Forensic Mapping with Trimble Total Stations, GNSS & Scanners

Course Learning Objectives

Intro to Forensic Mapping

At the conclusion of this block of instruction the student will be able to:

- Define forensic mapping
- Identify the difference between land survey and forensic mapping
- Understand the evolution of forensic mapping
- Describe the different hardware tools used for forensic mapping

Hand Measuring

At the conclusion of this block of instruction the student will be able to:

- Demonstrate the proper placement of Reference Points (RP)
- Describe the Cartesian coordinate system
- Describe the difference between baseline and triangulation hand measuring
- Demonstrate proper recording of hand measurements
- Demonstrate how to measure and calculate the radius of a curve

Total Station Basics and Nomenclature

At the conclusion of this block of instruction the student will be able to:

- Describe the parts of the total station mapping system
- Understand the proper care of equipment
- Demonstrate proper battery life care
- Describe suggested calibration requirements
- Describe the difference between mechanical and robotic total stations
- Describe prism offset
- Demonstrate how to update data collection software, data collector operating system, and instrument firmware
- Identify Trimble certified service centers through authorized Trimble dealerships

Total Station Setup

At the conclusion of this block of instruction the student will be able to:

- Proper placement of Reference Points (RP), Back sights (BS), and Control Points (CP)
- Demonstrate how to setup and level total station over a known point

Total Station Data Collection Software

At the conclusion of this block of instruction the student will be able to:

- Understand the features of the Trimble data collection software used by the their agency
- Describe the features of the Trimble data collection software

Mapping Basics

At the conclusion of this block of instruction the student will be able to:

- Describe a point could library
- Demonstrate how to map and code a small scene with no total station moves
- Demonstrate how to check a BS or point
- Demonstrate how to attach a evidence photo to a measure point
- Demonstrate how to measure using a prism and direct reflect mode
- Demonstrate how to change prism height
- Demonstrate how to scan with the SX10/12
- Demonstrate how to close a scene
- Demonstrate exporting of data

Moving the Total Station

At the conclusion of this block of instruction the student will be able to:

- Demonstrate how to move the total station utilizing all the available options
- Demonstrate how to return to a scene and continue mapping by setting up over a known point or resection from known points
- Demonstrate how to continue mapping if the total station is knocked out of level

Total Station Errors & Calculations

At the conclusion of this block of instruction the student will be able to:

- Understand errors in the mapping system, both instrument and human
- Describe what data the total station collects
- Describe what data collection software calculates and exports
- Demonstrate how to calculate X,Y,Z coordinates from the raw data

Forensic Mapping Accuracy Check

At the conclusion of this block of instruction the student will be able to:

- Describe the importance of back sight checks
- Demonstrate tape measure accuracy checks
- Demonstrate how to calculate accuracy checks from the raw data

GNSS Mapping

At the conclusion of this block of instruction the student will be able to:

- Describe the difference between GPS and GNSS
- Describe the importance of GNSS corrections
- Describe the difference between NTRIP, RTK, and RTX
- Demonstrate setup and mapping with GNSS
- Demonstrate GNSS offset measurements under canopy
- Demonstrate exporting of data

Mapping with the X7 Scanner

At the conclusion of this block of instruction the student will be able to:

- Demonstrate X7 mapping with the Trimble Capture and Trimble Perspective Software
- Demonstrate attaching annotations and precision points
- Demonstrate manual registration
- Demonstrate exporting registration reports and data
- Describe importance of NIST targets

Introduction to the Trimble Reveal Software

At the conclusion of this block of instruction the student will be able to:

- Demonstrate how to import mapping data into the Trimble Reveal Software
- Demonstrate how to view and generate scale check reports and check point reports

Setting up and Mapping Ground Control for UAV Missions

At the conclusion of this block of instruction the student will be able to:

- Demonstrate proper placement of Ground Control Points (GCP)
- Demonstrate mapping and coding of GCP's

Integrated Mapping with Multiple Instruments

At the conclusion of this block of instruction the student will be able to:

- Describe proper planning for mapping large scene with multiple instruments
- Demonstrate mapping common points from each mapping team
- Demonstrate mapping ground control and the scene with UAV, GNSS, total station, and a scanner
- Demonstrate export of data

Working with Data

At the conclusion of this block of instruction the student will be able to:

- Demonstrate importing data from the last lesson (Integrated Mapping with Multiple Instruments)
- Demonstrate importing data and integrating measurement logs