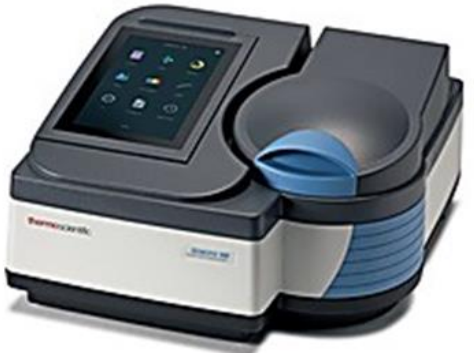
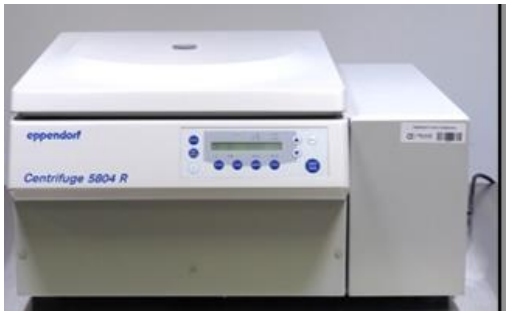
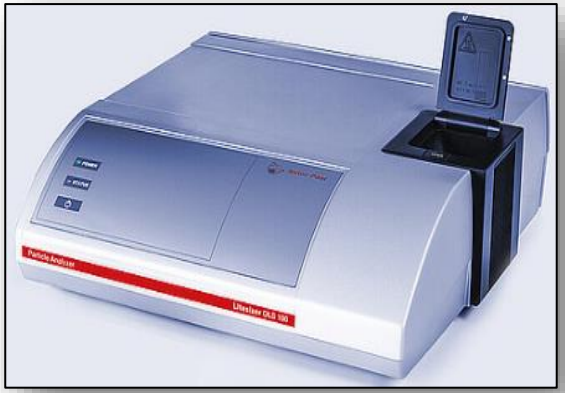
Major Instruments in Lab No. 4 of Botany Department

Name of Instruments	Brief Description of Instruments	Image of Instruments
Lab No. 4		
Plant growth chamber, Smita Scientifics	Plant growth chambers create controlled environmental conditions (light, temperature, humidity, and CO_2 levels) that simulate natural or experimental settings for plant growth. **Applications:** • Studying the impact of environmental variables on plant physiology and development. • Conducting experiments on plant genetics, breeding, and biotechnology. • Testing plant responses to abiotic stresses (e.g., temperature, drought, or elevated CO_2).	
UV-VIS Spectrophotometer Genesys 180	UV-Vis spectrophotometers operate based on the absorption of ultraviolet and visible light by a sample. When light passes through a sample, certain wavelengths are absorbed depending on the sample's molecular structure, while others are transmitted. The absorbance is measured to determine the concentration of analytes using Beer-Lambert's law. **Applications:** • Quantification of bio-molecules like proteins and nucleic acids. • Determination of nanoparticle size by their optical properties. • Measuring the purity of organic and inorganic compounds. • Analysis of color and dye compounds in industries.	

Refrigerated Centrifuge, Eppendorf -5804R	A refrigerated centrifuge separates components in a sample by spinning it at high speeds. Cooling prevents temperature-sensitive biological samples from degrading during centrifugation. **Applications:** • Isolation of cellular components like nuclei, mitochondria, and proteins. • Preparation of samples for molecular biology experiments like PCR or enzymatic assays. • Purification of nanoparticles or microemulsions.	
Particle size & Zeta Potential Analyzer	**Particle Analyzer**: Uses dynamic light scattering (DLS) to measure the size distribution of particles by analyzing the scattered light due to Brownian motion in a liquid medium. **Zeta Potential**: Measures the surface charge of particles in a colloidal system by analyzing their electrophoretic mobility in an electric field. **Applications:** It used to determine size of nanoparticle and its distribution in research and industrial formulations. It also applies for **a**ssessing colloidal stability of suspensions in fields like pharmaceuticals, agriculture, and material science. Characterizing emulsions and nanodispersions.	

Trinocular microscope, Infinity & Iox Ne 620	A trinocular microscope uses an optical system with three viewing tubes: two for binocular observation and one for connecting a camera. It magnifies specimens using lenses and enables documentation through an attached digital camera. **Applications:** • High-resolution imaging of plant, animal, or microbial samples for research or diagnostics. • Capturing detailed images and videos for analysis or presentations. • Useful in histology, cytology, and microbiological studies.