



## Welder Foundation Program – WELDF Trades Training

### Program Outline

PROGRAM IMPLEMENTATION DATE:	Pre 1998
OUTLINE EFFECTIVE DATE:	September 2021
PROGRAM OUTLINE REVIEW DATE:	April 2026

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#### GENERAL PROGRAM DESCRIPTION:

This comprehensive 28-week Welder Foundation (pre-apprenticeship) program provides students an opportunity to gain the skills, knowledge and training necessary to enter the welder trade and covers the program competencies for Level 1 and Level 2 of the Welder Apprenticeship program. Students learn techniques in cutting, gouging, oxy-fuel welding, shield metal arc welding, semi-automatic welding, gas metal arc welding, gas metal arc welding pulsed, flux core arc welding, metal core arc welding and submerged arc welding. In addition, students will be able to perform basic weld joints using gas tungsten arc welding. The program includes classroom theory, demonstrations and practical hands-on training in a welding shop. Safe work habits are emphasized, reinforced and practices throughout the program.

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**Credentials Granted:** Upon successful completion of the 28-week Welder Foundation program, students receive:

- College of the Rockies Certificate

Students will also receive from the Industry Training Authority:

- Level 1 and 2 Technical Training credit
  - Certificate of Completion
  - Credit for 300 Work-based Training hours
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**Delivery:** This program can be delivered face to face or hybrid (online with face-to-face components).

**Time for this program:** 28 weeks

#### Structure of Instructional Hours:

Instructional Activity	Duration
Instructional Hours	28 hrs/wk
Directed Studies	2 hrs/wk
Hours per Week	30 hrs/wk
Total Program Hours	840 hrs

Content Weightings	
Theory	20%
Practical Skills	80%
Total	100%

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**Program Outline Author or Contact:**

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Signature

**APPROVAL SIGNATURES:**

Department Head

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Department Head Signature

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Dean Signature

EDCO

Valid from: September 2021 – April 2026

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Education Council Approval Date

**ADMISSION REQUIREMENTS:**

**Prerequisites:**

- Secondary school graduation or equivalent, or completion of a College of the Rockies assessment to an acceptable level.

**Recommended prerequisites:** The following education is **highly** recommended for student success within the program:

- Workplace MATH 10 and Apprenticeship MATH 12. Either Apprenticeship and Workplace Math 11, Trades Mathematics 11, or equivalent
- Either English 12, English Studies 12, English First Peoples 12, ENGL 090, or equivalent (refer to Course Equivalency information on the College Website)

**Flexible Assessment (FA):**

Credit can be awarded for this program through FA

Yes     No

Learners may request formal recognition for flexible assessment at the College of the Rockies through one or more of the following processes: External Evaluation, Worksite Assessment, Demonstration, Standardized Test, Self-assessment, Interview, Products/Portfolio, Challenge Exam. Contact an Education Advisor for more information.

**Prior Learning Credit:** Student may apply for prior learning credit with the ITA (Industry Training Authority). Please visit [www.itabc.ca](http://www.itabc.ca) for more information.

**Prior Program Name:** WELC ⇨⇨ WELDF

**Date changed:** January 2014

## Textbooks and Required Resources:

Textbook selection varies by instructor and may change from year to year. At the Program Outline Effective Date the following textbooks were in use (most current edition):

BC Foundation Program Modules. Canadian Welder Bureau Group

*Please see the instructor's syllabus or check COTR's online text calculator <http://go.cotr.bc.ca/tuition/tCalc.asp> for a complete list of the currently required textbooks.*

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## PROGRAM COMPETENCIES AND TECHNICAL TRAINING CONTENT:

Upon the successful completion of this program, students will be able to

### **WELD 101 Occupation Skills (55 hours)**

- Describe welder apprenticeship and the scope of the trade in BC
- Describe safe working practices
- Perform basic trade related mathematical calculations
- Use and maintain measuring and layout tools
- Use and maintain hand tools
- Use and maintain power tools (electric and pneumatic)
- Describe shop materials
- Apply lifting, hoisting and rigging procedures

### **WELD 102 Cutting and Gouging Processes (OFC and OFG CAC-A, PAC) (50 hours)**

- Describe Oxy-Fuel Cutting (OFC) processes and their applications
- Describe Oxy-Fuel Cutting (OFC) equipment and its operation
- Perform free hand and guided cuts on low carbon steel (OFC)
- Use automatic and semi-automatic cutting machines (OFC)
- Describe CAC-A and PAC processes, equipment and their applications
- Use CAC-A and PAC cutting and gouging processes and equipment

### **WELD 103 Fusion and Braze Welding (TB) Using Oxy-Fuel (OFW) Process (25 hours)**

- Describe fusion welding, braze welding and brazing processes and their applications
- Describe fusion welding, braze welding and brazing equipment and its operation
- Describe filler metals, fluxes and tips used for fusion welding, braze welding and brazing
- Describe joint design and weld positions for OFW
- Fusion weld on low carbon steel sheet
- Braze weld (TB) using the OFW process
- Silver alloy braze on similar and dissimilar metals

- WELD 104 Shielded Metal Arc Welding (SMAW) (325 hours)**
- Describe the SMAW process
  - Describe SMAW equipment and its operation
  - Select electrodes for SMAW
  - Describe basic joint design and weld positions for SMAW
  - Describe weld faults and distortion in fabrications in SMAW
  - Use the SMAW process on low carbon steel plate and pipe
  - Use the hard-surfacing process on low carbon steel
  - Describe the SMAW process on grey cast iron
  - Use the SMAW process on stainless steel and/or low carbon steel plate and pipe
- WELD 105 Semi-Automatic and Automatic Welding (235 hours)**
- Describe GMAW, GMAW-P, FCAW, MCAW and SAW processes and their applications
  - Describe semi-automatic and automatic welding equipment and its operation
  - Describe filler metal and shielding gases for semi-automatic and automatic processes
  - Use the GMAW and GMAW-P process
  - Use the FCAW process
  - Use the MCAW process
  - Use the SAW process
- WELD 106 Gas Tungsten Arc Welding (GTAW) (30 hours)**
- Describe the GTAW process and its application
  - Describe GTAW equipment and its operation
  - Describe the application of GTAW for ferrous metals
  - Use the GTAW process for ferrous metals
  - Use the GTAW process for stainless steel
- WELD 107 Basic Metallurgy (14 hours)**
- Describe production processes for manufacturing metals
  - Describe mechanical and physical properties of ferrous and non-ferrous metals
  - Describe common ferrous, non-ferrous, reactive metals and their weldability
- WELD 108 Welding Drawings, Layout and Fabrication (50 hours)**
- Identify common welding symbols and bolted connections
  - Read and interpret drawings
  - Perform basic drafting
  - Perform mathematical calculations
  - Interpret and apply mechanical drawings and layout components
  - Fabricate weldments
  - Costing and estimating

The program competencies and technical training content delivered in this program follow the Industry Training Authority Program Outline for this trade.

See instructor's syllabus for the detailed outline of weekly readings, activities and assignments.

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## WORKPLACE HEALTH AND SAFETY COURSES:

Students must pass the following Workplace Health and Safety courses for program completion:

- Workplace Hazardous Material Information System (*WHMIS: PVHE-700*)
- Transportation of Dangerous Goods (TDG: *PVHE-701*)
- Occupational First Aid – Level 1 (*OFA-1: PVHE-100*) \*

<b>COM</b>	Completed to Defined Standard
<b>NCG</b>	No Credit Granted

\*Students must complete Occupational First Aid Level 1 within the program or have a current Occupational First Aid Level 1 certificate valid to the end of the program.

## EVALUATION AND ASSESSMENT:

<b>WELDER FOUNDATION</b>			
<b>COTR COURSE</b>	<b>SUBJECT COMPETENCIES</b>	<b>THEORY WEIGHTING</b>	<b>PRACTICAL WEIGHTING</b>
WELD 101	Occupational Skills	17%	8%
WELD 102	Cutting and Gouging Processes (OFC and OFG CAC-A, PAC)	10%	5%
WELD 103	Fusion and Braze Welding (TB) Using Oxy-Fuel (OFW) Process	5%	3%
WELD 104	Shielded Metal Arc Welding (SMAW)	25%	37%
WELD 105	Semi-Automatic and Automatic Welding	25%	35%
WELD 106	Gas Tungsten Arc Welding (GTAW)	3%	4%
WELD 107	Basic Metallurgy	5%	2%
WELD 108	Welding Drawings, Layout and Fabrication	10%	6%
	Total	100%	100%
<b>Welder Foundation</b> in-school theory & practical subject competency weighting		20%	80%
<b>Final In-school percentage score</b>		<b>IN-SCHOOL %</b>	

This program has a Standard Level Exam (SLE) that is administered by the Industry Training Authority on the last day of the program. In order to be eligible to write the SLE, students must have a final in-school percentage score of 70 % or higher.

The final percentage score for determining credit from the College of the Rockies and from the Industry Training Authority for the Welder Foundation program is calculated and determined as follows:

<b>In-school Percentage Score</b> Combined theory and practical subject competency multiplied by	80%
<b>Standard Level Exam Percentage Score</b> The exam score is multiplied by	20%
<b>Final Percentage Score</b>	FINAL%

### **Pass Requirements:**

#### **In order to pass this program, students are required to**

- achieve a minimum 70% overall final combined percentage score
  - pass all Workplace Health and Safety courses within the program
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### **SAFETY:**

WorkSafeBC regulations apply to all trades programs. Students are expected to follow all safe work practices and have high regard for the safety of others as well as of themselves. Students are responsible to wear personal protective equipment (PPE) as directed. At a minimum, students must provide and wear approved safety footwear and eyewear at all times in the shop. Additional PPE may be required for specific tasks. Students are expected to wear clothing suitable for working safely in the shop.

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### **STUDENTS MUST PROVIDE THEIR OWN:**

- steel-toed leather work boots
  - safety glasses
  - welding gloves
  - flame retardant work clothes (cotton or wool)
  - leather welding jacket
  - welding helmet (#11 lens)
  - welding goggles (#5 lens)
  - computer
  - reference manuals (as listed on third page)
  - personal half mask respirator
  - p100 particulate filters (3 or 4 sets)
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**EXAM POLICY:**

Students must attend all required scheduled exams that make up a final grade at the appointed time and place.

Individual instructors may accommodate for illness or personal crisis. Additional accommodation will not be made unless a written request is sent to and approved by the appropriate Department Head prior to the scheduled exam.

Any student who misses a scheduled exam without approval will be given a grade of "0" for the exam.

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**PROGRAM GRADE:**

Program grades are assigned as follows:

<b>COM</b>	Completed to defined standard $\geq 70\%$
<b>NCG</b>	No Credit Granted $< 70\%$

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**ACADEMIC POLICIES:**

See [www.cotr.bc.ca/policies](http://www.cotr.bc.ca/policies) for general college policies related to course activities, including grade appeals, cheating and plagiarism.

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**PROGRAM CHANGES:**

Information contained in program outlines is correct at the time of publication. Content of the programs is revised on an ongoing basis to ensure relevance to changing educational, employment and marketing needs. The instructor will endeavour to provide notice of changes to students as soon as possible. The instructor reserves the right to add material from programs.