Introduction to Infrared Thermography (8 hrs)

A beginning thermographic applications training course

Introduction to Infrared Thermography is a one-day course that provides an overview of essential concepts needed by anyone looking to put infrared thermal imaging into practice. The class combines lecture, hands-on lab, and interaction with experts to reinforce your learning. This class is not a substitute for the 32-hour Level 1 Infrared Thermography Applications course, but rather a condensed preview of the topics covered in the Level 1 class along with topics covered in Fox River Systems’ Operational Readiness Training for Thermal Imagers course. Introduction to Infrared Thermography is intended for people that have not taken Level 1 training but will be expected to operate a thermal imager as part of their job, oftentimes at the direction of qualified personnel. The class also serves people that have previously completed Level 1 training but are seeking a refresher class.

This class begins your journey of learning to “think thermally”—the pathway to proper measurement practices and interpretation of measurement results. The lecture portion of the class covers basic heat transfer and infrared thermography theory, inspection techniques for common applications (e.g. electrical and electromechanical equipment maintenance and condition monitoring, building envelope/energy performance, and process monitoring), and operational procedures for use of thermal imaging instrumentation and software. Hands-on lab exercises complement the lecture to reinforce learning and help build confidence with the use of a thermal imager for performing work.

This class is offered as a public or private, on-site training class by Fox River Systems, Inc. The course is open to everyone regardless of whether or not they own a thermal imager. Attendees that do have equipment are encouraged to bring their thermal imagers and laptop PCs as there are a number of hands-on learning opportunities available during the week.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
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<tr>
<td>INTRO-IRT</td>
<td><strong>Introduction to Infrared Thermography</strong> 8-hour class, printed training materials, and loaner use of a thermal imager for those students without one.</td>
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For questions about our current public course schedule or on-site training, ordering assistance, or cancellation/refund policy, please contact:

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Part One (1.5 hours):

- Thermal Imager Overview
- Hardware Review – Features & Controls
  - Accessories Review Battery & Recharging
  - Imager Display
  - User Interface
- Menu System Navigation
  - Menu System and Key Settings
  - Setting default settings such as Date & Time, File Format, Temperature Units
- Temperature Range vs. Level & Span
  - Auto Scale vs. Manual
  - How to Capture an Image Focus, Focus, Focus!
  - Best Practices for Focus
- Using IR FusionTM and Palettes to Help Find Anomalies
  - IR Fusion TM Selection Changing Palettes
  - Reviewing Images in Memory
- Lab Exercise 1: Capture and Save an Image
- Lab Exercise 2: Optimize Image w/Manual Level & Span

Part Two (1.5 hours):

- Introduction to Image Analysis & Reporting Software
  - Managing the thermal images/data
  - Saving & Transferring Images
  - Strategies for Managing Your Images Managing Images in Workspaces
  - Opening Image Files & Workspaces
- Using the SmartView Image Editor for Image Analysis
  - Image Pop-up Menu
  - Viewing Temperatures on any pixel in your image
  - Making Image Annotations for documenting conditions and findings Graphs & Graph Types
  - Viewing Infrared & Visible Light Images in SmartView
- Report Generation Using Quick Reports or Wizard
- Exercise 3: Analyzing & Reporting with Imported Files

Part Three (1 hour):

- Temperature & Temperature Sensing
  - Temperature Scales
  - Discovery of Infrared in the Electromagnetic Spectrum
  - Infrared Spot Thermometers – How they work
- Focal Plane Array Sensor
- Resolution & Image Quality Comparisons
- Heat Transfer
  - Heat Transfer Modes
  - Conduction
  - Convection
  - Radiation
  - Transient vs. Steady State
- 1st Law of Thermodynamics
  - Conservation of Energy
  - Reflection, Absorption, and Transmission
  - Emissivity of Surfaces
  - Guidelines for Temperature Measurement in Low Emissivity Situations
  - Background/Reflected Temperatures
- Parameters for Capturing a High Quality Thermal Image
- Qualitative vs. Quantitative Infrared Thermography

Part Three (4 hours):

- Application: Inspection of Buildings & Roofs
  - Insulation performance, Air Leakage, moisture intrusion, etc.
  - Conditions and basic procedures for inspections
  - Demonstrations
  - Hands-on Exercises
- Application: Electrical Distribution Systems Inspections
  - Examples of equipment to be inspected
  - Thermal patterns and causes
  - Conditions for successful/safe inspection
  - Demonstrations
  - Hands-on Exercises
- Application: Electro-Mechanical Systems Inspections
  - Examples of equipment to be inspected
  - Thermal patterns and causes
  - Demonstrations
  - Hands-on Exercises
- Application: Process Systems Inspections
  - Examples of equipment to be inspected
  - Thermal patterns and causes
  - Demonstrations
  - Hands-on Exercises
- Questions & Answers