

## **Common facility center (CFC); Sophisticated analytical instrumentation facility (SAIF)**



Estd : 1962

'A'" Accredited by NAAC (2021)  
with CGPA 3.52



### **About CFC & SAIF**

The Common Facilities Centre (C.F.C) was started in 1984 under USIC with five instruments such as AAS, XRD, Ultra centrifuge, UV Visible, Dispersive IR. The intention was to provide analytical instrumentation facility to the university, university affiliated college researchers and academic staffs, research institutes and industries nearby. Although it was started with only five equipment's, now the Common Facility Centre is having total number of fourteen advanced sophisticated analytical instruments. Many funding agencies such as SAIF-DST, DST-PURSE, RUSA, UGC etc. supported financially to make it as state of art facility, hence center renamed as CFC-SAIF-DST center.

The objective of the '**Common Facilities Centre**' under the University Science Instrumentation Centre (USIC) is;

- To provide characterization facility with very subsidized rate to the Academic Institutes, Universities, Colleges and Industries.
- To increase number of publications, IPRs and the level of research of the university.

## List of Sophisticated Analytical Instruments available at CFC

Sr. No.	Equipment
1)	X-ray Diffraction (XRD)
2)	Gas Chromatography Mass Spectroscopy (GCMS)
3)	Fourier Transform Infrared spectroscopy (FTIR)
4)	Inductive Coupled Plasma-Optical Emission Spectroscopy (ICP-OES)
5)	Microwave Digester
6)	Gas Chromatography double Mass Spectroscopy- (GCMS-MS)
7)	Thermo gravimetric Analysis-Differential Thermal Analysis-Differential Scanning Calorimetric (TGA-DTA-DSC)
8)	Particle Size Analyzer zeta potential
9)	Micro-Raman
10)	Transmission Electron Microscopy (TEM)
11)	Vector network analyzer
12)	Ultra-centrifuge
13)	X-ray Photoelectron Spectroscopy (XPS)
14)	Bio- Atomic Force Microscopy (Bio-AFM)

## Transmission Electron Microscopy (TEM):



**Make: JEOL ASIA PTE LTD.**  
**Model: JEM 2100 PLUS**

### Specification:

Accelerating voltage	200 kV
Electron source	Both W and Lab6 filaments
Resolution	$\leq 0.23\text{nm}$
Operating modes	HRTEM, STEM, EDS, BF, DF, HAADF, SAED and NBD etc.

**Applications:** It provides topographical, morphological and compositional and crystalline information. It allows to view samples on molecular level, making it possible to analyse structure and texture.

## X-ray photoelectron spectroscopy (XPS)



**Make: JEOL ASIA PTE LTD**  
**Model: JPS 9030**

### Specification:

X-ray sou	MgK $\alpha$ /ALK $\alpha$
Resolution	1,000,000 cps or more
Analyzer	Electrostatic hemispherical analyser
Etching ion source	Ar ion with 100NM/MIN etching rate

**Applications:** It is widely used to gain information about the composition, electronic state, chemical state, binding energy, and more of the surface region of solids. Even by using UPS technique, we can do depth profiling of the material also.

## X-ray diffractometer (XRD)



**Make: Bruker Ltd Germany**  
**Model: AXS D8 Advances**

### Specification:

Geometry	$\theta$ - $\theta$ and $\theta$ -2 $\theta$
Scanning range	-110° to 168°
Detector	LYNXEYE XE-T
Target	Copper (Cu) $\lambda$ = 1.54 Å
Resolution	0.0001°

**Application:** Pharmaceutical Industry, Forensic Science, Geological, Microelectronics Industry, Glass Industry, Corrosion Analysis, Environmental Science, Material Science

## Bio - Atomic Force Microscopy (Bio-AFM):



**Make: Park Syst. S. Korea**  
**Model: NX-10**

### Specification:

Mode	Contact, non-contact and tapping mode
XYZ stage	20 $\mu$ m x 20 $\mu$ m x 25 $\mu$ m
Resolution	XY scanner- 0.05nm & Z scanner- 0.015 nm.
Resonance frequency	>9 kHz
Sample size	100 mm x 100mm x 20mm

**Applications:** surface imaging, dielectric and photoelectric properties, magnetic, mechanical and electrical property measurement.

## Micro-Raman:

**Make: Renishaw UK**  
**Model: Renishaw INVIA0120-02**



### Specification:

Spectral range	50 cm <sup>-1</sup> to 4000 cm <sup>-1</sup>
Resolution	0.5cm <sup>-1</sup>
Laser Source	Diode laser
wavelength	532 nm
Sample required	Thin film, powder, liquid with all solvents.

**Applications:** Chemistry Research Fields. Material Science, Biology Research Fields.

## Gas Chromatography-double Mass Spectroscopy (GC-MS/MS):

**Make: Shimadzu Japan.**  
**Model: TQ 8050 Plus with HS 20**



### Specification:

Analyzer	Quadrupole with pre-filter
Mass range	4-1090 Daltons (amu)
Mass stability	0.1 m/z
Ionization modes	EI, CI, NCI and FID
Sampler	Auto injection and headspace sampler

**Applications:** environmental flavors, fragrances, pharmaceuticals, organic, petrochemicals, fine chemicals, nominal molecular weight calculation. Molecular structure, impurities in drinking water, waste water.

## Gas Chromatography Mass Spectroscopy (GC-MS)



**Make: Shimadzu Japan**

**Model: QP2010**

### **Specification:**

Analyzer	Single quad
Mass range	4-1090 Daltons (amu)
Mass stability	0.1 m/z
Ionization modes	EI

**Applications:** environmental flavors, fragrances, pharmaceuticals, organic, petrochemicals, fine chemicals, nominal molecular weight calculation. Molecular structure, impurities in drinking water, waste water.

## Inductively Coupled Plasma - Optical Emission Spectrometry (ICP-OES):



**Make: Agilent Technology**

**Model: ICP-OES 5100**

### **Specification:**

Analysis	Dual view analysis (vertical and horizontal)
Detector	CCD detector

### **Applications:**

- Determination Of Metals In Wine,
- Arsenic In Food
- Trace Elements Bound To Proteins.
- Minerals Processing
- Pharmaceutical and Energy Industries.



## Vector Network Analyzer (VNA):

**Make: Keysight Technology**

**Model: ENAE5063A**



### Specification:

Frequency range	50 kHz to 18 GHz
Frequency resolution	1 to 11Hzfor (100 kHz to 18 GHz)
Power resolution	0.5 dB
Measurement	Material measurement & antenna test

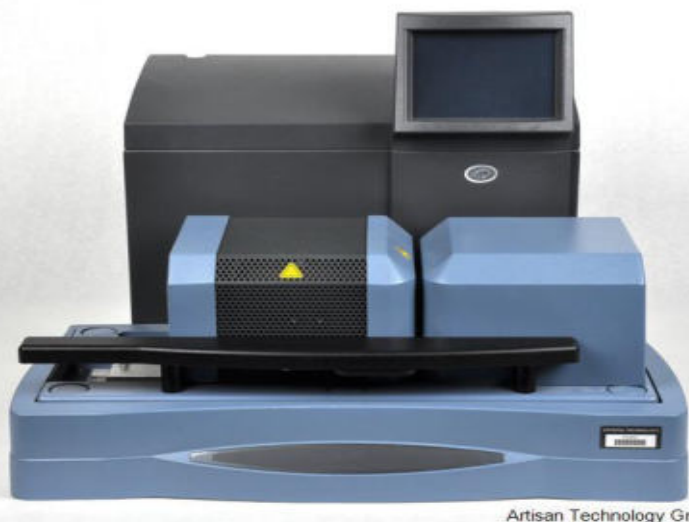


**Applications:** It is mostly used for microwave design application, material characterization, antenna design, testing designs or prototypes in wireless communication industries etc.

## Thermo Gravimetric Analysis-Differential Thermal Analysis-Differential Scanning Calorimetric (TGA-DTA-DSC):

**Make: TA Instruments**

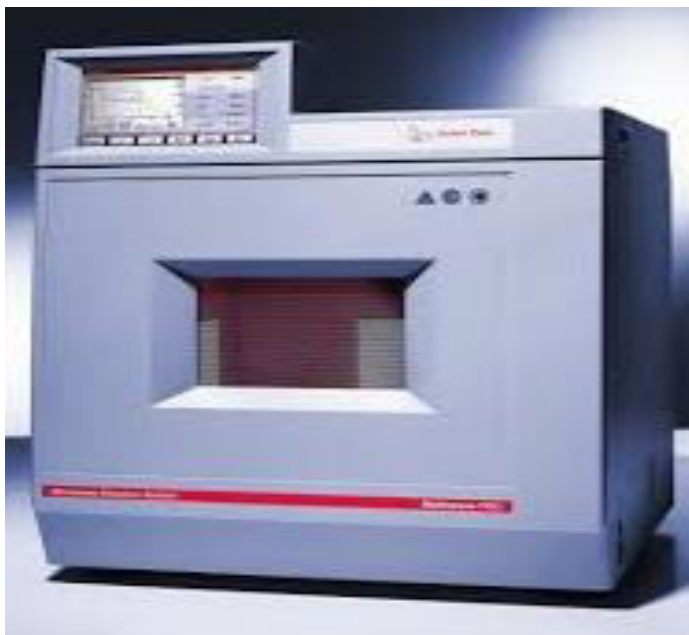
**Model: SDT Q600**



System design	horizontal balance and furnace
Sample capacity	200mg or 350 mg including sample holder
Balance sensitivity	0.1 $\mu$ g
Temperature range	Ambient to 1500 $^{\circ}$ C
DTA sensitivity	0.001 $^{\circ}$ C

**Applications:** Pharmaceutical Industries, Petrochemical, Cement Chemistry, Mineralogical Research, Environmental Studies, Material Science etc.

## Microwave Digestive System:



**Make: Anton Paar**

**Model: Multiwave Pro**

### Specification:

Digestion type	Microwave; acid
Microwave power	1400 watt
Temperature	Max 300 °C
Pressure	0-140 bar

### Applications:

It is generally used for sample preparation for ICP-OES by digesting all types of soft and hard materials. It is also used for liquid samples containing organic compounds, combustible solids protein hydrolysis, solvent extraction, drying and evaporation.

## Fourier Transform Infrared Spectroscopy (FTIR):



**Make: Bruker**

**Model: ALPHA**

### Specification:

Operating Modes	ATR and KBR optics
Spectral range	375 – 7500 $\text{cm}^{-1}$
Resolution	Better than 2 $\text{cm}^{-1}$
Wavelength precession	$<0.0005 \text{ cm}^{-1}$ @ 2000 $\text{cm}^{-1}$
Samples	Solid, liquid and gasses.

### Applications:

It is generally used for sample preparation for ICP-OES by digesting all types of soft and hard materials. It is also used for liquid samples containing organic compounds, combustible solids protein hydrolysis, solvent extraction, drying and evaporation.



## Ultra-Centrifuge:



### Applications:

It is generally used for sample preparation for ICP-OES by digesting all types of soft and hard materials. It is also used for liquid samples containing organic compounds, combustible solids protein hydrolysis, solvent extraction, drying and evaporation.

## Particle Size Analyser with Zeta Potential (PSA-ZP):



**Make: Malvern**

**Model: Nano ZS90**

### Specification:

Size range	0.5 nm to 5 $\mu$ m
Zeta potential range	+/- 500mV
Mobility range	+/- 20 $\mu$ .cm/V.s
Laser	Helium neon laser (633nm, max 4mW)

**Applications:** It is applicable in variety of fields such as chemical industries, food technology, mining, forestry, agriculture, nutrition, pharmaceutical and energy industries.

## Rate List for Analysis

Sr. No.	Equipment	Proposed rates for SUK		
		University	Other than University	Industry
1)	XRD	Rs.150/-	Rs.400/-	Rs.1500/-
2)	GCMS	Rs.500/-	Rs.1000/-	Rs.1500/-
3)	FTIR	Rs.200/-	Rs.500/-	Rs.1000/-
4)	ICP-OES	Rs.500/- (Per Sample)	Rs.1200/-	Rs.2500/-
5)	Sample Preparation Microwave Digestive	Rs.200/- (Per Sample)	Rs.300/-	Rs.500/-
6)	GCMS-MS Analysis	Rs.750/-	Rs.1500/-	Rs.3500/-
7)	DSC/ TGA	Rs.500/-	Rs.900/-	Rs.1500/-
8)	Particle Size Analyzer	Rs.150/-	Rs.300/-	Rs.800/-
	Zeta Potential	Rs.300/-	Rs.600/-	Rs.1200/-
9)	Micro-Raman	Rs.300/-	Rs.900/-	Rs.2000/-
10)	TEM	Rs.1800/-	Rs.2900/-	Rs.4500/-
	TEM Sample Preparations	Rs.400/-	Rs.400/-	Rs.400/-
11)	Vector network analyzer	Rs.300/-	Rs.600/-	Rs.1000/-
12)	Ultra centrifuge	Rs.50/-	Rs.100/-	Rs.200/-
13)	XPS	Rs.2100/-	Rs.3100/-	Rs.6100/-
14)	Bio AFM	Rs.500/-	Rs.1000/-	Rs.2000/-

For availing facility register on I-STEM portal. For more information please follow the link:  
<https://www.istem.gov.in/i-progress>