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PROGRAM OUTLINE

Security Systems Technician

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SECURITY SYSTEMS TECHNICIAN

PROGRAM OUTLINE

July 20, 2010

Developed By
SkilledTradesBC
Province of British Columbia

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FORWARD

The revised Security Systems Technician Program Outline is intended as a guide for instructors, apprentices, and employers of apprentices as well as for the use of industry organizations, regulatory bodies, and provincial and federal governments. It reflects the new Security System Technician Occupational Analysis and updated standards based on British Columbia Security System Industry and program instructor subject matter experts.

Practical instruction by demonstration and student participation should be integrated with classroom sessions. Safe working practices, even though not always specified in each operation or topic, are an implied part of the program and should be stressed throughout the apprenticeship.

The Program Outline includes a list of recommended reference textbooks that are available to support the learning objectives and the minimum shop requirements needed to support instruction.

The Program Outline was prepared with the advice and assistance of the Security Systems Technician Review Committee and will form the basis for further updating of the British Columbia Security Systems Technician Program and learning resources by the Construction Industry Training Organization on behalf of SkilledTradesBC.

Each competency is to be evaluated through the use of written examination in which the learner must achieve a minimum of 70% in order to receive a passing grade for that competency. The types of questions used on these exams must reflect the cognitive level indicated by the learning objectives and the learning tasks listed in the related competencies.

Achievement Criteria are included for those competencies that require a practical component. The intent of including Achievement Criteria in the program outline is to ensure consistency in training across the many training institutions in British Columbia. Their purpose is to reinforce the theory and to provide a mechanism for evaluation of the learner's ability to apply the theory to practice. It is important that these performances be observable and measureable and that they reflect the skills spelled out in the competency as those required of a competent journeyperson. The conditions under which these performances will be observed and measured must be clear to the learner as well as the criteria by which the learner will be evaluated. The learner must also be given the level of expectation of success.

The performance spelled out in the Achievement Criteria is a suggested performance and is not meant to stifle flexibility of delivery. Training providers are welcome to substitute other practical performances that measure similar skills and attainment of the competency. Multiple performances may also be used to replace individual performances where appropriate.

SAFETY ADVISORY

Be advised that references to the WorkSafeBC safety regulations contained within these materials do not/may not reflect the most recent Occupational Health and Safety Regulation (the current Standards and Regulation in BC can be obtained on the following website: http://www.worksafebc.com. Please note that it is always the responsibility of any person using these materials to inform him/herself about the Occupational Health and Safety Regulation pertaining to his/her work.

ACKNOWLEDGEMENTS

This Program Outline was prepared with advice and direction from the Security Systems Technician Review Committee with funding support from SkilledTradesBC.

SkilledTradesBC would like to acknowledge the dedication and hard work of the industry representatives appointed to identify the training requirements of the Security System Technician trade.

Gabriel Ana
Jeff Lewis
Mike Jagger
Peter Moore
Tim Neil
Stu Armour
John Jacinto
Trevor Johnstone
Wess Lambright
Michael Zecchel

SECTION 1

OCCUPATION ANALYSIS CHART

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Security Systems Technician
Occupation Analysis Chart

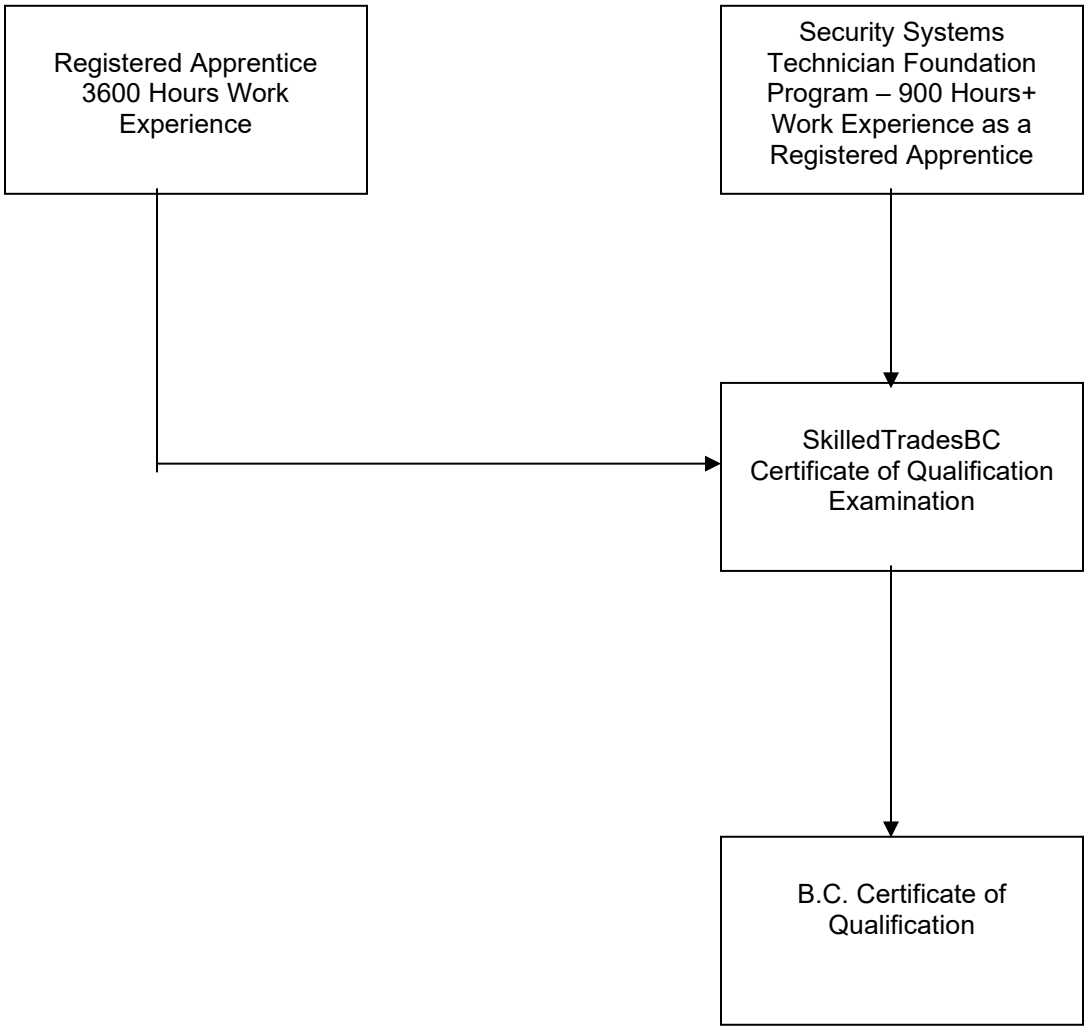
Use Safe Work Practices A	Interpret WorkSafeBC Regulations A1	Demonstrate WorkSafeBC Work Practices A2	Work Safely with Electricity A3	Use Fire Safety Procedures A4	Use Workplace Hazardous Materials Information System (WHMIS) A5	
Use Standard Work Practices and Procedures B	Use Hand Tools B1	Use Power Tools B2	Use Test Instruments B3	Use Fasteners, Sealants and Surface Fillers B4	Read And Interpret Blueprints, Specifications and Vendor Manuals B5	Communicate Effectively with Customers, Regulatory Agencies and Co-workers B6
Apply Codes and Regulations C	Explain Requirements of Security Services Act (SSA) C1	Explain SkilledTradesBC Requirements for Certificate of Qualification C2	Comply with Municipal False Alarm Bylaws C3	Comply with Electrical Code Requirements C4	Comply with Provincial Regulations C5	Comply with Underwriters Laboratories of Canada Standards C6
Use Work Practices for Security System Installations D	Identify Elements of Building Construction Design D1	Apply Electrical Principles to Circuits with Electrical/Electronic and Digital Devices D2	Use Approved Wiring Methods to Install Cable, System Devices and Control Panels D3	Use Computer for Programming, Networking and Documentation Tasks D4	Apply Security System Troubleshooting Strategies D5	
Select Security System Devices E	Select Intrusion Alarm System Devices E1	Select Access Control System Devices E2	Select Closed Circuit Television (CCTV) System Devices E3	Select Monitoring System Devices E4	Select Intercom System Devices E5	
Install Security Systems F	Design Security Systems F1	Use Planning and Organizing Strategies F2	Install Intrusion Alarm Systems F3	Install Access Control Systems F4	Install Closed Circuit Television (CCTV) Systems F5	Install Intercom Systems F6

SECTION 2

SECURITY SYSTEMS TECHNICIAN

PROGRAM OUTLINE

SECURITY SYSTEMS TECHNICIAN
INDUSTRY TRAINING MODEL



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Persons completing a formal apprenticeship also receive a ***Certificate of Apprenticeship***

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SUGGESTED SCHEDULE OF TIME ALLOTMENT FOR SECURITY SYSTEMS TECHNICIAN

Level One		Theory %	Practical %
Line A	**Use Safe Work Practices**	**4**	
A-1	Interpret WorkSafeBC Regulations	34	
A-2	Demonstrate WorkSafeBC Work Practices	22	
A-3	Work Safely with Electricity	22	
A-4	Use Fire Safety Procedures	11	
A-5	Use Workplace Hazardous Materials Information System (WHMIS)	11	
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B-1	Use Hand Tools	15	
B-2	Use Power Tools	15	
B-3	Use Test Instruments	10	
B-4	Use Fasteners, Sealants and Surface Fillers	20	
B-5	Read And Interpret Blueprints, Specifications, and Vendor Manuals	30	
B-6	Communicate Effectively With Customers, Regulatory Agencies And Co-Workers	10	
Line C	**Apply Codes and Regulations**	**11**	
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C-2	Explain SkilledTradesBC Requirements For Certificate Of Qualification	10	
C-3	Comply with Municipal False Alarm Bylaws	10	
C-4	Comply with Electrical Code Requirements	30	
C-5	Comply with Provincial Regulations	20	
C-6	Comply with Underwriters Laboratories of Canada (ULC) Standards	10	
Line D	**Use Work Practices for Security System Installations**	**28**	40
D-1	Identify Elements of Building Construction Design	12	
D-2	Apply Electrical Principles to Circuits with Electrical/Electronic and Digital Devices	60	
D-3	Use Approved Wiring Methods to Install Cable, System Devices and Control Panels	15	✓
D-4	Use Computers for Programming, Networking and Documentation Tasks	11	✓
D-5	Apply Security System Troubleshooting Strategies	2	
Line E	**Select Security System Devices**	**21**	
E-1	Select Intrusion Alarm System Devices	25	
E-2	Select Access Control System Devices	25	
E-3	Select Closed Circuit Television (CCTV) System Devices	25	
E-4	Select Monitoring System Devices	8	
E-5	Select Intercom System Devices	17	

Line F	**Install Security Systems**	**29**	**60**
F-1	Design Security Systems	10	✓
F-2	Use Planning and Organizing Strategies	5	
F-3	Install Intrusion Alarm Systems	25	✓
F-4	Install Access Control Systems	25	✓
F-5	Install Closed Circuit Television (CCTV) Systems	25	✓
F-6	Install Intercom Systems	10	✓

PROGRAM OUTLINE

LINE A: USE SAFE WORK PRACTICES

Competency: **A-1** **Interpret WorkSafeBC Regulations**

Learning Objectives:

1 The learner will be able to describe the application of the Occupational Health and Safety Regulations and know how to find requirements applicable to the Security System Technician trade.

LEARNING TASKS	CONTENT
1 Define terms used in the Occupational Health and Safety Regulations.	• Occupational Health and Safety Regulations • Workplace Hazardous Materials Information System (WHMIS)
2 Describe the Occupational Health and Safety Regulations.	• Accident reporting • Housekeeping • Material storage • Ladders/scaffolding • Fall arrest • WHMIS • Personal protective equipment (PPE) • Lockout/tagout procedures • Ventilation requirements

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LINE A: USE SAFE WORK PRACTICES

Competency: **A-2 Demonstrate WorkSafeBC Work Practices**

Learning Objectives:

1 The learner will be able to use personal protective equipment and explain proper maintenance and storage techniques.

2 The learner will be able to recognize the ergonomic risks in the workplace and identify applicable preventive measures.

	LEARNING TASKS	CONTENT
1	Use personal protective equipment (PPE).	• Eye protection/Face shield • Eye-wash stations • Hearing protection, regular hearing tests • Hand protection • Head protection • Foot protection • Clothing (safety vest, coveralls) • Fall arrest
2	Explain the proper maintenance and storage of PPE.	• Respirators • Eye protection/face shield • Eye-wash stations • Hearing protection • Head protection • Clothing (safety vest, coveralls) • Fall arrest
3	Identify lifting risks and considerations.	• Lifting techniques • Limitations • PPE
4	Demonstrate safe lifting techniques.	• Hands • Arms • Back
5	Identify the risks of repetitive motion.	• Repetitive motion – Hand – Arm – Back

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LINE A: USE SAFE WORK PRACTICES

Competency: **A-3** **Work Safely with Electricity**

Learning Objectives:

1. The learner will be able to explain electrical safety regulations as they apply to the security system installations.
2. The learner will be able to apply work practices to reduce risk of electrical injury.
3. The learner will be able to describe an electrical lockout.

LEARNING TASKS	CONTENT
1 Describe electrical safety practices.	• WorkSafeBC provisions for electrical safety • Voltage limitations
2 Describe electrical shock.	• Effect of electricity on the human body • Ways to reduce the risk of electrical injury

3 Describe a lockout procedure.	• De-energize circuit
	• Lockout circuit
	• Lockout methods:
	  – Locks
	  – Tags
	  – Cables
	  – Key-box system
	• Verify circuit de-energized

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LINE A: USE SAFE WORK PRACTICES

Competency: **A-4 Use Fire Safety Procedures**

Learning Objectives:

1 The learner will be able to prevent and identify various classes of fires.
2 The learner will be able to select appropriate fire extinguishers for the class of fire and environmental condition.

LEARNING TASKS	CONTENT
1 Describe the conditions necessary to support a fire.	• Oxygen • Fuel • Heat
2 Identify various types of fires.	• Type A • Type B • Type C • Type D
3 Explain principles of fire fighting.	• Fire triangle • Flammable liquids • Loose material • Gas • Company specific firefighting procedures
4 Describe the proper use of fire extinguishers.	• Handling and usage • Pull, aim, squeeze, sweep (PASS) • Storage • Inspection (signed, dated, sealed) • Identification (colour, shape, lettering)
5 Describe the considerations and steps to be taken prior to fighting a fire.	• Warning others and notifying fire department • Evacuation of others • Fire contained and not spreading • Personal method of egress • Training

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LINE A: USE SAFE WORK PRACTICES

Competency: **A-5 Use Workplace Hazardous Materials Information System (WHMIS)**

Learning Objectives:

1 The learner will be able to interpret Material Safety Data Sheets (MSDS)
2 The learner will be able to apply knowledge of WHMIS regulations to maintain a safe working environment.

LEARNING TASKS	CONTENT
1 State the purpose of WHMIS.	• Protection of workers from adverse effects of hazardous materials through provision of relevant information while minimizing economic impact on industry and disruption of trade • Recognition of rights – Workers – Employers – Suppliers – Regulators
2 Describe the key elements of WHMIS.	• MSDS labelling of containers of hazardous materials • Worker education programs
3 Describe the responsibilities of suppliers under WHMIS.	• Provide: – MSDSs – Labels
4 Describe the responsibilities of employers under WHMIS.	• Provide: – MSDSs – Labels • Ensure employee training
5 Describe information to be disclosed on a MSDS.	• Hazardous ingredients • Preparation information • Product information • Physical data • Fire or explosion • Reactivity data • Toxicological properties • Preventive measures • First-aid measures
6 Identify symbols found on WHMIS labels and their meaning.	• Compressed gases • Flammable and combustible materials • Oxidizing materials • Poisonous and infectious materials • Materials causing immediate and serious toxic effects – Materials causing other toxic effects – Bio-hazardous infectious materials – Corrosive materials

- Dangerously reactive materials

LINE B: USE STANDARD WORK PRACTICES AND PROCEDURES

Competency: B-1 Use Hand Tools

Learning Objectives:

1 The learner will select and safely use hand tools and soldering/de-soldering equipment for various work applications.

2 The learner will maintain hand tools and soldering/de-soldering equipment in good working order.

LEARNING TASKS	CONTENT
1 Select and safely use hand tools.	• Measuring and layout tools • Fastener tools • Cutting tools • Hammering tools • Pliers and strippers for wire and cable • EMT benders • Punches and Alignment tools • Wire and cable pulling tools • Soldering tools • Termination tools
2 Maintain hand tools.	• Correct use and handling • Clean and lubricate hand tools • Inspect tools for wear, damage and defects • Store and secure hand tools

LINE B: APPLY STANDARD WORK PRACTICES AND PROCEDURES

Competency: **B-2 Use Power Tools**

Learning Objectives:

1 The learner will select and safely use power tools for various work applications.
2 The learner will maintain power tools in good working order.

LEARNING TASKS	CONTENT
1 Select and safely use power tools.	• Drilling tools • Cutting tools • Screw/nut drivers • Powder actuated tools • Power cords
2 Maintain power tools.	• Correct use and handling • Clean and lubricate power tools • Inspect tools for wear, damage and defects • Store and secure power tools

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LINE B: APPLY STANDARD WORK PRACTICES AND PROCEDURES

Competency: **B-3 Use Test Instruments**

Learning Objectives:

1 The learner will select and safely use test instruments for various work applications.
2 The learner will maintain test instruments in good working order.

LEARNING TASKS	CONTENT
1 Select and safely use test instruments.	• Types and applications of instruments and testers • Selecting best technical instrument and tester for a required task • Reading results from instruments and testers • Calibrate instruments and testers as required
2 Perform tests and measurements for system installations and troubleshooting.	• Basic power measurements in AC and DC circuits • Measure voltage, frequency, resistance, current and continuity • Testing phone lines • LAN testing
3 Maintain test instruments.	• Correct use and handling • Clean test instruments • Inspect test instruments for wear, damage and defects • Store and secure test instruments

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LINE B: APPLY STANDARD WORK PRACTICES AND PROCEDURES

Competency: **B-4 Use Fasteners, Sealants and Surface Fillers**

Learning Objectives:

1 The learner will be able to use assorted fasteners and locking devices for security system installations.
2 The learner will be able to use sealants and surface fillers.
4 The learner will be able to identify the proper chemical fastening compound for work applications.

	LEARNING TASKS	CONTENT
1	Use threaded fasteners.	• Bolts • Screws • Studs • Ready rod
2	Use cable fasteners.	• Staples • Straps • Velcro • Cable hangers
3	Use anchors.	• Dry wall anchors • Concrete
4	Use sealants.	• Silicone • Epoxy • Super glue • Hot glue
5	Use miscellaneous fasteners and surface fillers.	• Double sided tape • Nails • Drywall filler • Wood fillers • Concrete patch • Fire stop

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LINE B: APPLY STANDARD WORK PRACTICES AND PROCEDURES

Competency: **B-5 Read and Interpret Blueprints, Specifications, and Vendor Manuals**

Learning Objectives:

1 The learner will be able to interpret drawings and specifications.
2 The learner will be able to interpret technical information contained in service and operating manuals, technical bulletins and warranties.
3 The learner will be able to construct as-built drawings and sketches to facilitate security system installation.

LEARNING TASKS	CONTENT
1 Interpret drawings and specifications.	• Drawing types – Electrical – Mechanical – Assembly – Structural – Civil • Drawing symbols, lines and terminology • Circuit drawings: – Schematic – Wiring – Single line • Block diagrams • Converting between schematic and wiring diagrams – Diagram layouts – Wiring numbering system • Security system installation requirements • Specifications, standards and codes
2 Interpret service and operating manuals, technical bulletins and warranties.	• Types of service and operating manuals, technical bulletins and warranties • Accessing and interpreting service and operating manuals, technical bulletins and warranties
3 Create installation sketches.	• Floor plan layout • Mark-up blueprint for as-built drawing • Wiring schematic

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LINE B: APPLY STANDARD WORK PRACTICES AND PROCEDURES

Competency: **B-6** **Communicate Effectively with Customers, Regulatory Agencies and Co-workers**

Learning Objectives:

1 The learner will be able to apply effective oral communication skills.
2 The learner will be able to apply effective written communication skills.

LEARNING TASKS	CONTENT
1 Use correct trade terminology.	• Taking instructions • Giving instructions • Ordering components and parts • Explaining security system concepts
2 Maintain records specific to workplace requirements.	• Sales documents – Contracts – Estimates – Proposals – Commission reports • Technical documents – Schematics – Wiring diagrams – Cable lists • Administrative documents – Work orders – Time sheets – Maintenance records – Inventory control • End user documents – Instruction manuals – Activity reports – Insurance reports – Inventory control
3 Establish and maintain effective communication	• Supervisors • Co-workers • Other tradespersons • Customers • Suppliers • Manufacturers • Regulatory officials
4 Train customers on the use of alarm and security systems.	• System operation • User features • Demonstrating system software • General system maintenance

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LINE C: APPLY CODES AND REGULATIONS

Competency: **C-1 Explain Requirements of Security Services Act (SSA)**

Learning Objectives:

1 The learner will be able to identify regulatory requirements of the SSA for security system installations and security system personnel.
2 The learner will comply with Security Programs and Police Technology Division (SPPTD) licensing regulations for security workers.

LEARNING TASKS	CONTENT
1 Describe the SSA.	• Purpose and scope • Describe SPPTD licensing – SSA – Security Programs Division – Security Business Licence – Security Worker Licence – Security Worker Licence application form • Definition of security services that require a licence • Training and proof of qualification • Code of Conduct
2 Describe online services for businesses and security system workers at SSA website.	• Applying for a new licence • Renewing a licence • Updating a licence • Uploading the supporting documentation for applications • Checking the status of submitted applications • Employer payment for employee applications online • License verification

LINE C: APPLY CODES AND REGULATIONS

Competency: **C-2** **Explain SkilledTradesBC Requirements for Certificate of Qualification**

Learning Objectives:

1 The learner will be able to explain SkilledTradesBC requirements for Certificate of Qualification.

LEARNING TASKS	CONTENT
1 Explain certification pathways.	• Registered apprentice • Challenge program • Accredited program plus work experience as registered apprentice •
2 Explain certification examination.	• Applying to write examination • Examination subjects • Length of examination • Eligibility requirements • Passing criteria • Rewrites •

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LINE C: APPLY CODES AND REGULATIONS

Competency: **C-3 Comply with Municipal False Alarm Bylaws**

Learning Objectives:

1 The learner will be able to describe compliance requirements for municipal false alarm bylaw provisions generally applied in British Columbia.

LEARNING TASKS	CONTENT
1 Explain false alarm implications.	• False alarm causes – User error – Environmental changes – Equipment failures – Changes in occupancy – Changes in use • Consequences and dangers of false alarms • Methods for preventing false alarms • Common causes of false alarms • Liability of security alarm company
2 Describe alarm permit fees & false alarm fines in British Columbia.	• Permits • Bylaws • User fees • Fines

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LINE C: APPLY CODES AND REGULATIONS

Competency: **C-4 Comply with Electrical Code Requirements**

Learning Objectives:

1 The learner will be able to apply the Canadian Electrical Code (CEC) for security system installations.

LEARNING TASKS	CONTENT
1 Interpret the CEC.	• Purposes and administration of the CEC – Purposes of the CEC – Bulletins – Amendments – Circulars • Layout of the CEC – Numbering of rules – Tables – Notes on rules • Interpreting code sections applicable to security system installations: – Definitions given in code – General rules – Rules on conductors – Rules for circuit loading – Rules for grounding and bonding – Rules for general wiring methods – Rules for installation of electrical equipment – Rules for Class 1 and Class 2 circuits – Rules for electrical communications systems • Using tables applicable to security alarms – Types of conductors – Allowable ampacities for conductors – Correction factors

LINE C: APPLY CODES AND REGULATIONS

Competency: **C-5 Comply with Provincial Regulations**

Learning Objectives:

1 The learner will be able to determine Fire Code, Building Code and Electrical Safety Act compliance requirements for security system installations.

	LEARNING TASKS	CONTENT
1	Explain Fire Code requirements.	• Installation of wire, cable and raceways in building structures • Location and mounting of system components and devices in building structures • Fire alarm release • Building ingress and egress • Fire stops • Fire rating regulations
2	Explain Building Code requirements.	• Installation of wire, cable and raceways in building structures • Location and mounting of system components and devices in building structures • Flame spread rating for cables
3	Explain Electrical Safety Act requirement.	• Requirements for permits and inspections • Duties of Field Service Representative (FSR)

LINE C: APPLY CODES AND REGULATIONS

Competency: **C-6 Comply with Underwriters Laboratories of Canada (ULC) Standards**

Learning Objectives:

1 The learner will be able to describe compliance requirements for ULC Standards.

	LEARNING TASKS	CONTENT
1	Explain purpose of ULC.	• Standards for installation • Standards for manufacturing • Standards for protection • Listing services • Testing facilities • Certification services
2	Interpret ULC standards for installation of alarms.	• ULC-S302 Standard for Installation and Classification of Burglar Alarm Systems for Financial and Commercial Premises, Safes and Vaults • ULC-S310 Standard for Installation and Classification of Residential Burglar Alarm Systems

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LINE D: USE WORK PRACTICES FOR SECURITY SYSTEM INSTALLATIONS

Competency: **D-1 Identify Elements of Building Construction Design**

Learning Objectives:

1 The learner will be able to relate building code and construction design features to security system installation methods.

	LEARNING TASKS	CONTENT
1	Describe building construction elements.	• Conventional framing – Platform framing – Plank-and-beam framing • Roof construction • Wall coverings – Lath and plaster – Drywall
2	Describe typical wood frame members.	• Joist • Column • Beam • Bridging, blocking & strapping • Trimmer • Tail joist • Header • Floor sheathing or subfloor
3	Describe wall and partition members.	• Plates • Studs • Trimmers • Lintels
4	Describe other framing members.	• Fire stops • Backing • Security blocking
5	Describe roof members.	• Rafters • Roof joists • Roof trusses • Ridge boards
6	Describe typical steel-and-concrete construction.	• Construction of outer structure • Metal framing methods • Dropped ceilings • Concrete structures

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LINE D: USE WORK PRACTICES FOR SECURITY SYSTEM INSTALLATIONS

Competency: **D-2** **Apply Electrical Principles to Circuits with Electrical/Electronic and Digital Devices**

Learning Objectives:

1 The learner will be able to explain electrical theory.
2 The learner will be able to solve simple circuit problems.
3 The learner will be able to connect common electrical and electronic components.
4 The learner will be able to troubleshoot common electrical faults.

LEARNING TASKS	CONTENT
1 Explain basic electrical theory.	• Voltage • Current • Resistance • Power • Ohm's Law • Watt's Law
2 Solve simple circuit problems.	• Apply Ohm's Law • Apply Watt's Law • Solve series circuits problems • Solve parallel circuits • Solve combination circuits
3 Connect circuit components.	• Resistors • Switches • Fuses • Capacitors • Diodes • Relays • Timers • Transformers
4 Service power supplies and batteries.	• AC and DC power sources • Service rechargeable batteries

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LINE D: USE WORK PRACTICES FOR SECURITY SYSTEM INSTALLATIONS

Competency: **D-3** **Use Approved Wiring Methods to Install Cable, System Devices and Control Panels**

Learning Objectives:

1 The learner will be able to select and install cables for security systems.
2 The learner will be able to plan and organize a typical wiring installation.
3 The learner will be able to install raceways and conduit.
4 The learner will be able to install system devices and control panels.

LEARNING TASKS	CONTENT
1 Select cables.	• Distinguishing: – Cable – Conductor – Wire • Features of solid and stranded conductors • Twisted pair cable construction • Cable sheath construction, application and voltages • Sizing conductors with reference to: – conductor resistance – conductor ampacity
2 Plan and organize cable installation.	• Reviewing layout of room or building • Determining location of control panel and system devices • Determining locations for cable runs • Identifying hazards when running cables • Documenting cable runs
3 Install raceways, conduit for cable.	• Drilling and cutting techniques for creating cable route in building • Conduit size, layout and required conduit fittings and junction boxes • Fabricating conduit bends: – Angles – Offsets – Saddles • Installing cable pathways and fastening conduit system
4 Pull cables.	• Setting up cable for cable pull • Fishing tools – Fish tape – Pull strings – Glow rods • Labelling cables • Pulling and securing cable • Verifying cable continuity

5	Install security system devices and control panels.	• Fasteners and anchors for mounting devices and control panels • Mounting locations and heights • Stripping cable and preparing for terminations • Applying cable terminating techniques •
6	Install low voltage transformer.	• Scope of work limitations for Security Technicians • Identifying branch circuits on a typical residential service panel • Identifying overcurrent devices • Identifying conditions causing circuit interruption • Installing low-voltage transformers • Installing cable • Connecting pigtails • Installing receptacles and switches • Junction boxes: – 1110 – Octagon – Extension – Ez-box • Installing system bonding • Fasteners for building wiring

Achievement Criteria:

1	Performance Criteria	The learner will install conduit, junction box and cable in a small installation. The learner will score 70% or better on a rating sheet that reflects the following criteria: • Safety • Accuracy of installed components • Task completed within time allowance • Bends free of flaws • Code compliance
2	Performance Criteria	The learner will install a small branch circuit and install a transformer. The learner will score 70% or better on a rating sheet that reflects the following criteria: • Safety • Accuracy of installed components • Task completed within time allowance • Cable installed free of flaws and damage • Neatness of installation • Code compliance

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LINE D: USE WORK PRACTICES FOR SECURITY SYSTEM INSTALLATIONS

Competency: **D-4 Use Computers for Programming, Networking and Documentation Tasks**

Learning Objectives:

1 The learner will be able to use computers to perform security system work tasks.

LEARNING TASKS	CONTENT
1 Use computers for security system applications.	• Computer technology and its applications in the security trade • Using operating systems • Configuring ports for communications between computer and devices • Loading software and use proper file management techniques • Interpreting instruction manuals • Applications for recording and reporting • Industry specific technical software – DLS – Compass • User management – logons • Power management settings for computer • Backing up data
2 Apply networking principles.	• Network topography • Network protocols – TCP/IP – Addressing – Sub-net mask – Gateways • Setting up a basic network • Using network components such as: – Hubs – Switches – Routers – Modems.
3 Terminate and test network cables.	• Network cable standards • Stripping cable • Terminating cable • Testing cable • Interpreting test results

Achievement Criteria:

1	Performance	The learner will terminate and test a network cable.
	Conditions	The learner will be given: • Cable • Termination tools LAN tester
	Criteria	The learner will score 70% or better on a rating sheet that reflects the following criteria: • Safety • Termination to Canadian wiring standards • Termination free from faults • Test completed within time allowance •
2	Performance	The learner will network two computers.
	Conditions	The learner will be given: • Network cable • Two computers • Worksheet of instructions
	Criteria	The learner will score 70% or better on a rating sheet that reflects the following criteria: • The two networked computers are able to communicate • Test completed within time allowance

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LINE D: USE WORK PRACTICES FOR SECURITY SYSTEM INSTALLATIONS

Competency: **D-5 Apply Security System Troubleshooting Strategies**

Learning Objectives:

1 Apply systematic troubleshooting strategies to solve security system problems.

LEARNING TASKS	CONTENT
1 Identify prerequisites for troubleshooting.	• Background knowledge of the site and equipment • Good installation procedures • System maintenance • Accurate documentation
2 Describe maintenance procedures.	• Regular service intervals • Preventing troubles from developing • Typical maintenance procedures • ULC requirements for testing and maintenance
3 Apply standard steps to problem-solving.	• Right attitude and approach to troubleshooting: – Care – Attention to detail – Patience – Keeping track of steps taken • Assembling facts and symptoms – talk to client • Assessing possible causes • Testing and measuring procedures to check possible causes • Selecting best solution and implement corrective action • Continuing troubleshooting process until system operation restored • Documenting steps taken and resolution of problem
4 Apply typical troubleshooting techniques.	• Interpreting reports and event logs to aid troubleshooting • Loop resistances • Aux power current readings • Ground fault testing • Isolation & substitution
5 Use troubleshooting tools.	• Multimeter • Telephone handset • Inductive pickup & toner • LAN tester • Handheld CCTV monitor • Digital camera

6	Identify common fault conditions and failures on security systems.	• User error • Power outage • Batteries • Blown fuses • Faulty devices • Loop faults – grounds, opens, shorts • Programming errors • Induction based faults • False alarms

SKILLED TRADES BC

LINE E: SELECT SECURITY SYSTEM DEVICES

Competency: **E-1** **Select Intrusion Alarm System Devices**

Learning Objectives:

1 The learner will be able to select devices for an intrusion alarm system installation.

LEARNING TASKS	CONTENT
1 Describe operation of intrusion alarm system devices.	• Keypads: – LCD – LED – Touch screen • Detectors: – PIRs – Glass Break – Smoke – Photo-electric – Shock – Heat – Carbon monoxide – Water • Alarm outputs: – Sirens – Strobes • Door/window contacts • Transformers and Power Supply • Battery system • Telephone jack • Hold-up buttons • Asset protection device
2 Describe control panels for intrusion alarm systems.	• Basic functions of control panel • Applications: – Commercial – Residential – ULC – Zone capability – Partitions – Loop supervision • Zone expander • Relay outputs • Wireless expander • Communication modules • Download adaptor • Miscellaneous modules: printer, power line carrier

SKILLED TRADES BC

LINE E: SELECT SECURITY SYSTEM DEVICES

Competency: **E-2 Select Access Control System Devices**

Learning Objectives:

1 The learner will be able to select access control system devices.

LEARNING TASKS	CONTENT
1 Describe operation of access control system devices.	• Readers: – Proximity – Magnetic strip – Biometric – PIN pad – Wiegand – Infrared • Request to exit devices: – PIRs – Push buttons – Crash bars – Sense bars • Locking hardware: – Maglocks – Door strikes – Electric lock sets • Outputs: – Sirens – Strobes • Inputs: – door contacts • Transformer and power supply • Battery system • Fire Alarm Release (FARs), Manual Override Release (MOR) • Telephone jack
2 Describe control panels for access control systems.	• Basic functions of control panel • Applications: – Commercial – Residential – ULC – zone capability – Loop supervision • Access point features • Modules: – Elevator – Relay – Network – Communication • Credentials: – Cards – Fobs – Remotes • Time schedules

- Miscellaneous functions:
  - Guard tour
  - Time and attendance
  - Photo badge
  - Printers
  - Camera

SKILLED TRADES BC

LINE E: SELECT SECURITY SYSTEM DEVICES

Competency: **E-3** **Select Closed Circuit Television (CCTV) System Devices**

Learning Objectives:

1 The learner will be able to select devices for a CCTV installation.

LEARNING TASKS	CONTENT

1 Describe operation of CCTV system devices.	• Camera types:
	  – Dome
	  – Bullet
	  – Box
	  – Covert
	  – Day/Night
	  – IP cameras
	  – Wide Dynamic
	  – Mega Pixel
	• Camera features:
	  – Resolution
	  – Lux levels
	• Guidelines for camera location/lighting conditions
	• Camera housing
	  – Mounts
	  – Heaters and fans
	• Lens types:
	  – Fixed
	  – Vari-focal
	  – Auto Iris
	  – Electronic Iris
	• Focal lengths:
	  – Fisheye
	  – Wide angle
	  – Telephoto
	• Pan Tilt Zoom (PTZ)
	• Transformer/power supply
	• IR illuminator
	• Balun

2 Describe system control devices.	• Recording devices (embedded and non-embedded):
	  – DVR
	  – NVR
	• Recording device features:
	  – Frame rate
	  – Motion detection
	  – Alarm inputs/outputs
	  – Analytics
	  – Schedules
	  – Video output
	  – Exporting video
	• Uninterrupted Power Supplies (UPSs)
	• Modules and expanders
	• Switches

- Multiplexer

LINE E: Select security system devices

Competency: **E-4** **Select Monitoring System Devices**

Learning Objectives:

1 The learner will be able to select devices for monitoring systems.

	LEARNING TASKS	CONTENT
1	Describe monitoring system devices.	• GSM Cellular • Radio • Internet • Dialler
2	Describe communication protocols.	• Contact ID • SIA • 4/2 • Paging
3	Describe fire alarm system monitoring.	• Municipal/Provincial requirements • ULC requirements • Dual mode monitoring • Connection to fire panel • Testing requirements

LINE E: SELECT SECURITY SYSTEM DEVICES

Competency: **E-5 Select Intercom System Devices**

Learning Objectives:

1 The learner will be able to select devices for an intercom system installation.

LEARNING TASKS	CONTENT
1 Describe operation of intercom system devices.	• Request to exit device: – Motion – Button – Crash bar – Sense bar • Intercom station • Locking hardware: – Maglocks – Door strikes – Electric lock sets • Transformer • Telephone jack • Postal switch • Auxiliary devices: – Door releases – Door bells • Video systems • Fire alarm release
2 Describe master station operation.	• Basic functions of master station • Device compatibility • Modules: no phone bill interface • Station numbers • Station features: – Access control – User programming – Remote access

SKILLED TRADES BC

LINE F: INSTALL SECURITY SYSTEMS

Competency: **F-1** **Design Security Systems**

Learning Objectives:

1 The Learner will be able to design a security system.

	LEARNING TASKS	CONTENT
1	Describe elements of a security system.	• Security system features • Different security systems • Purposes of a security system – deterrence – prevention – detection – response – apprehension/conviction • Layers of protection (onion skin principle) – perimeter – space – spot – personal
2	Describe security systems.	• Intrusion • Access control • CCTV • Monitoring • Intercom • System Integration •
3	Describe the effects of false alarms.	• Define false alarm • Causes for false alarms • Common solutions to false alarm problems • Strategies to deal with false alarms
4	Conduct site survey.	• Assessing risk • Interviewing customer • Determining extent of protection required • Assessing building construction, systems, and equipment for factors impacting security system installation • Determining security system options: – Intrusion – Access control – CCTV – Monitoring • Complying with Regulations and Standards: – ULC – Electrical Code – Building Code – Fire Code • Creating a site sketch for installation
5	Prepare installation proposal.	• Confirming budget for system

- Determining appropriate equipment and materials for system
- Calculating equipment costs
- Calculating labour times
- Calculating retail price of system

Achievement Criteria:

1	Performance	The learner will perform a site survey and design an installation.
	Conditions	The learner will be given: • Access to a building • Worksheet instructions and proposal information
	Criteria	The learner will score 70% or better on a rating sheet that reflects the following criteria: • Safety • Site survey has all required elements • Survey elements are complete and accurate • Proposal reflects a plausible installation • Cost estimates valid • Professional presentation

SKILLED TRADES BC

LINE F: INSTALL SECURITY SYSTEMS

Competency: **F-2** **Use Planning and Organizing Strategies**

Learning Objectives:

1 The Learner will be able to use planning and organizing strategies for a security system installation.

	LEARNING TASKS	CONTENT
1	Identify project requirements.	• Assessing project needs to determine material, tools and equipment and personnel requirements • Determining product availability, suppliers and pricing • Estimating time to complete tasks • Obtaining permits
2	Organize materials and tools.	• Selecting and using required materials, tools and equipment • Calculating quantities of materials from drawings and bill of materials • Organizing ordering and delivery of materials
3	Schedule and monitor project.	• Work flow, procedures and practices • Scheduling work with other trades and personnel as required • Monitoring activities and modify or adapt work schedule as required • Monitoring costs/labour throughout project
4	Maintain project documentation.	• Floor plan layout • Mark-up blueprint for as-built drawing • Wiring schematic

SKILLED TRADES BC

LINE F: INSTALL SECURITY SYSTEMS

Competency: **F-3** **Install Intrusion Alarm Systems**

Learning Objectives:

1 The Learner will be able to install an intrusion alarm system.

	LEARNING TASKS	CONTENT
1	Install system cables for devices.	• Cable pathways and access • Cable fishing techniques • Cable types • Wire labels • Mark control panel location
2	Install system devices.	• Keypad(s) • Detectors • Sirens, strobes • Door/window contacts • Transformer • Telephone jack • Terminate system devices
3	Install control panel.	• Mounting control panel • Determining zone groupings • Terminating cables • Installing power supplies and batteries • Installing modules and expanders • Powering up control panel
4	Program control panel.	• Completing programming worksheets • Establishing communication to control panel • Entering program data • Enrolling modules and expanders • Verifying data
5	Commission system.	• Walk testing detectors • Testing all door and window contacts • Testing all auxiliary devices • Verifying signal transmission • Testing strobe and siren • Completing monitoring information form • Providing system orientation for customer

6	Document installation.	• Making wiring list • Completing programming worksheet • Filling in keypad zone directories • Completing monitoring station form • Project pictures • Completing work orders – Total hours – Equipment used • Floor plan • Equipment manuals

Achievement Criteria:

1	Performance	The learner will complete a small intrusion alarm installation.
	Conditions	The learner will be given: • Installation instructions and guidelines • All necessary devices and materials • Lab computer, Lab monitoring station • Programming worksheets • Related software • Student hand tools
	Criteria	The learner will score 70% or better on a rating sheet that reflects the following criteria: • Safety • Completeness and accuracy of documentation • Neatness of installation • System function without faults • Ability to explain system operation • Ability to explain programming options

SKILLED TRADES BC

LINE F: INSTALL SECURITY SYSTEMS

Competency: **F-4 Install Access Control Systems**

Learning Objectives:

1 The Learner will be able to install an access control system.

LEARNING TASKS	CONTENT
1 Install system cables for devices.	• Cable pathways and access • Cable fishing techniques • Cable types • Wire labels • Marking control panel location
2 Install system devices.	• Keypad/Readers • Request to exit device • Locking hardware • Sirens, strobes • Door contacts • Transformer • Telephone jack • Terminating system devices
3 Install control panel.	• Mounting control panel • Terminating cables • Power supplies and batteries • Modules and expanders • Fire alarm release • Powering up control panel
4 Install computer and software.	• Database location • Number of client or support servers • Install database • Setting network settings • Installing clients • Verifying communications
5 Program control panel.	• Establishing communication to control panel • Configuring site information • Network settings • Access points • Inputs and outputs • Time schedules • Access credentials • Access levels • Enrolling modules and expanders • Verifying data • Downloading data to controllers

6	Commission system.	• Testing all access points • Testing all auxiliary devices • Verifying signal transmission • Testing strobe and siren • Testing fire alarm release • Providing system orientation for customer
7	Document installation.	• Making wiring list • Completing monitoring station form • Database backup • As-built drawings/documentation • Project pictures • Completing work order: – Total hours – Equipment used • Floor plan • Equipment manuals

Achievement Criteria:

1 Performance — The learner will complete a small access control installation.

Conditions — The learner will be given:

- Installation instructions and guidelines
- All necessary devices and materials
- Lab computer, Lab monitoring station
- Programming worksheets
- Related software
- Student hand tools

Criteria — The learner will score 70% or better on a rating sheet that reflects the following criteria:

- Safety
- Completeness and accuracy of documentation
- Neatness of installation
- System function without faults
- Ability to explain system operation
- Ability to explain programming options

SKILLED TRADES BC

LINE F: INSTALL SECURITY SYSTEMS

Competency: **F-5 Install Closed Circuit Television (CCTV) Systems**

Learning Objectives:

1 The Learner will be able to install a CCTV system.

	LEARNING TASKS	CONTENT
1	Install system cables for devices.	• Cable pathways and access • Cable fishing techniques • Cable types • Wire labels • Marking DVR location • Marking monitor locations
2	Install system devices.	• Cameras • Focus cameras • Pan Tilt Zoom (PTZ) • Transformer/power supply • Terminating system devices • IR illuminator • Balun
3	Install System Control devices.	• Mounting recording devices • Terminating cables • Power supplies and batteries • Modules and expanders • Switches • DVR/NVR/Multiplexer • Powering up control panel
4	Install computer and software.	• Database location • Number of client or support servers • Installing database • Setting network settings • Installing clients • Verifying communications
5	Program video devices.	• Establishing communication to devices • Network settings • Inputs and outputs • Recording settings • Access levels • Verifying data
6	Commission system.	• Testing all cameras • Testing Pan Tilt Zoom (PTZ) • Testing all auxiliary devices • Testing recording function • Testing site connectivity • Providing system orientation for customer
7	Document installation.	• Making wiring list • Database backup

- As-built drawings/documentation
- Project pictures
- Completing work order:
  - Total hours
  - Equipment used
- Floor plan
- Equipment manuals

Achievement Criteria:

1 Performance — The learner will complete a small CCTV installation.

Conditions — The learner will be given:

- Installation instructions and guidelines
- All necessary devices and materials
- Lab computer, Lab monitoring station
- Programming worksheets
- Related software
- Student Hand tools

Criteria — The learner will score 70% or better on a rating sheet that reflects the following criteria:

- Safety
- Completeness and accuracy of documentation
- Neatness of installation
- System function without faults
- Ability to explain system operation
- Ability to explain programming options

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LINE F: INSTALL SECURITY SYSTEMS

Competency: **F-6** **Install Intercom Systems**

Learning Objectives:

1 The learner will be able to install an intercom system.

	LEARNING TASKS	CONTENT
1	Install system cables for devices.	• Cable pathways and access • Cable fishing techniques • Cable types • Wire labels • Marking control panel location
2	Install system devices.	• Request to exit device • Intercom station • Locking hardware • Transformer • Telephone jack • Postal switch • Terminating system devices
3	Install master station.	• Mounting master station • Terminating cables • Power supplies • Modules and expanders • Fire alarm release • Powering up master station
4	Program master station.	• Establishing communication to master station • Configuring site information • Network settings • Inputs and outputs • Access credentials • Verifying data
5	Commission system.	• Testing all stations • Testing all auxiliary devices • Testing fire alarm release • Testing Postal switch • Providing system orientation for customer
6	Document installation.	• Making wiring list • Database backup • As-built drawings/documentation • Project pictures • Completing work order: – Total hours – Equipment used • Floor plan • Equipment manuals

Achievement Criteria:

1 Performance — The learner will complete a small intercom installation.

Conditions — The learner will be given:

- Installation instructions and guidelines
- All necessary devices and materials
- Lab computer, lab monitoring station
- Programming worksheets
- Related software
- Student hand tools

Criteria — The learner will score 70% or better on a rating sheet that reflects the following criteria:

- Safety
- Completeness and accuracy of documentation
- Neatness of installation
- System function without faults
- Ability to explain system operation
- Ability to explain programming options

SECTION 3

FACILITY REQUIREMENTS

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FACILITY REQUIREMENTS

Classroom Areas

- Comfortable seating and tables suitable for learning
- Compliance with the local and national fire code and occupational safety requirements
- Overhead and multimedia projectors with a projection screen
- Whiteboard with marking pens and erasers
- Lighting controls to allow easy visibility of the projection screen while allowing students to take notes
- Windows must have shades or blinds to adjust sunlight
- Heating/Air conditioning for comfort all year round
- In-room temperature control to ensure comfortable room temperature
- Acoustics in the room must allow audibility of the instructor
- Computer lab complete with 16 computers and internet access
- Library complete with reference material for student and instructor use

Shop Areas

- 1000 square foot workshop with ceiling height sufficient to allow safe movement of materials including construction mock-ups
- 400 square foot storage area which includes:
  - Tool crib
  - Lockers
- Adequate lighting and lighting control
- Ventilation as per WorkSafeBC standards
- Refuse and recycling bins for used shop materials
- First-aid facilities

Shop Tools, Equipment and Materials

General lab	• Desks/workbenches
	• Power supplies
	• Circuit breadboards
	• Electrical/electronic components
	  – Resistors
	  – Diodes
	  – Capacitors
	• 12 volt relays
	• General cleanup equipment

Installation tools and equipment	• Soldering equipment • Ladders • Drills • Auger bits • Flexible drill bits • Fishing tools • Power cords • T-25 staple gun and staples

Alarm devices	• Plug-in and wire-in transformers – 16 VAC 20 or 37 VA • Batteries: rechargeable gel type, 12V 4.0 Ah • Control panels: class instruction set by well known manufacturers • Detectors: 5 well known brands of PIRs, 2 well known brands of Dualtechs, 2 well known brands of Break Glass detectors • Strobe lights for alarm output testing • Assortment of 20 & 30 watt sirens, piezo buzzers, and speakers • Sufficient supply of magnetic contacts of assorted types and brands
Electrical Equipment	• 120 volt distribution panel • 15 amp circuit breakers • NMD 90 connectors, staples • Assortment of electrical boxes; pre-wire and surface mount • Receptacles and switches • Wire nuts (Marrettes)
EMT Conduit	• Supply of EMT conduit • EMT benders • EMT fittings, couplings, straps, etc.
Cable	• LVT • Station Z • Coaxial • Cat-5 • NMD 90
Consumables	• Cable fasteners: – Tie wraps – Wall anchors • Self-tapping screws and wood screws • Bell caps or crimp connectors
Test Equipment	• Butt-in phone • Cable toners (inductive pickup) • Dialer testers, (DSC DTS-1 or equivalent to allow students to test digital communicators)

Student Facilities

- Adequate lunch room as per WorkSafeBC requirements
- Adequate washroom facilities as per WorkSafeBC requirements
- Personal storage lockers

Instructor's Office Space

- Desk and filing space
- Computer

TOOLS AND EQUIPMENT

The listing of these tools and equipment implies, on the part of the qualified worker, the ability to select, inspect, maintain, set up and use these devices with proficiency and safety. Security System Technicians commonly use the following tools and equipment:

Hand Tools

Awl
Allen keys
Cable fishing tools
Cable strippers
Centre-point set
Channel-lock pliers
Claw hammer
Cold-chisel set
Conduit benders
Crowbar
Electrician's knife
Electrician's pouch
Files
Flashlight
Fuse pullers
Hacksaw
Hand crimper
Hex drivers
Holding screwdriver
Integrated circuit chip puller
Keyhole saw
Knockout set
Level
Lineman pliers
Mini torch
Needle-nose pliers
Nut drivers
Rubber mallet
Screwdrivers (complete set),
Screw extractors
Side cutter pliers
Socket sets,
Stud finder
Tap and die set
Tape measure
Tin snips
Wire strippers
Wood chisels
Wrenches (adjustable, box and open-end)

Power Tools

Angle grinder
Bench-grinder/buffer
Circular saw
Dremel tool
Drill; and assorted bits
Drill press
Electric screw/nut drivers
Glue gun
Hammer-drill
Heat gun
Hole-saw
Jigsaw
Nibbler
Powder actuated tools
Power cords, GFCI
Reciprocating saw
Specialty vacuum equipment

Soldering/De-soldering Equipment

Butane soldering
Flux removers
Flux
Soldering irons
Soldering guns
Solder suckers
Solder wicks
Ventilation fans

Safety Gear and Personal Protective Equipment

- Anti-static ground straps
- Anti-static mats
- Anti-static sprays
- Equipment dollies/carriers
- Eye wash kit
- Face shield
- Fall- arrest and restraint systems
- Fire extinguishers
- First aid kit
- Gloves (leather, rubber)
- Hard hat
- Hearing protection
- High visibility vest
- Ladder
- Lifting/levelling devices
- Lock-out devices
- Overalls
- Pylons and caution tape
- Respiratory mask
- Safety boots
- Safety Glasses/Goggles

Testing and Measuring Equipment

- Battery tester
- Calculator
- Cable tester
- Camera monitor
- Canned smoke
- Computer
- Digital multimeter
- Glass break tester
- Inductive toner
- LAN testers
- Power supply
- RF power meter
- Telephone handset

SECTION 4

FACULTY CREDENTIAL AND EXPERIENCE REQUIREMENTS

FACULTY CREDENTIAL AND EXPERIENCE REQUIREMENTS

The instructor must possess:

- A BC Certificate of Qualification in the appropriate trade *or*
- Certificate of Qualification from another Canadian jurisdiction *and*
- A minimum of 5 years experience working in the industry as a journeyperson.

It is preferred that the instructor also possesses previous teaching and/or supervisory experience and one of the following education credentials:

- An Instructors Diploma or equivalent
- A Bachelors Degree in Education
- A Masters Degree in Education

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REQUIRED AND RECOMMENDED RESOURCES

REQUIRED TEXTBOOKS, LAB OR SHOP MANUALS, EQUIPMENT, ETC.,

PRINT AND ONLINE RESOURCES

EXPLORING ELECTRICITY: TECHNIQUES AND TROUBLESHOOTING
Michael Merchant, Prentice Hall.

Security Systems Technician Learning Guide & Lab Manual

Canadian Electrical Code
CSA Standards

Equipment Manuals

MANUFACTURERS OF SECURITY DEVICES

WorkSafeBC
Available at:
https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation

Provincial Building and Fire Codes
Available at:
https://www.bccodes.ca/building-code.html
https://www.bccodes.ca/fire-code.html

BC Security Services Act (SSA)
Available at:
http://www.bclaws.ca/eplibraries/bclaws_new/document/id/freeside/00_07030_01

SkilledTradesBC https://www.**SKILLEDTRADESBC**.ca/

GLOSSARY OF VERBS

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GLOSSARY

Adjust:	To bring to a more satisfactory state. To bring the parts of to a true or more effective relative position.
Align:	To bring into alignment.
Analyze:	To examine critically so as to determine appropriate procedures, process, or course of action.
Apply:	To put to use especially for some practical purpose.
Assemble:	To fit together the parts of.
Assess:	To determine the value, significance, or extent of; appraise.
Calculate:	To arrive at a precise numerical answer – often through the use of mathematical formulas.
Construct:	To make or form by combining or arranging parts or elements.
Control	Lesson the intensity of, temper, hold in restraint, hold or keep within limits
Define:	To set forth the meaning of a word or expression.
Demonstrate:	To exhibit, show clearly or perform, to a competency standard, a process or competence.
Describe:	To set forth the properties or characteristics of an object. To give a detailed or graphic account of a process or procedure. (To use correct terminology, sequencing and inter-relationship of the elements is implied where required.)
Determine:	To arrive at, or locate, information by a simple process (e.g. by rule of thumb).
Explain:	To show the logical development or relationships of.
Evaluate:	To determine the significance, worth, or condition of usually by careful appraisal and study.
Identify:	To use the correct terminology to describe objects, both individually and collectively; to state their application or use, and to point out and name them.
Inspect:	To look into, or at carefully. To examine, or observe, critically in order to detect flaws, errors, etc.
Install:	To set up for use or service.
Interpret	To make sense of. To give meaning to.
List:	To give in point form, several items of information; no sequence or inter-relationship is implied.

Locate:	To seek out and determine the location of.
Maintain:	To keep in good condition. To keep functional, and in good repair.
Obtain:	To gain or attain usually by planned action or effort.
Operate:	To perform a function: exert power or influence.
Overhaul:	To check thoroughly for needed service, and to make the repairs, replacements, adjustments, etc., necessary to restore to good working order.
Perform:	To carry out. To do in a formal manner or according to prescribed ritual.
Read:	To look at carefully so as to understand the meaning of. To attribute meaning to: Interpret.
Rebuild:	To restore to an original state.
Remove:	To move by lifting, pushing aside, or taking away or off.
Repair:	To put back into good condition after damage or wear. To mend or fix.
Replace:	To put something new in the place of.
Select:	To choose the most appropriate object, process or procedures, given a specific situation; (when used in relation to an object it also implies the ability to identify and describe).
Service:	To remove, maintain, repair, or replace items and/or components.
Set up:	To assemble the parts of and erect in position.
Sketch:	To make a sketch, rough draft, or outline of.
State:	To set out briefly (in the equivalent or a sentence or two) an idea.
Test:	To try something against a criterion or standard.
Troubleshoot:	To investigate a problem. To look at, or into, critically and methodically in order to find out the causes, facts, conditions, etc.
Use:	The act or practice of employing something.