

UV-Visible Spectrophotometer



A UV-Vis (Ultraviolet-Visible) Spectrophotometer is an analytical instrument used to measure the absorbance or transmittance of light in the ultraviolet (UV) and visible (Vis) regions of the electromagnetic spectrum (typically 190–900 nm). It is widely used in chemistry, biology, and material science for quantitative and qualitative analysis of substances.

Key Components:

1. Light Source – Usually a deuterium lamp (UV) and a tungsten-halogen lamp (visible).
2. Monochromator – Selects a specific wavelength of light.
3. Sample Holder – Holds the sample in a cuvette.
4. Detector – Converts transmitted light into an electrical signal (commonly a photodiode or photomultiplier tube).
5. Display & Software – Shows and processes the absorbance or transmittance data.

Applications:

- Concentration Determination (Beer-Lambert Law)
- DNA, RNA, Protein Analysis (e.g., at 260 nm and 280 nm)
- Pharmaceutical Testing
- Colorimetric Analysis
- Material Characterization (e.g., nanomaterials, dyes, and coatings)