Surveying Laboratory

Surveying laboratory allows the students to apply the classroom knowledge in real world scenarios like exploring the art and the science of measuring land, using instruments like total stations, theodolites, and leveling equipment, to map and analyze terrain. It reinforces the concept of laying the groundwork for the construction work and ensuring accurate land boundaries.

The laboratory serves as an extension of Modern Survey course where the students apply the theoretical learnings to get an in-depth learning or a particular topic. The laboratory focuses on various sessions that deal with understanding computation of Bearings of line, Reduced Levels of various points, Elevation of Vertical Buildings and Points, Horizontal angle and distance between points and object, etc. Apart from these, the sessions also provide substantial opportunities to students to learn and experience modern tools in surveying like Total Station, Drone-based survey and Remote Sensing & GIS for collecting, organizing, and analyzing the data.

Equipments Available in the Laboratory:

S.No.	Equipment Name	Photo
1.	**Total Station-** Total Station is an advanced surveying instrument that combines electronic distance measurement (EDM), an electronic theodolite, and a microprocessor to measure angles, distances, and coordinates with high precision. It is widely used in land surveying, construction, and engineering projects for tasks such as topographic mapping, setting out building layouts, and monitoring structural movements. With its ability to store and process data, a Total Station improves accuracy, efficiency, and ease of surveying, making it an essential tool for modern geospatial measurements.	

2.	**Theodolite-** theodolite is a precision instrument used in surveying and engineering to measure horizontal and vertical angles. It is essential for tasks such as establishing land boundaries, aligning structures, and mapping terrain. Theodolites are widely used in construction, road planning, and geodetic surveys, helping ensure accuracy in layout and positioning. Modern digital theodolites offer enhanced precision and ease of use, making them a fundamental tool in surveying and civil engineering projects.	
3.	**Auto Level-** An Auto Level is a precision instrument used in surveying to determine height differences and ensure level measurements over a distance. It is commonly used in construction, roadworks, and land surveying to establish accurate elevation points and ensure structures are built on a level surface. The Auto Level automatically maintains a horizontal line of sight, reducing human error and improving accuracy in leveling tasks. Its ease of use and reliability make it an essential tool for engineers and surveyors.	

4.	**Prismatic Compass-** Prismatic Compass is a portable surveying instrument used to measure bearings and angles in the field. It is commonly used for navigation, mapping, and preliminary land surveys where quick and reasonably accurate directional measurements are needed. The built-in prism allows users to read the compass while sighting an object, improving efficiency and precision. It is especially useful in areas where GPS or other electronic devices may not be practical, making it a reliable tool for surveyors, explorers, and engineers.	
5.	**Chains-** Chain is a traditional surveying tool used to measure distances accurately in the field. It consists of linked metal segments, typically 66 feet (Gunter's chain) or 100 feet long, and is commonly used for land measurement, property boundary determination, and construction layout. Chains are lightweight, easy to use, and effective for short- to medium-range distance measurements, making them a reliable tool in basic surveying tasks despite the availability of modern electronic instruments.	

6.	**Ranging Rods-** Ranging rods are tall, brightly colored poles used in surveying to mark positions and align survey lines over long distances. They help surveyors visually establish straight lines and reference points for measurements. Typically made of wood or metal and painted with alternating red and white or black and white sections for visibility, ranging rods are essential for accurate land surveying, construction layout, and roadwork alignment.	
7.	**Automated Drone-** Drone is used to collect aerial data for various applications in transportation research such as: traffic analysis, accident investigation, road condition assessment, and urban planning.