

# Grade 12D Applied Specialities and Qualifications (40S)

Course Code: 8503

Credit: 1.0 Credit

Program: Senior Years Technology Education Program (SYTEP)

School: Swan Valley Regional Secondary School

Program Cluster: Welding Technology

Course Length: Approximately 110 instructional hours (one semester)

Instructor: Mr. Jeremy Hicks

## Course Description

Applied Specialities and Qualifications (40S) prepares students for the Manitoba Welder Practical Examination Structural Level 1 (Canadian Welding Bureau) while strengthening the safety, communication, equipment-use, measurement, inspection, and workplace skills expected of an entry-level welder.

Students prepare and complete oxy-acetylene cutting, shielded metal arc welding (SMAW), and gas metal arc welding (GMAW) practical work to supplied drawings and examination specifications. Visual inspection, destructive bend testing, professional work habits, and accurate documentation are emphasized throughout.

Instruction reflects the updated Manitoba Grade 12D curriculum and Apprenticeship Manitoba Level 1 technical-training outcomes, particularly Learning About Work, Trade Safety Awareness, Tools and Equipment, Trade-Related Communications, and Welder Practical Examination I.

## Course Goals

Upon successful completion of this course, students will:

- Apply Manitoba workplace safety requirements, WHMIS, safe work procedures, injury-prevention practices, and required PPE.
- Demonstrate professional communication, active listening, workplace conduct, and accurate use of trade-related documents.
- Select, inspect, operate, maintain, and store welding-shop tools, equipment, materials, and consumables safely.
- Communicate measurements and tolerances accurately using metric and imperial systems.

- Prepare and complete the required oxy-acetylene cutting exercise to drawing and visual-inspection criteria.
- Prepare and complete the required SMAW flat-groove assembly using specified electrodes and welding procedures.
- Prepare and complete the required GMAW flat-groove and flat-fillet assembly using specified wire and procedures.
- Evaluate weld quality through visual inspection and destructive bend testing, then correct deficiencies through informed practice.

## Course Content

### Trade Safety, Legislation and Examination Orientation (12 Hours)

Students review Manitoba worker rights and responsibilities, workplace safety and health programs, PPE, WHMIS, safe work procedures, the hierarchy of controls, injury prevention and response, lockout/tagout, emergency equipment, ventilation, housekeeping, and the expectations and sequence of the practical examination.

### Career Education and Trade-Related Communication (8 Hours)

Students examine apprenticeship and Red Seal pathways, workplace competency, accessibility and respectful workplace expectations. They practise verbal and non-verbal communication, active listening, use of communication devices, and interpretation of work orders, cut lists, order sheets, invoices, and shipping documents.

### Trade Mathematics, Tools, Equipment and Materials (10 Hours)

Students communicate measurements and allowable variation using metric and imperial systems. They select, inspect, use, maintain, and store layout tools, hand tools, portable and stationary power tools, non-thermal cutting and grinding equipment, welding consumables, and mild-steel test materials.

### Weld Processes, Quality Inspection and Test Preparation (8 Hours)

Students review terminology, drawings, process variables, acceptance criteria, common discontinuities, and safe inspection practices. Visual inspection, destructive bend and tensile testing, etching, impact and hardness testing, and non-destructive methods such as radiography, ultrasonic, liquid penetrant, magnetic particle, hydrostatic, and phased-array examination are introduced.

## Oxy-Acetylene Cutting Practical Preparation (14 Hours)

Students prepare a mild-steel test plate measuring 120 mm (4.72 in.) x 125 mm (4.92 in.) x 12 mm (0.47 in.) and practise a 30-degree freehand straight-angle cut, a 90-degree circular cut to accept 25 mm (0.98 in.) round bar, and a freehand coping cut to accept a 120 mm (4.72 in.) channel. Work follows the supplied drawing and is evaluated by visual examination.

## SMAW Flat-Groove Practical Preparation (26 Hours)

Students prepare and weld a mild-steel groove-weld assembly in the flat-groove (1G) position. The specified procedure uses E-4312 (E-6012) for the root and E-4918 (E-7018) for the hot pass, fill, and cap. Students practise fit-up, electrode control, bead placement, interpass cleaning, defect correction, visual examination, and destructive bend testing.

## GMAW Flat-Groove and Fillet Practical Preparation (24 Hours)

Students prepare and weld the required mild-steel assembly in the flat-groove (1G) and flat-fillet (1F) positions using ER49S (ER70S) wire with a 0.035 in. diameter. Practice emphasizes machine setup, fit-up, parameter selection, travel and work angles, bead placement, visual examination, and destructive bend testing.

## Practical Examination Simulation and Qualification (8 Hours)

Students complete timed mock-examination work and, when scheduled, the Manitoba Welder Practical Examination Structural Level 1. They organize tools and materials, follow drawings and specifications independently, maintain a safe work area, document results, review inspection feedback, and identify next steps for improvement or qualification.

## Assessment

Student achievement will be evaluated using the following categories:

- Classwork: 20%
- Practical Skill Demonstrations: 30%
- Tests and Quizzes: 30%
- Projects: 20%

Assessment emphasizes both theoretical knowledge and practical skill development. Students are expected to demonstrate safe work habits, active participation, improving technical skill, examination readiness, and quality workmanship throughout the course.

## Required Personal Protective Equipment

Students are required to wear appropriate PPE during all shop activities. If a student does not have the following PPE, it will be provided to them.

- CSA-approved steel-toe boots or toe caps
- Safety glasses
- Hearing protection
- Welding gloves
- Appropriate protective clothing and welding helmet as required

Students who do not wear the required PPE may not be permitted to participate in shop activities.

## Student Expectations

Students are expected to:

- Attend class regularly and arrive on time.
- Follow all shop safety rules, safe work procedures, examination requirements, and teacher instructions.
- Wear required PPE before entering the shop.
- Respect classmates, instructors, examiners, equipment, materials, and facilities.
- Maintain a clean and organized work area.
- Participate fully in classroom, shop, and examination-preparation activities.
- Demonstrate responsibility, teamwork, communication, and professionalism.
- Complete assignments, weld samples, tests, inspections, and practical assemblies to the best of their ability.

Unsafe behavior may result in removal from shop activities until safety expectations have been met.

## Cell Phone Policy

To maintain a safe and focused learning environment, students are required to place their cell phones in the classroom phone lockbox at the beginning of each class. Phones will remain securely stored for the duration of the class and will be returned at the end of the class period.

Students do not require personal cell phones during Welding Technology. School-issued laptops and classroom resources will be provided for online learning, research, quizzes, drawings, documentation, or other educational tasks.

This policy minimizes distractions, promotes engagement, and supports a safe working environment in the welding shop.

## Curriculum Alignment

This course addresses learning outcomes from the updated Manitoba Grade 12D Applied Specialities and Qualifications curriculum and is aligned with selected Apprenticeship Manitoba Level 1 technical-training outcomes.

Primary Apprenticeship Manitoba units addressed include:

- A1 Learning About Work
- A2 Trade Safety Awareness
- A3 Tools and Equipment
- A4 Trade-Related Communications
- A13 Welder Practical Examination I

Supporting outcomes related to trade mathematics, materials and consumables, weld-process terminology, quality inspection, environmental responsibility, Indigenous perspectives, and workplace professionalism are integrated throughout the course.