characterizing co-valent bonding information.
- Stretching and Bending vibrations of organic compounds
- Support in Identification of components in a mixture of components.
- Provide information about structure of material.
- Understanding the unknown contaminants in industrial samples.

XRD (D8 ADVANCE ECO - Bruker )

- Non –destructive techniques to identify crystalline phases and orientation.
- To determine structural properties: strain, grain size, epitaxy, phase composition, ordered disordered transformation, thermal expansion etc.
- To determine crystalline and amorphous arrangements.
- Measurement of thickness of layers
- Determination of texture of poly grained material
- ...



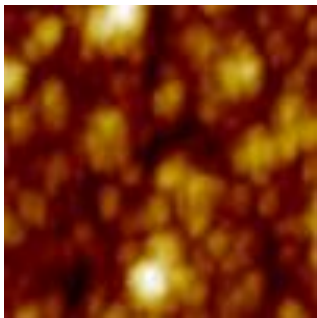
Spectro Photo meter UV-Vis ( LAMDA 35, Perkin Elmer )



- Determination of metal and organic non-metal analytes in water
- Characterization of petrochemical Products
- To generate quick and easy methods for common food analyses without the need for extensive training ensuring that the correct results are reported without compromising food quality.
- High optical quality for environmental analysis.

Atomic Force Microscope (NANOSURF AG)

- Image of material surface at atomic resolution.
- Determine the roughness of surface samples and measure the thickness of crystal growth.
- Imaging of non-conductive biological surfaces.
- Applicable for quantification of abrasion, adhesion and corrosion of surfaces.





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### ***CHNS-O Analyzer ( Flash 2000 Series, Thermo Scientific)***

- To analyse organic CHNSO composition of the solid and liquid samples from 0.01 to 100% using TCD.
- To analyse trace level sulphur up to 25 ppm using FPD
- Organic CHNSO composition of solid and liquid samples such as biomass, bio-oil, liquid and solid fuels.
- Provide information about structure of material.
- Predicting theoretical calorific value from the CHNSO composition of the sample.

### ***ICP-OES (Plasma Quant 9000- Analytikjena )***

- Direct Analysis of Saline Matrices.
- Composition Analysis of an Electrolytic Etching Solution.
- Specification Analysis of Gasoline.
- Trace Metals Analysis in Water-Methanol-Oil Mixtures.
- Analysis of Rare Earth Elements in Granite and Sandstone.
- Analysis of High-alloyed Steel.



### ***Contact Angle Goniometer/Drop Shape Analyzer (Easy Drop, Kruss, Grmany 2014 )***

- Characterization of surface pre-treatment processes
- Investigation of the adhesion and stability of bonding and coating processes
- Investigation of coating substances in accordance with DIN 55660
- Checking the wettability of plastic, glass, ceramic, wood or metal
- Quality control for wafers and microelectronics

### ***Nano fluid interferometer (Mittal Enterprises-NF10)***

- Characterization of Nanofluids like Ag/Au & Ferrofluids etc.
- To evaluate modest nanoparticles concentration in the fluid for significant enhancement of its property.
- Prediction of enhanced thermal conductivity due to suspension of the metallic nanoparticles with very low concentration in to the polymeric fluids.
- Sound Velocity and compressibility of nanoparticles with liquid suspension.
- Study of Phase transition and to detect/assess weak and strong molecular interactions in Nanofluids.
- To determine the extent of complexation and calculate the stability constants of such nanofluid complexes.





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### *Particle size analyzer (ZEN1690, Malvern Instruments Ltd,)*

- For solids, the surface area of the particle is critical in determining the rate of chemical reaction.
- Particle characterization analyzers have found uses in quality control, process material evaluation, and research and development for applications.

### *Photoluminescence Spectrophotometer (LAMBDA 45, Perkin Elmer)*

- Quantification of heavy metals (nanomaterials) in freshwater, seawater, air, and soil.
- Soil contamination from organic materials.
- Sunscreen efficacy.
- Water and wastewater analysis.



### *Potentiostat-Galvanostat (CHI660E, CH Instruments, USA,)*

- General purpose electrochemical measurements
- Kinetic measurements
- Electroanalysis
- Fundamental research
- Corrosion
- Battery studies.

### *Rheometer (Model C-LTD80/QC, Anton Paar GMBH,Austria,)*

- Viscosity measurement – From single point up to complex rheological tests
- Quick and accurate temperature control
- Ease of operation for single-point viscosity determinations as well as more sophisticated rheological tests
- A wide range of applications covered by only one rotational rheometer
- A broad variety of measuring systems and accessories for a multitude of applications



## Central Instrumentation Center ( CIC)



### *Thermo mechanical Analyzer (TA Instruments-TMAQ400EM)*

Intrinsic and product property measurements

- Accurate Co-efficient of Thermal Expansion
- Material performance
- Multilayer film analysis
- Shrinkage force testing
- Film tensile
- Fiber stress/strain measurement

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### *GC-MS ( CLARUS SQ8S, Perkin Elmer )*

- Test for contaminants and quality in food, flavors and fragrances
- Monitor for VOCs and SVOCs in air, water and soil
- Ensure quality of consumer goods, including plastics
- Analyze lubricants for quality and conformity
- Meet global regulatory requirements
- Gain efficiencies in sample handling through an autosampler.

*Arriving soon...*





**NABL Accredited Laboratory**



**National Accreditation Board for  
Testing and Calibration Laboratories**  
(A Constituent Board of Quality Council of India)



**CERTIFICATE OF ACCREDITATION**

**HEALTH, SAFETY AND ENVIRONMENT LABORATORY**

has been assessed and accredited in accordance with the standard

**ISO/IEC 17025:2005**

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

University of Petroleum and Energy Studies, Bidholi Campus via Premnagar, Dehradun, Uttarakhand

in the field of

**TESTING**

**Certificate Number** TC-5420 (in lieu of T-3263)

**Issue Date** 31/03/2017

**Valid Until** 30/03/2019



This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.

(To see the scope of accreditation of this laboratory, you may also visit NABL website [www.nabl-india.org](http://www.nabl-india.org))

Signed for and on behalf of NABL

N. Venkateswaran  
Program Director

Anil Relia  
Chief Executive Officer



NABL Accredited Laboratory



Atomic Absorption Spectroscopy

- Software-controlled changeover from flame to furnace analysis, without an operator even in the room.
- Run unattended, automated analysis with fully configurable auto-sampler
- SOLAAR software provides incredible support with wizards, optimization routines and automated performance controls.
- Six lamp auto-aligning carousel for maximum light throughput

High Volume Sampler (PM 2.5 & PM 10, Ecotech)

- Instruments used to measure PM<sub>10</sub> and PM<sub>2.5</sub> .
- Measuring the volume of air sampled and weighing the filters before and after sampling determines the concentration of PM<sub>10</sub> and PM<sub>2.5</sub> particles in the air.
- High volume air sampler is used to collect TSP samples.
- The high volume air sampler draws a large known volume of air through a pre-weighed filter for 24 hours.



Digital Weighing Balance Up to 5 Decimals (Sartorius CPA225D)

- Its is use only for R&D purpose.
- It is Suitable for weighing PM<sub>10</sub> and PM<sub>2.5</sub>
- Conditioning can be done within ±5% of that ambient humidity.
- Can measure up to 5 decimal.

Digital pH Meter (Orion Star A11)

- PH meter, electric device used to measure hydrogen-ion activity (acidity or alkalinity) in solution .
- Fundamentally, a pH meter consists of a voltmeter attached to a pH-responsive electrode and a reference (unvarying) electrode.
- Instrumentation is frequently the source of disturbance for pH systems, through repeatability error, measurement noise, or valve hysteresis
- pH electrode submersion assemblies with unencapsulated terminations below the liquid surface will eventually have wet terminations.





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### *Turbidity Meter (Macro Scientific Works)*

- Turbidity meters are used to quickly measure the turbidity (or cloudiness) of water, caused by suspended solid particles.
- Understanding how turbidity meters work can help in achieving more accurate results and ensuring the samples and meter are handled correctly.
- Electronic turbidity meters work by measuring the amount of light which is scattered at 90° by the suspended particles.

### *Conductivity Meter (Con 700)*

- An electrical conductivity meter (EC meter) measures the electrical conductivity in a solution.
- It has multiple applications in research and engineering, with common usage in hydroponics, aquaculture, aquaponics, and freshwater systems to monitor the amount of nutrients, salts or impurities in the water.
- Water and wastewater analysis.



### *Hot Air Oven (Grace Scientific Industries)*

- Hot air ovens are electrical devices which use dry heat to sterilize.
- Generally, they can be operated from 50 to 300 °C, using a thermostat to control the temperature.
- A complete cycle involves heating the oven to the required temperature, maintaining that temperature for the proper time interval for that temperature, turning the machine off and cooling the articles in the closed oven till they reach room temperature. The standard settings for a hot air oven are:
- 1.5 to 2 hours at 160 °C (320 °F)
- 6 to 12 minutes at 190 °C (374 °F)

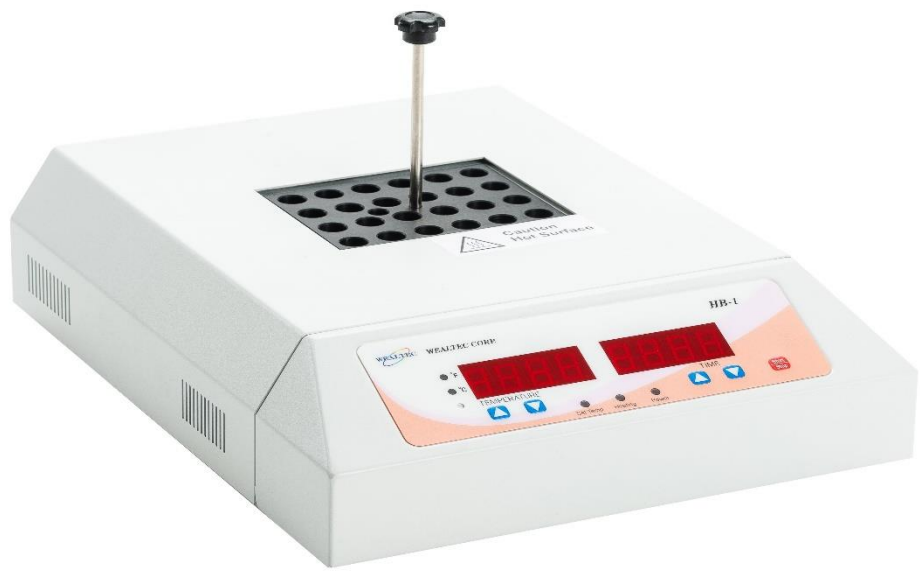
### *BOD Incubator (SONAR 8450M)*

- It is the most versatile and reliable low temperature incubator which is designed to maintain at 20°C, necessary for Biological Oxygen Demand/Biochemical Oxygen Demand (BOD) determination.
- It provides controlled temperature conditions for accelerated tests and exposures
- In measuring waste loadings to treatment plants and in evaluating the BOD-removal efficiency of such treatment systems.
- It measures the amount of oxygen used to oxidize reduced forms of nitrogen (nitrogenous demand) unless their oxidation is prevented by an inhibitor.





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## COD Incubator (Wealtech HB-1)

- Intrinsic and product property measurements
- Low cost, safe heating device at laboratory
  - Selectable wide variety aluminum block
  - No more external temperature probe
  - COD reactor

## Respirable Dust Sampler (Ecotech AMP 460 BL)

- Brushless blower reduces equipment downtime and maintenance effort.
- Provision of light for flow and time reading during night.
- Toolbox within the instrument.
- Lockable casters, top cover and gaseous attachment.
- Improved cabinet design which is more sturdy and durable with SS hardware.
- Electromagnetic Interference (EMI) to TVs totally eliminated.



## UV Spectrophotometer (Thermo UV-1)

- Accelerate through wavelength scans with scan speeds up to 4,200nm/minute
- Provision of light for flow and time reading during night.
- Depend on dual-beam optics for superior photometric accuracy
- Lockable casters, top cover and gaseous attachment.
- Acquire data from the UV to the near-IR
- Save data to a USB memory device.
- Rely on accurate data with pre-programmed verification methods.

## Humidity Chamber (Weiber ACM- 78092-5)

- 20 Ltrs To 20000 Ltrs Chamber Capacity. Depend on dual-beam optics for superior photometric accuracy
- Lockable casters, top cover and gaseous attachment.
- In Built Printer For Printing Graphs Save
- Over And Under Temperature Specimen Protection.
- Temperature And Humidity Controlled By Microprocessor Based System.
- Temperature Fluctuation  $\pm 0.3^{\circ}\text{C}$ , Temperature Uniformity  $\pm 0.75^{\circ}\text{C}$ .
- Humidity Deviation  $\pm 2.5\%\text{RH}$ , Humidity Uniformity  $\pm 5\%\text{RH}$ .

