



IAFSM BASIC LASER SCANNER CERTIFICATION OUTLINE ON-SITE TRAINING

Goals

The primary goal of the Basic Laser Scanning Certification course is to provide a foundation and background for those wishing to use the laser scanner in areas such as collision reconstruction, crime scenes, fire and security. Subject areas such as history, technology, applications and future trends will be presented. In order to ensure that students have grasped the content, a written examination will be given at the end of the course. The examination includes questions on all course content including exercise files using CloudCompare software to align, segment and work with point cloud data.

The class runs for 2 days with the first day covering theory and hands on exercises to learn the foundational concepts of working laser scanner data. The class times are 8 am to 5 pm for both days. The exam will be written the last two hours of the second day.

Morning Session (8am Start)

- Opening and Introductions
- History of Laser Scanning
 - Surveying history
 - Theodolites, Total Stations, GPS
 - Remote Sensing
 - Lidar and Lasers
 - Forensic Mapping vs. Surveying
- Physics of Laser Scanning
 - Physics of Light and Lasers
 - Properties of Light and Electromagnetic Radiation
 - Light Spectrum. Wavelength and Absorption
 - Constant Speed of Light
 - Refraction and Reflections
 - LIDAR and LASER
 - Laser Safety
 - Types of Laser Scanners
 - Phase Based Scanners
 - Time of Flight Scanners
 - Structured Light Scanners
- 3D Concepts and Definitions
 - Coordinate Systems
 - Cartesian Coordinates
 - Polar Coordinates

- Converting Polar Coordinates to Cartesian
- Distance between two points in 3D
- Point Clouds, Meshes and Textures
- Octree Database
- GPS and Large Coordinates
- Floating Point Values
- Registration Concepts
 - Registration Methods
 - Targeted Registration
 - Types of Targets and Their Use
 - Bundle Adjustment
 - Cloud to Cloud Registration
 - ICP Algorithms
 - External Controls
- Hands on Exercises in CloudCompare

Lunch

- Applications of Laser Scanning
 - Crime and Collision Scene Mapping
 - Bloodstain Pattern Analysis
 - Bullet Trajectories
 - Suspect Height Analysis
 - Witness Perspectives
- Visualizations
 - Plan Drawings
 - Orthoimages
 - Animations
 - Virtual Tours
 - 3D Printing
 - Virtual Reality
- The Laser Scanner at Trial
 - Admissibility of 3D Evidence
 - Case Studies
 - Daubert and Frye Considerations
 - Report Writing
 - Calibration and Validation
 - Published Studies
- IAFSM Best Practices
- Exam Preparation

DAY 2

Two workshops will be run (morning and afternoon sessions) to further students' knowledge on the application of laser scanning technology in various areas. Some of these topics may include two of the following:

- Analysis and Applications
- Suspect Height Analysis
- Bullet Trajectory Documentation
- Bloodstain Pattern Analysis
- Witness Perspective
- Pattern Matching and Change Analysis
- Vehicle Crashes
- Hardware and Vendors

Exam:

Online exam will be run at the end of Day 2 for a duration of 2 hours.

Each student will require a laptop or computer loaded with CloudCompare and access to internet in order to write the exam.

Upon successful completion of the exam, students will be awarded a Basic Laser Scanning Certification from the IAFSM. This certification will be good for 3 years.

Cost:

- \$6000 for 2 Day class with 12 students maximum.
- Larger classes are possible with an additional instructor and expense.

Reference Materials:

- Students will be supplied with handout notes for studying purposes however, taking notes and reviewing videos are recommended.

Resources Supplied by Hosting Agency:

- Classroom with projector
- White board or large sheets of paper
- Laptops with online access
- There will be some prerequisite online videos that students will need to watch before the course. Links will be provided by IAFSM after students are registered for the course

Contact:

- All inquiries may be sent to Kathy Lockner at info@iafsm.org