SKILLEDTRADESBC

PROGRAM OUTLINE

Locksmith

SKILLED TRADES BC

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SKILLED TRADES BC

LOCKSMITH

PROGRAM OUTLINE

SEPTEMBER 2011

Developed by
SkilledTradesBC
Province of British Columbia

SKILLED TRADES BC

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Section 1

INTRODUCTION

Locksmith

Foreword

This revised Locksmith Program Outline is intended as a guide for apprentices and employers of apprentices as well as for the use of industry organizations, regulatory bodies, and Provincial and Federal Governments. It reflects updated standards based on the new Locksmith National Occupational Analysis (2006) and British Columbia industry and instructor Subject Matter Experts (SMEs).

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.

This Program Outline includes a list of recommended reference textbooks that are available to support the learning objectives.

The Program Outline was prepared with the advice and assistance of the Locksmith Review Committee and will form the basis for further updating of the British Columbia Locksmith 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. 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.

SAFETY ADVISORY

Be advised that references to the WorkSafe BC 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 the advice and direction of an industry steering committee convened initially by the BC Construction Industry Training Organization (CITO). Members include:

- Bill Beazley
- Jim Broughton
- Shawn Carter
- Mark Daigle
- Michael P. Hines
- Kevin Jewell
- Ron Mclennan
- Alan Pantinga
- Mitchell Verigen

Industry Subject Matter Experts retained to assist in the development of Program Outline content:

- Bill Beazley
- Jim Broughton
- Shawn Carter
- Michael P. Hines
- Kevin Jewell
- Mitchell Verigen

SkilledTradesBC would like to acknowledge the dedication and hard work of all the industry representatives appointed to identify the training requirements of the Locksmith occupation.

How to Use this Document

This Program Outline has been developed for the use of individuals from several different audiences. The table below describes how each section can be used by each intended audience.

Section	Employers/ Sponsors	Apprentices	Challengers
Program Credentialing Model	Understand the length and structure of the program	Understand the length and structure of the program, and pathway to completion	Understand challenger pathway to Certificate of Qualification
Program Assessment	Understand the various assessment requirements for the program	Understand the various assessment requirements for the program	Understand the assessment requirements they would have to fulfill in order to challenge the program
OAC	Understand the competencies that an apprentice is expected to demonstrate in order to achieve certification	View the competencies they will achieve as a result of program completion	Understand the competencies they must demonstrate in order to challenge the program
Training Topics and Suggested Time Allocation	Understand the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Understand the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Understand the relative weightings of various competencies of the occupation on which assessment is based
Program Content	Identifies detailed program content and performance expectations for competencies with a practical component; may be used as a checklist prior to signing a recommendation for certification (RFC) for an apprentice	Provides detailed information on program content and performance expectations for demonstrating competency	Allows individual to check program content areas against their own knowledge and performance expectations against their own skill levels

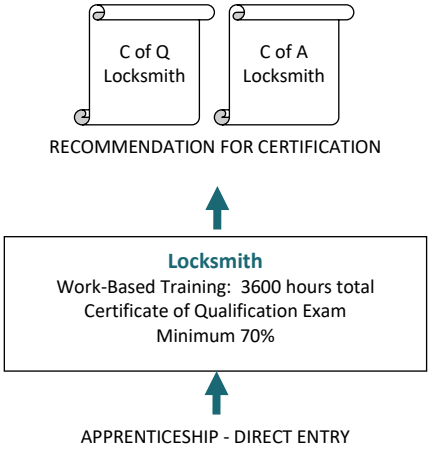
Section 2

PROGRAM OVERVIEW

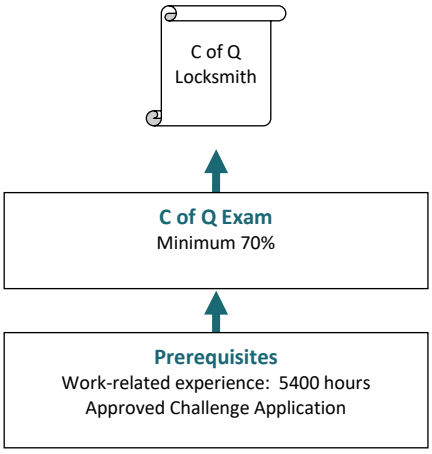
Locksmith

Program Credentialing Model

Occupation Name: Locksmith
Model Type: Single Track
Pathway: Apprenticeship



Occupation Name: Locksmith
Pathway: Challenger



Program Assessment

Apprentices will be assessed fairly and accurately throughout the program on the various skills required to be a professional Locksmith. Assessment activities are designed to provide feedback and allow for further development of skills that have been identified as essential for on the job performance.

The forms of assessment used in this program are described below.

Completion Requirement	Evidence of Achievement	Level of Achievement Required
Work-based training hours	Work-based training report completed by Sponsor or Employer	3600 hours completed
Provincial Exam	SkilledTradesBC-administered exam	Minimum 70%
Recommendation for Certification	Approval or sign-off by Sponsor, Employer, or other individual with sign-off authority	Declared competent

Occupational Analysis Chart

LOCKSMITH

Occupation Description: "Locksmith" means a person who repairs, services and/or installs all types of keys, locks, access/egress control systems (mechanical or electrical), and builders of hardware in accordance with the provisions of the Ministry of Public Safety & Solicitor General, Security Programs Division, Policing & Community Safety Branch, Private Investigators and Security Agencies Act.

USE SAFE WORK PRACTICES **A**	Demonstrate workplace safety W A1	Use WHMIS W A2	Practice fire prevention W A3			
ORGANIZE WORK **B**	Explain the locksmith trade W B1	Interpret blueprints W B2	Apply codes and regulations W B3	Perform material handling W B4	Perform customer sales and services W B5	Perform security consultation W B6
USE TOOLS AND EQUIPMENT **C**	Use hand tools W C1	Use power tools W C2	Use key-cutting equipment W C3	Describe welding W C4		
CREATE KEYS **D**	Duplicate keys W D1	Originate keys W D2				
INSTALL AND SERVICE LOCKS **E**	Install, repair and service locks W E1	Open secured entry W E2	Install and service high security hardware W E3	Service automotive locks W E4	Install and service safes, vaults and safe deposit boxes W E5	
INSTALL HARDWARE **F**	Repair doors and frames W F1	Install door closers W F2	Install panic hardware W F3	Service other hardware W F4		

SKILLED TRADES BC

Program Overview

INSTALL ELECTRICAL AND ELECTRONIC COMPONENTS AND HARDWARE **G**	Describe electrical and electronic theory W G1	Install access controls W G2	Repair and install electrical and electronic hardware W G3	Test and commission electrical and electronic installations W G4
DEVELOP MASTER KEY SYSTEMS **H**	Plan master key systems W H1	Generate bitting list and pinning charts W H2	Master key cylinders W H3	Maintain accurate records W H4

W = Knowledge or skills are primarily acquired in the workplace
EN = Endorsement
EL = Elective

Training Topics and Suggested Time Allocation

LOCKSMITH

			% of Time Allocated to:		
		% of Time	Theory	Practical	Total
Line A	**USE SAFE WORK PRACTICES**	**3%**			**100%**
A1	Demonstrate workplace safety		50	✓	
A2	Use WHMIS		25	✓	
A3	Practice fire prevention		25	✓	
Line B	**ORGANIZE WORK**	**8%**			**100%**
B1	Explain the locksmith trade		18		
B2	Interpret blueprints		12	✓	
B3	Apply codes and regulations		25	✓	
B4	Perform material handling		12	✓	
B5	Perform customer sales and services		18	✓	
B6	Perform security consultation		15	✓	
Line C	**USE TOOLS AND EQUIPMENT**	**8%**			**100%**
C1	Use hand tools		20	✓	
C2	Use power tools		30	✓	
C3	Use key-cutting equipment		40	✓	
C4	Describe welding		10		
Line D	**CREATE KEYS**	**10%**			**100%**
D1	Duplicate keys		40	✓	
D2	Originate keys		60	✓	
Line E	**INSTALL AND SERVICE LOCKS**	**27%**			**100%**
E1	Install, repair and service locks		25	✓	
E2	Open secured entry		20	✓	
E3	Install and service high security hardware		15	✓	
E4	Service automotive locks		15	✓	
E5	Install and service safes, vaults and safe deposit boxes		25	✓	
Line F	**INSTALL HARDWARE**	**17%**			**100%**
F1	Repair doors and frames		20	✓	
F2	Install door closers		20	✓	
F3	Install panic hardware		30	✓	
F4	Service other hardware		30	✓	

Line G	**INSTALL ELECTRICAL AND ELECTRONIC COMPONENTS AND HARDWARE**	**17%**			**100%**
G1	Describe electrical and electronic theory		10		
G2	Install access controls		35	✓	
G3	Repair and install electrical and electronic hardware		35	✓	
G4	Test and commission electrical and electronic installations		20	✓	
Line H	**DEVELOP MASTER KEY SYSTEMS**	**10%**			**100%**
H1	Plan master key systems		30	✓	
H2	Generate bitting list and pinning charts		30	✓	
H3	Master key cylinders		30	✓	
H4	Maintain accurate records		10	✓	
	Total Percentage for Locksmith	**100%**			

Section 3

PROGRAM CONTENT

Locksmith

Line (GAC): A USE SAFE WORK PRACTICES

Competency: A1 Demonstrate workplace safety

Objectives

To be competent in this area, the individual must be able to:

- Describe the application of the Occupational Health and Safety Regulations and know how to find requirements applicable to the Locksmith trade.
- Use personal protective equipment and explain proper maintenance and storage techniques.
- Explain electrical safety regulations as they apply to the Locksmith trade.
- Apply work practices to reduce risk of electrical injury.

LEARNING TASKS	CONTENT
1. Interpret WorkSafeBC Regulations	• Terms used in the Occupational Health and Safety Regulations • Accident reporting • Housekeeping • Material storage • Ladders • WHMIS • Personal protective equipment (PPE) • Lockout/tag-out procedures • Ventilation requirements

2. Use personal protective equipment (PPE)	• Types
	  ○ Eye protection/face shield
	  ○ Hearing protection, regular hearing tests
	  ○ Hand protection
	  ○ Head protection
	  ○ Foot protection
	  ○ Clothing (safety vest, coveralls)
	• Maintenance
	• Storage

3. Identify lifting risks and considerations	• Lifting techniques • Limitations • PPE

4. Identify the risks of repetitive motion	• Repetitive motion
	  ○ Hand
	  ○ Arm
	  ○ Back

LEARNING TASKS	CONTENT

5. Work safely with electricity	• Electrical safety practices
	• WorkSafeBC provisions for electrical safety
	• Voltage limitations
	• Electrical shock
	• Effect of electricity on the human body
	• Ways to reduce the risk of electrical injury
	• Lockout procedure
	• De-energize circuit
	• Lockout circuit
	• Lockout methods
	  ○ Locks
	  ○ Tags
	  ○ Cables
	• Key-box system
	• Verify circuit de-energized

6. Lab entry	• Identification before entry
	  ○ Asbestos
	  ○ Mold
	  ○ HAZMAT

Line (GAC): A USE SAFE WORK PRACTICES

Competency: A2 Use WHMIS

Objectives

To be competent in this area, the individual must be able to:

- Interpret Material Safety Data Sheets (MSDS).
- 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 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 an MSDS	• Hazardous ingredients • Preparation information • Product information • Physical data • Fire or explosion • Reactivity data • Toxicological properties • Preventive measures • First-aid measures

LEARNING TASKS	CONTENT

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 (GAC): A USE SAFE WORK PRACTICES

Competency: A3 Practice fire prevention

Objectives

To be competent in this area, the individual must be able to:

- Prevent and identify various classes of fires.
- 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 firefighting	• Fire triangle • Flammable liquids • Loose material • Gas • Company specific firefighting procedures • National Fire Prevention Association (NFPA)
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

Line (GAC): B ORGANIZE WORK

Competency: B1 Explain the locksmith trade

Objectives

To be competent in this area, the individual must be able to describe general duties and responsibilities of the Locksmith trade.

LEARNING TASKS	CONTENT

1. Describe scope of the trade	• Principles of locksmithing
	• Specialty areas
	  ○ Automotive
	  ○ Forensic or investigative
	  ○ High security
	  ○ Master keying
	  ○ Access control
	  ○ Safes and vaults
	  ○ Video surveillance (CCTV)

2. Demonstrate good work ethics	• Customer service • Interpersonal skills and attire • Professionalism • Basic accounting procedures • Basic business practices

3. Describe security clearance procedures	• Code and licencing requirements
	  ○ Security Programs and Police Technology Division – Public Safety and Solicitor General
	  ○ Fingerprinting
	  ○ Criminal records check

4. Identify liability responsibilities	• Proper installations ○ Manufacturer's specificiations • Regulatory compliance • Insurance coverage • Professional upgrading to remain current • Trade's Code of Conduct
5. Describe commercial vehicle requirements	• Licencing • Costs • Regulation requirements
6. Inspect vehicle	• Physical condition • Operating condition • Regulation requirments

Line (GAC): B ORGANIZE WORK

Competency: B2 Interpret blueprints

Objectives

To be competent in this area, the individual must be able to:

- Interpret blueprints as they pertain to the Locksmith trade.
- Describe types of components that are available and explain their applications.

LEARNING TASKS	CONTENT

1. Interpret blueprints	• Types of drawings and schedules
	• Read blueprints
	• Read floor plans
	• Take-offs
	  ○ Design hardware schedule
	  ○ Set up a key schedule
	  ○ Route wires for access or electronic lock systems
	• Engineering symbols and coding
	  ○ Indentify
	  ○ Interpret
	• Cross-referencing of hardware specifications to different manufacturers

2. Describe related mechanical components	• Types
	  ○ Locks
	  ○ Hinges
	  ○ Door closers
	  ○ Strikes
	  ○ Panic devices
	• Applications
	• Functions

LEARNING TASKS

3. Describe related electrical and electronic components

CONTENT

- Types
  - Electric strikes
  - Locks and mag locks
  - Rectifiers
  - Keyless entry systems
  - Solenoids
  - Transformers
  - Power transfers
  - Relays
  - Time clocks, electronic security timers
  - Switches
  - Circuit breakers
  - Fuses
  - Remote controls
  - Electrified panic exit devices
  - Electronic keypads and card readers
- Applications
- Functions

Line (GAC): B ORGANIZE WORK

Competency: B3 Apply codes and regulations

Objectives

To be competent in this area, the individual must be able to describe and apply Acts, Regulations and Municipal By-laws affecting Locksmiths and their customers.

LEARNING TASKS	CONTENT
1. Describe Acts and Regulations related to the Locksmith trade	• Laws and regulations • Permit requirements • Resource locations

2. Apply building codes	• Types
	  ○ National Building Code of Canada
	  ○ BC Building Code
	• Scope pertaining to locksmithing
	• Reading the code books
	  ○ Definitions and abbreviations
	• Permits
	• Responsibilitiy and liability

3. Apply fire codes, ratings and labels	• Types of code
	  ○ National Fire Code of Canada
	  ○ BC Fire Code
	  ○ NFPA 80 – Standards for Fire Doors and Fire Windows
	  ○ NFPA 101 – Life Safety Code
	• Scope pertaining to locksmithing
	• Reading the code books
	  ○ Definitions and abbreviations
	• Determine product compatibility
	• Responsibility and liability

LEARNING TASKS	CONTENT

4. Identify life safety and codes	• Persons with disabilities
	  ○ Canadian policy
	  ○ Human Rights Council
	• Accessibility requirements of the BC Building Code
	  ○ Hardware requirements
	  – Residential occupancy
	  – Business and personal service occupancy
	  – Mercantile occupancy
	  ○ Access and egress requirements
	  – Care and detention occupancy
	  – Business and personal services occupancy (sprinklered and unsprinklered)
	• Residential occupancy (sprinklered and unsprinklered)

5. Apply municipal by-laws	• Differences between codes and by-laws
	  ○ Municipal Act
	  ○ Municipal Building By-law
	  ○ Municipal Fire By-law
	• Types of code and related documents
	• Scope pertaining to locksmithing
	• Reading the By-laws
	  ○ Definitions and abbreviations
	• Requirments for life safety and persons with disabilities
	• Permits
	• Responsibility and liability

6. Apply Canadian Electrical Code and BC Electrical Code	• Interpret Code, Supplements, Bulletins and Errata • Locksmith specific sections of the code • Licenses • Permits • Inspections

Line (GAC): B ORGANIZE WORK

Competency: B4 Perform material handling

Objectives

To be competent in this area, the individual must be able to:

- Describe stock handling, invoicing and shipping procedures.
- Follow and complete work orders and order the required parts to complete the project.

LEARNING TASKS	CONTENT

1. Describe stock handling procedures	• Product knowledge
	• Purchasing procedures
	  ○ Order stock
	  ○ Proper forms
	  ○ Catalogues and supply lists
	• Receiving procedures
	  ○ Incoming order procedure
	  ○ Inspect stock
	  ○ Stores stock
	• Warehousing procedures
	  ○ Warehouse set-up for Locksmiths
	• Set-up and stocking procedures for Locksmiths vans
	• Inventories

2. Describe invoicing and shipping procedures	• Knowledge of shipping rates and routing • Writing of invoices • Packaging and shipping methods

3. Complete work orders and order required parts	• Types of work orders
	• Parts of the work order
	• Completing a work order
	  ○ Description of work required
	  ○ Importance of properly filling out the work order
	• Order components and parts
	  ○ Proper part numbers and nonmenclature
	  ○ Getting a signature on the completed work order

Line (GAC): B ORGANIZE WORK

Competency: B5 Perform customer sales and services

Objectives

To be competent in this area, the individual must be able to:

- Demonstrate effective communication skills.
- Perform customer sales and service.

LEARNING TASKS	CONTENT

1. Establish and maintain effective communication	• Industry vocabulary
	• Communication techniques
	  ○ Oral
	  ○ Written
	• Supervisors
	• Co-workers
	• Other tradespersons
	• Customers
	• Suppliers
	• Manufacturers
	• Regulatory officials

2. Perform customer sales and services	• Selling techniques
	  ○ Personal characteristics
	  ○ Knowledge base
	  ○ Rudiments of selling services and products
	  ○ Professional ethics
	• Indentifing customer needs
	• Taking instructions
	• Giving instructions
	• Explaining system concepts
	  ○ System operation
	  ○ User features
	  ○ General system maintenance

LEARNING TASKS	CONTENT

3. Maintain records specific to workplace requirements	• Sales documents
	  ○ Contracts
	  ○ Estimates
	  ○ Proposals
	  ○ Commission reports
	• Technical documents
	  ○ Schematics
	  ○ Wiring diagrams
	  ○ Cable lists
	  ○ Key records
	  ○ Door schedules
	• Administrative documents
	  ○ Work orders
	  ○ Time sheets
	  ○ Maintenance records
	• End user documents
	  ○ Instruction manuals
	  ○ Activity reports
	  ○ Insurance reports

Line (GAC): B ORGANIZE WORK

Competency: B6 Perform security consultation

Objectives

To be competent in this area, the individual must be able to:

- Perform a client's needs assessment and communicate, verbally and written, effectively to the client.
- Determine project compliance with codes.

LEARNING TASKS	CONTENT
1. Identify customer needs	• Overview of crime prevention • Security concerns in relation to the Codes • Identify security requirements • Products available
2. Perform security surveys	• Break-and-enter concerns • Employee safety concerns • Traffic control for customers • Written list of deficiencies for the owner

3. Determine compliance with building and fire codes	• Identify and interpret relevent codes
	  ○ Life safety
	  – Fire escape doors
	  – Panic devices
	  – Door hold-open devices
	  – Magnetic locks
	  ○ Minimum lock requirements as per current code
	• Permits
	• Job site issues
	  ○ WorkSafeBC inspections
	  ○ Union jurisdictions
	  ○ Dealing with other contractors

Line (GAC): C USE TOOLS AND EQUIPMENT

Competency: C1 Use hand tools

Objectives

To be competent in this area, the individual must be able to:

- Select and use hand tools for particular applications.
- Maintain and properly store hand tools.

LEARNING TASKS	CONTENT
1. Describe basic hand tools	• Followers • Tweezers • Screwdrivers • Pop riveter • Picks • Pick guns • Jigs • Hack saws • Vises • Clamps • Hammers • Chisels and punches • Files • Slip joint pliers • Socket sets • Wrenches • Plug spinners • Measuring and layout tools • Taps and dies • Locksmith specialty hand tools • Car opening tools
2. Use hand tools	• Application • Tool selection • Maintenance • Storage • Safety

Line (GAC): C USE TOOLS AND EQUIPMENT

Competency: C2 Use power tools

Objectives

To be competent in this area, the individual must be able to:

- Select and use power tools for particular applications.
- Maintain and properly store power tools.

LEARNING TASKS	CONTENT
1. Describe power tools	• Drills • Reciprocating saws • Jig saws • Routers • Dremmels • Grinders and buffers • Air tools
2. Use power tools	• Application • Tool selection • Maintenance • Storage • Safety

Line (GAC): C USE TOOLS AND EQUIPMENT

Competency: C3 Use key-cutting equipment

Objectives

To be competent in this area, the individual must be able to operate key-cutting equipment.

LEARNING TASKS	CONTENT

1. Describe key-cutting equipment	• Duplicating machines
	  ○ Types
	  ○ Mechanics of cutting keys
	• Milling machines
	  ○ Mechanics of the machine as it relates to key cutting
	• Code machines
	  ○ Types
	  ○ Function
	  ○ Clippers and punches

2. Use key-cutting machines	• Application • Selection • Maintenance • Storage • Safety

Line (GAC): C USE TOOLS AND EQUIPMENT

Competency: C4 Describe welding

Objectives

To be competent in this area, the individual must be able to describe basic welding equipment, characteristics, and techniques.

LEARNING TASKS

1. Describe welding

CONTENT

- Types of equipment
  - Oxyacetylene
  - Gas Metal Arc (GMAW)
  - MIG
  - TIG
- Welding characteristics
- Cutting components
- Basic techniques
- Safety

Line (GAC): D CREATE KEYS

Competency: D1 Duplicate keys

Objectives

To be competent in this area, the individual must be able to:

- Identify and describe keys.
- Demonstrate the ability to duplicate keys.

LEARNING TASKS	CONTENT

1. Describe keys and blanks	• Types
	  ○ Paracentric
	  ○ Tubular
	  ○ Bit and barrel
	  ○ Flat steel
	  ○ High security
	• Manufacturers
	• Parts of a key
	  ○ Bow
	  ○ Tip
	  ○ Blade
	  ○ Shoulder stop
	  ○ Tip stop
	• Composition of a key
	  ○ Nickel/silver
	  ○ Nickel plated
	  ○ Brass
	  ○ Steel
	  ○ Aluminum alloy
	  ○ Plastic
	  ○ Thickness
	  ○ Length
	• Key catalogues and cross reference charts
	  ○ Match key blanks to pictures and profiles
	• Visual blank identifying/matching
	• High security key
	• Restricted distribution key

2. Operate key machine	• Operation and function
	• Types
	  ○ Manual duplicator
	  ○ Semi-automatic duplicator
	  ○ Automatic duplicator
	  ○ Code machine
	  ○ Milling

LEARNING TASKS	CONTENT
	○ Tubular ○ Flat steel ○ Bit and barrel • Parts ○ Shoulder guide ○ Tip stop ○ Jaws ○ Cutters ○ Carriage ○ Dials ○ Cords ○ Adjustment points • Cutting theory ○ Visual inspection ○ Angles of cut ○ Depth ○ Spacing ○ Maximum adjacent cut specifications ○ Width of slots or wards ○ High security • Placing original and duplicate • Machine operation ○ Feed ○ Adjustments for spacing and depth ○ Set-up a duplicator to cut multiple generation key • Maintenance ○ Adjustments ○ Lubrication ○ Cleaning • Safety ○ Keep machine and work area clean ○ Use goggles and safety equipment ○ Stay alert ○ Stay clear of cutter while machine is operating ○ Lockout procedure for machine maintanence
3. Duplicate keys	• Measure keys • Cut keys using key machines • Cut keys using hand tools • Duplicate broken keys • Troubleshooting poorly operating keys

Line (GAC): D CREATE KEYS

Competency: D2 Originate keys

Objectives

To be competent in this area, the individual must be able to:

- Describe methods of originating keys and their applications.
- Originate keys using the appropriate method.

LEARNING TASKS	CONTENT
1. Describe methods of originating keys	• By code • By disassembly • By decoding • By pick and read • By impressioning • By sight

2. Use codes to generate key	• Application of method
	• Identify a key code
	  ○ Code versus part number
	• Read a code book
	  ○ Transfer a code to actual bitting
	  ○ Spacing and depths
	  ○ Key blank number
	• Differentiate between code series in the same manufacturer's codes
	• Differentiate the same code for different manufacturers

3. Dismantle and decode a lock to fit a key	• Application of method
	• Disassembly of the cylinder
	  ○ Picking
	  ○ Shimming
	  ○ Rapping
	• Calipers or micrometer, to measure the length of each pin or wafer
	• Depth keys to decode the lock
	• Keys for a lever lock
	• Determine a master key given a keyed cylinder and a change key
	• Determine a change key given a keyed cylinder and a master key
	• How to compensate for wear
	• Pick the control shear line of an interchangeable core cylinder

LEARNING TASKS	CONTENT
	• Determine the control key of interchangeable core cylinders
4. Demonstrate pick and read to generate a key	• Picking techniques ○ Application of method • Spacing • Pick used to feel the depths and interpret into a key depth • Dressing a key and finish off by impression
5. Demonstrate impressioning a key	• Impressioning techniques ○ Application of method • Use of visual aid or special lighting

Line (GAC): E INSTALL AND SERVICE LOCKS

Competency: E1 Install, repair and service locks

Objectives

To be competent in this area, the individual must be able to:

- Describe locks and padlocks, lock mechanisms and parts of the locks.
- Disassemble and reassemble lock cylinders and padlocks.
- Change combinations, repair locks, remove broken keys and open malfunctioning locks.

LEARNING TASKS	CONTENT

1. Describe locks	• Types of locks
	• Characteristics of locks
	  ○ Finishes
	  ○ Grades
	  ○ Functions
	• Major manufacturers' lock appearances
	  ○ Names
	  ○ Styles
	• Part names
	  ○ Parts break-down manuals

2. Disassemble and reassemble locks	• Lock removal theory
	• Lock mechanisms
	  ○ Types
	  – Warded
	  – Lever
	  – Wafer tumbler
	  – Pin
	  – Disc
	  – Function
	• Cylinders
	  ○ Types
	  ○ Function
	• Tool selection
	• Teardown
	• Reassemble

3. Disassemble and reassemble padlocks	• Types of padlocks • Padlock mechanisms • Security classifications • Remove, repair and maintain

4. Rekey locks
   - Characteristics of a good combination
   - Procedures for rekeying
     - Tool selection
     - Decoding the lock and/or decoding a key
     - Pin stacks
   - Check drivers and springs

5. Repair locks
   - Troubleshooting various locks
     - Remove broken keys
     - Key won't turn
     - Latch or deadbolt won't throw or retract
     - Parts loose
     - Intermittent malfunctions
     - Repair or replace
   - Parts breakdown diagrams
   - Type and purposes of lubricants
   - Parts replacement

6. Service locks
   - Clean and lubricate
   - Tighten screws and components
   - Check for wear
   - Check for key functionality
   - Alignment and proper operation
   - Check drivers and springs

Line (GAC): E INSTALL AND SERVICE LOCKS

Competency: E2 Open secured entry

Objectives

To be competent in this area, the individual must be able to pick and circumvent a variety of locks using the proper techniques.

LEARNING TASKS	CONTENT

1. Pick locks	• Theory of how picking works
	  ○ Types of picks
	  ○ Types of tension wrenches
	• Amounts of tension to use as per lock type and manufacturer
	• Techniques and procedures
	• Tool selection and use
	• Kinds of locks that can't be readily picked
	• Picking versus other techniques

2. Circumvent/bypass locks	• Types of lockouts
	  ○ Vandalism
	  ○ Malfunctioning
	  ○ No keys
	• Techniques and procedures
	• Tool selection and use
	• Bumping
	• Shimming a latch
	• Spread the door and frame
	• Ice-picking a deadbolt
	• Opening car locks

3. Drill locks	• Where and when to drill • Techniques and procedures • Tool selection and use

Line (GAC): E INSTALL AND SERVICE LOCKS

Competency: E3 Install and service high security hardware

Objectives

To be competent in this area, the individual must be able to describe, service and install high security locks.

LEARNING TASKS	CONTENT
1. Describe high security locks and restricted keyways	• Types • Functions • Specifications
2. Service high security locks	• Cut keys • Repair • Master key • Disassemble for servicing • Types of lubricants and frequency of use • Troubleshooting
3. Install high security locks	• Lock selection • Installation and hardware requirements • Tool selection and application • Manufacturer's specifications • Installation procedures • Clean-up • Explain operation to client

Line (GAC): E INSTALL AND SERVICE LOCKS

Competency: E4 Service automotive locks

Objectives

To be competent in this area, the individual must be able to:

- Secure owner authorization.
- Describe automotive locks and keys, locking mechanisms and operation of locks.
- Open locked vehicles, fit keys, remove, replace and service lock cylinders.

LEARNING TASKS	CONTENT
1. Secure owner authorization	• Questions to ask over the phone • Identification required • Verify vehicle ownership • Legal ramifications and risks
2. Describe automotive locks and keys	• Types of locks • Parts of locks • Lock mechanism • Basic knowledge of automotive door design • Anti-theft systems • Codes on locks • Types of keys
3. Open automotive locks	• Tool selection • Opening techniques and applications • Sourcing information

4. Service and fitting keys	• Code books and software
	• Fitting keys
	• Service lock mechanisms
	• Repair locks
	• Regular maintenance
	• Basic door panel servicing
	• Ignition lock service
	  ○ Steering column
	  ○ In-dash
	• Airbag systems
	  ○ Types
	  ○ Hazards
	  ○ Safety measures
	  ○ Liability concerns
	• Specialty locks
	  ○ Trailer lock
	  ○ Locking gas cap

LEARNING TASKS	CONTENT

5. Describe locks for motorcycles, marine craft and recreational vehicles	• Anti-theft device
	• Lock types
	  ○ Utility
	  ○ Chassis
	  ○ Ignition
	• Applications
	• Operation
	• Key codes and keying procedures
	• Resource material available

Line (GAC): E INSTALL AND SERVICE LOCKS

Competency: E5 Install and service safes, vaults and safe deposit boxes

Objectives

To be competent in this area, the individual must be able to:

- Describe safes, vaults and safe deposit boxes and their parts.
- Install and service safes, vaults and safe deposit boxes.

LEARNING TASKS	CONTENT
1. Describe safes and vaults	• Types of safes and vaults ○ Features to identify the unit • Types of safe and vault locks • Classifications • Testing authorities

2. Service safes and vaults	• Clean and lubricate
	• Check and service safe and vault components and hardware
	  ○ Service door bolt works
	  ○ Adjust door fit
	  ○ Hinges
	  ○ Adjustment and setting of relock devices
	• Time locks
	• Identify conditions that may cause future problems
	• Inspect each part and its function in the lock

3. Install safes and vaults	• Handling procedures
	  ○ Deliver
	  ○ Position
	• Tool selection and use
	• Ways to anchor a safe
	• Door and frame installations
	• In the floor safes
	• Installation techniques for different sizes and classes of safe
	• Safety

4. Perform safe and vault entry
    - Safe and vault hardware
    - Vault specifics
        - Alarm systems
        - Design and construction requirements
        - Ventilation equipment
    - Safe and vault penetration
        - Entry methods
        - Tools and equipment
    - Barrier materials
5. Opens, installs and maintains safe deposit boxes
    - Parts of a safe deposit box
    - Policy regarding opening
    - Type and size of door, lock and prep key
    - Methods of opening
        - Drilling boxes
        - Replacing locks
    - Install lock on door of box
        - Adjust
        - Fit door and box
    - Maintenance
    - Troubleshoot

Line (GAC): F INSTALL HARDWARE

Competency: F1 Repair doors and frames

Objectives

To be competent in this area, the individual must be able to:

- Inspect original door features and operations for both steel and wood doors.
- Repair or replace metal and wood doors.
- Describe methods of repairing or replacing metal or wood frames.

LEARNING TASKS	CONTENT

1. Repair or replace steel doors	• Inspect original features and specifications
	  ○ Labelling
	  ○ Handing
	  ○ Hinge location
	  ○ Height, width and thickness
	  ○ Hinge preps
	  ○ Hardware prep and measurement
	  ○ Vents or windows
	• Order new door to specifications
	• Replace door and reinstall all hardware
	• Test operation

2. Repair or replace wood doors	• Inspect original features and specifications
	  ○ Labelling
	  ○ Handing
	  ○ Hinge location
	  ○ Height, width and thickness
	  ○ Hollow or solid core
	  ○ Hinge preps
	  ○ Hardware prep and measurement
	  ○ Vents or windows
	• Order new door to specifications
	• Replace and reinstall all hardware
	• Test operation

3. Describe replacement of metal door frames	• Inspect original features and specifications • Procedures for removing and replacing
4. Describe replacement of wood door frames	• Inspect original features and specifications • Procedures for repairing/replacing and removing

Line (GAC): F INSTALL HARDWARE

Competency: F2 Install door closers

Objectives

To be competent in this area, the individual must be able to describe, install and troubleshoot door closers.

LEARNING TASKS	CONTENT
1. Describe styles of closers	• Styles • Types of installations • Manufacturers • Operation and adjustments • Special hardware
2. Install door closers	• Wood or metal door frame assembly • Closer selection • Arm configuration • Placement • Adjustments • Hold-open features • Troubleshooting

Line (GAC): F INSTALL HARDWARE

Competency: F3 Install panic hardware

Objectives

To be competent in this area, the individual must be able to describe, install and repair panic exit devices and hardware.

LEARNING TASKS	CONTENT
1. Describe panic exit devices and hardware	• Styles • Functions • Manufacturers
2. Install and repair panic devices and hardware	• Selection • Installation methods • Tool selection • Test for proper operation • Troubleshooting

Line (GAC): F INSTALL HARDWARE

Competency: F4 Service other hardware

Objectives

To be competent in this area, the individual must be able to repair and service other hardware associated with locksmithing.

LEARNING TASKS	CONTENT
1. Repair and service other hardware	• Home and office furniture • Detention (jail locks) • Door operators • Glass and aluminum doors and frames • Components

Line (GAC): G INSTALL ELECTRICAL AND ELECTRONIC COMPONENTS AND HARDWARE

Competency: G1 Apply electrical and electronic theory

Objectives

To be competent in this area, the individual must be able to:

- Explain basic electrical theory as it pertains to the Locksmith trade.
- Connect common electrical and electronic components.
- Troubleshoot and solve common electrical faults.

LEARNING TASKS	CONTENT
1. Describe basic electrical theory	• Principles • Terms • Voltage • Current • Resistance • Conductors • Transformer action • Solenoid action • Power sources • Ohm's law • Kirchhoff's law
2. Solve simple circuit problems	• Apply Ohm's Law • Apply Watt's Law • Troubleshoot component problems • Solve series circuits problems • Solve parallel circuits • Solve combination circuits • Electrical meters and measuring tools
3. Connect circuit components	• Resistors • Switches • Fuses • Capacitors • Diodes • Relays • Timers • Transformers
4. Describe power supplies and batteries	• AC and DC power sources • Cells and batteries • Charging systems

Line (GAC): G INSTALL ELECTRICAL AND ELECTRONIC COMPONENTS AND HARDWARE

Competency: G2 Install access controls

Objectives

To be competent in this area, the individual must be able to describe, service and install access controls.

LEARNING TASKS	CONTENT

1. Describe access controls	• Types
	  ○ Electronic
	  ○ Mechanical
	  ○ Electro-mechanical
	  ○ Stand-alone
	  ○ Hard wired
	• Functions

2. Install access controls	• Client consulation and system design • Manufacturer's specifications • Tool selection • Retrofitting • Initial programming and set-up • Commissioning and verifying codes • Customer orientation
3. Service access controls	• Changing access credentials/permissions • Audit trails • Troubleshoot • Replace parts • Lubrication points • Power source repair or replacement

Line (GAC): G INSTALL ELECTRICAL AND ELECTRONIC COMPONENTS AND HARDWARE

Competency: G3 Repair and install electrical and electronic hardware

Objectives

To be competent in this area, the individual must be able to:

- Describe different makes of electric strikes and models available for different applications.
- Diagnose, repair and install electrical hardware systems.

LEARNING TASKS	CONTENT
1. Describe electric and electronic locks and strikes	• Makes/manufacturers • Types/models • Features • Functions

2. Install electrical hardware	• Install in metal, wood or other building materials
	  ○ Marking, using templates, cutting and drilling
	• Hardware
	  ○ Electric strikes
	  ○ Latches
	  ○ Electro-magnetic
	  ○ Video surveillance equipment (CCTV)
	• Tool selection
	• Codes, blueprints and as-built drawings
	• Voltage and current draws
	• Alignment and adjustment

LEARNING TASKS	CONTENT

3. Wire the installation	• Gauge and wire selection
	• Run wire
	  ○ Carpet runs
	  ○ False ceilings
	  ○ Concealed behind walls
	  ○ Magnetic switches
	  ○ Door cords
	  ○ Electric hinges
	• CEC and BC Electrical code
	  ○ Classes of circuits
	  ○ Parallel and series circuit hook-up
	  ○ Overcurrent protection use
	• Connect wires
	  ○ Solder
	  ○ Wire connectors
	  ○ Terminal blocks
	  ○ Crimp caps
	• Numbering and lettering procedures for wires
	• Hook-up each component in a system according to the circuit diagram

4. Diagnose and repair electrical components and hardware	• Troubleshoot
	  ○ Diagnose
	  ○ Follow codes and drawings
	• Repair
	  ○ Electrical components
	  ○ Electrical hardware
	  ○ Electrical system

Line (GAC): G INSTALL ELECTRICAL AND ELECTRONIC COMPONENTS AND HARDWARE

Competency: G4 Test and commission electrical and electronic installations

Objectives

To be competent in this area, the individual must be able to:

- Test, troubleshoot and verify that the system works.
- Commission system and client orientation.

LEARNING TASKS	CONTENT
1. Test complete system	• Verify system works • Use troubleshooting techniques
2. Commission system	• Start-up • System sign-over to client

Line (GAC): H DEVELOP MASTER KEY SYSTEMS

Competency: H1 Plan master key systems

Objectives

To be competent in this area, the individual must be able to:

- Describe master key systems.
- Perform client consulation and plan master key systems.

LEARNING TASKS	CONTENT

1. Describe master key systems	• Basic principles and terminology
	• Types of systems
	• Master keying
	  ○ Planning
	  ○ Charting
	  ○ Process
	  ○ Total progression structure
	  ○ Manual and computer generated
	• Decode existing system
	• Manufacturer's specifications

2. Determine client requirements and plan master key system	• Conduct physical survey as per Competency B5 • Organization of information • Draw schematic of the system • Review schematic with client • Product and system knowledge • Customer approvals • Future needs/expansion

Line (GAC): H DEVELOP MASTER KEY SYSTEMS

Competency: H2 Generate bitting list and pinning charts

Objectives

To be competent in this area, the individual must be able to:

- Organize and coordinate a master key project.
- Generate key bitting lists and pinning charts.

LEARNING TASKS	CONTENT
1. Select new master key	• Manufacturer specific rules for selecting master keys • Maximum adjacent cut (MAC'S) • Parity (odd and even)
2. Factoring the system	• Constant pin lengths • Progression sequence • Step increment • Room for future expansion
3. Generate codes, masters and sub-masters as needed	• Progression • Matrix • Tree • Manual and computer generated

4. Generate pinning charts for each code	• Manual and computer generated
	  ○ Bitting numbers
	  ○ Generating charts

Line (GAC): H DEVELOP MASTER KEY SYSTEMS

Competency: H3 Master key cylinders

Objectives

To be competent in this area, the individual must be able to apply master key system to the facility.

LEARNING TASKS	CONTENT
1. Apply master key system to the facility	• Manufacturer's specifications and processes • Methods and techniques • Install or recode cylinders corresponding to the master key system • Test all keys and entire lock function • Troubleshooting

Line (GAC): H DEVELOP MASTER KEY SYSTEMS

Competency: H4 Maintain accurate records

Objectives

To be competent in this area, the individual must be able to:

- Generate and maintain accurate records.
- Explain the locksmith records process to the client.

LEARNING TASKS	CONTENT

1. Generate records for file	• Content
	  ○ Client details
	  ○ Consulation reports
	  ○ Door location
	  ○ Blind code number
	  ○ Number of keys cut and dates
	  ○ Number of locks rekeyed to this code
	  ○ Which masters fit
	  ○ Manufacturer's specifications
	• System labelling
	• Authorization list
	• Updating process
	  ○ Changes made to the system

2. Explain records process to the client	• Why Locksmith should retain the records • What information is given to the client

Section 4

REFERENCE MATERIALS

REFERENCE MATERIALS

Recommended resources

SkilledTradesBC www.skilledtradesbc.ca

- Permit requirements
  - Provincial Security Licence http://www2.gov.bc.ca/gov/content/employment-business/business/security-services/security-industry-licensing
  - City licenses
  - Electrical permits
  - Insurance Corporation of BC (ICBC) www.icbc.com
  - Liability insurance
  - WCB/WorkSafeBC www.worksafebc.com
  - Non-performance insurance
  - Employee benefits
  - Workplace Hazardous Materials Information System (WHMIS) and First Aid http://www.hc-sc.gc.ca/ewh-semt/occup-travail/whmis-simdut/index-eng.php
- Resource locations
  - Government
  - Library
  - WorkSafeBC (WCB) www.worksafebc.com
  - American National Standards Insitutute (ANSI) www.ansi.org
  - Door and Hardware Institute (DHI) www.dhi.org
  - American Society for Industrial Security (ASIS) International www.asisonline.org
  - Canadian Pacific Chapter of ASIS International www.asis-canada.org
  - Canadian Security Association (CANASA) www.canasa.org
  - Associated Locksmiths of America Inc. (ALOA) www.aloa.org
- Codes
  - National Fire Code of Canada http://www.nrc-cnrc.gc.ca/eng/ibp/irc/codes/2010-national-fire-code.html
  - BC Ministry of Housing http://www.gov.bc.ca/buildingcodes Queen's Printer for BC Code books http://www.bccodes.ca/default.htm
    - BC Building Code
    - BC Fire Code
    - BC Electrical Code
  - National Fire Protection Association www.nfpa.org
    - NFPA 80 – Standards for Fire Doors and Fire Windows
    - NFPA 101 – Life Safety Code
  - Canadian Electrical Code http://www.csagroup.org/services/codes-and-standards/installation-codes/canadian-electrical-code/
  - Canadian National Building Code http://www.nrc-cnrc.gc.ca/eng/publications/codes_centre/2015_national_building_code.html

Suggested texts

Locksmith Dictionary, ALOA
The Complete Book of Locks and Locksmithing, Bill Phillips
Locksmithing, Bill Phillips (First edition 1999; Second edition 2005)
Complete Course in Professional Locksmithing, Robert L. Robinson
The National Locksmith Guide to Manitpulation, Robert Gene Sieveking
Sargent and Greenleaf Mechanical Safe Lock Guide, Stanley Sargent and Greenleaf