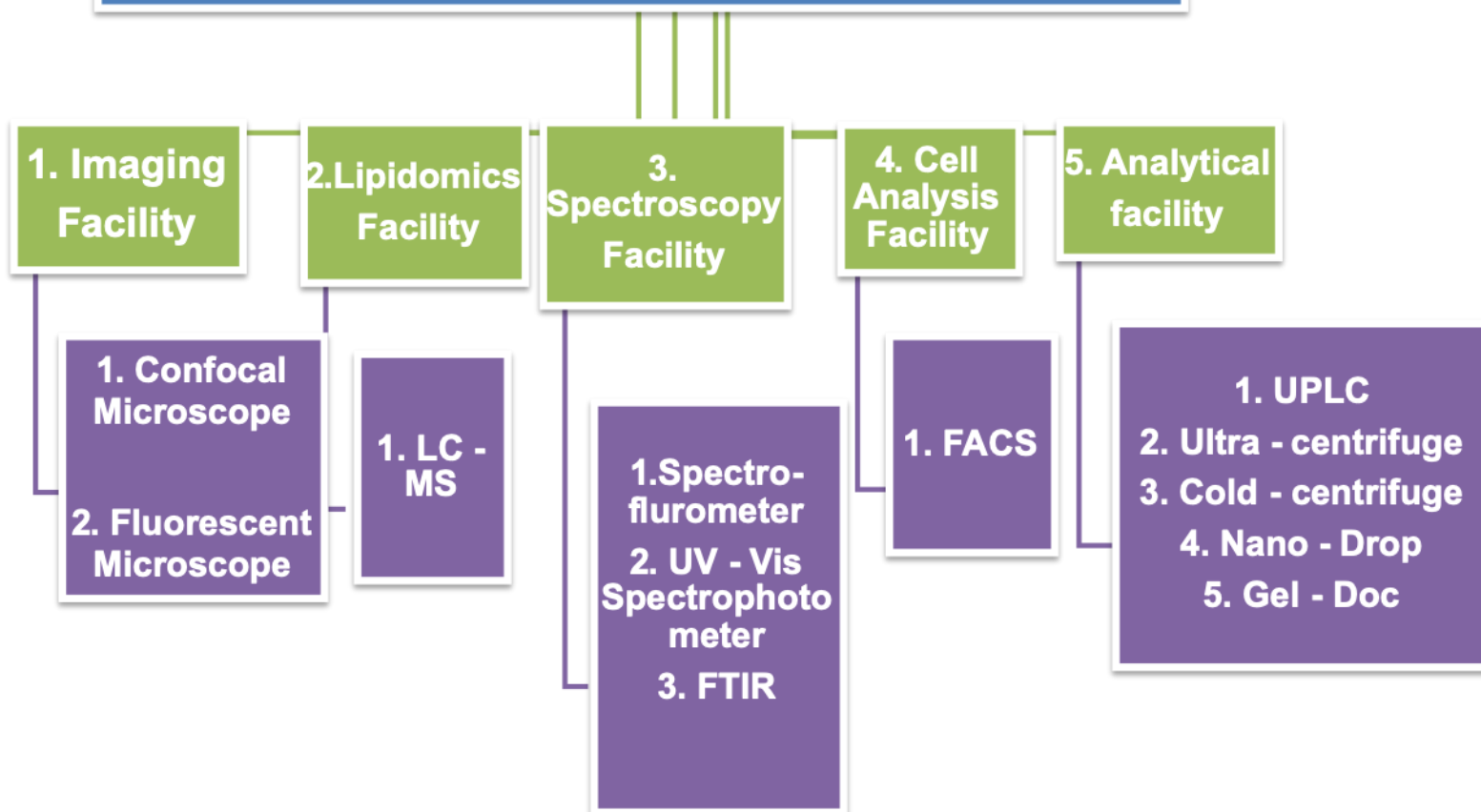




Central Instrument Research Facility

Amity University Haryana, Gurugram

Central Instrument Research Facility (CIRF) List of equipment

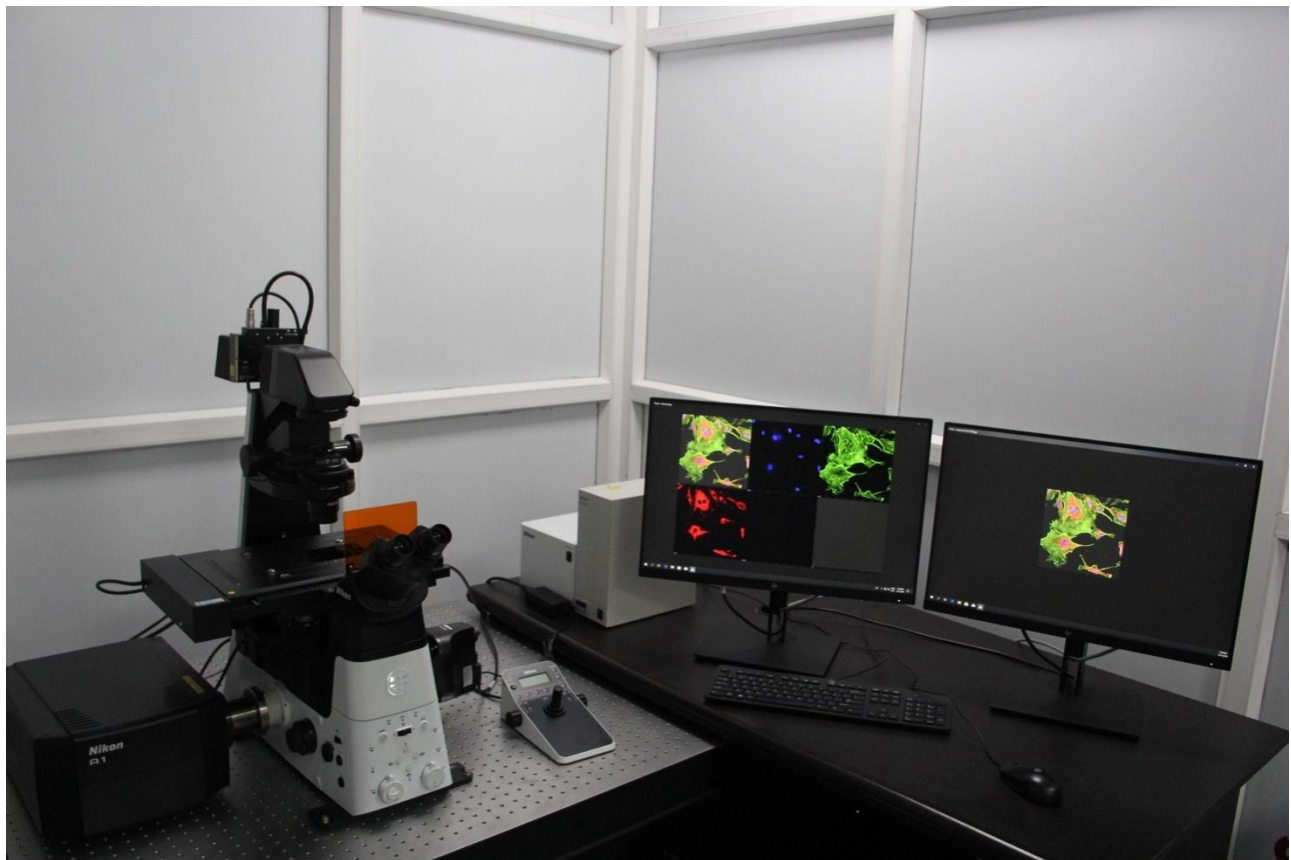


Central Instrument Research Facility, AUH

The central instrument research facility (CIRF) is housed at Amity University Haryana, Gurugram provides a central facility of latest and advanced analytical instrument for research and for promoting interdisciplinary research. Instruments are manned by qualified personnel. This facility is available for Amitians and other academic research institutions, Industries and organizations.

1.Imaging facility

a. Confocal Microscope



About Instrument:-

Nikon confocal microscope (Model:-A1R HD 25)

1. Features:-

- Largest field of view (25 mm) in its field, when combined with the justified Ti 2-E inverted microscope, the imaging area of A1 R HD 25 is nearly twice the conventional FOV of 18 mm.
- High definition imaging up to 1k x 1K, 1024 x 1024 pixels enables acquisition of high resolution, high quality images at lower magnification, enabling compatibility with a wide range of samples.
- High speed imaging capability up to 720 fps, in combination with a large field of view, dramatically increases imaging throughput. The scanning method reduces the exposure time of the sample to excitation light, minimizing photo toxicity and photo bleaching
- Capture large scale overview images as well as high magnification images with the same instrument. The 25 mm FOV of the A1R HD 25 is effective for observation of large samples, while its 1k x 1k high definition is ideal for the observation of minute structures.
- High sensitive detector options for various types of fluorescence labels.

Confocal Microscopy can be useful for

3D imaging, Co localization, FLIP*, Fluorescence, FRAP*, FRET,*
Microscopy, Photo activation, Time lapse*.

*Some applications are limited to certain cell/tissue types due to unavailability of a live cell imager at the moment. Kindly consult with the faculty in charge for further information.

Samples:-

Tissue culture dishes, slide chambers, microplates, glass slides etc. can be used with ADHERENT/FIXED samples. Operating Scientist/Operator must be consulted regarding the thickness/material of slides/dishes required for sample preparation before booking the facility. Control samples without any fluorophore and with fluorophore are required.

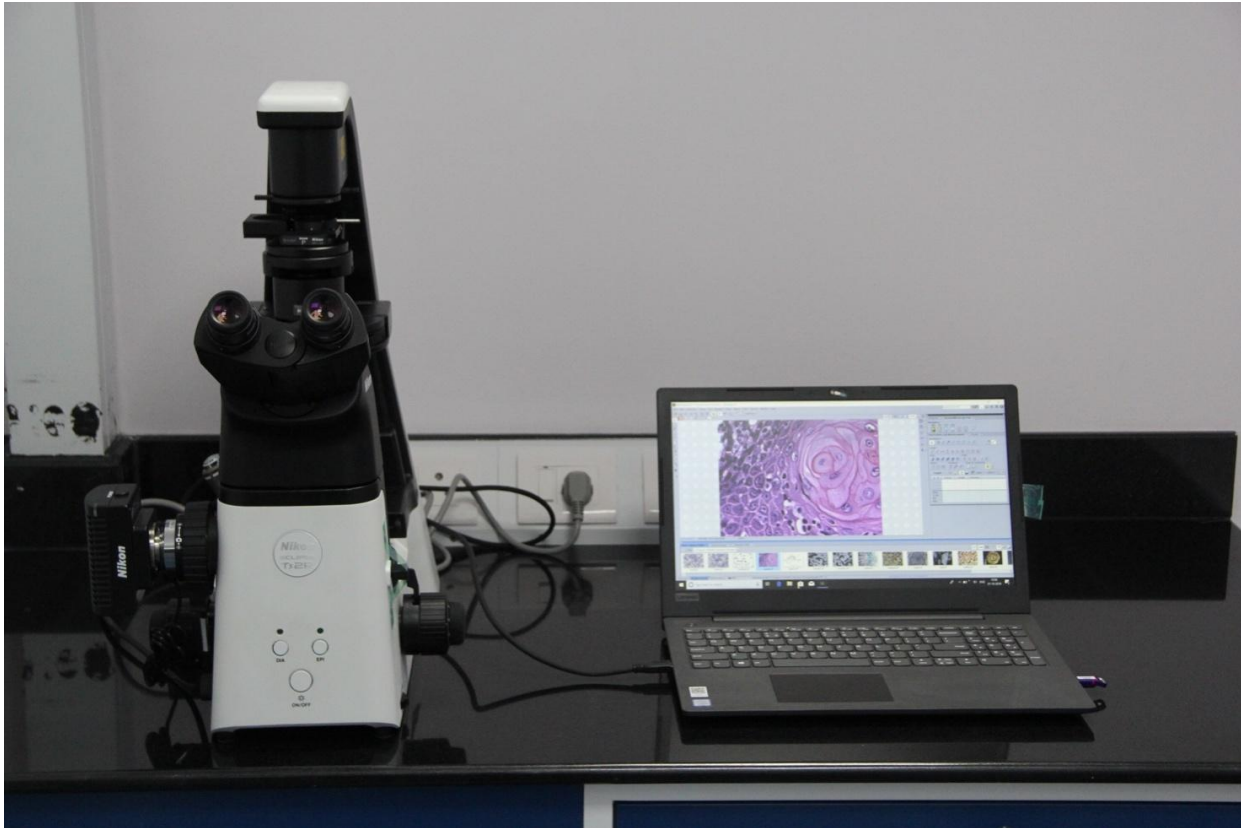
Charges:-*

Users types	Confocal microscope
Amity University	Rs 500/hour
Academic & Research institution	Rs 2000/hour
Private industries/other laboratories	Rs 3000/hour

*Additional Charge – 18% GST

b. Fluorescence Microscope

A1 R (Nikon Microscope)



Features

- A fluorescence microscope uses fluorescence and phosphorescence instead of, or in addition to, reflection and absorption to study specimens.
- A sample is illuminated with light of a wavelength which excites fluorescence in the sample.
- Typical components of a fluorescence microscope are a light source, excitation filter, the dichroic mirror (or dichroic beamsplitter), and emission filter.
- Fluorescence microscopes can be used for many different applications including localization of specific proteins, determining the shape of

organs, cells, and intracellular structures, studying protein interactions or conformation, examining ion concentration and observing live cells.

- Look for ease of use, ergonomic features, multiple modes, high resolution and the possibility to upgrade.

2. Microscopy can be useful for

- Imaging structural components of small specimens, such as cells
- Conducting viability studies on cell populations (are they alive or dead?)
- Imaging the genetic material within a cell (DNA and RNA)
- Viewing specific cells within a larger population with techniques such as FISH

Samples:-

Tissue culture dishes, slide chambers, microplates, glass slides etc. can be used with ADHERENT/FIXED samples. Operating Scientist/Operator must be consulted regarding the thickness/material of slides/dishes required for sample preparation before booking the facility. Control samples without any fluorophore and with fluorophore are required.

2. ALRF (Amity Lipidomics Research Facility)

<https://amity.edu/gurugram/lipidomics-research-facility.aspx>

Amity Lipidomics Research Facility (ALRF), was established at the Amity University, Haryana in 2018, with funding from Department of Science and Technology (DST-FIST) Gov. of India and Amity University, Haryana.

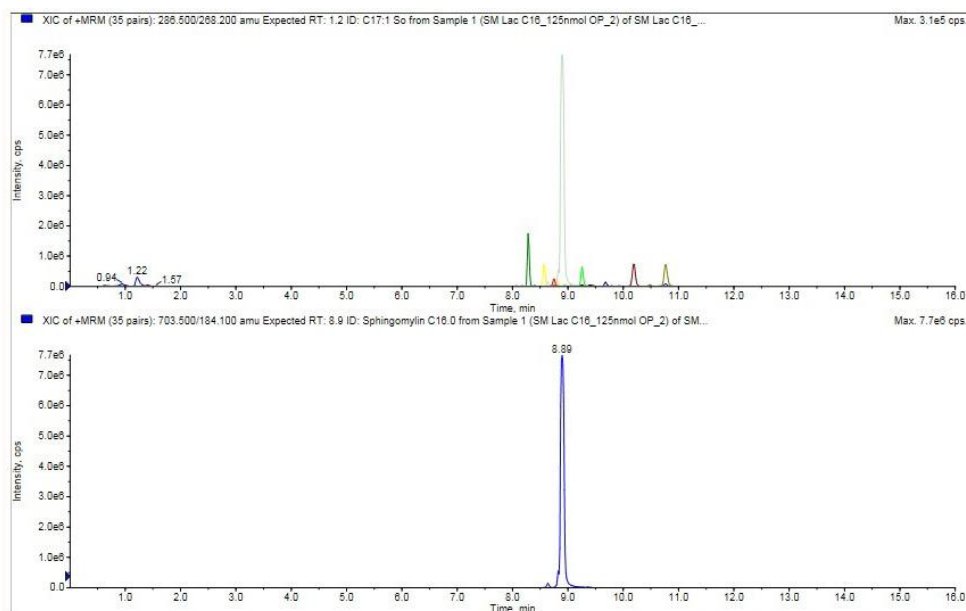
The purpose of establishing this facility is to provide the scientific community (within Amity University and external researchers, both academia and industry) with state-of-the-art mass spectrometric techniques for separation, identification and quantitation of biomolecules like lipids, metabolites and proteins.

Amity Lipidomics Research Facility houses a triple stage quadrupole/linear ion trap mass spectrometer, Q-Trap 4500 (SCIEX), equipped with ion sources (turbo V) Electrospray ionization (ESI), and Atmospheric pressure chemical ionization (APCI), autosampler, column oven with HPLC (Exion LC-AC) system. This instrument provides necessary resolution and sensitivity for a broad range of qualitative and quantitative lipid and metabolite analyses required for exhaustive characterization of lipid signaling molecules and metabolic pathways. We utilize ESI technique for generation of singly charged molecular ions with excellent concentration sensitivity and different scanning modes like precursor ion, neutral loss or MS/MS scan for detection of all species within a lipid/metabolite class. Separation and scanning of sample extracts in various scan modes give a complete and comprehensive profile of all molecular species in different lipid classes. Identification and quantification of unknown and known lipids/metabolites in biological samples such as cell extracts, tissue preparations, plasma, urine and saliva samples by using Data dependent (DDA) and data independent (DIA) analysis are done. ALRF focuses on targeted and non-targeted analysis of lipids/metabolites. Depending on the lipid class and scientific question, analytical methods with (LC-MS/MS) or without (shotgun lipidomics) are used. LipidView and MultiQuant software are used for data processing.

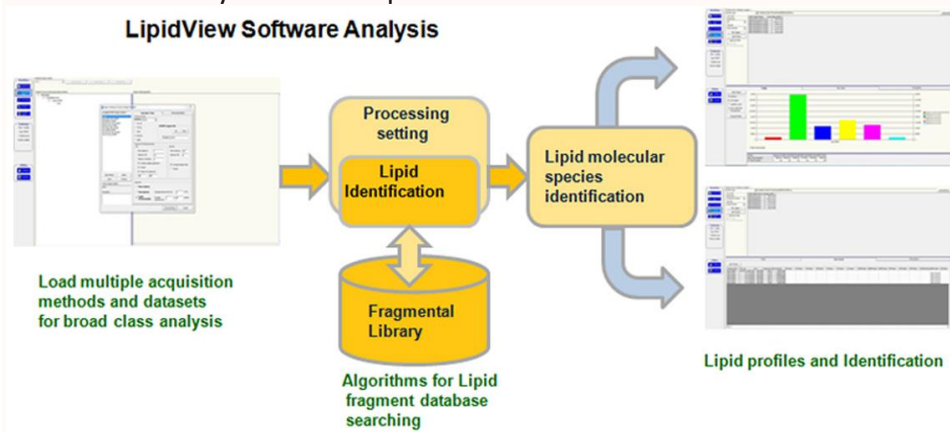
Technology used for Lipid Profiling

We use a triple quad Q-TRAP 4500 (SCIEX) mass spectrometer with electrospray ionization source (ESI). Q-Trap 4500 functions like a standard triple quad and also doubles as a linear ion trap (LIT), a proprietary technology that can perform a multitude of additional workflows and is coupled to a HPLC system, Exion LC-AC (SCIEX). Direct infusions as well as LC-MS/MS methods are used for targeted and untargeted analysis of lipids/metabolites. ESI ionizes the lipid molecules, and forms protonated molecular ions ($[M+H]^+$) and adduct molecular ions ($[M+NH_4]^+$, $[M+Na]^+$, and $[M+K]^+$) in ESI positive mode (ESI+). Deprotonated molecular anions ($[M-H]^-$) and adduct anions ($[M+Cl]^-$ and $[M+acetate]^-$) are formed ESI negative scan mode (ESI-). Fragmentation is done by collision activation and collision-induced dissociation (CID) by applying collision induced gas like (N₂/Ar/He).

For targeted analysis we use Multiple Reactions Monitoring (MRM) scan mode or advanced scheduled MRM scan mode.



We use Information Dependent Acquisition (IDA) method for untargeted lipid molecules, where Precursor ion (Prec) and Neutral loss (NL) scans are performed that are specific to particular lipid classes; some classes are analyzed with Precursor scans, and others are analyzed with Neutral loss scans. The updated IDA method is capable for the profiling the lipids/metabolites in a single injection using additional enhanced product ion scan mode, which generate MS/MS spectrum that is used for library search or LipidView search for further confirmation.



Proteomics

ALRF provides service for targeted Proteomics analysis with focus on molecular weight confirmation, identification and their quantitation in complex biological samples. For Proteomics data analysis online Mascot and ProteinPilot 5.0 software are used for confirmation and structure identification of proteins molecules.

Application Support

- Sample preparation
- Mass spectrometric analysis
- Data processing

3. Spectroscopy Facility:-

a. Spectrofluorometer:-

Cary Eclipse Spectrofluorometer (Agilent)



Feature:-

- Measuring wave length range of the instrument is 190-1100 nm.
- Manual polarizer holder accessory.
- Multi cell holder and peltier system for heating upto 100 °C.
- Horizontal slit orientation for increased viewing.
- Light source: Xenon pulse lamp

- Wavelength accuracy: 0.5 – 0.07 nm.
- Wavelength reproducibility: 0.1 nm
- 2 bandpass filters in the range of 250–395 nm and 335–620 nm
- WinFLR Software

Fluorescence Spectrophotometer can be used for:-

- Fluorescence, phosphorescence, chemiluminescence and bioluminescence studies

Sample preparation:-

1. The cuvette should contain the liquid or solution in the spectrofluorometer sample area.

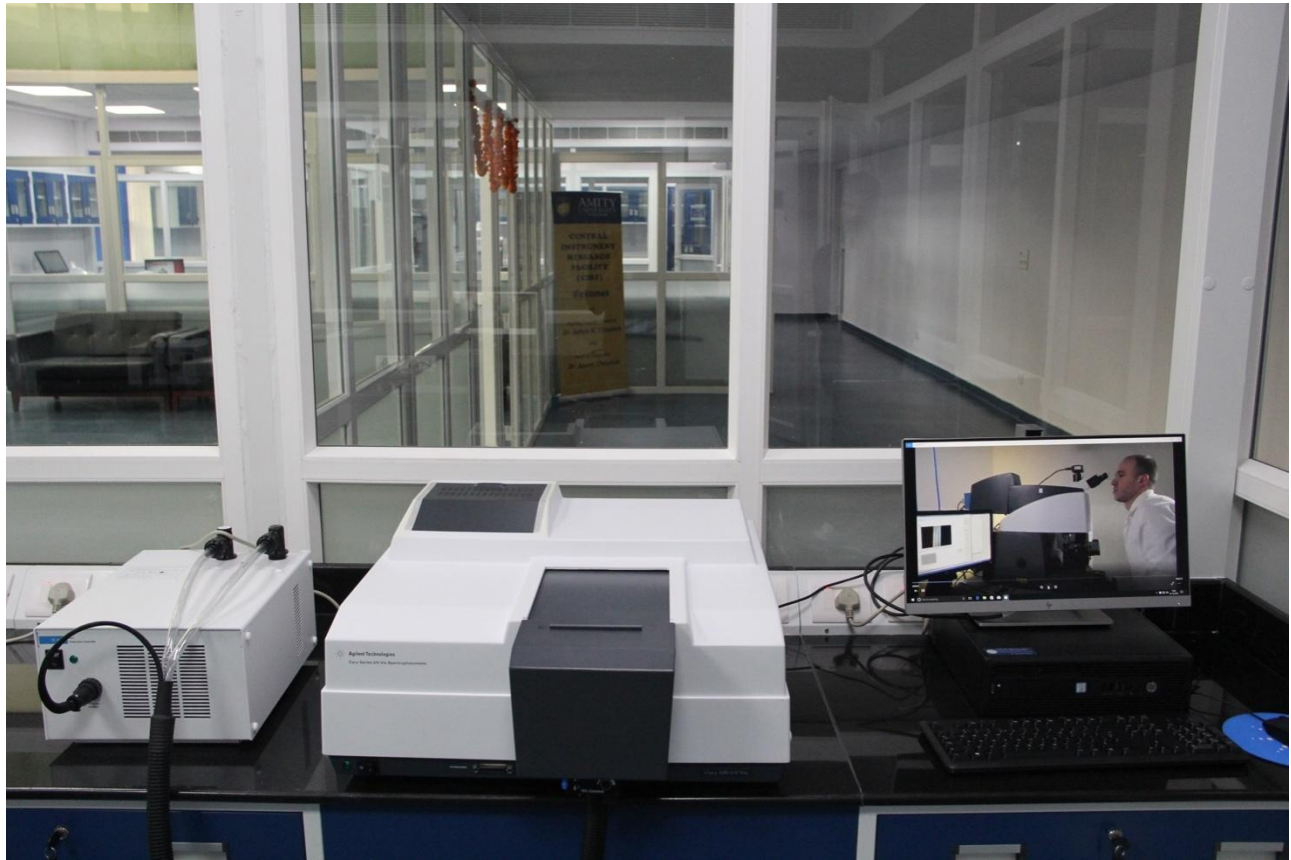
Charges*:-

Users types	Spectrofluorometer
Amity University	Rs 150/sample
Academic & Research institution	Rs 300/sample
Private industries /other laboratories	Rs 1000/sample

*Additional Charge – 18% GST

b.UV-Visible spectrophotometer:-

Cary 100 UV-Visible spectrophotometer (Agilent)



Features:-

- Double beam UV/Vis spectrophotometer, wave length range is 190 to 1100 nm with R928 PMT detector
- **Versatile set of accessories** including peltier system, multicell liquid sample holders (cuvette as small as 8 μ l)
- Wavelength accuracy ± 0.02 nm; UV Vis limiting resolution 0.189 nm.
- **WinUV software** – modular design provides a wide range of applications via a simple interface

UV-Visible spectrophotometer can be used for

- Nanomaterial characterization, detection of organic materials in water, food and agriculture
- DNA and protein quantification and measuring small volumes
- Monitoring kinetics of reactions that occur at sub-second rates
- Study of denaturation of biomolecules at elevated temperature

Samples:-

UV-Visible spectroscopy is used primarily to measure absorbance of liquids or solutions. In this technique, the cuvette should contain the liquid or solution in the spectrophotometer sample area.

Charges*:-

Users types	UV-visible spectrophotometer
Amity University	Rs 100/sample
Academic & Research institution	Rs 200/sample
Private industries/other laboratories	Rs 750/sample

*Additional Charge – 18% GST

c. FTIR:-

Cary 630 FTIR Spectrometer (Agilent)



Features:-

- Spectral range 7000–350 cm^{-1} with KBr optics.
- Wavenumber reproducibility 0.005 cm^{-1} .
- Single Reflection Diamond ATR for solid or liquid sample. (360° swivel press available)

- Resolution Pro software and Spectral Libraries of 10,000 compounds including pharma, polymer etc.

FTIR can be used for:-

The Agilent Cary 630 FTIR spectrometer is versatile, innovative, and intuitive, providing superior quantitative and qualitative information for routine analysis of solids, liquids, and gases.

Sample preparation

1. Minimum 5 mg dried and finely grounded samples are required for analysis.
2. Only powdered and viscous liquid samples (compatible with KBr) will be entertained.

The scanning range will be is $4000\text{-}400\text{ cm}^{-1}$.

*Charge*s:-*

Users types	FITR
Amity university	Rs 300/sample
Academic & Research institution	Rs 1000/sample
Private industries /other laboratories	Rs 2000/sample

*Additional Charge – 18% GST

4. Cell Analysis Facility

a. FACS:-

BD FACSLytic™ Flow Cytometer



The BD FACSLytic™ is a high performance flow cytometer designed to support both routine clinical analysis and clinical research. With an

integrated solution that combine instrument, software reagents and services, bd facslyric™ provides.

clinicians and scientists with accurate, reliable and repeatable result -test to test, instrument to instrument and site to site, regardless of the assay complexity or operator experience level.

solid-state laser specifications

blue laser: 488 nm, 20 mw

red laser: 640 nm, 40 mw

optics: excitation lasers upto 10 color with below configuration

- **6-color: 2-laser (blue, red) (4-2)**

detection channels

forward scatter (fsc), side scatter (ssc) and up to 10 fluorescence

a flexible, high-performance instrument in a compact footprint. The system is available in 4, 6, 8, 10 or 12 colors and equipped with a blue, red and violet laser depending on the configuration.

- Absorbance /excitation 488 nm (blue), 640 nm (red), 405 (violet)
- The fluidics design enables a large selection of sample input devices. For manual acquisition, choose from 12 x 75-mm tubes, microcentrifuge tubes (~500-μL) or large (up to 50-mL) conical tubes for continuous sample acquisition. For automated acquisition, the optional BD FACS™ Universal Loader provides walkaway operation with samples loaded in either microtiter plates or 12 x 75- mm tube racks.
- Runs at up to 35,000 events per second
- Can achieve sample carryover =0.05%
- No limit on events acquired

FACS can be used for

- Cellular uptake studies
- Cancer Studies
- Detection of apoptosis with Annexin V
- Cell Cycle analysis

Charges*:-

Users types	FACS
Amity University	Rs 150/ hour or Rs 1000/ day
Academic & research Institution	Rs 400/ hour or Rs 2500 /day
Private Industries / other laboratories	Rs 1000/ hour

*Additional Charge – 18% GST

5. Analytical facility:-

UPLC (Ultra Performance liquid chromatography)

a. UPLC H-Class (Waters)



Features

- The Ultra Performance Liquid Chromatography (UPLC) is used for separation of individual compounds in a mixture.
- It is equipped with PDA detector and quaternary solvent system . It is one of the widely used techniques in the fields like: clinical research, biochemical research and Industrial quality control, etc.
- The principle involved in UPLC testing is the separation of compounds in a mixture. Segregation of compounds is due to their relative differences in their retention time or RT. For example, all the monoamines like dopamine, epinephrine, and serotonin can be separated and estimated in a single run.

UPLC H- Class can be used for

- **Determination of Pesticides in Groundwater**
- **Improved Resolving Power in Peptide Maps**
- **Rapid Dose Formulation Analysis**
- **Analysis of Traditional Chinese Medicines (TCM)**
- **Identification of Metabolites**
- **In Manufacturing / Quality Assurance (QA) / Quality Control (QC)**

Samples:-

- All the chemicals and reagents used for the process should be of UPLC grade for efficient and smooth analysis.
- The sample should be dissolved in the eluent to be used and filtered through 0.45µm disposable filter before injection into UPLC system (5 to 10µL).
- The injection volume of standards and that of actual sample should be the same.
- The recordings (preferably in the form of quantitative peaks) are compared with those of standard, and the individual compounds are identified.

User Charges List*:-

Equipment	Experiment	Amity University	Academic& Research Institutions	Private Industries/ other Laboratories
UHPLC** Mass spectrometry	1. ESI-MS based analysis Nominal mass/MW. Determination*	Rs.400 per sample	Rs.800 per sample	Rs.1500 per sample
	2. MS/MS analysis*	Rs. 300 (per Precursor ion)	Rs.600 (per Precursor ion)	Rs.1500 (per Precursor ion)
	3. UPLC-MS analysis (Qualitative)	Rs. 1000 (per Precursor ion)	Rs.2000 (per Precursor ion)	Rs.4000 (per Precursor ion)
	4. UPLC-MS/MS Analysis (Qualitative)	Rs.2500/sample (5 peaks, Rs 200 per additional peak)	Rs.5000/sample (5 peaks, Rs 300 per additional peak)	Rs.10000/sample (5 peaks, Rs 400 per additional peak)
	5. UPLC-MS/MS for Targeted analysis of Lipids/Small	Rs 1000/ MRM/analytical lipid unit	Rs 2500/ MRM/analytical lipid unit	Rs 4000/ MRM/analytical lipid unit

	molecules			
	6. UPLC-MS/MS for Targeted analysis of Lipids/Small molecules including data analysis by MultiQuant Software	Rs 1500/ MRM/analytical lipid unit	Rs 4000/ MRM/analytical lipid unit	Rs 5000/ MRM/analytical lipid unit
	7. UPLC-MS/MS for Untargeted analysis of Lipids/Small molecules	Rs.1500/sample	Rs.2500/sample	Rs.5000/sample
	8. UPLC-MS/MS for untargeted analysis of Lipids/Small molecules including data analysis by Lipid view Software	Rs.2500/sample	Rs.5,000/sample	Rs.10,000/sample

*Experiment no. 1 and 2. Would be done only for pure compound.

****Instrument use only for AUH faculty** charge Rs. 250/ per day (all reagent, column, guard column, solvents, standards provide by user).

*Additional Charge – 18% GST

b. Ultra centrifuge

Beckman Coulter Optima XPN-100 Ultracentrifuge



- Beckman Coulter's Optima XPN-100 Ultracentrifuge is a high performance centrifuge optimized for spinning its rotor at speeds approaching 100,000 rpm or 802,000 x g.
- Maximum speed 100,000 rpm with speed control of +/- 2 rpm of set speed (above 1,000 rpm).

- Large touch screen display, energy efficient and real time run graphing.
- Optima XPN boasts additional enhancement that will simplify use, optimize control and security and increase productivity.

Ultra centrifuge can be used

- To separate components of a sample through the use of relative centrifugal force.
- It has a wide range of applications ranging from separating cell organelles to measuring conformational changes in proteins

Charges*:-

Users types	Ultracentrifuge
Amity University	Rs 800/ sample
Academic & research Institution	Rs 1500/ sample
Private Industries / other laboratories	Rs 3000/ sample

*Additional Charge – 18% GST

c. Cold centrifuge

Avanti JE Biosafe cold centrifuge (Beckman Coulter)



- Speed range is 300 to 21,000 rpm, refrigerated floor and temperature range is -10 °C to 40 °C

- The Avanti J-E system generates maximum speeds up to 21,000 rpm (53,300 x *g*) and offers the capacity of processing from up-to 4 liters in under 10 minutes.
- It achieves a high degree of separation in a size compatible with your operations.
- The Avanti J-E's high torque switched reluctance (*SR) direct drive technology achieves faster acceleration and deceleration with gentle precision that delivers the fastest separations in the shortest run times, unattainable by standard high speed centrifuge systems. Shorter run times mean more discovery time for you.
- For clinical research applications, conical tubes and bottles for swinging bucket rotors spin volumes of 15, 50, 250, and 500mL for effective blood component isolation with a variety of gradient kits.

Cold centrifuge can be used for:

Beside routine centrifuge applications such as cell pelleting from large volumes of cultures, it can be used for separation of macromolecules/ ligand binding kinetic studies, separation of various lipoprotein fractions from plasma and deprotonisation of physiological fluids for amino acid analysis.

TEAM

Director:

Director, of Amity Institute of Biotechnology and Amity Institute of Integrative Sciences and Health, AUH



Prof. Rajendra Prasad

Director,

AIB/AIISH, AUH

Email: rprasad@ggn.amity.edu

Eminent Scientist, Prof. Rajendra Prasad, is the Director of Amity Institute of Biotechnology and Amity Institute of Integrative Sciences and Health, AUH. Dr Prasad is a former Professor & Dean of School of Life Sciences at Jawaharlal Nehru University (JNU), New Delhi.

He is a leading molecular mycologist and has done trend setting research in the area of antifungal clinical drug resistance

CIRF Faculties:-

Dr. Kaustav Bandyopadhyay

Assistant professor (AUH)

Mrs. Kanchan Pandey

CIRF Manager (AUH)

Mr. Shiv nandan

Technical officer (AUH)

Mr. Saurabh Sharma

Technical officer (AUH)

Mr. S.M.Haseeb Faheem

Technical officer (AUH)

CIRF Members:

Dr.Atanu Banerjee

Assistant professor (AUH)

Dr.Gargi Bagchi

Associate professor (AUH)

Dr.Amit Pandey

Assistant professor (AUH)

Dr.Anurag Sharma

Assistant professor (AUH)

Dr.Krishna Murari Sinha

Associate professor (AUH)

Dr. Nitai Debnath

Assistant professor (AUH)

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