



# Board/Authority Authorised Course Mechanical Trades Sampler - Welding

School District/Independent School Authority Name	Kamloops/Thompson
School District/Independent School Authority Number	#73
Developed by	Allen Kotani
Date Developed	December 2013
School Name	NorKam Secondary School
Principal's Name (District)	Sheryl Lindquist
Superintendent Approval Date (for School Districts only)	
Superintendent Signature (for School Districts only)	
Board/Authority Approval Date	
Board/Authority Chair Signature	
Course Name	Mechanical Trades Sampler - Welding
Grade Level of Course	12
Number of Course Credits	4
Number of Hours of Instruction	120
Prerequisite(s)	Completion of Grade 10 as well as successful application process.

## **Synopsis**

This course has been developed to offer students the opportunity to gain theoretical and practical experience, examining four different mechanical trades. This mechanical sampler and initiative, set forth by The Ministry of Jobs, Tourism, and Skills Training, Ministry of Education, School District #73, and Thompson Rivers University (TRU) will explore four career paths; Automotive Service Technician, Heavy



Duty Technician-Commercial Transport Technician, Motorcycle Technician, and Welding Trade. The Industry Training Authority (ITA) and Ministry of Education Instructional Resource Package have been used as guidelines for the content covered within this sampler.

## Rationale

This course is intended to introduce students to specific trades training in the area of Welding Level C. This will provide students with an overview of the Foundations Welding program.

This program will explore:

- Introduction of safe work practices employed in a Mechanical/Instructional facility
- Overview of the practices, skill sets needed for the Mechanical Trade
- Theory and practical applications within Mechanical Trades
- Direct exposure to Foundation Training content, Post-Secondary and job ready expectations. Therefore, providing students with the ability to make informed choices regarding the direction they choose to embark during Senior Secondary School and/or thereafter.

Unit/Topic	Title	Time
Unit 1	Safety	10 hours
Unit 2	Fasteners/Tools/Equipment	10 hours
Unit 3	Oxy-Fuel Cutting/Welding	10 hours
Unit 4	Shielded Metal Arc Welding (SMAW)	25 hours
Unit 5	Gas Metal Arc Welding (GMAW)	25 hours
Unit 6	Fitting – Capstone Project	40 hours
	Total Hours	120

## Unit 1 - Safety

**Objective:** Safe worksite practices are of the utmost importance. Students need to be aware of safety-oriented rules and regulations, and be able to perform all industry tasks in a safe and responsible manner.

## Prescribed Learning Outcomes

Students will acquire skills related to identification and use of:

- WCB Regulation
- WorkSafeBC



- Workplace Hazardous Materials Information System (WHMIS)
- Fire Safety and Prevention
- Hoisting, jacking, supporting
- Personal Safety

## **Unit 2 – Fasteners/Tools/Equipment**

**Objective:** Trades and technology fields have a very strong practical component. Tools are used regularly and must be used properly, from basic hand tools to precision-measuring instruments.

### **Prescribed Learning Outcomes**

Students will acquire skills related to identification and use of:

1. Fasteners
  - Types of fasteners.
2. Tools
  - Hand
  - Electric
  - Portable power
  - Pneumatic
  - Hydraulic
  - Precision-measuring mathematical calculations
3. Equipment
  - Lifting
  - Supporting
  - Cutting/welding

## **Unit 3 – Oxy-Fuel Cutting/Welding**

### **Prescribed Learning Outcomes**

Students will acquire skills related to identification and use of:

1. Oxy-Fuel Cutting
  - Equipment and operation
2. Oxy-Fuel Fusion
  - Equipment and operation
  - Welding
  - Brazing
  - Joint designs

## **Unit 4 – Shielded Metal Arc Welding (SMAW)**

### **Prescribed Learning Outcomes**

Students will acquire skills related to identification and use of:



- Equipment and operation
- Joint designs and weld positions

## **Unit 5 – Gas metal Arc Welding (GMAW)**

### **Prescribed Learning Outcomes**

Students will acquire skills related to identification and use of:

- Equipment and operation
- Joint designs and weld positions

## **Unit 6 – Fitting – Capstone Project**

**Objective:** The Capstone Project is a culmination of skills learned throughout the previous units. The project will be selected by the instructor and meet some or all of the criteria listed.

### **Prescribed Learning Outcomes**

Students will acquire skills related to identification and use of:

- Design and build a product to address a specific need, such as assisting the disabled.
- Fit and fabricate a product by following blueprint designs.

### **Instructional Component**

- Direct instruction
- Indirect instruction
- Interactive (peer) instruction
- Independent instruction
- Modeling
- Practical creativity
- Brainstorming
- Group work
- Analysis of own and classmates' project work
- Project-based learning

### **Assessment Component**

- Daily quizzes
- Unit quizzes
- Demonstration of skills related to practical activities

Eighty per cent (80%) of the grade will be based on safety tests and project evaluations throughout the course. This portion of the grade will reflect the students' most consistent level of achievement throughout the course, although special consideration will be given to the more recent evidence of achievement.



Twenty per cent (20%) of the grade will be based on student research, documentation, reflection, and demonstration of proper employability skills (proper industrial work habits ranging from the safe use of equipment to good “Housekeeping” techniques).

## Learning Resource

- Teacher handouts
- Guest speakers from the community in related fields
- Visit/interview local trades people in related fields
- ILMs

## Facility Requirements

### Classroom Area

- Comfortable seating and tables for training, teaching, lecturing.
- Compliance with all Local and National Fire Code and occupational safety requirements.
- Lighting controls to allow easy visibility of projection screen allowing students to take notes.
- Windows must have shades or blinds to adjust sunlight
- Heating/air conditioning for comfort all year round.
- In-room temperature regulation and ventilation to ensure comfortable room temperature.
- Acoustics in the room must allow the instructor to be heard.
- White marking board with pens and eraser (optional: flipchart in similar size).
- Projection screen or projection area at front of classroom.
- Overhead projector and/or multimedia projector.

### Shop Area

- One welding booth per student (minimum booth size must be 6' x 6') fully equipped with:
  - Industrial-grade multi-process welding power source or equipment suitable for all Level C required welding processes.
  - Welding table (minimum recommended size 18" x 20").
  - One height adjustable positioning arm.
  - One 115 volt receptacle or pneumatic air supply for grinders.
  - Ventilation as per WorkSafeBC Standards.
  - Task lighting.
- Suitable demonstration area of approximately 7' x 14'.
- Aisle size must be a minimum of 6' wide.
- The grinding and test coupon preparation area must be a minimum 300 square feet
- Outside storage fenced area of 2000 square feet (including a secured cylinder storage area).
- Ceiling shall be a minimum height of 16' or as varied by good engineering practices and codes.

## Reference Materials

Alberta Apprenticeship Resource Package, Crown Publications

Motorcycles, Johns & Edmunston

Industry Training Authority (ITA), [www.itabc.ca](http://www.itabc.ca)

Ministry of Education, Instructional Resource Package (IRP), [www.bced.gov.bc.ca](http://www.bced.gov.bc.ca)



WorkSafeBC, workers' Compensation Board of BC (WCB), [www.worksafebc.com](http://www.worksafebc.com)  
Workplace Hazardous Materials Information System (WHMIS), [www.hc-sc.gc.ca](http://www.hc-sc.gc.ca)