

**National Training School**  
**Level 1 Certified Alarm Technician**  
**Course Syllabus**  
**August 1997 edition**

**A. Course Description**

In 18 hours of intensive instruction followed by a 2-hour examination, this program provides an overview on the theory, installation and maintenance of alarm systems. Additional hours may be added but no class shall reduce the number of hours below the indicated time. Below are the required hours in brackets [ ], the New York required hours in braces { }, and the NTS recommended extended hours in parentheses ( ).

**B. Overall Outline, Objectives & Hours**

The Certified Alarm Technician course has eighteen [18] contact hours. The main goals of this course are to reduce false alarms, increase life safety, and to increase the level of security. Subject areas will be covered as follows:

Outline	Learning Objectives
Overall Goal	To point out the general concepts of the electronic security and life safety industry to the student including; <ul style="list-style-type: none"> <li>• the operation, application, installation and maintenance of commonly used equipment and components,</li> <li>• industry standards and legal requirements, and</li> <li>• the students role in the industry.</li> </ul>
1. Introduction [.5 Hour] {.5 Hour} (.5 Hour)	Upon completion of this instructional section, each student will correctly indicate the following on a written examination, or demonstrate during practical exercises, in accordance with the instruction provided: <ul style="list-style-type: none"> <li>• the structure &amp; objectives of this course.</li> </ul>
2. The Electronic Security & Life Safety Industry [.5 Hour] {.5 Hour} (1 Hour)	<ul style="list-style-type: none"> <li>• the basic elements of the electronic security &amp; life safety field.</li> <li>• the critical points of the history of the electronic security &amp; life safety industry</li> </ul>
3. Organizations & Standards [1 Hour] {1 Hour} (1 Hour)	<ul style="list-style-type: none"> <li>• the appropriate standard(s) or code(s) for a particular system.</li> </ul>
4. Essential Electricity (1 Hour) {1.25 Hour} (2.25 Hour)	<ul style="list-style-type: none"> <li>• the application of the theory of electricity to the electronic security &amp; life safety industry.</li> </ul>
5. Troubleshooting (1 Hour) {2 Hour} (2.5 Hour)	<ul style="list-style-type: none"> <li>• common problems &amp; solutions</li> </ul>
6. Alarm Systems [1 Hour] {1 Hour} (1 Hour)	<ul style="list-style-type: none"> <li>• The objectives, uses &amp; limitations of;               <ul style="list-style-type: none"> <li>• burglary alarm systems</li> <li>• fire alarm systems</li> </ul> </li> </ul>



7. False Alarm Prevention	[1 Hour] {1.25 Hour} (1.25 Hour)	<ul style="list-style-type: none"> <li>the importance of false alarm prevention &amp; of the relationships &amp; interactions between the electronic security &amp; alarm professional &amp; law enforcement &amp; fire prevention officials.</li> <li>methods of instructing end users on the use &amp; testing of systems,</li> </ul>
8. Power Supplies	[1 Hour] {1 Hour} (1 Hour)	<ul style="list-style-type: none"> <li>how to calculate the power required for various system types</li> </ul>
9. Control Panels	[1 Hour] {1.25 Hour} (1.25 Hour)	<ul style="list-style-type: none"> <li>the types of control panels and how to select a control based on the application.</li> </ul>
10. Communications	[1 Hour] {1 Hour} (1 Hour)	<ul style="list-style-type: none"> <li>common electronic communications methods &amp; monitoring procedures,</li> </ul>
11. Perimeter Detection Systems	[1 Hour] {1 Hour} (1 Hour)	<ul style="list-style-type: none"> <li>the proper devices to be used with intrusion detection systems.</li> </ul>
12. Interior Detection Systems	[1 Hour] {1 Hour} (1 Hour)	<ul style="list-style-type: none"> <li>the proper devices to be used with intrusion detection systems.</li> </ul>
13. Fire Alarm Sensors	[1 Hour] {1.25 Hour} (1.25 Hour)	<ul style="list-style-type: none"> <li>the proper devices to be used with fire protection systems.</li> </ul>
14. Notification Devices	[.5 Hour] {.5 Hour} (.5 Hour)	<ul style="list-style-type: none"> <li>the proper notification devices to be used with detection systems.</li> </ul>
15. Other Systems (Home Automation, Environmental, Holdup, etc.)	[.5 Hour] {.5 Hour} (.5 Hour)	<ul style="list-style-type: none"> <li>the proper devices to be used with Home Automation, Environmental, Holdup &amp; other systems.</li> </ul>
16. Closed Circuit Television	[1 Hour] {1 Hour} (1 Hour)	<ul style="list-style-type: none"> <li>the proper camera, lenses, and other components to use in a closed circuit television system.</li> </ul>
17. Access Control Systems	[1 Hour] {1 Hour} (1 Hour)	<ul style="list-style-type: none"> <li>the items considered in designing access control systems.</li> </ul>
18. Job Safety	[1 Hour] {1 Hour} (1 Hour)	<ul style="list-style-type: none"> <li>the need for job safety practices.</li> </ul>
19. Wiring Methods	[1 Hour] {1 Hour} (1 Hour)	<ul style="list-style-type: none"> <li>proper wiring methods including the applicable sections of the National Electrical Code.</li> </ul>



20. Quality Control & Job Planning	[1 Hour] {1 Hour} (1 Hour)	<ul style="list-style-type: none"> <li>the importance of quality control &amp; planning in each &amp; every job.</li> </ul>
21. Examination	[2 Hours] {2 hours} (2 hours)	<ul style="list-style-type: none"> <li>multiple choice open book examination.</li> </ul>

## Chapter 1- Introduction

Outline	Learning Objectives
	Upon completion of this instructional section, each student will correctly indicate the following on a written examination, or demonstrate during practical exercises, in accordance with the instruction provided:
1. Class Structure & Schedule	<ul style="list-style-type: none"> <li>the structure and objectives of this course.</li> </ul>
2. Class Rules	<ul style="list-style-type: none"> <li>the rules of the class.</li> </ul>
3. What Is The National Training School <ul style="list-style-type: none"> <li>a. Mission</li> <li>b. Sponsors</li> <li>c. Instructor Qualifications</li> <li>d. Continuing Education (CEUs)</li> </ul>	<ul style="list-style-type: none"> <li>the mission and organization of the National Training School.</li> <li>the purpose and operation of the continuing education (CEU) program</li> </ul>

## Chapter 2- The Electronic Security & Life Safety Industry

Outline	Learning Objectives
	Upon completion of this instructional section, each student will correctly indicate the following on a written examination, or demonstrate during practical exercises, in accordance with the instruction provided:
1. Industry Overview	
2. The Electronic Security & Life Safety Brief History <ul style="list-style-type: none"> <li>Future Trends</li> </ul>	<ul style="list-style-type: none"> <li>major events in the history of the industry</li> <li>future industry trends</li> </ul>
3. Roles, Skills & Responsibilities of Personnel <ul style="list-style-type: none"> <li>Sales</li> <li>Installation</li> <li>Service</li> <li>Monitoring</li> <li>Customer Service</li> <li>Administration</li> </ul>	<ul style="list-style-type: none"> <li>roles, responsibilities &amp; ethical obligations of; <ul style="list-style-type: none"> <li>salespeople</li> <li>installers</li> <li>service technicians</li> <li>monitoring personnel</li> <li>customer service</li> <li>administration</li> </ul> </li> </ul>
4. Types of Systems <ul style="list-style-type: none"> <li>Burglary</li> <li>Fire</li> </ul>	<ul style="list-style-type: none"> <li>the objectives, uses &amp; limitations of; <ul style="list-style-type: none"> <li>burglary systems</li> <li>fire systems</li> </ul> </li> </ul>



- Holdup, panic or Emergency
- Process Supervision & Condition Monitoring
- Access Control
- CCTV
- Home Automation

- holdup, panic or emergency systems
- process supervision & condition monitoring
- access control systems
- CCTV systems
- home automation systems

### Chapter 3- Organizations & Standards

Outline	Learning Objectives
I. Why Standards?	
II. What Are Standards & Codes? Define Standard Define Code	<ul style="list-style-type: none"> <li>• the benefits of standards</li> <li>• a comparison of installation and performance standards</li> <li>• a comparison of codes &amp; standards</li> </ul>
III. Types of Standards International National Regional & Local Safety Standards	<ul style="list-style-type: none"> <li>• a comparison of international, national, regional, local &amp; safety standards</li> </ul>
IV. What Is An AHJ?	
V. How Are Standards Developed?	
VI. Approved vs. Listed vs. Accepted	<ul style="list-style-type: none"> <li>• a definition of the AHJ</li> <li>• the relationship between the AHJ and fire system design</li> <li>• how standards are developed</li> </ul>
VII. Profile Of Associations NBFAA SIA CSAA AIREF ASIS Other	<ul style="list-style-type: none"> <li>• a comparison of listed, approved &amp; accepted standards</li> <li>• the major industry associations</li> </ul>
VIII. Alarm Industry Standards Burglary- UL, NBFAA, DIA, Etc. Fire- UL, NFPA, NICET, BOCA, ICBO, SBC, CABO, Etc.	<ul style="list-style-type: none"> <li>• the organizations that develop industry standards.</li> <li>• some alarm industry standards.</li> </ul>
IX. UL What Makes A System Certified? UL Grades UL Extents	<ul style="list-style-type: none"> <li>• a definition of UL equipment.</li> <li>• a use for UL installation standards.</li> <li>• examples of UL certification requirements</li> <li>• the qualifications of Underwriters Laboratories (UL) installing companies.</li> </ul>

# Chapter 4 Essential Electricity

Outline	Learning Objectives
1. Application of Electricity to the industry What Is Electricity? How Do We Use It?	<ul style="list-style-type: none"> <li>• what electricity is and how we use it as an industry.</li> </ul>
2. Electrical Essentials Matter Energy	<ul style="list-style-type: none"> <li>• the basic essentials of electricity</li> </ul>
3. Conductors, Insulators & Semiconductors	<ul style="list-style-type: none"> <li>• the uses of conductors, insulators &amp; semiconductors</li> </ul>
4. Sources of Electricity <ul style="list-style-type: none"> <li>• Friction- Static Electricity</li> <li>• Chemical Action- Batteries</li> <li>• Magnetism- Generators</li> <li>• Light- Photocells</li> <li>• Heat- Thermocouples</li> <li>• Pressure- Piezoelectric</li> </ul>	<ul style="list-style-type: none"> <li>• sources of electricity</li> <li>• how to properly handle static sensitive devices.</li> <li>• how to correct problems caused by battery life.</li> </ul>
5. Types of Electricity <ul style="list-style-type: none"> <li>• DC</li> <li>• AC</li> </ul>	<ul style="list-style-type: none"> <li>• the uses of AC and DC power</li> </ul>
6. Induction	<ul style="list-style-type: none"> <li>• the effect of induction.</li> </ul>
7. Ground	<ul style="list-style-type: none"> <li>• a definition of grounding.</li> <li>• how to identify a short to ground.</li> </ul>
7. Surges, transients	<ul style="list-style-type: none"> <li>• the sources and effect of surges transients &amp; spikes</li> </ul>
6. Measuring Electricity <ul style="list-style-type: none"> <li>• Volts, Amps, Ohms, Watts</li> <li>• Resistance</li> <li>• Conductance</li> <li>• Ohms Law</li> </ul>	<ul style="list-style-type: none"> <li>• the differences between voltage, current, resistance and power.</li> </ul>
7. Ohms Law <ul style="list-style-type: none"> <li>• Symbols</li> <li>• Formula</li> <li>• Using The Formula</li> </ul>	<ul style="list-style-type: none"> <li>• solutions to problems using Ohm's Law.</li> </ul>
8. Watts Law <ul style="list-style-type: none"> <li>• Symbol</li> <li>• Formula</li> <li>• Using The Formula</li> </ul>	<ul style="list-style-type: none"> <li>• solutions to problems using Watts law</li> </ul>
9. Conversions <ul style="list-style-type: none"> <li>• Milli</li> <li>• Micro</li> <li>• Kilo</li> <li>• Mega</li> </ul>	<ul style="list-style-type: none"> <li>• conversion of Voltage to millivolts.</li> <li>• conversion of millivolts to Volts</li> <li>• conversion of Amps to Milliamps</li> </ul>
10. Resistors <ul style="list-style-type: none"> <li>• Ratings-               <ul style="list-style-type: none"> <li>• Resistance</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• the correct resistor to use by reading the color code.</li> <li>• the correct AWG size for specific applications.</li> <li>• the problems caused by incorrect use of AWG size or resistors.</li> </ul>



<ul style="list-style-type: none"> <li>• Wattage</li> <li>• Color Code</li> <li>• Wire as Resistor</li> <li>• Wire Resistance Chart</li> </ul>	
<b>12. Other Common Electrical Components</b> <ul style="list-style-type: none"> <li>• Diodes</li> <li>• Capacitors</li> <li>• MOVs</li> <li>• Transorbs</li> <li>• Relays</li> </ul>	<ul style="list-style-type: none"> <li>• the proper uses of diodes, capacitors, MOVs, transorbs &amp; relays.</li> <li>• the usual appearance of common electronic components.</li> </ul>

## Chapter 5 - Troubleshooting

Outline	Learning Objectives
	<p>Upon completion of this instructional section, each student will correctly indicate the following on a written examination, or demonstrate during practical exercises, in accordance with the instruction provided:</p>
<b>1. Troubleshooting</b> <ul style="list-style-type: none"> <li>• Flow Charts</li> </ul>	<ul style="list-style-type: none"> <li>• a description of troubleshooting</li> <li>• the use of a flow chart during troubleshooting</li> </ul>
<b>2. Overview of circuits</b>	<ul style="list-style-type: none"> <li>• different types of circuits</li> <li>• how to draw a wiring diagram</li> </ul>
<b>3. Using A Meter</b>	<ul style="list-style-type: none"> <li>• the use of digital &amp; analog meters</li> <li>• how to measure voltage</li> <li>• how to measure current</li> <li>• how to measure resistance</li> <li>• the use of a meter during troubleshooting</li> </ul>
<b>4. Series</b> <ul style="list-style-type: none"> <li>• Show common uses</li> <li>• Diagram a series circuit</li> <li>• Find unknown values</li> <li>• Show effect of batteries in series</li> </ul>	<ul style="list-style-type: none"> <li>• how to identify &amp; correct several problems with a series circuit</li> <li>• how to correctly use batteries in series &amp; in parallel</li> </ul>
<b>5. Parallel</b> <ul style="list-style-type: none"> <li>• Show common uses</li> <li>• Diagram a parallel circuit</li> <li>• Find missing values</li> <li>• Show effect of batteries in parallel</li> </ul>	<ul style="list-style-type: none"> <li>• how to identify &amp; correct several problems with a parallel circuit</li> <li>• how to correctly use batteries in series &amp; in parallel</li> </ul>
<b>6. Series Parallel</b> <ul style="list-style-type: none"> <li>• Show common uses</li> <li>• Diagram a series parallel circuit</li> <li>• Find missing values</li> </ul>	<ul style="list-style-type: none"> <li>• how to identify &amp; correct several problems with a series- parallel circuit</li> </ul>
<b>7. Circuit Characteristics</b> <ul style="list-style-type: none"> <li>• 2 &amp; 4 Wire Detectors</li> <li>• Power &amp; Circuit Supervision</li> <li>• Proper Wire Sizing</li> </ul>	<ul style="list-style-type: none"> <li>• fire circuit characteristics</li> <li>• the uses of two wire detectors &amp; four wire detectors</li> <li>• a proper method of power supervision.</li> <li>• a proper method of circuit supervision.</li> <li>• the difference between Class A &amp; Class B circuits</li> <li>• the use of the end of the line resistor</li> <li>• the proper wire size to be used in fire systems.</li> </ul>

## Chapter 6 Alarm Systems

Outline	Learning Objectives
1. The Threat? <ul style="list-style-type: none"> <li>• From Burglary</li> <li>• From Fire</li> </ul>	<ul style="list-style-type: none"> <li>• the threat from fire, burglary, holdups &amp; other emergencies.</li> </ul>
2. Types of Systems <ul style="list-style-type: none"> <li>• Burglary</li> <li>• Fire</li> </ul>	<ul style="list-style-type: none"> <li>• the objectives, uses &amp; limitations of;               <ul style="list-style-type: none"> <li>• burglary systems</li> <li>• fire systems</li> </ul> </li> </ul>
3. The Central Station <ul style="list-style-type: none"> <li>• What is a central station?</li> <li>• Central station security</li> <li>• What is a signal?</li> <li>• How do signals reach the central station?</li> <li>• Monitoring Options               <ul style="list-style-type: none"> <li>• Central Stations.</li> <li>• Monitoring Stations.</li> <li>• Proprietary.</li> <li>• Police Department</li> </ul> </li> <li>• What happens to the signals at the central station?</li> </ul>	<ul style="list-style-type: none"> <li>• the purpose of a central station</li> <li>• how signals reach a central station</li> <li>• the differences between central stations, monitoring stations, proprietary monitoring &amp; police department facilities</li> </ul>
4. Types of Signals <ul style="list-style-type: none"> <li>• General</li> <li>• Trouble</li> <li>• Supervisory</li> <li>• Burglary-Intrusion</li> <li>• Fire Detection</li> <li>• Holdup, Emergency &amp; Medical</li> <li>• Process Supervision &amp; Condition Monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• the types of signals</li> <li>• required documentation</li> <li>• steps taken in response to alarms</li> <li>• public safety response to alarms</li> <li>• the difference between alarm, supervisory &amp; trouble signals.</li> </ul>

## Chapter 7 False Alarm Prevention

Outline	Learning Objectives
1. Overview <ul style="list-style-type: none"> <li>• What Is A False Alarm?</li> <li>• Causes of False Alarms</li> <li>• How Many False Alarms Occur?</li> <li>• What Do False Alarms Cost?</li> </ul>	<ul style="list-style-type: none"> <li>• the definition of a false alarm</li> <li>• how false alarms are caused</li> <li>• the impact of false alarms on police and fire departments</li> </ul>
2. What Police & Fire Departments Can Do	<ul style="list-style-type: none"> <li>• steps for police &amp; fire departments</li> </ul>
3. What Alarm Dealers Can Do <ul style="list-style-type: none"> <li>• Verify</li> <li>• Customer Demonstrations</li> <li>• Maintenance</li> </ul>	<ul style="list-style-type: none"> <li>• a description of verification</li> <li>• the role maintenance plays in reducing false alarms</li> </ul>

<p>4. Communicating With Alarm Users.</p> <ol style="list-style-type: none"> <li>1. Justification             <ol style="list-style-type: none"> <li>a. Explain What False Alarms Cost</li> </ol> </li> <li>2. Knowledge             <ol style="list-style-type: none"> <li>a. Causes</li> <li>b. What They Can Do?</li> <li>c. How To Do It.</li> <li>d. What Help Is Available.</li> </ol> </li> <li>3. Presentation             <ol style="list-style-type: none"> <li>a. Communication Effectiveness</li> <li>b. Customer Feelings Are Important.</li> <li>c. Don't Ever Forget The Extra's</li> <li>d. Guidance &amp; Help</li> <li>e. Checkout The Equipment</li> <li>f. Realistic Examples</li> <li>g. Teach Alarm Users To                 <ol style="list-style-type: none"> <li>1. Cancel False Alarms.</li> <li>2. Test Their System.</li> <li>3. Use Their Touchpad.</li> </ol> </li> <li>h. Use Questions</li> <li>i. Modes Of Learning</li> </ol> </li> </ol>	<ul style="list-style-type: none"> <li>• how to provide customer demonstrations to reduce false alarms</li> <li>• the impact of local ordinances on false alarms</li> </ul>
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## Chapter 8 Power Supplies

<p><b>Outline</b></p>	<p><b>Learning Objectives</b></p> <p>Upon completion of this instructional section, each student will correctly indicate the following on a written examination, or demonstrate during practical exercises, in accordance with the instruction provided:</p>
<ol style="list-style-type: none"> <li>1. Secondary Power             <ul style="list-style-type: none"> <li>• Standby Battery Calculation Form</li> </ul> </li> </ol>	<ul style="list-style-type: none"> <li>• how to calculate power requirements, including battery stand-by time.</li> <li>• a definition of transformers.</li> <li>• some common uses of transformers.</li> <li>• a definition of batteries.</li> <li>• some common uses of batteries.</li> <li>• how to calculate current demands for auxiliary outputs.</li> <li>• the uses of calculating capacities.</li> <li>• how to calculate battery stand-by time.</li> </ul>

## Chapter 9- Control Panels

<p><b>Outline</b></p>	<p><b>Learning Objectives</b></p> <p>Upon completion of this instructional section, each student will correctly indicate the following on a written examination, or demonstrate during practical exercises, in accordance with the instruction provided:</p>
<ol style="list-style-type: none"> <li>1. Overview             <ul style="list-style-type: none"> <li>• What Does The Control Do?</li> <li>• Common Types</li> </ul> </li> </ol>	<ul style="list-style-type: none"> <li>• the four components of alarm systems. (detection, control, annunciation &amp; transmission)</li> <li>• the types of control panels &amp; their functions.</li> </ul>
<ol style="list-style-type: none"> <li>2. Detection</li> </ol>	<ul style="list-style-type: none"> <li>• some uses of circuits.</li> </ul>

<ul style="list-style-type: none"> <li>• What Is a Detection Circuit?</li> <li>• Common Circuit Uses <ul style="list-style-type: none"> <li>• Intrusion Detection Circuit Uses</li> <li>• Fire Monitoring Circuits</li> <li>• Panic &amp; Emergency Circuits</li> <li>• Ambush, Duress, Holdup Circuits</li> <li>• Condition Monitoring</li> </ul> </li> <li>• Wired Vs. Wireless</li> <li>• Common Circuit types</li> <li>• Circuit Options</li> <li>• Partitions</li> <li>• Zoning <ul style="list-style-type: none"> <li>• What Is A Zone?</li> <li>• Why Zone A System?</li> <li>• Perimeter</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• the differences between <ul style="list-style-type: none"> <li>• hardwire &amp; wired systems.</li> <li>• supervised &amp; non-supervised circuits.</li> <li>• hardwire closed loops &amp; hardwire open loops.</li> </ul> </li> <li>• a definition of loop response.</li> <li>• a definition of partitions.</li> <li>• some reasons for partitions.</li> <li>• a definition of zoning.</li> </ul>
<p>3. User Control Points</p> <ul style="list-style-type: none"> <li>• Serial Data Keypads</li> <li>• Integrated Control-Keypads</li> </ul>	<ul style="list-style-type: none"> <li>• types of user controls.</li> <li>• how to select key pads.</li> </ul>

## Chapter 10 Communications

Outline	Learning Objectives
<p>1. Objective</p>	<ul style="list-style-type: none"> <li>• the purposes of communication</li> </ul>
<p>2. Communications Methods</p>	<ul style="list-style-type: none"> <li>• the possible means to communicate a signal</li> </ul>
<p>3. Overview Of Old Technologies</p> <ul style="list-style-type: none"> <li>• Direct Connect</li> <li>• Direct Wire</li> <li>• McCulloh</li> <li>• Tape Dialers</li> </ul>	<ul style="list-style-type: none"> <li>• the difference between direct connect &amp; direct wire</li> <li>• a description of McCulloh transmission</li> <li>• some problems with McCulloh</li> <li>• a description of tape dialers</li> <li>• some problems with tape dialers</li> </ul>
<p>4. Digital Communicators</p> <ul style="list-style-type: none"> <li>• Description</li> <li>• Phone Wiring <ul style="list-style-type: none"> <li>• PSTN</li> <li>• Cellular</li> </ul> </li> <li>• Line Seizure</li> <li>• Line Fault Monitoring</li> <li>• Test Signals</li> <li>• Advantages</li> <li>• Disadvantages</li> </ul>	<ul style="list-style-type: none"> <li>• common uses of ; <ul style="list-style-type: none"> <li>• digital communicators</li> <li>• line fault monitoring</li> <li>• long range radio</li> <li>• cellular</li> </ul> </li> <li>• a definition of digital communicators</li> <li>• the different transmission formats</li> <li>• the NFPA standards for digital communicators</li> <li>• a description of phone wiring</li> <li>• a description of cellular</li> <li>• the use of a RJ31X telephone jack</li> <li>• how line seizure works</li> <li>• a wiring diagram for an RJ31X telephone jack.</li> <li>• the legal requirements (FCC rules) of RJ31X telephone jack</li> <li>• the function of the test signal</li> <li>• the use of line fault monitoring</li> <li>• the advantages of digital communicators</li> <li>• the disadvantages of digital communicators</li> </ul>

5. Multiplex	<ul style="list-style-type: none"> <li>• types of multiplex transmission</li> <li>• some advantages of multiplexing</li> </ul>
6. Radio	<ul style="list-style-type: none"> <li>• a use of long range radio central station interconnect</li> </ul>
7. Derived Channel	<ul style="list-style-type: none"> <li>• a definition of derived channel</li> <li>• the relationship of derived channel with the telephone company</li> </ul>

## Chapter 11 - Perimeter Intrusion Sensors

Outline	Learning Objectives
	<p>Upon completion of this instructional section, each student will correctly indicate the following on a written examination, or demonstrate during practical exercises, in accordance with the instruction provided:</p>
1. System Description <ul style="list-style-type: none"> <li>• What Are We Detecting?</li> <li>• Types of sensors               <ul style="list-style-type: none"> <li>• Perimeter vs. Interior</li> <li>• Types of Space Detection</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• the objective of an intrusion sensor</li> <li>• the definition of perimeter</li> </ul>
2. Types Of Sensors <ul style="list-style-type: none"> <li>• Magnetic Mechanical Switch</li> <li>• Magnetic Reed Switch</li> <li>• Balanced Magnetic Reed Switch</li> <li>• Foil Patterns</li> <li>• Lacing &amp; Trap Wire</li> <li>• Alarm Screens</li> <li>• Shock Or Vibration Detectors</li> <li>• Mercury Devices</li> <li>• Shock Sensors</li> <li>• Piezo Electric Devices</li> <li>• Screens</li> <li>• Mechanical Switches</li> <li>• Sound/Audio Discrimination.</li> <li>• Coax Cable Fence Alarm Systems.</li> <li>• E-field</li> </ul>	<ul style="list-style-type: none"> <li>• types of sensors</li> <li>• common uses of               <ul style="list-style-type: none"> <li>• magnetic mechanical switch</li> <li>• magnetic reed switch</li> <li>• balanced magnetic reed switch</li> <li>• foil patterns</li> <li>• lacing &amp; trap wire</li> <li>• alarm screens</li> <li>• shock or vibration detectors</li> <li>• mercury devices</li> <li>• shock sensors</li> <li>• piezo electric devices</li> <li>• screens</li> <li>• mechanical switches</li> <li>• sound/audio discrimination</li> <li>• coax cable fence alarm systems</li> <li>• E-field</li> </ul> </li> </ul>

## Chapter 12 Interior Intrusion Sensors

Outline	Learning Objectives
	<p>Upon completion of this instructional section, each student will correctly indicate the following on a written examination, or demonstrate during practical exercises, in accordance with the instruction provided:</p>
1. System Description <ul style="list-style-type: none"> <li>• What Are We Detecting?</li> <li>• Types of sensors               <ul style="list-style-type: none"> <li>• Perimeter vs. Interior</li> <li>• Types of Space Detection</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• the objective of an intrusion sensor</li> <li>• the definition of perimeter</li> </ul>

<p>2. Space Detection Overview</p> <ul style="list-style-type: none"> <li>• Roles Of Motion Detection</li> <li>• Disguised Sensors</li> </ul>	<ul style="list-style-type: none"> <li>• the roles of space detection</li> <li>• the differences between trap, spot, channel &amp; volumetric detection</li> <li>• the role of combination sensors</li> <li>• the differences between active &amp; passive sensors</li> <li>• how sensors can be disguised</li> </ul>
<p>3. Types of Sensors</p> <ul style="list-style-type: none"> <li>• Photoelectric Beam</li> <li>• Ultrasonic</li> <li>• Microwave</li> <li>• Passive Infrared</li> <li>• Audio Discriminators</li> <li>• Infrasonics</li> <li>• Pressure Mats</li> <li>• Stress Sensors</li> <li>• Combined Technology</li> </ul>	<ul style="list-style-type: none"> <li>• proper uses of; <ul style="list-style-type: none"> <li>• photoelectric active sensors</li> <li>• ultrasonic detectors</li> <li>• microwave active sensors</li> <li>• PIRs</li> <li>• stress sensors</li> <li>• infrasonic sensors</li> <li>• mats</li> <li>• dual-technology sensors</li> </ul> </li> <li>• the effect of hard &amp; soft objects on sound waves</li> <li>• the impact of the environment on each type of sensor</li> </ul>

## Chapter 13 - Fire Alarm Sensors

Outline	Learning Objectives
<p>1. Fire Signatures</p> <ul style="list-style-type: none"> <li>• Stages Of Fire</li> </ul>	<ul style="list-style-type: none"> <li>• the four stages of fire.</li> </ul>
<p>2. Detection Vs. Stages</p>	<ul style="list-style-type: none"> <li>• how to match the proper detector to the stages of fire.</li> </ul>
<p>3. Selecting The Detector</p> <ul style="list-style-type: none"> <li>• Pull Stations</li> <li>• Heat Detectors <ul style="list-style-type: none"> <li>• Fixed Temperature</li> <li>• Rate Of Rise</li> </ul> </li> <li>• Smoke <ul style="list-style-type: none"> <li>• Ionization</li> <li>• Photoelectric</li> <li>• Duct</li> <li>• Beam</li> </ul> </li> <li>• IR &amp; UV</li> <li>• Sprinkler System Basics</li> </ul>	<ul style="list-style-type: none"> <li>• the difference between manual &amp; automatic detection.</li> <li>• the common uses of; <ul style="list-style-type: none"> <li>• pull stations</li> <li>• fixed temperature heat detectors.</li> <li>• rate of rise detectors</li> <li>• ionization smoke detectors.</li> <li>• photoelectric smoke detectors.</li> <li>• beam smoke detectors</li> <li>• duct smoke detectors</li> <li>• sprinkler systems</li> </ul> </li> </ul>
<p>4. Detector Placement</p> <ul style="list-style-type: none"> <li>• Smooth &amp; Flat Ceilings</li> <li>• Pull Stations</li> <li>• Home Smoke Detector Locations</li> </ul>	<ul style="list-style-type: none"> <li>• how to select the proper locations for; <ul style="list-style-type: none"> <li>• pull stations</li> <li>• residential smoke detectors.</li> </ul> </li> </ul>

## Chapter 14 Notification Devices

Outline	Learning Objectives
1. Annunciation <ul style="list-style-type: none"> <li>• Outputs</li> <li>• Visual Annunciators</li> <li>• Audibles               <ul style="list-style-type: none"> <li>• Audible Time-outs</li> <li>• Audibility Considerations</li> </ul> </li> </ul>	Upon completion of this instructional section, each student will correctly indicate the following on a written examination, or demonstrate during practical exercises, in accordance with the instruction provided: <ul style="list-style-type: none"> <li>• some types of alarm outputs</li> <li>• types of annunciators.</li> <li>• types of sounding devices.</li> <li>• methods of annunciation.</li> <li>• the need for different methods of annunciation.</li> </ul>

## Chapter 15 - Other Systems (Home Automation, Environmental, Holdup, Emergency, Etc.)

Outline	Learning Objectives
1. System Description <ul style="list-style-type: none"> <li>• Types of Systems               <ul style="list-style-type: none"> <li>• Personal Assistance- Holdup, etc.</li> <li>• Home Automation</li> <li>• Process or Environmental</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• other types of systems</li> </ul>
2. Personal Assistance <ul style="list-style-type: none"> <li>• Holdup</li> <li>• Emergency</li> <li>• Panic</li> <li>• Duress- Ambush</li> <li>• Medical</li> </ul>	<ul style="list-style-type: none"> <li>• the objective of Personal Assistance systems</li> </ul>
3. Home Automation	<ul style="list-style-type: none"> <li>• the objective of home automation systems</li> </ul>
4. Process or Environmental <ul style="list-style-type: none"> <li>• Low temperature</li> <li>• High Water</li> <li>• Equipment Failure</li> <li>• Power Failure</li> </ul>	<ul style="list-style-type: none"> <li>• the objective of Process or Environmental systems</li> </ul>

## Chapter 16 - Closed Circuit Television (CCTV)

Outline	Learning Objectives
	Upon completion of this instructional section, each student will correctly indicate the following on a written examination, or demonstrate during practical exercises, in accordance with the instruction provided:
1. Overview of CCTV	<ul style="list-style-type: none"> <li>the basic components of a CCTV system.</li> </ul>
2. Types Of Cameras	<ul style="list-style-type: none"> <li>types of cameras.</li> </ul>
3. Lens Selection	<ul style="list-style-type: none"> <li>how to determine the proper lens.</li> <li>a description of focal length.</li> <li>common lighting requirements.</li> </ul>
4. Monitors	<ul style="list-style-type: none"> <li>common uses of monitors.</li> </ul>
5. Types of Switchers	<ul style="list-style-type: none"> <li>different types of switchers</li> </ul>
6. Signal Transmission Methods <ul style="list-style-type: none"> <li>Coax</li> <li>Fiber Optic</li> <li>Microwave</li> <li>Phone Line</li> <li>Laser</li> </ul>	<ul style="list-style-type: none"> <li>common signal transmission methods including, coax, fiber optic, Microwave, phone line &amp; laser.</li> <li>cable requirements.</li> <li>common methods of remote control.</li> </ul>
7. Housings & Accessories	<ul style="list-style-type: none"> <li>the requirements of an environmental housing.</li> </ul>
8. Recording <ul style="list-style-type: none"> <li>VCR</li> <li>Disc</li> </ul>	<ul style="list-style-type: none"> <li>a description of the time lapse recording process.</li> <li>the difference between VCR and disc recording.</li> </ul>

## Chapter 17 Access Control

Outline	Learning Objectives
	Upon completion of this instructional section, each student will correctly indicate the following on a written examination, or demonstrate during practical exercises, in accordance with the instruction provided:
1. What Is Access Control?	<ul style="list-style-type: none"> <li>what access control is</li> </ul>
2. Why Access Control?	<ul style="list-style-type: none"> <li>some uses of access control</li> </ul>
3. General Considerations	<ul style="list-style-type: none"> <li>some general considerations in system design</li> </ul>
4. Determine Objectives	<ul style="list-style-type: none"> <li>access control objectives</li> </ul>
5. Life Safety Codes	<ul style="list-style-type: none"> <li>the applicable codes</li> </ul>
6. Electric Locks <ul style="list-style-type: none"> <li>Types</li> <li>Hand Of Door</li> <li>Fail Safe</li> <li>Fail Secure</li> </ul>	<ul style="list-style-type: none"> <li>types of electric locks</li> <li>the difference between fail safe and fail secure</li> </ul>
7. Reader	<ul style="list-style-type: none"> <li>types of readers</li> </ul>
8. Cards & Keys	<ul style="list-style-type: none"> <li>types of cards &amp; keys</li> </ul>
9. Biometrics	<ul style="list-style-type: none"> <li>types of biometric controls</li> </ul>
10. Exit Control	<ul style="list-style-type: none"> <li>types of exit controls</li> </ul>
11. Processing	<ul style="list-style-type: none"> <li>the difference between distributed &amp; centralized processing</li> </ul>

<ul style="list-style-type: none"> <li>• Distributed</li> <li>• Centralized</li> <li>• Degraded</li> </ul>	
12. Reports	<ul style="list-style-type: none"> <li>• the impact of reporting needs on the system design</li> </ul>
13. Common Features <ul style="list-style-type: none"> <li>• Anti-Passback</li> <li>• Access Level</li> <li>• Time Zone</li> </ul>	<ul style="list-style-type: none"> <li>• a definition of anti-passback</li> <li>• a definition of access level</li> <li>• a definition of time zone.</li> </ul>

## Chapter 18 - Job Safety

Outline	Learning Objectives
	<p>Upon completion of this instructional section, each student will correctly indicate the following on a written examination, or demonstrate during practical exercises, in accordance with the instruction provided:</p>
1. Job Safety	<ul style="list-style-type: none"> <li>• the need for adequate job safety practices.</li> </ul>
2. Potential Hazards	<ul style="list-style-type: none"> <li>• examples of wiring hazards.</li> <li>• how to locate potential hazards.</li> <li>• methods to protect customers and other people.</li> </ul>
3. OSHA	<ul style="list-style-type: none"> <li>• what the acronym OSHA stands for.</li> <li>• the importance of OSHA.</li> </ul>
4. Safety Equipment	<ul style="list-style-type: none"> <li>• reasons for proper clothing.</li> <li>• common safety equipment.</li> </ul>
5. Proper tools	<ul style="list-style-type: none"> <li>• the proper tools/equipment</li> <li>• reasons for tool safety.</li> </ul>
6. Ladders	<ul style="list-style-type: none"> <li>• the proper use of ladders.</li> </ul>

## Chapter 19 - Wiring Methods

Outline	Learning Objectives
	<p>Upon completion of this instructional section, each student will correctly indicate the following on a written examination, or demonstrate during practical exercises, in accordance with the instruction provided:</p>
1. Types Of Wire	<ul style="list-style-type: none"> <li>• types of wire including single conductor, twisted pair, zip cord, jacketed &amp; shielded cable wiring.</li> </ul>
2. Wiring Techniques <ul style="list-style-type: none"> <li>• Fishing</li> <li>• Conduit</li> </ul>	<ul style="list-style-type: none"> <li>• methods of attaching wires.</li> <li>• different wiring techniques.</li> <li>• the use of conduit.</li> </ul>
3. Grounding	<ul style="list-style-type: none"> <li>• why grounding is done (protect panel from lightning).</li> <li>• how grounding is done.</li> </ul>



## Chapter 20 - Quality Control & Job Planning

Outline	Learning Objectives
1. Quality Control <ul style="list-style-type: none"><li>• Professionalism</li><li>• Customer Service</li></ul>	<p>Upon completion of this instructional section, each student will correctly indicate the following on a written examination, or demonstrate during practical exercises, in accordance with the instruction provided:</p> <ul style="list-style-type: none"><li>• the recommended customer service practices.</li></ul>
2. Job Planning <ul style="list-style-type: none"><li>• System Design</li><li>• Sample Forms</li></ul>	<ul style="list-style-type: none"><li>• the need for adequate job planning.</li><li>• the need for wire labeling.</li><li>• the need for documentation.</li><li>• examples of documentation.</li><li>• how to complete sample design forms.</li><li>• how to apply the principles relayed in the course to design a sample system.</li></ul>
3. Standard Symbols	<ul style="list-style-type: none"><li>• the appropriate symbols.</li></ul>
4. NBFAA Minimum Standards	<ul style="list-style-type: none"><li>• the NBFAA minimum standards.</li></ul>
5. Computers & Programming	<ul style="list-style-type: none"><li>• how computers are used in the industry</li><li>• what programming means in our industry</li><li>• the meaning of uploading.</li><li>• the meaning of downloading.</li></ul>