

Machine Vision and Quality Control with the Cognex In-Sight 2000

COURSE OUTLINE

Catalogue Number	8087-0000
Category	Mechatronics
Duration	15 Hours
Prerequisite Courses	None

Activity 1: Introduction to Vision Systems

- Defining Quality Control and Quality Assurance
- Machine Vision Systems
- Introduction to Image Processing
- Enhancement vs Analysis

Activity 2: How Cameras Work

- Film vs Digital Photography
- Digital Camera Anatomy
- Image Sensors and How They Operate
- Image Sensor Types
- Analog to Digital Conversion

Activity 3 (Lab): Getting to Know Your Device

- Introduction to QC Applications
- Vision Sensor Anatomy
- The In-Sight 2000 Control Panel
- Device Specifications

Activity 4: Digitalization

- Photon to Voltage Conversion
- Analog and Digital Signals
- Conversion to Digital
- Pixels
- Gain and Offset

Activity 5 (Lab): Introduction to In-Sight Explorer

- Getting Connected
- Troubleshooting Connectivity
- The In-Sight Explorer Interface
- Acquiring an Image
- Recording Images

Activity 6: Analytical Tools

- Histograms – Overview
- Histograms – Simplification and Examples
- How Histograms Aid in Quality Control
- Thresholding
- Regions of Interest

Activity 7: Image Types

- Bits and Bytes
- Bit Depth and File Size
- File Compression
- Digital Image File Formats

Activity 8 (Lab): EasyBuilder

- Application Steps
- Creating a New Job
- Setting up Location Tools
- Setting up Inspection Tools
- Running a Job
- Adjusting Tolerances

Activity 9: Optics and Lighting

- The Importance of Lighting
- Optics Explained
- Focal Length and Related Parameters
- Resolution and Contrast
- Distortions
- Lens Types
- Types of Reflection

Activity 10: Lighting Techniques

- Bright and Dark Field Lighting
- Diffusion and Condensation
- Constant and Strobed Lighting
- Lighting Techniques Overview
- Optical Filters

Activity 11 (Lab): Image Setup, Lighting, and Calibration

- The Set Up Image Tabs
- Brightness Settings
- Exposure & White Balance
- Calibrating the Field of View

Activity 12: Image Enhancements and Operations

- Contrast and Brightness Adjustment
- Histogram Equalization and Stretching
- Morphological Operations
- Geometric Operations

Activity 13: Filters and Noise Elimination

- Defining Digital Noise
- Types of Noise
- Defining Filters
- Neighborhood Operations
- Point Operations

Activity 14: Blobs

- Defining Blobs
- Identifying Blobs
- Edges
- Blob Analysis, Features, and Measurements

Activity 15 (Lab): Counting Tools

- New EasyBuilder Tools
- Machine Vision Counting and Applications
- The EasyBuilder Filmstrip
- Building a Counting Job