

National Training School

Electronic Access Control Course

Course Syllabus

April 2010

A. Course Description

This fourteen hour intensive classroom instruction, followed by a 2-hour examination, provides broad training to provide you with the information you need to successfully design and install an Electronic Access Control system.

B. Overall Outline, Objectives, & Hours

The Electronic Access Control Course has a total of fourteen (14) contact hours with two (2) hours for testing. It also includes 2 exercises in the form of workshop. The instructor must allow for a ten (10) minute break approximately every hour. Classes can be scheduled for longer contact hours but not for less than fourteen (14) contact hours. Subject areas will be covered as follows:

- | | |
|---|-----------------|
| 1. Introduction | .25 HOUR |
| Class rules | |
| About this course | |
| Program objectives | |
| 2. Overview of EAC Systems | .5 HOUR |
| Objectives | |
| Historical methods of protecting assets | |
| The theories of Access Control | |
| Emerging physical security needs | |
| Definition of Electronic Access Control | |
| Key control: the old and new | |
| Lock control: the old and new | |
| System integration | |
| Automation | |
| Components of EAC | |
| Readers and access control points | |
| 3. Locksmithing | 1 HOUR |
| Objectives | |
| History and philosophy | |
| Life Safety Code 2009 | |
| International Building Code (IBC) | |
| ADA Highlights | |
| Lock theory | |

- Lock types
- Internal example
- Examples of latches
- Hand of door
- Keyless functions
- Door applications

4. Locks and Barriers

1.5 HOURS

- Objectives
- Components of EAC
- Access control points
- Locking devices terms
- Door states
- Fire rating
- Choosing the right door devices for the application
- Level of security
- Construction of door
- Locking devices
- Magnetic locks
- Magnetic direct hold lock
- Wiring magnetic locks
- Wiring magnetic locks on a DC circuit
- Wire resistance
- Magnetic lock installation
- Magnetic lock door mounting
- Troubleshooting magnetic locks:
- Magnetic shear lock
- Wiring a magnetic shear lock
- Shear lock flush installation
- Types of Electro-mechanical locking devices
- Styles of electric doorknob locks
- Electric doorknob locks (mortise-style)
- Installation of Mortise-style Locks
- Door preparation tips
- Electric doorknobs
- Electric deadbolt locks
- Electric strikes
- Electric strikes: deadlatch vs. springlatch
- Electric strikes: for mortise-style
- Installing electric strikes
- Standard strike installation guidelines
- Unlatching strike installation guidelines

5. Entry Devices

1.25 HOURS

- Objectives
- Ingress and Egress
- How do we get in?
- How do we decide who gets in?

Security often dictates the type of reader
Types of entry devices
Keypads
Bar code
Magnetic stripe
Magnetic stripe
Barium ferrite
Wiegand cards and readers
Proximity
Federal Information Processing Standards 201
PIV Identity verification and issuance
Smart card
Biometric readers
Facial recognition
Fingerprint recognition
Palm/hand geometry
Iris/retina scanning
Signature scanning
Voice print
Vein scanning
Mixed technology
“Audio” access systems
Audio access control
CCTV access control

6. Exit Devices

1.5 HOURS

Objectives
Anti-Passback
Exit device selection
No special knowledge
Preventing egress
Delayed egress
Delayed egress: two types of locking mechanisms
Fire alarm systems and controlled egress
Request to Exit (REX) devices
Readers as REX devices
Exit device selection
Buttons as exit devices
Placement of (REX) devices
Motion detectors as exit devices
PIR REX patterns
Input power of (REX) devices
Wiring REX to magnetic locks
Wiring to shunt an alarm point
Integrating REX with an EAC
Vertical rods and panic hardware
Panic bars as exit devices
Touch sense bars or crash bars
Installing touch sense bars or crash bars

Double break wiring on touch sense bars or crash bars
Troubleshooting touch sense bars:
Power transfer devices: power transfer hinge and power cords
Two types of power transfer hinges
Loop detectors

1 HOUR

7. Powering Components

Objectives
Power supplies
Rectification and noise filtering
Primary power
Powering an EAC system's components
Overcurrent
Calculating secondary power
Life safety and backup power
Fail safe and non-fail safe devices
Secondary power for certain devices
Compute your requirements
Considering inrush current
Review of typical power examples
Determining proper voltage
Determining the proper amperage rating
Practice problem
Surge protection
Metal oxide varistors
Diodes

1 HOUR

8. Controllers and Processors

Objectives:
Functions of controllers and processors
Controller location
Common system configurations
Stand alone system
Distributed versus Non-distributed
Distributed system
Centralized or non-distributed system
Wireless systems
Types of wireless
IP systems
Programming the system
Global I.O.
Central processor/host computer
Program options
Linking user data to credentials
Access level
Time zone
Door propped open alarm
Door forced open alarm
Working with computers

Troubleshooting panels
Troubleshooting panels: common errors

9. Wiring Methods

1.5 HOURS

Objectives
Wiring and equipment
Commonly used wire gauges
Wire sizes for load current at 24V
Wire sizes for load current at 12V
Class 2 cable
Typical power examples
Wire gauges data/communications
Wire gauges power
Power and data
Characteristics of signal flow
Attenuation
Radio Frequency Interference (RFI)
Crosstalk or Electro-Magnetic Interference (EMI)
Types of cable
Twisted pair
Shielded cable
Grounding shielded cable
Grounding
Step-voltage-difference
Ground termination point
NEC - Plenum
NEC - Riser
NEC - General Wiring
NEC - Cable support
NEC - Proximity to other cables

10. Building Codes

1 HOUR

Objectives
Wiring and equipment
AHJ
Listed vs. Labeled
Shall vs. Should
Equivalency
Minimum requirements
NFPA 101 LSC: How to use
EAC and The Life Safety Code
EAC and International Building Code (IBC)
No Special Knowledge
When is access control permitted?
Manual release
Code on exit device
Manual release
Delayed-egress vs. Access-controlled egress
Exit sensors

- Power failure
- Delayed-egress locks
- Stairwell doors
- Where you can use delayed-egress locks
- Delayed egress locks - Signage
- Delayed egress locks - Lighting
- High hazard
- Code deviations and conflicts
- Company standards
- Olin's Law

11. System Design

1 HOUR

- Objectives
- Learning about EAC design
- Stand alone system outside door
- System with electric strike; view from inside of door
- System with electric strike; view from outside the door
- Electric lock view from outside the door
- Magnetic lock view from inside the door
- Door with 2 readers and anti-passback (inside)
- A word about EAC and IP
- Designing a configuration
- Configurations of networks
- Overview of topologies
- Daisy-chain network topology
- Star network topology
- Ring network topology
- Bus network topology
- Terminating devices
- Communication protocol
- Programming and communication paths
- Design phases
- Needs assessment
- Review the Application Design Worksheet
- System specifications

12. Common Errors and Solutions

1 HOUR

- Objectives
- What is the impact?
- The possible impacts
- Common error #1:
- Solution
- Common errors #2
- Wiring solutions
- Manufacturer's specifications
- Common error #3
- Solution
- Common error #4
- Solutions

Common error #5

Solution

Predictive maintenance: turnstiles and gates

Equipment analysis on turnstiles

Repair estimates and actions after inspections: turnstiles

Equipment analysis on gates

Repair estimates and actions after inspections: gates

More preventative procedures for turnstiles and gates

Exercise 1:

Student will be given an opportunity to practice linking customer's needs with certain design choices.

.5 HOUR

Exercise 2:

Students will use the Application Design Worksheet provided, and the following to complete an in-class exercise designing an EAC system.

- Equipment Power Specification Sheet
- Generic Parts List
- Power Needs List

1 HOUR

XIII. Final Examination

2 HOURS

C. Guidelines

The course shall be present in accordance with the most recently adopted NTS Administrative & Operational Guidelines. Students with special needs shall be accommodated as required by law and specified in the National Training School Policy Concerning Students with Special Learning/Examination Needs.

D. Method of Presentation

1. Lecture

The instructors shall present the material following the instructor guide and the slide presentation combined with question and answers throughout the course to verify and reinforce comprehension and relate the material to the student's particular needs.

2. Audio Visual Aids

- Slide presentation (slide projector or computer driven monitors).
- Reference book.

E. Method of Evaluation

1. Written examination.
2. A (50) question multiple-choice exam is given at the conclusion of the course. Seventy percent (70%) correct answers are required to pass.
3. The course is reviewed annually by experts designated by the National Training School Committee.
4. Students complete written evaluations of each course and each instructor. The designated class leader at each class also evaluates instructors.

F. Qualification of Instructors

Our program succeeds through individual instruction in the art of teaching by experienced instructors, essentially a train the trainer concept. The course instructors shall include at

least one NTS Certified Electronic Access Control Course Instructor or more of any of the following:

1. A NTS Certified Senior Electronic Access Control Course Instructor
2. A NTS Certified Electronic Access Control Course Instructor
3. A NTS Candidate Electronic Access Control Course Instructor
4. An instructor appointed by the NTS director of education and known by the director to be both knowledgeable of the course material and able to present it in a professional manner.

(Classes of less than 25 students are recommended to have two or more instructors as indicated above but are only required to have one NTS Certified Electronic Access Control Course Instructor).

To qualify as a NTS NTS Certified Electronic Access Control Course Instructor one must:

1. Take the Electronic Access Control Course and score 80% or better.
2. Complete an application and sign an instructor's agreement.
3. Satisfactorily student teach under the supervision of a Certified Electronic Access Control Course Instructor.
4. Be approved by the NTS Director.

Note: The times given are approximate. The instructor must allow for a 10 minute break approximately every hour. Classes can be scheduled for longer contact hours but not for less than 14 contact hours plus 2 hours testing.