

COURSE WDA3400: FABRICATION ORIENTATION & SAFETY

Level: First Period Apprenticeship

Prerequisite: None

Description: Students develop an understanding of basic work site safety practices.

Parameters: Access to a materials work centre, complete with basic fabrication tools, and to instruction from an individual with specialized training in the welding trade.

ILM Resources: Welder Apprenticeship Training Program Orientation 120101a, Safety Guidelines 120101b, Welding Safety 120101c

Outcomes: The student will:

1. describe the responsibilities and opportunities in the welding trade

- 1.1 identify and describe the apprenticeship training system in Alberta including:
 - 1.1.1 its history
 - 1.1.2 designated trades and occupations in Alberta
 - 1.1.3 patterns of apprenticeship training
 - 1.1.4 local and provincial apprenticeship committees
 - 1.1.5 the Red Seal Program
 - 1.1.6 technical training registration procedures
 - 1.1.7 safety education
- 1.2 identify and describe the training profile of the welding apprenticeship training program in Alberta including:
 - 1.2.1 the development of a welder training profile
- 1.3 explain the welder program outcomes and objectives including:
 - 1.3.1 learning outcomes and objectives
 - 1.3.2 apprenticeship exam questions
- 1.4 describe the responsibilities for the contract of apprenticeship training program by the apprentice, employer and Alberta Apprenticeship and Industry Training:
- 1.5 identify industrial, commercial and construction fields that provide employment opportunities for welders; e.g., dual trade and multi-trade qualifications
- 1.6 discuss the content of the Welding Training Record Book
- 1.7 demonstrate the ability to complete a résumé and a cover letter:

2. identify, describe or explain the *Workers' Compensation Act*, *Occupational Health and Safety Act*, and the Workplace Hazardous Materials Information System (WHMIS) guidelines

- 2.1 identify and describe applications of the *Workers' Compensation Act* in the workplace
- 2.2 identify, locate and interpret sections of the *Occupational Health and Safety Act* and general safety regulations as they apply to welding
- 2.3 identify and explain the WHMIS program related to:
 - 2.3.1 worker education
 - 2.3.2 labels
 - 2.3.3 other means of identification
 - 2.3.4 material safety data sheets

- 2.4 identify and describe the procedure for welding or cutting in confined spaces or dangerous enclosures including:
 - 2.4.1 welding or cutting in the presence of flammables
 - 2.4.2 working in a confined space
 - 2.4.3 rendering containers safe for welding and cutting
- 3. apply safe work practices and procedures when using welding or cutting equipment**
 - 3.1 identify physical hazards that are common to welding and cutting operations that impact welding safety including:
 - 3.1.1 radiant energy hazards
 - 3.1.2 hazards associated with temperature extremes
 - 3.1.3 noise hazards
 - 3.2 identify the use of the following personal protective equipment for welding and cutting operations:
 - 3.2.1 head protection
 - 3.2.2 eye protection
 - 3.2.3 protective clothing
 - 3.2.4 welding gloves
 - 3.2.5 footwear
 - 3.2.6 hearing protection
 - 3.3 identify fire hazards and methods of fire prevention including:
 - 3.3.1 classes of fires
 - 3.4 identify and explain hazards with welding fumes and gases including:
 - 3.4.1 occupational exposure limits
 - 3.4.2 hydrogen sulphide gas and sulphur dioxide gas
 - 3.5 identify welding fume ventilation methods
 - 3.6 identify personal protective equipment for hazardous and toxic materials that:
 - 3.6.1 protects a person from fumes
 - 3.6.2 is a face piece
 - 3.6.3 is a type of respirator
 - 3.7 identify the effects of electricity and safety precautions used to prevent injury from electric shock; e.g., avoiding electric shock, rescue procedures for electric shock victims
- 4. demonstrate basic competencies**
 - 4.1 demonstrate fundamental skills to:
 - 4.1.1 communicate
 - 4.1.2 manage information
 - 4.1.3 use numbers
 - 4.1.4 think and solve problems
 - 4.2 demonstrate personal management skills to:
 - 4.2.1 demonstrate positive attitudes and behaviours
 - 4.2.2 be responsible
 - 4.2.3 be adaptable
 - 4.2.4 learn continuously
 - 4.2.5 work safely
 - 4.3 demonstrate teamwork skills to:
 - 4.3.1 work with others
 - 4.3.2 participate in projects and tasks
- 5. create a transitional strategy to accommodate personal changes and build personal values**
 - 5.1 identify short-term and long-term goals
 - 5.2 identify steps to achieve goals

COURSE WDA3405: FABRICATION TOOLS & WELD FAULTS

Level: First Period Apprenticeship

Prerequisite: None

Description: Students develop knowledge and skills in the use of basic hand and power tools used in fabrication processes. Identify the causes of faults in welds and methods for their prevention.

Parameters: Access to a materials work centre, complete with basic hand and power tools, and to instruction from an individual with specialized training.

ILM Resources: Hand Tools 120101d, Power Tools 120101e, Weld Faults 120101f

Supporting Resources: Apprentice Record Book: Blue Book, Fractions 120104a, Decimals 120104b, Percentage and Ratios 120104c, Geometric Formulas 120104d, Metric and Imperial Measurement 120104e

Outcomes: The student will:

1. identify and describe the safe use of hand tools

- 1.1 describe safety precautions and general safety procedures for hand tools
- 1.2 identify and describe layout and measuring tools and their uses including:
 - 1.2.1 three general categories for measuring and layout tools
 - 1.2.2 marking tools
- 1.3 identify and describe clamping tools and their uses including:
 - 1.3.1 pliers
 - 1.3.2 clamps
- 1.4 identify and describe cutting tools and their uses including:
 - 1.4.1 hacksaws
 - 1.4.2 files
 - 1.4.3 chisels
 - 1.4.4 metal snips
 - 1.4.5 diagonal pliers and bolt cutters
 - 1.4.6 hand shears
- 1.5 identify and describe other hand tools and their uses including:
 - 1.5.1 hammers
 - 1.5.2 screwdrivers
 - 1.5.3 punches
 - 1.5.4 pinch bars and pry bars
 - 1.5.5 wrenches
 - 1.5.6 wire brushes

2. identify and describe the safe use of power tools

- 2.1 demonstrate and describe the safe operation of bench, pedestal, angle and straight grinders including:
 - 2.1.1 general grinding safety
 - 2.1.2 pedestal and bench grinders
 - 2.1.3 grinding wheels
 - 2.1.4 portable grinders

- 2.2 demonstrate and describe the use and safe operation of portable power drills, drill presses and twist drills including:
 - 2.2.1 drilling machines
 - 2.2.2 drill chucks
 - 2.2.3 twist drills
 - 2.2.4 lubricants, coolants and cutting fluids
- 2.3 describe the use and safe operation of metal forming and shaping tools including:
 - 2.3.1 plate rolls
 - 2.3.2 power brakes
 - 2.3.3 power benders
 - 2.3.4 presses
 - 2.3.5 trip hammers
- 2.4 identify and describe the procedures for cutting metals using:
 - 2.4.1 cutting machines
 - 2.4.2 plate shears
 - 2.4.3 ironworker machines
 - 2.4.4 cut-off saws
 - 2.4.5 shearing machines
 - 2.4.6 metal cutting band saws
- 3. identify and describe weld faults, their causes and how they can be prevented**
 - 3.1 define the major classification of weld faults including:
 - 3.1.1 weld fault classification
 - 3.1.2 definition of weld faults
 - 3.1.3 three general classes of weld faults
 - 3.2 define the notching effect and the following:
 - 3.2.1 stress flow lines and the notching effect
 - 3.2.2 failure to taper out rapid changes in cross-section
 - 3.2.3 tapered transition
 - 3.2.4 failure to taper out rapid changes in contour
 - 3.2.5 stress flow on lap joints
 - 3.2.6 failure to fill craters or to fill and float over weld ends
 - 3.3 identify basic weld faults, causes and ways to avoid them including:
 - 3.3.1 dimensional defects
 - 3.3.2 dimensional faults after welding
 - 3.3.3 structural discontinuities
 - 3.3.4 surface defects
 - 3.3.5 internal defects
 - 3.3.6 cracking
- 4. demonstrate basic competencies**
 - 4.1 demonstrate fundamental skills to:
 - 4.1.1 communicate
 - 4.1.2 manage information
 - 4.1.3 use numbers
 - 4.1.4 think and solve problems
 - 4.2 demonstrate personal management skills to:
 - 4.2.1 demonstrate positive attitudes and behaviours
 - 4.2.2 be responsible
 - 4.2.3 be adaptable
 - 4.2.4 learn continuously
 - 4.2.5 work safely

- 4.3 demonstrate teamwork skills to:
 - 4.3.1 work with others
 - 4.3.2 participate in projects and tasks
- 5. create a transitional strategy to accommodate personal changes and build personal values**
 - 5.1 identify short-term and long-term goals
 - 5.2 identify steps to achieve goals

COURSE WDA3410: OXYFUEL WELDING

Level: First Period Apprenticeship

Prerequisite: None

Description: Students develop basic skills in the safe handling and operation of oxyacetylene equipment.

Parameters: Access to a materials work centre, complete with oxyfuel welding equipment and fabrication facilities, and to instruction from an individual with journeyman certification in the welding trade.

ILM Resources: Oxyfuel Equipment 120101g, Oxyfuel Welding, Brazing and Braze Welding 120101h, Oxyfuel Cutting 120101i

Supporting Resources: Apprentice Record Book: Blue Book, Fractions 120104a, Decimals 120104b, Percentage and Ratios 120104c, Geometric Formulas 120104d, Metric and Imperial Measurement 120104e

Outcomes: The student will:

1. assemble oxyfuel equipment

- 1.1 describe characteristics and handling procedures for oxygen, acetylene and alternative fuel gases
- 1.2 describe functions of oxyfuel equipment components including:
 - 1.2.1 oxygen storage and use
 - 1.2.2 acetylene cylinders
 - 1.2.3 rules for handling compressed gas cylinders
 - 1.2.4 identification of gases in cylinders
 - 1.2.5 the oxyacetylene outfit
- 1.3 demonstrate the use, care and maintenance of oxyfuel equipment components including:
 - 1.3.1 regulator malfunctions
 - 1.3.2 hose maintenance
 - 1.3.3 torch and torch mixer maintenance
 - 1.3.4 care and maintenance of tips
- 1.4 explain recommended procedures for placement, set-up and shutdown of oxyfuel equipment including:
 - 1.4.1 setting up the oxyacetylene outfit
 - 1.4.2 detecting leaks using leak detection fluids
 - 1.4.3 shutting down equipment
- 1.5 identify causes and prevention measures for backfires, flashbacks and burnbacks
- 1.6 describe pressure and flame adjustments:
 - 1.6.1 lighting the torch
 - 1.6.2 gas speed and the speed of flame propagation
 - 1.6.3 types of flames
 - 1.6.4 stages of combustion

2. perform oxyfuel welding, braze welding and brazing

- 2.1 describe filler rods and fluxes including:
 - 2.1.1 definition of terms related to filler rods and fluxes
 - 2.1.2 selecting an oxyfuel filler rod to suit the job
 - 2.1.3 filler metal types and specifications
 - 2.1.4 AWS A5.2–92 specifications for carbon and low alloy steel rods for oxyfuel gas welding
 - 2.1.5 AWS A5.8–92 specifications for filler metal for brazing and braze welding
 - 2.1.6 fluxes
 - 2.1.7 data sheets
- 2.2 demonstrate the ability to run lines of fusion with and without filler rods in the flat and vertical positions through:
 - 2.2.1 preparation of materials for welding
 - 2.2.2 run lines of fusion; e.g., flat, vertical
 - 2.2.3 beading
- 2.3 demonstrate the ability to weld lap joints on 10 or 11 ga. (3.00–3.25 mm) mild steel in the horizontal (2F) and vertical (3F) positions, using a comparable filler material including:
 - 2.3.1 fusion welding of horizontal lap joints
 - 2.3.2 fusion welding of vertical lap joints
- 2.4 demonstrate the ability to weld butt joints on 10 or 11 ga. mild steel in the flat (1G) and vertical (3G) positions, using a comparable filler material including:
 - 2.4.1 fusion welding of vertical butt joints
 - 2.4.2 fusion welding of flat butt joints
- 2.5 demonstrate the ability to weld lap joints on 10 or 11 ga. mild steel in the vertical position, using a braze welding filler material including:
 - 2.5.1 braze welding of vertical lap joints

3. perform oxyfuel cutting

- 3.1 demonstrate the ability to safely operate a hand-held oxyfuel cutting torch on mild steel plate and structural shapes by understanding:
 - 3.1.1 principles of rapid oxidation
 - 3.1.2 terms associated with cutting
 - 3.1.3 travel speed and drag
 - 3.1.4 gases used for oxyfuel cutting
 - 3.1.5 torch and tip designs
 - 3.1.6 types of cutting tips
 - 3.1.7 accessories for hand cutting
 - 3.1.8 points to consider for good cutting
 - 3.1.9 starting the cut
 - 3.1.10 piercing holes
 - 3.1.11 stack cutting
 - 3.1.12 metals that present problems to flame cutting
- 3.2 perform straight line, bevel and shape cutting on mild steel using cutting methods followed by an exercise; e.g., shop projects
- 3.3 pierce and cut holes in mild steel plate including:
 - 3.3.1 pierce a plate and cut an S-beam shape
 - 3.3.2 follow-up with an exercise
- 3.4 cope 3/8" mild steel to fit a 4" channel member including:
 - 3.4.1 cope, bevel and shape cutting
 - 3.4.2 follow-up with an exercise
- 3.5 demonstrate the ability to safely operate a machine oxyfuel cutting torch on mild steel plate and follow-up with an exercise

4. demonstrate basic competencies

4.1 demonstrate fundamental skills to:

- 4.1.1 communicate
- 4.1.2 manage information
- 4.1.3 use numbers
- 4.1.4 think and solve problems

4.2 demonstrate personal management skills to:

- 4.2.1 demonstrate positive attitudes and behaviours
- 4.2.2 be responsible
- 4.2.3 be adaptable
- 4.2.4 learn continuously
- 4.2.5 work safely

4.3 demonstrate teamwork skills to:

- 4.3.1 work with others
- 4.3.2 participate in projects and tasks

5. create a transitional strategy to accommodate personal changes and build personal values

5.1 identify short-term and long-term goals

5.2 identify steps to achieve goals

COURSE WDA3415: GAS METAL ARC WELDING

Level: First Period Apprenticeship

Prerequisite: None

Description: Students develop basic knowledge and skills related to the use of Gas Metal Arc Welding (GMAW).

Parameters: Access to a fabrication work centre, complete with GMAW equipment and supplies, and to instruction from an individual with formal journey person certification in the welding trade.

ILM Resources: Gas Metal Arc Welding (GMAW) – Equipment 120103a,
GMAW Filler Metals, Shielding Gases and Safety 120103b,
GMAW Equipment Maintenance and Troubleshooting 120103c

Supporting Resources: Apprentice Record Book: Blue Book, Fractions 120104a, Decimals 120104b, Percentage and Ratios 120104c, Geometric Formulas 120104d, Metric and Imperial Measurement 120104e

Outcomes: The student will:

1. identify and select GMAW equipment

- 1.1 describe the principles of operation of GMAW including the history of GMAW
- 1.2 identify the components of a basic GMAW set-up including:
 - 1.2.1 equipment for GMAW
 - 1.2.2 power sources
 - 1.2.3 wire feeder
 - 1.2.4 electrode holders and cable assembly
 - 1.2.5 spooled filler wire
 - 1.2.6 shielding gas
 - 1.2.7 regulators/flowmeters
 - 1.2.8 cooling system
- 1.3 describe the following modes of metal transfer obtained with GMAW:
 - 1.3.1 pinch effect
 - 1.3.2 short-circuiting metal transfer
 - 1.3.3 globular transfer
 - 1.3.4 spray transfer
- 1.4 describe GMAW power sources and wire feeders including:
 - 1.4.1 wire feed control and drive units
 - 1.4.2 power source and wire feeder operating variables
 - 1.4.3 power sources for pulsed spray arc transfer mode
- 1.5 describe GMAW wire drive systems and welding gun and cable assemblies
- 1.6 identify shielding gas supply systems for GMAW including:
 - 1.6.1 cylinder identification, storage and handling
 - 1.6.2 regulators
 - 1.6.3 flowmeters
 - 1.6.4 equipment selection guidelines
 - 1.6.5 hoses
 - 1.6.6 solenoid valves

2. identify GMAW filler metals including:

- terms associated with GMAW filler metals
- manufacture of filler wires
- chemistry and wire sizing
- testing requirements
- identification and packaging
- cast and helix
- wire finish
- selection of filler wire
- choosing the correct wire size
- filler wire classifications
- American Welding Society specifications
- Canadian Standards Association standards
- classification of low carbon steel filler metals for GMAW
- electrode wire applications
- GMAW electrode wire characteristics and applications
- GMAW filler metals packaging
- handling consumables
- storing GMAW consumables

2.1 identify shielding gases for GMAW including:

- 2.1.1 basic properties of shielding gases
- 2.1.2 applications of shielding gases used with GMAW
- 2.1.3 advantages and disadvantages of various shielding gases
- 2.1.4 metal

2.2 identify advantages and disadvantages of GMAW

2.3 identify the precautions against electrical shock, toxic fumes and radiant energy associated with GMAW including:

- 2.3.1 safety
- 2.3.2 electric hazards
- 2.3.3 toxic fumes
- 2.3.4 personal protection

3. identify set-up, maintenance and troubleshooting of GMAW equipment

3.1 describe and demonstrate the set-up and maintenance for wire drive systems and gun assemblies by:

- 3.1.1 setting up equipment for GMAW
- 3.1.2 selecting and feeling the electrode wire
- 3.1.3 attaching a wire cleaner
- 3.1.4 adjusting the brake
- 3.1.5 following daily shutdown procedures
- 3.1.6 ensuring ongoing maintenance of equipment

3.2 diagnose and demonstrate corrective measures for malfunctioning GMAW equipment by:

- 3.2.1 using corrective measures with welding techniques
- 3.2.2 using corrective measures with wire feed equipment
- 3.2.3 troubleshooting wire feed equipment
- 3.2.4 identifying weld defects

4. demonstrate basic competencies

4.1 demonstrate fundamental skills to:

- 4.1.1 communicate
- 4.1.2 manage information
- 4.1.3 use numbers
- 4.1.4 think and solve problems

4.2 demonstrate personal management skills to:

- 4.2.1 demonstrate positive attitudes and behaviours
- 4.2.2 be responsible
- 4.2.3 be adaptable
- 4.2.4 learn continuously
- 4.2.5 work safely

4.3 demonstrate teamwork skills to:

- 4.3.1 work with others
- 4.3.2 participate in projects and tasks

5. create a transitional strategy to accommodate personal changes and build personal values

- 5.1 identify short-term and long-term goals
- 5.2 identify steps to achieve goals

COURSE WDA3420: FLUX CORED ARC WELDING & SUBMERGED ARC WELDING

Level: First Period Apprenticeship

Prerequisite: None

Description: Students develop basic knowledge and skills related to the use of Flux Cored Arc Welding (FCAW) and the theory of Submerged Arc Welding (SAW).

Parameters: Access to a fabrication work centre, complete with FCAW equipment and supplies, as well as to instruction from an individual with journeyperson certification in the welding trade.

ILM Resources: Flux Cored Arc Welding (FCAW) 120103d, Submerged Arc Welding (SAW) 120103e

Supporting Resources: Apprentice Record Book: Blue Book, Fractions 120104a, Decimals 120104b, Percentage and Ratios 120104c, Geometric Formulas 120104d, Metric and Imperial Measurement 120104e

Outcomes: The student will:

1. select and use FCAW equipment and consumables

- 1.1 describe the principles of operation of FCAW including:
 - 1.1.1 the history of FCAW
 - 1.1.2 applications
- 1.2 identify the components of a basic FCAW set-up including:
 - 1.2.1 power sources
 - 1.2.2 wire feeders
 - 1.2.3 electrode holders and cable assembly
 - 1.2.4 spooled filler wires
 - 1.2.5 shielding gas
 - 1.2.6 regulator/flowmeters
 - 1.2.7 cooling systems
- 1.3 describe FCAW power sources, wire feeders and gun and cable assemblies including:
 - 1.3.1 wire feeder control and drive units
 - 1.3.2 wire feeder drive roll assemblies
 - 1.3.3 welding gun and cable assemblies
- 1.4 describe FCAW operating variables
- 1.5 identify shielding gases for FCAW including:
 - 1.5.1 applications of shielding gases used with FCAW
 - 1.5.2 FCAW shielding gas flow rates
- 1.6 describe FCAW filler metals and the following:
 - 1.6.1 terms associated with FCAW filler metals
 - 1.6.2 manufacture of flux-cored wires
 - 1.6.3 operating characteristics of FCAW wires
 - 1.6.4 functions of the flux of FCAW wires
 - 1.6.5 selection of filler wire

- 1.6.6 choosing the correct wire size
- 1.6.7 FCAW filler metals packaging
- 1.6.8 filler wire classifications for FCAW
- 1.6.9 American Welding Society (AWS) specifications
- 1.6.10 Canadian Standards Association (CSA) standards
- 1.6.11 consumables storage and handling
- 1.6.12 electrode wire applications
- 1.6.13 FCAW electrode wire characteristics and applications
- 1.6.14 metal-cored electrode wire characteristics and applications
- 1.7 describe FCAW equipment maintenance and troubleshooting; e.g., ongoing maintenance of FCAW equipment
- 1.8 identify advantages and disadvantages of FCAW
- 2. select SAW equipment and consumables**
- 2.1 describe the principles of operation of SAW including:
 - 2.1.1 the history of SAW
 - 2.1.2 applications
- 2.2 identify the components of a basic SAW set-up including:
 - 2.2.1 SAW power sources
 - 2.2.2 welding head assembly
 - 2.2.3 travel carriage
 - 2.2.4 fixtures and positioners
 - 2.2.5 spooled filler wire
 - 2.2.6 flux
 - 2.2.7 flux feed and recovery equipment
 - 2.2.8 work lead connection
- 2.3 describe SAW power sources, wire feeders, flux feed systems, welding head assemblies and control systems
- 2.4 describe SAW operating variables and effects of polarity
- 2.5 identify SAW filler metals and fluxes and the following:
 - 2.5.1 terms associated with SAW filler metals and fluxes
 - 2.5.2 manufacture of filler wires
 - 2.5.3 chemistry and wire sizing
 - 2.5.4 testing requirements
 - 2.5.5 identification and packaging
 - 2.5.6 cast and helix
 - 2.5.7 wire finish
 - 2.5.8 choosing the correct wire size
 - 2.5.9 electrode and flux designations for SAW
 - 2.5.10 CSA classification system of carbon steel SAW flux-electrode combinations (CSA standard W48.6)
 - 2.5.11 AWS classification system of carbon steel flux-electrode combinations (AWS specification A5.17)
- 2.6 points to consider in choosing SAW consumables:
 - 2.6.1 CSA mechanical property requirements for SAW flux/electrode combinations
 - 2.6.2 SAW fluxes
 - 2.6.3 SAW fluxes classified according to method of manufacturer
 - 2.6.4 SAW fluxes classified according to effect on alloy content of the weld deposit
 - 2.6.5 typical SAW flux/electrode combination characteristics and application
 - 2.6.6 storing SAW consumables

- 2.7 describe SAW equipment maintenance and troubleshooting including:
 - 2.7.1 ongoing maintenance of equipment
 - 2.7.2 corrective measures
 - 2.7.3 troubleshooting
- 2.8 identify advantages and disadvantages of SAW
- 3. demonstrate basic competencies**
 - 3.1 demonstrate fundamental skills to:
 - 3.1.1 communicate
 - 3.1.2 manage information
 - 3.1.3 use numbers
 - 3.1.4 think and solve problems
 - 3.2 demonstrate personal management skills to:
 - 3.2.1 demonstrate positive attitudes and behaviours
 - 3.2.2 be responsible
 - 3.2.3 be adaptable
 - 3.2.4 learn continuously
 - 3.2.5 work safely
 - 3.3 demonstrate teamwork skills to:
 - 3.3.1 work with others
 - 3.3.2 participate in projects and tasks
- 4. create a transitional strategy to accommodate personal changes and build personal values**
 - 4.1 identify short-term and long-term goals
 - 4.2 identify steps to achieve goals

COURSE WDA3425: MATERIALS HANDLING

Level: First Period Apprenticeship

Prerequisite: None

Description: Students develop basic skills and knowledge in the handling of materials at the work site.

Parameters: Access to a materials work centre, complete with basic hand and power tools, and to instruction from an individual with specialized training in the use of basic hand and power tools.

ILM Resources: Materials Handling 120101j

Supporting Resources: Apprentice Record Book: Blue Book, Fractions 120104a, Decimals 120104b, Percentage and Ratios 120104c, Geometric Formulas 120104d, Metric and Imperial Measurement 120104e

Outcomes: The student will:

1. identify safe procedures for handling and storing materials

- 1.1 identify safe procedures for handling and storing materials including:
 - 1.1.1 personal protection
 - 1.1.2 housekeeping
 - 1.1.3 safe lifting and carrying
 - 1.1.4 safe handling of loads supported by cranes
 - 1.1.5 correct storage practices
- 1.2 determine the weight and centre of gravity of loads by:
 - 1.2.1 calculating the weight of structural steel shapes
 - 1.2.2 locating the centre of gravity
- 1.3 describe the effect that sling angles have on safe lifting
- 1.4 identify the working load limits of commonly used wire rope slings and synthetic slings
- 1.5 describe the causes and effects of shock loading on rigging; e.g., actual working loads
- 1.6 identify provincial occupational health and safety regulations regarding safety factors
- 1.7 identify and use hand signals for crane operations including:
 - 1.7.1 hand signal procedures for crane and hoist operations
 - 1.7.2 instructions to signalmen
- 1.8 describe safe procedures for lifting, hoisting and moving loads including:
 - 1.8.1 softeners
 - 1.8.2 slings
 - 1.8.3 sling attachment arrangements
 - 1.8.4 crane levelling
 - 1.8.5 planning a lift
 - 1.8.6 pick and carry operations
- 1.9 describe the purpose and use of knots, hitches and bends
- 1.10 describe the proper care and use of wire rope, synthetic rope and chains; e.g., breaking strength reductions
- 1.11 describe the correct use of plate clamps

- 1.12 describe the correct procedures for applying cable clips including:
 - 1.12.1 wire rope clips
 - 1.12.2 double saddle and bolt type rope clips
 - 1.12.3 U-bolt and saddle type rope clips
- 2. demonstrate basic competencies**
 - 2.1 demonstrate fundamental skills to:
 - 2.1.1 communicate
 - 2.1.2 manage information
 - 2.1.3 use numbers
 - 2.1.4 think and solve problems
 - 2.2 demonstrate personal management skills to:
 - 2.2.1 demonstrate positive attitudes and behaviours
 - 2.2.2 be responsible
 - 2.2.3 be adaptable
 - 2.2.4 learn continuously
 - 2.2.5 work safely
 - 2.3 demonstrate teamwork skills to:
 - 2.3.1 work with others
 - 2.3.2 participate in projects and tasks
- 3. create a transitional strategy to accommodate personal changes and build personal values**
 - 3.1 identify short-term and long-term goals
 - 3.2 identify steps to achieve goals

COURSE WDA3430: SHIELDED METAL ARC WELDING – PART 1

Level: First Period Apprenticeship

Prerequisite: None

Description: Students develop the knowledge and skills associated with the effects electrical current has on the arc welding process and how it applies to the welding power source.

Parameters: Access to a materials work centre, complete with Shielded Metal Arc Welding (SMAW) equipment, and to instruction from an individual with specialized training in welding.

ILM Resources: SMAW Equipment 120102a, Mild Steel Electrodes 120102b, Basic Joints and Weld Types 120102c

Supporting Resources: Apprentice Record Book: Blue Book, Fractions 120104a, Decimals 120104b, Percentage and Ratios 120104c, Geometric Formulas 120104d, Metric and Imperial Measurement 120104e

Outcomes: The student will:

1. identify SMAW equipment

- 1.1 define SMAW-related terms
- 1.2 describe AC and AC/DC rectified welding power sources including:
 - 1.2.1 AC transformers and AC/DC transformers/rectifiers
- 1.3 describe AC and DC generator welding power sources including:
 - 1.3.1 AC and DC generators and alternators
- 1.4 describe multi-process inverter welding power sources
- 1.5 identify welding cables and accessories for welding power sources including:
 - 1.5.1 machine installation and maintenance
 - 1.5.2 welding cables
 - 1.5.3 cable connectors and cable lugs
 - 1.5.4 electrode holders
 - 1.5.5 work lead clamps
- 1.6 identify the effect of arc length on amperage and voltage

2. select mild steel electrodes for SMAW

- 2.1 identify and define the terms associated with SMAW electrodes including:
 - 2.1.1 types of welding electrodes
 - 2.1.2 the coated electrode
 - 2.1.3 the SMAW process
 - 2.1.4 mechanical properties of metal
 - 2.1.5 dynamic and static loading considerations
- 2.2 identify the Canadian Standards Association (CSA) and American Welding Society (AWS) classifications and specifications for SMAW electrodes including:
 - 2.2.1 AWS classification system
 - 2.2.2 electrodes (AWS)
 - 2.2.3 current
 - 2.2.4 CSA classification system
 - 2.2.5 comparison of the AWS and CSA classification systems

- 2.3 identify the types and functions of SMAW electrode coatings including:
 - 2.3.1 core wire
 - 2.3.2 electrode coating
 - 2.3.3 grouping electrodes according to operating characteristics
 - 2.3.4 grouping electrodes according to usability characteristics
 - 2.3.5 iron powder electrodes
- 2.4 describe the functions of the slag
- 2.5 describe basic care, handling, packaging and storage procedures for these electrodes
- 2.6 identify commonly used mild steel SMAW electrodes and their applications
- 3. identify basic joints and weld types**
 - 3.1 identify the five basic joints
 - 3.2 describe the four types of welds and their acceptable dimensions
 - 3.3 identify joint and weld type variations including:
 - 3.3.1 corner joint
 - 3.3.2 edge joint
 - 3.3.3 tee joint
 - 3.3.4 lap joint
 - 3.3.5 butt joint
 - 3.3.6 position designations for groove and fillet welds
 - 3.4 outline the major considerations to be accounted for in the design of a good joint for welding
- 4. demonstrate basic competencies**
 - 4.1 demonstrate fundamental skills to:
 - 4.1.1 communicate
 - 4.1.2 manage information
 - 4.1.3 use numbers
 - 4.1.4 think and solve problems
 - 4.2 demonstrate personal management skills to:
 - 4.2.1 demonstrate positive attitudes and behaviours
 - 4.2.2 be responsible
 - 4.2.3 be adaptable
 - 4.2.4 learn continuously
 - 4.2.5 work safely
 - 4.3 demonstrate teamwork skills to:
 - 4.3.1 work with others
 - 4.3.2 participate in projects and tasks
- 5. create a transitional strategy to accommodate personal changes and build personal values**
 - 5.1 identify short-term and long-term goals
 - 5.2 identify steps to achieve goals

COURSE WDA3435: SHIELDED METAL ARC WELDING – PART 2

Level: First Period Apprenticeship

Prerequisite: None

Description: Students develop the knowledge and skills associated with the effects electrical current has on the arc welding process and how it applies to the welding power source.

Parameters: Access to a materials work centre, complete with Shielded Metal Arc Welding (SMAW) equipment, and to instruction from an individual with journeyperson certification in the welding trade.

ILM Resources: Shop/Lab Practices: SMAW Welds on Mild Steel Plate 120102d, Arc Cutting and Gouging 120102e

Supporting Resources: Apprentice Record Book: Blue Book, Fractions 120104a, Decimals 120104b, Percentage and Ratios 120104c, Geometric Formulas 120104d, Metric and Imperial Measurement 120104e

Outcomes: The student will:

1. perform surface welds in the flat position and 1F, 2F, 3F, 1G and 1GF welds, using SMAW

- 1.1 demonstrate the ability to weld surface welds (stringer beads) in the flat position, using E4914, E4310 and E4918 electrodes including:
 - 1.1.1 practical welding applications
 - 1.1.2 definition of terms
 - 1.1.3 setting the current and polarity
 - 1.1.4 positioning relative to the weld
 - 1.1.5 striking the arc
 - 1.1.6 stops and restarts
 - 1.1.7 arc length
 - 1.1.8 completing an exercise; e.g., surface welds
- 1.2 demonstrate the ability to weld fillet welds in the 1F position, using E4310 or E4311, E4914 and E4918 electrodes including:
 - 1.2.1 completing an exercise; e.g., fillet welds in the 1F (flat) position
- 1.3 demonstrate the ability to weld fillet welds in the 2F position, using E4310 or E4311, E4914 and E4918 electrodes including:
 - 1.3.1 completing an exercise; e.g., fillet welds in the 2F (horizontal) position
- 1.4 demonstrate the ability to weld fillet welds in the 3F position, using E4310 or E4311 and E4918 electrodes including:
 - 1.4.1 completing an exercise; e.g., fillet welds in the 3F (vertical) position
- 1.5 describe guided bend tests including:
 - 1.5.1 guided bend test equipment
 - 1.5.2 acceptance standards for guided bend test coupons
- 1.6 demonstrate the ability to weld groove welds on butt joints in the 1G position, root pass using E4310 or E4311, and fill and cap using E4918 filler material including:
 - 1.6.1 completing an exercise; e.g., groove welds in the 1G (flat) position

- 1.7 demonstrate the ability to weld groove welds on butt joints in the 1G position, using a 1GF test assembly using E4918 filler material complete with ¼" backing plate including:
 - 1.7.1 completing an exercise; e.g., groove welds in the 1G (flat) position with backing
- 2. gouge and cut, using the carbon arc cutting with air process and observe plasma arc cutting**
 - 2.1 describe the carbon arc cutting process including:
 - 2.1.1 air carbon arc cutting
 - 2.2 observe air carbon arc cutting including:
 - 2.2.1 setting up and operating with air carbon arc cutting
 - 2.2.2 completing an exercise; e.g., air carbon arc gouging
 - 2.3 describe the plasma arc cutting process and equipment and other arc cutting process
 - 2.4 observe plasma arc cutting including:
 - 2.4.1 completing an exercise; e.g., plasma arc cutting and gouging
- 3. demonstrate basic competencies**
 - 3.1 demonstrate fundamental skills to:
 - 3.1.1 communicate
 - 3.1.2 manage information
 - 3.1.3 use numbers
 - 3.1.4 think and solve problems
 - 3.2 demonstrate personal management skills to:
 - 3.2.1 demonstrate positive attitudes and behaviours
 - 3.2.2 be responsible
 - 3.2.3 be adaptable
 - 3.2.4 learn continuously
 - 3.2.5 work safely
 - 3.3 demonstrate teamwork skills to:
 - 3.3.1 work with others
 - 3.3.2 participate in projects and tasks
- 4. create a transitional strategy to accommodate personal changes and build personal values**
 - 4.1 identify short-term and long-term goals
 - 4.2 identify steps to achieve goals

COURSE WDA3440: SHOP/LAB PRACTICES FOR GMAW, FCAW & SAW

Level: First Period Apprenticeship

Prerequisite: None

Description: Students develop skills associated with Gas Metal Arc Welding (GMAW) and Flux Cored Arc Welding (FCAW) processes.

Parameters: Access to a materials work centre, complete with GMAW, FCAW and Submerged Arc Welding (SAW) equipment, and to instruction from an individual with journey person certification in the welding trade.

ILM Resources: Shop/Lab Practices: GMAW Welds on Mild Steel 120103f,
Shop/Lab Practices: FCAW Welds on Mild Steel 120103g,
Shop/Lab Practices: Combined GMAW and FCAW Welds on Mild Steel 120103h

Supporting Resources: Apprentice Record Book: Blue Book, Fractions 120104a, Decimals 120104b, Percentage and Ratios 120104c, Geometric Formulas 120104d, Metric and Imperial Measurement 120104e

Outcomes: The student will:

- 1. perform surface welds in the flat and horizontal positions and perform 1F, 2F, 3F, 1G, 2G and 3G position welds on mild steel**
 - 1.1 demonstrate the ability to weld stringer/weave beads in the flat and horizontal positions including:
 - 1.1.1 practical welding applications
 - 1.1.2 definition of terms
 - 1.1.3 setting GMAW welding parameters
 - 1.1.4 completing an exercise
 - 1.2 demonstrate the ability to weld 1F welds on mild steel plate including:
 - 1.2.1 fillet welds in the 1F position
 - 1.2.2 completing an exercise; e.g., fillet welds in the 1F (flat) position
 - 1.3 demonstrate the ability to weld fillet welds in the horizontal (2F) position on mild steel plate including:
 - 1.3.1 completing an exercise; e.g., fillet welds in the 2F (horizontal) position
 - 1.4 demonstrate the ability to weld fillet welds in the vertical (3F) position (downhill root and uphill fill and cover pass) on mild steel plate including:
 - 1.4.1 completing an exercise; e.g., fillet welds in the 3F (vertical) position
 - 1.5 prepare and fit up butt joints without backing
 - 1.6 demonstrate the ability to weld butt joints in the 1G position including:
 - 1.6.1 completing an exercise; e.g., butt joints in the 1G (flat) position
 - 1.7 demonstrate the ability to weld butt joints in the 2G position including:
 - 1.7.1 completing an exercise; e.g., butt joints in the 2G (horizontal) position
 - 1.8 demonstrate the ability to weld butt joints in the 3G position including:
 - 1.8.1 completing an exercise; e.g., butt joints in the 3G (vertical) position

- 2. perform surface welds in the flat and horizontal positions and perform 1F, 2F, 3F, 1GF, 2GF and 3GF position welds on mild steel**
 - 2.1 demonstrate the knowledge to weld stringer/weave beads in the flat and horizontal positions on mild steel plate including:
 - 2.1.1 getting started with FCAW
 - 2.1.2 setting FCAW welding parameters
 - 2.1.3 following the FCAW start-up checklist
 - 2.1.4 completing an exercise; e.g., surface welding
 - 2.2 demonstrate the ability to weld 1F welds on mild steel plate including:
 - 2.2.1 completing an exercise; e.g., fillet welds in the 1F (flat) position
 - 2.3 demonstrate the knowledge to weld fillet welds in the horizontal (2F) position on mild steel plate including:
 - 2.3.1 completing an exercise; e.g., fillet welds in the 2F (horizontal) position
 - 2.4 demonstrate the knowledge to weld fillet welds in the vertical (3F) position on mild steel plate including:
 - 2.4.1 completing an exercise; e.g., fillet welds in the 3F (vertical) position
 - 2.5 prepare and fit up butt joints with backing material
 - 2.6 demonstrate the knowledge to weld butt joints in the 1G position with backing on mild steel plate including:
 - 2.6.1 completing an exercise; e.g., butt joints in the 1G (flat) position with backing
 - 2.7 demonstrate the knowledge to weld butt joints in the 2G position with backing on mild steel plate including:
 - 2.7.1 completing an exercise; e.g., butt joints in the 2G (horizontal) position with backing
 - 2.8 demonstrate the knowledge to weld butt joints in the 3G position with backing on mild steel plate including:
 - 2.8.1 completing an exercise; e.g., butt joints in the 3G (vertical) position with backing
- 3. perform 1G, 2G and 3G position welds on mild steel**
 - 3.1 demonstrate the knowledge to weld butt joints in the 1G position on mild steel, using GMAW for the root bead and FCAW fill and cap including:
 - 3.1.1 using two processes for one weld
 - 3.1.2 setting GMAW and FCAW welding parameters
 - 3.1.3 using GMAW and FCAW start-up checklist
 - 3.1.4 completing an exercise; e.g., 1G (flat position) welds on mild steel using GMAW and FCAW
 - 3.2 demonstrate the knowledge to weld butt joints in the 2G position on mild steel, using GMAW for the root bead and FCAW fill and cap including:
 - 3.2.1 completing an exercise; e.g., butt joints in the 2G (horizontal) position
 - 3.3 demonstrate the knowledge to weld butt joints in the 3G position on mild steel, using GMAW for the root bead and FCAW fill and cap including:
 - 3.3.1 completing an exercise; e.g., butt joints in the 3G (vertical) position
- 4. demonstrate basic competencies**
 - 4.1 demonstrate fundamental skills to:
 - 4.1.1 communicate
 - 4.1.2 manage information
 - 4.1.3 use numbers
 - 4.1.4 think and solve problems

- 4.2 demonstrate personal management skills to:
 - 4.2.1 demonstrate positive attitudes and behaviours
 - 4.2.2 be responsible
 - 4.2.3 be adaptable
 - 4.2.4 learn continuously
 - 4.2.5 work safely
- 4.3 demonstrate teamwork skills to:
 - 4.3.1 work with others
 - 4.3.2 participate in projects and tasks
- 5. create a transitional strategy to accommodate personal changes and build personal values**
 - 5.1 identify short-term and long-term goals
 - 5.2 identify steps to achieve goals

COURSE WDA3445: OAW CUTTING PRACTICAL

Level: Advanced

Prerequisite: None

Description: Students, on the work site, continue to develop and refine those competencies developed in related Career and Technology Studies (CTS) occupational areas, previous practicums and other experiences.

Parameters: This course should be accessed only by students continuing to work toward attaining a recognized credential offered by an agency external to the school. Practicum courses extend the competencies developed in related CTS occupational areas. The practicum courses may not be delivered as stand-alone courses and may not be combined with core courses. This course may not be used in conjunction with Registered Apprenticeship Program courses. This practicum course may be delivered on- or off-campus. Instruction must be delivered by a qualified teacher or an experienced professional, who is under the supervision of the qualified teacher; both must be authorized to supervise trainees for the external credential.

Outcomes: The student will:

- 1. perform assigned tasks and responsibilities efficiently and effectively, as required by the agency granting credentials**
 - 1.1 identify regulations and regulatory bodies related to the credential
 - 1.2 describe personal roles and responsibilities including:
 - 1.2.1 key responsibilities
 - 1.2.2 support functions/responsibilities
 - 1.2.3 code of ethics
 - 1.3 describe personal work responsibilities and categorize them as:
 - 1.3.1 routine tasks; e.g., daily, weekly, monthly, yearly
 - 1.3.2 non-routine tasks; e.g., emergencies
 - 1.3.3 tasks requiring personal judgement
 - 1.3.4 tasks requiring approval of a supervisor
- 2. analyze personal performance in relation to established standards**
 - 2.1 evaluate his or her application of competencies developed in related CTS courses
 - 2.2 evaluate standards of performance in terms of:
 - 2.2.1 quality of work
 - 2.2.2 quantity of work
 - 2.3 evaluate his or her adherence to workplace policies and procedures related to health and safety
 - 2.4 evaluate the work environment in terms of:
 - 2.4.1 location
 - 2.4.2 floor plan of work area
 - 2.4.3 analysis of work flow patterns

- 2.5 evaluate a professional in a related occupation in terms of:
 - 2.5.1 training and certification
 - 2.5.2 interpersonal skills
 - 2.5.3 technical skills
 - 2.5.4 professional ethics

3. demonstrate basic competencies

- 3.1 demonstrate fundamental skills to:
 - 3.1.1 communicate
 - 3.1.2 manage information
 - 3.1.3 use numbers
 - 3.1.4 think and solve problems
- 3.2 demonstrate personal management skills to:
 - 3.2.1 demonstrate positive attitudes and behaviours
 - 3.2.2 be responsible
 - 3.2.3 be adaptable
 - 3.2.4 learn continuously
 - 3.2.5 work safely
- 3.3 demonstrate teamwork skills to:
 - 3.3.1 work with others
 - 3.3.2 participate in projects and tasks

COURSE WDA3450: GMAW & FCAW PRACTICAL

Level: Advanced

Prerequisite: None

Description: Students, on the work site, continue to develop and refine those competencies developed in related Career and Technology Studies (CTS) occupational areas, previous practicums and other experiences.

Parameters: This course should be accessed only by students continuing to work toward attaining a recognized credential offered by an agency external to the school. Practicum courses extend the competencies developed in related CTS occupational areas. The practicum courses may not be delivered as stand-alone courses and may not be combined with core courses. This course may not be used in conjunction with Registered Apprenticeship Program courses. This practicum course may be delivered on- or off-campus. Instruction must be delivered by a qualified teacher or an experienced professional, who is under the supervision of the qualified teacher; both must be authorized to supervise trainees for the external credential.

Outcomes: The student will:

- 1. perform assigned tasks and responsibilities efficiently and effectively, as required by the agency granting credentials**
 - 1.1 identify regulations and regulatory bodies related to the credential
 - 1.2 describe personal roles and responsibilities including:
 - 1.2.1 key responsibilities
 - 1.2.2 support functions/responsibilities
 - 1.2.3 code of ethics
 - 1.3 describe personal work responsibilities and categorize them as:
 - 1.3.1 routine tasks; e.g., daily, weekly, monthly, yearly
 - 1.3.2 non-routine tasks; e.g., emergencies
 - 1.3.3 tasks requiring personal judgement
 - 1.3.4 tasks requiring approval of a supervisor
- 2. analyze personal performance in relation to established standards**
 - 2.1 evaluate his or her application of competencies developed in related CTS courses
 - 2.2 evaluate standards of performance in terms of:
 - 2.2.1 quality of work
 - 2.2.2 quantity of work
 - 2.3 evaluate his or her adherence to workplace policies and procedures related to health and safety
 - 2.4 evaluate the work environment in terms of:
 - 2.4.1 location
 - 2.4.2 floor plan of work area
 - 2.4.3 analysis of work flow patterns

- 2.5 evaluate a professional in a related occupation in terms of:
 - 2.5.1 training and certification
 - 2.5.2 interpersonal skills
 - 2.5.3 technical skills
 - 2.5.4 professional ethics

3. demonstrate basic competencies

- 3.1 demonstrate fundamental skills to:
 - 3.1.1 communicate
 - 3.1.2 manage information
 - 3.1.3 use numbers
 - 3.1.4 think and solve problems
- 3.2 demonstrate personal management skills to:
 - 3.2.1 demonstrate positive attitudes and behaviours
 - 3.2.2 be responsible
 - 3.2.3 be adaptable
 - 3.2.4 learn continuously
 - 3.2.5 work safely
- 3.3 demonstrate teamwork skills to:
 - 3.3.1 work with others
 - 3.3.2 participate in projects and tasks

COURSE WDA3455: SMAW PRACTICAL

Level: Advanced

Prerequisite: None

Description: Students, on the work site, continue to develop and refine those competencies developed in related Career and Technology Studies (CTS) occupational areas, previous practicums and other experiences.

Parameters: This course should be accessed only by students continuing to work toward attaining a recognized credential offered by an agency external to the school. Practicum courses extend the competencies developed in related CTS occupational areas. The practicum courses may not be delivered as stand-alone courses and may not be combined with core courses. This course may not be used in conjunction with Registered Apprenticeship Program courses. This practicum course may be delivered on- or off-campus. Instruction must be delivered by a qualified teacher or an experienced professional, who is under the supervision of the qualified teacher; both must be authorized to supervise trainees for the external credential.

Outcomes: The student will:

- 1. perform assigned tasks and responsibilities efficiently and effectively, as required by the agency granting credentials**
 - 1.1 identify regulations and regulatory bodies related to the credential
 - 1.2 describe personal roles and responsibilities including:
 - 1.2.1 key responsibilities
 - 1.2.2 support functions/responsibilities
 - 1.2.3 code of ethics
 - 1.3 describe personal work responsibilities and categorize them as:
 - 1.3.1 routine tasks; e.g., daily, weekly, monthly, yearly
 - 1.3.2 non-routine tasks; e.g., emergencies
 - 1.3.3 tasks requiring personal judgement
 - 1.3.4 tasks requiring approval of a supervisor
- 2. analyze personal performance in relation to established standards**
 - 2.1 evaluate his or her application of competencies developed in related CTS courses
 - 2.2 evaluate standards of performance in terms of:
 - 2.2.1 quality of work
 - 2.2.2 quantity of work
 - 2.3 evaluate his or her adherence to workplace policies and procedures related to health and safety
 - 2.4 evaluate the work environment in terms of:
 - 2.4.1 location
 - 2.4.2 floor plan of work area
 - 2.4.3 analysis of work flow patterns

- 2.5 evaluate a professional in a related occupation in terms of:
 - 2.5.1 training and certification
 - 2.5.2 interpersonal skills
 - 2.5.3 technical skills
 - 2.5.4 professional ethics

3. demonstrate basic competencies

- 3.1 demonstrate fundamental skills to:
 - 3.1.1 communicate
 - 3.1.2 manage information
 - 3.1.3 use numbers
 - 3.1.4 think and solve problems
- 3.2 demonstrate personal management skills to:
 - 3.2.1 demonstrate positive attitudes and behaviours
 - 3.2.2 be responsible
 - 3.2.3 be adaptable
 - 3.2.4 learn continuously
 - 3.2.5 work safely
- 3.3 demonstrate teamwork skills to:
 - 3.3.1 work with others
 - 3.3.2 participate in projects and tasks

COURSE WDA3460: WDA PRACTICUM COURSE A

Level: Advanced

Prerequisite: None

Description: Students, on the work site, continue to develop and refine those competencies developed in related Career and Technology Studies (CTS) occupational areas, previous practicums and other experiences.

Parameters: This course should be accessed only by students continuing to work toward attaining a recognized credential offered by an agency external to the school. Practicum courses extend the competencies developed in related CTS occupational areas. The practicum courses may not be delivered as stand-alone courses and may not be combined with core courses. This course may not be used in conjunction with Registered Apprenticeship Program courses. This practicum course may be delivered on- or off-campus. Instruction must be delivered by a qualified teacher or an experienced professional, who is under the supervision of the qualified teacher; both must be authorized to supervise trainees for the external credential.

Outcomes: The student will:

- 1. perform assigned tasks and responsibilities efficiently and effectively, as required by the agency granting credentials**
 - 1.1 identify regulations and regulatory bodies related to the credential
 - 1.2 describe personal roles and responsibilities including:
 - 1.2.1 key responsibilities
 - 1.2.2 support functions/responsibilities
 - 1.2.3 code of ethics
 - 1.3 describe personal work responsibilities and categorize them as:
 - 1.3.1 routine tasks; e.g., daily, weekly, monthly, yearly
 - 1.3.2 non-routine tasks; e.g., emergencies
 - 1.3.3 tasks requiring personal judgement
 - 1.3.4 tasks requiring approval of a supervisor
- 2. analyze personal performance in relation to established standards**
 - 2.1 evaluate his or her application of competencies developed in related CTS courses
 - 2.2 evaluate standards of performance in terms of:
 - 2.2.1 quality of work
 - 2.2.2 quantity of work
 - 2.3 evaluate his or her adherence to workplace policies and procedures related to health and safety
 - 2.4 evaluate the work environment in terms of:
 - 2.4.1 location
 - 2.4.2 floor plan of work area
 - 2.4.3 analysis of work flow patterns

- 2.5 evaluate a professional in a related occupation in terms of:
 - 2.5.1 training and certification
 - 2.5.2 interpersonal skills
 - 2.5.3 technical skills
 - 2.5.4 professional ethics

3. demonstrate basic competencies

- 3.1 demonstrate fundamental skills to:
 - 3.1.1 communicate
 - 3.1.2 manage information
 - 3.1.3 use numbers
 - 3.1.4 think and solve problems
- 3.2 demonstrate personal management skills to:
 - 3.2.1 demonstrate positive attitudes and behaviours
 - 3.2.2 be responsible
 - 3.2.3 be adaptable
 - 3.2.4 learn continuously
 - 3.2.5 work safely
- 3.3 demonstrate teamwork skills to:
 - 3.3.1 work with others
 - 3.3.2 participate in projects and tasks