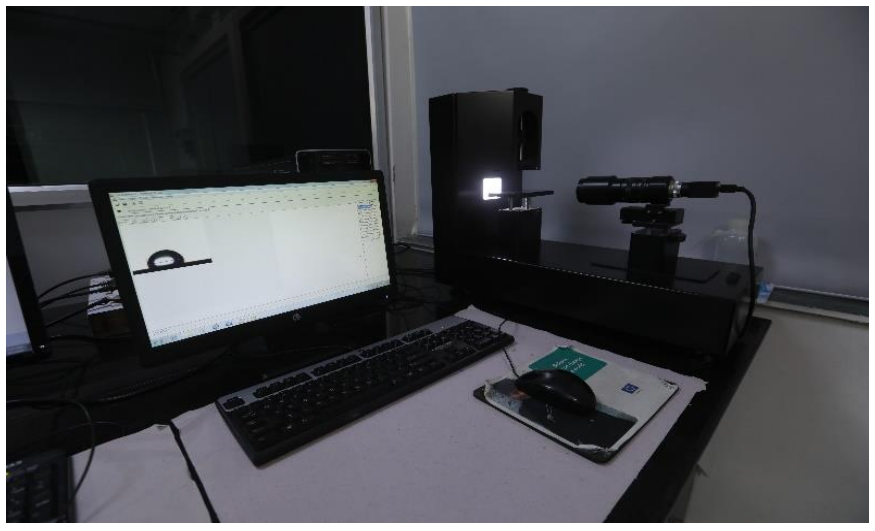
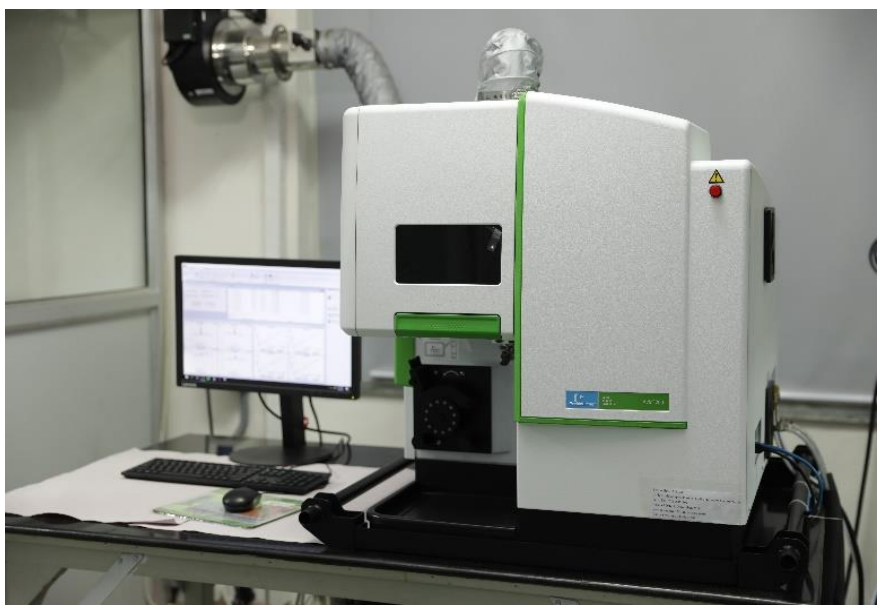
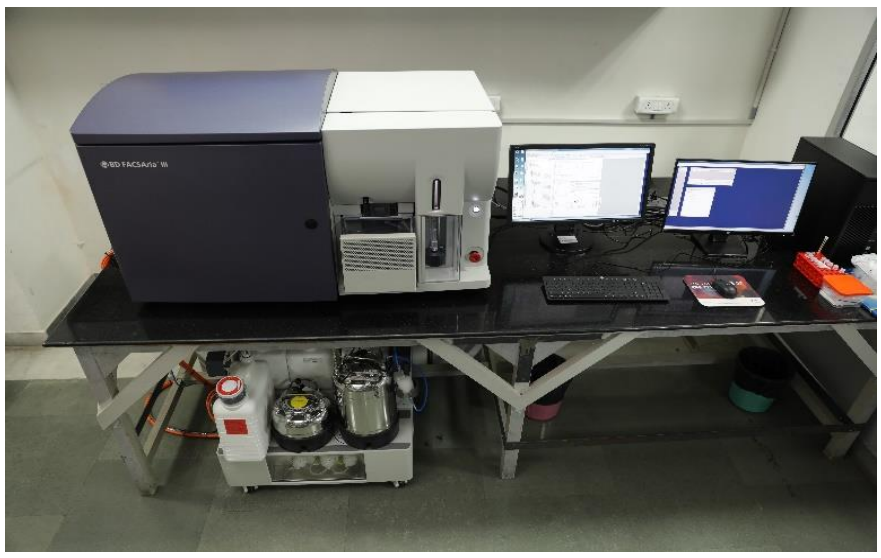
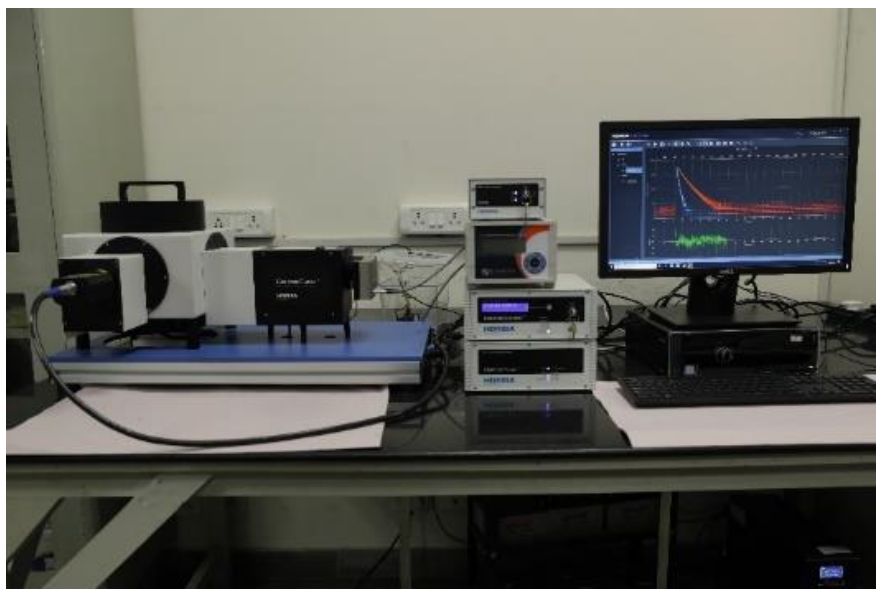
List of Equipment available in CIF

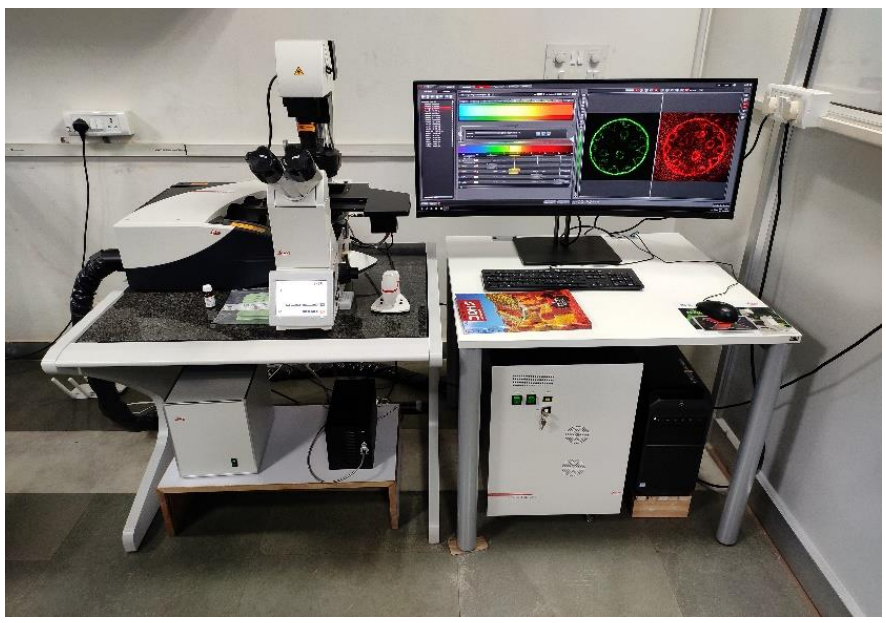
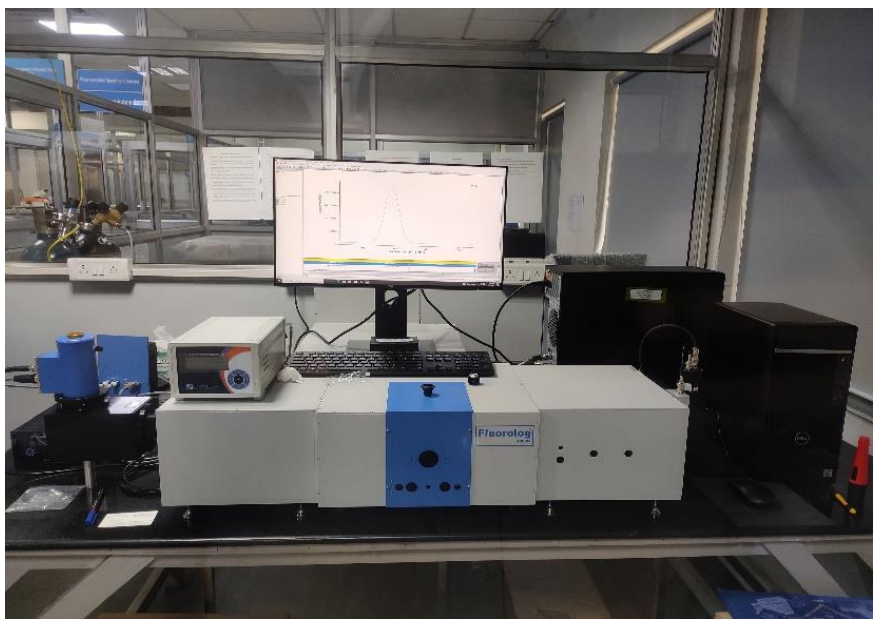
Sr.No.	Equipment Name	Make & Model	Incharge	Image & Brief description
1.	**Atomic Force Microscope**	Bruker Multimode- 8	 **Dr. Prabhash Mishra** e-mail: pmishra@jmi.ac.in Department of Applied Sciences	 AFM is used to analyze surface topology, morphology, estimate surface roughness, atomic manipulation and spectroscopy.
2.	**FTIR**	Bruker Tensor 37	 **Prof. Asimul Islam** e-mail: aislam@jmi.ac.in CIRBSc	 FTIR is used for elemental analysis to understand the vibrational bands, surface functionalization etc.
3.	**UV-Visible Spectro-photometer**	Hitachi U3900	 **Prof. Asimul Islam** e-mail: aislam@jmi.ac.in CIRBSc	 A basic instrument is used for obtaining the absorption/transmittance spectra, optical band gap and solute concentration etc.
4.	**Contact Angle Analyzer**	SEO Optics	 **Prof. Rajan Patel** e-mail: rpatel@jmi.ac.in CIRBSc	 The system is used for measuring contact angle, surface and interfacial tensions, wettability, and absorption. Characterization of wetting properties of solid surfaces. Characterization of surface energy of smooth surfaces. Characterization of absorption of liquid into porous materials.

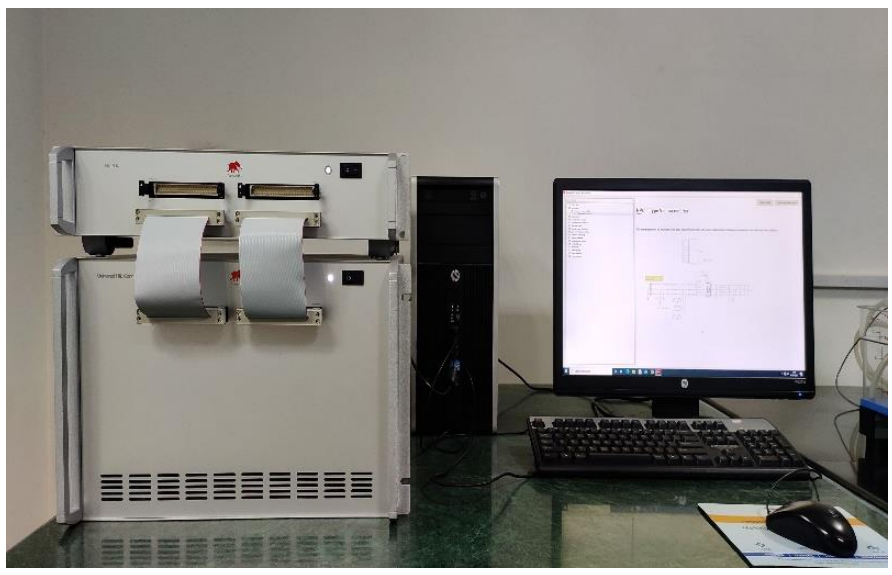
5.	**Robotic Crystallization System**		 **Prof. Md. Imtaiyaz Hassan** email:mihassan@jmi.ac.in CIRBSc	 The machine is used for the purpose of high-throughput protein crystallization**.** TaqMan arrays can be obtained with customer- selected TaqMan Gene Expression Assays dried into each of the 384 reaction wells.
6.	**Inductively Coupled Plasma Enhanced Optical Emission Spectroscopy (ICPE-OES)**	Perkin Elmer AVIO-200	 **Dr. Sajid Ali** e-mail: asajid2@jmi.ac.in Department of Environmental Science	 Inductively coupled plasma optical emission spectroscopy (ICP-OES) is the technique of choice for many different applications, including those in the environmental, metallurgical, geological, petrochemical, pharmaceutical, materials, and food safety arenas. It can be applied to varying sample types such as aqueous and organic liquids and solids. The advantages of using ICP-OES over other elemental analysis techniques include its wide linear dynamic range, high matrix tolerance, and the enhanced speed of analysis that can be achieved.
7.	**Erbium Doped Fiber Amplifier with Optical Fiber System**	Benchmark Electronic Systems ETS	 **Prof. Mainuddin** e-mail: mainuddin@jmi.ac.in Department of Electronics & Communication Engineering	 Erbium-Doped Fiber Amplifier (EDFA) is an optical amplifier used in the C-band and L-band, where the loss of telecom optical fibers becomes lowest in the entire optical telecommunication wavelength bands. EDFA is now most commonly used technique to ascertain the loss of an optical fiber in long-distance optical communication. Another important characteristic is that EDFA can amplify multiple optical signals simultaneously, and thus can be easily combined with WDM technology.

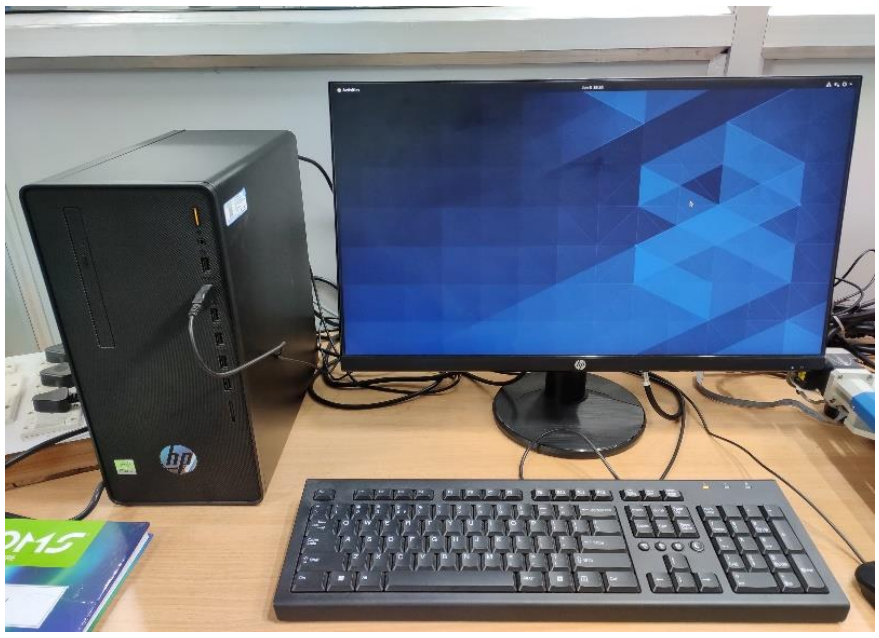
8.	**Fluorescence Activated Cell Sorter System (FACS)**	Becton Dickinson Aria III	 **Dr. Syed Mansoor Ali** e-mail: smansoor@jmi.ac.in Department of Biotechnology	 Fluorescence-activated cell sorting (FACS) is a specialized type of flow cytometry. It provides a method for sorting a heterogeneous mixture of biological cells into two or more containers, one cell at a time, based upon the specific light scattering and fluorescent characteristics of each cell. It is a useful scientific instrument, as it provides fast, objective and quantitative recording of fluorescent signals from individual cells as well as physical separation of cells of particular interest.
9.	**Stopped-Flow Reaction Analyzer, Double Mixing System with Abs and Fluorescence detection**	Applied Photophysics SX20	 **Prof. Mohammad Mahfuzul Haque** e-mail: mhaque@jmi.ac.in Department of Biotechnology	 Typically used to gain an understanding of reaction mechanisms including drug-binding processes, or to determine protein structure, stopped-flow spectroscopy enables the study of fast reactions in solution over timescales in the range of 1 millisecond to hundreds of seconds. A wide range of reactions can be investigated involving, for example, protein-protein interactions, ligand binding, electron transfer, fluorescence resonance energy transfer (FRET), protein folding, as well as enzyme, chemical or coordination reactions.
10.	**Zeta Potential Analyzer**	Malvern Zetasizer Nano ZS	 **Prof. Rajan Patel** e-mail: rpatel@jmi.ac.in CIRBSc	 The Zetasizer range provides both exceptionally high performance and entry level systems that incorporate combinations of a particle size analyzer, zeta potential analyzer, molecular weight analyzer, protein mobility and microrheology measurements. Particles and molecules from less than a nanometer in size to several microns can

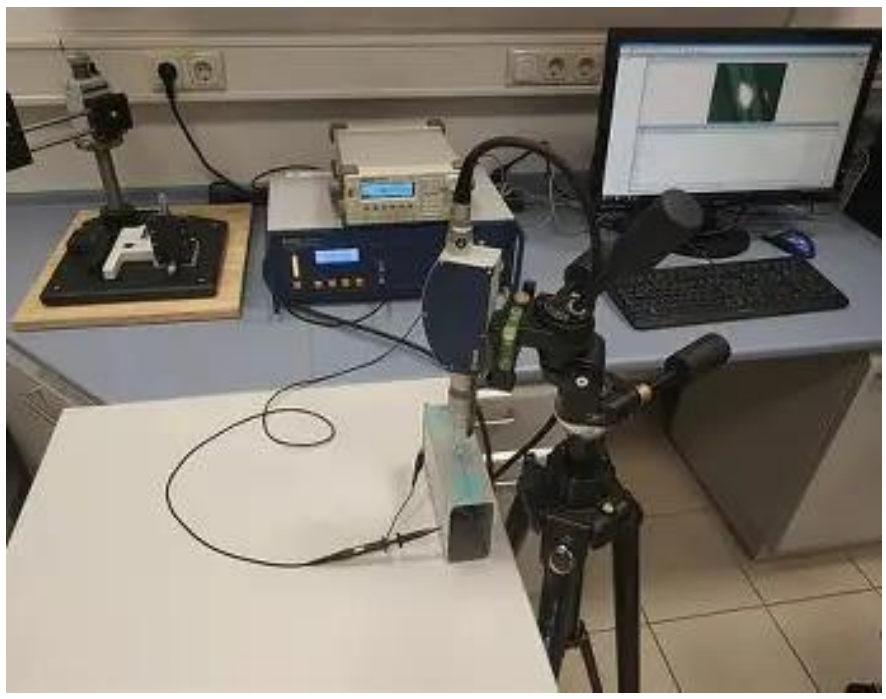
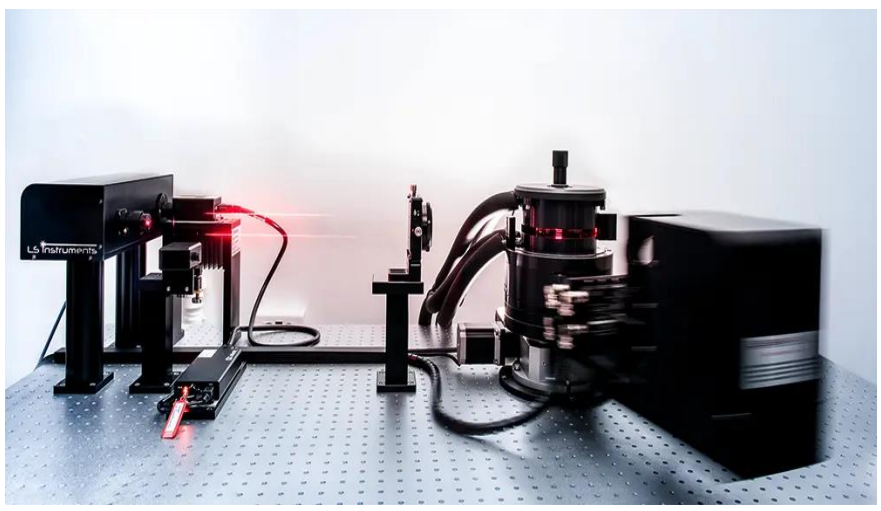
				be analyzed by a range of variants to suit your applications and budget. The systems measure size and microrheology using dynamic light scattering, zeta potential and electrophoretic mobility using electrophoretic light scattering, and molecular weight using static light scattering.
11.	**TG-DTA & DSC**	Setaram Instrumentation, France LABSYS EVO 1150°C DSC131EVO Analyzer	 **Dr. Maqsood Ahmad Malik** e-mail: mamalik@jmi.ac.in Department of Chemistry	  Thermogravimetry is a technique that measures the variation in mass of a sample when it undergoes temperature scanning in a controlled atmosphere. This variation in mass can be either a loss of mass (vapour emission) or a gain of mass (gas fixation). Differential thermal analysis is a technique measuring the difference in temperature between a sample and a reference (a thermally inert material) as a function of the time or the temperature, when they undergo temperature scanning in a controlled atmosphere. The DTA method enables any transformation to be detected for all the categories of materials.
12.	**Time Resolved Fluorescence Lifetime Measurement Spectrometer**	Horiba DeltaFlex- 01-DD	 **Prof. Rajan Patel** e-mail: rpatel@jmi.ac.in CIRBSc	 The fluorescence (or in general, photoluminescence) lifetime is characteristic of each fluorescent or phosphorescent molecule and can thus be used to characterize a sample. It is, however, also influenced by the chemical composition of its environment. Additional processes like Förster Resonance Energy Transfer (FRET), quenching, charge transfer, solvation dynamics, or molecular rotation also have an effect on the decay kinetics. Lifetime changes can therefore be used to gain information about the local chemical environment or to follow reaction mechanisms.

13.	**Liquid Chromatography–Mass Spectrometry (LC–MS)**	Waters Xevo TQD System	 **Dr. Mohammad Abid** e-mail: mabid@jmi.ac.in Department of Biosciences	 Liquid chromatography–mass spectrometry is an analytical chemistry technique that combines the physical separation capabilities of liquid chromatography with the mass analysis capabilities of mass spectrometry.
14.	**Electrical Power System Simulator**	OPAL-RT	 **Prof. Majid Jamil** e-mail: mjamil@jmi.ac.in Department of Electrical Engineering	 Electrical power system simulation involves power system modeling and network simulation in order to analyze electrical power systems using design/offline or real-time data. Power system simulation software's are a class of computer simulation programs that focus on the operation of electrical power systems.
15.	**Raman Spectrometer**	RENISHAW Raman Microscope	 **Dr. Zubair Mohd Saddam Hussain Khan** e-mail: zkhan5@jmi.ac.in Department of Biosciences	 Raman spectroscopy is a powerful analytical technique used to study vibrational, rotational, and other low-frequency modes in a material. It works on the principle of inelastic scattering of monochromatic light, usually from a laser. When the light interacts with molecular vibrations, it causes a shift in the energy of the scattered photons, known as the Raman shift. This shift provides a molecular fingerprint unique to the substance, making it useful for material identification and characterization. Raman spectroscopy is non-destructive and can be applied to solids, liquids, and gases.

16.	**Confocal Microscope**	Leica Vertrieb GmbH	 **Prof. Tanuja** e-mail: tanuja@jmi.ac.in CIRBSc &  **Dr. Mohd. Mohsin** e-mail: mmohsin1@jmi.ac.in Department of Biosciences	 A confocal microscope is an advanced optical imaging device that uses point illumination and a spatial pinhole to eliminate out-of-focus light. This allows it to produce high-resolution, sharp images of thick biological specimens or materials in 3D. Unlike traditional microscopes, confocal systems scan samples point-by-point using lasers and reconstruct the image digitally. It is commonly used in cell biology, material science, and nanotechnology for detailed structural analysis. The technique provides improved contrast and depth selectivity, making it ideal for observing subcellular structures.
17.	**Photoluminescence Spectrophotometer**	Fluorolog Horiba Scientific	 **Dr. Maqsood Ahmad Malik** e-mail: mamalik@jmi.ac.in Department of Chemistry	 A photoluminescence (PL) spectrophotometer is an analytical instrument used to study the light emission from a material after it has absorbed photons. It helps in analyzing the electronic and optical properties of semiconductors, nanomaterials, and organic compounds. When a sample is excited by a light source (usually a laser or UV lamp), it emits light at different wavelengths, which the spectrophotometer detects and records. This technique is non-destructive and highly sensitive, making it useful for quality control, defect analysis, and band gap estimation. PL spectroscopy is widely used in materials science, optoelectronics, and photonics research.

18.	**Multimode Microplate Reader**	BioTek CYTATION 5	 **Dr. Mohd. Mohsin** e-mail: mmohsin1@jmi.ac.in Department of Biosciences	 A multimode microplate reader is a versatile analytical instrument used to detect biological, chemical, or physical events in microtiter plates. It supports multiple detection modes such as absorbance, fluorescence, luminescence, and sometimes time-resolved fluorescence or fluorescence polarization. This flexibility allows it to perform a wide range of assays including enzyme kinetics, cell viability, protein quantification, and drug screening. It can read multiple wells at once, making it efficient for high-throughput screening. Most modern multimode readers come with advanced software for data analysis and automation.
19.	**Real Time Digital Emulator**	Typhoon Hil	 **Prof. Ahteshamul Haque** e-mail: ahaque@jmi.ac.in Department of Electrical Engineering	 A Real-Time Digital Emulator is a high-performance tool used to simulate and test digital control systems or embedded hardware in real-time. It mimics the behavior of physical systems digitally, allowing engineers to develop, debug, and validate control algorithms without needing the actual hardware. These emulators are widely used in power electronics, automotive, aerospace, and industrial automation sectors. They enable safe and cost-effective testing by running real-time models at high speeds. Real-time emulators support hardware-in-the-loop (HIL) testing, ensuring system reliability before final deployment.

20.	**VLSI Simulation Tools (Service) Synopsys Asia Pack**	EIGEN Technologies	 **Prof. Sajad A. Lone** e-mail: sloan@jmi.ac.in Department of Electronics & Communication Engineering	 VLSI (Very-Large-Scale Integration) simulation is the process of verifying the functionality and performance of integrated circuits (ICs) before physical fabrication. It involves testing digital designs using software tools to simulate the behavior of logic gates, timing, power consumption, and signal integrity. Simulation ensures that the design meets the required specifications and helps identify and fix errors early in the design cycle. Tools like ModelSim, Xilinx Vivado, and Cadence are commonly used for VLSI simulation. It plays a critical role in reducing costs and improving the reliability of complex chip designs.
21.	**X-Ray Diffractometer**	Rigaku Ultima IV	 **Dr. Zeba Haque** e-mail: zeba@jmi.ac Department of Chemistry	 An X-Ray Diffractometer (XRD) is an analytical instrument used to determine the crystalline structure of materials. It works by directing X-rays onto a sample and measuring the intensity and angles of the diffracted rays. The resulting diffraction pattern provides information about the crystal phases, lattice parameters, and crystallite size. XRD is widely used in materials science, chemistry, geology, and metallurgy. It is a non-destructive technique that helps identify unknown compounds and analyze structural changes in materials.

22.	**Laser Doppler Vibrometer**		 **Prof. S.M. Muzakkir** e-mail: smmuzakkir@jmi.ac.in Department of Mechanical Engineering	 A laser Doppler vibrometer (LDV) is a scientific instrument that is used to make non-contact vibration measurements of a surface. The laser beam from the LDV is directed at the surface of interest, and the vibration amplitude and frequency are extracted from the Doppler shift of the reflected laser beam frequency due to the motion of the surface. The output of an LDV is generally a continuous analog voltage that is directly proportional to the target velocity component along the direction of the laser beam.
23	**Multiangle Dynamic Light Scattering**		 **Dr. Najmul Arfin** e-mail: narfin@jmi.ac.in CIRBSc	 Multi-Angle Light Scattering (MALS) is an analytical technique used to determine the absolute molecular weight and size of macromolecules in solution without the need for reference standards. It measures the intensity of light scattered by a sample at multiple angles. When combined with size-exclusion chromatography (SEC), it provides detailed information about molecular conformation and aggregation. MALS is widely used in polymer, protein, and nanoparticle characterization.