

Grade 11C Basic SMAW (ARC) Procedures (30S)

Course Code: 8486

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

Basic SMAW (ARC) Procedures (30S) develops foundational skills in shielded metal arc welding and visual quality inspection.

Students learn to select electrodes, current type, polarity, and amperage; inspect and set up equipment; strike and maintain an arc; and produce consistent welds in basic positions. Practical work emphasizes bead control, flat and horizontal fillet welds, slag removal, troubleshooting, and correction of common discontinuities.

Instruction reflects the updated Manitoba curriculum and Apprenticeship Manitoba Level 1 outcomes for weld processes, quality inspection, and shielded metal arc welding.

Course Goals

Upon successful completion of this course, students will:

- Demonstrate safe work practices for SMAW equipment, electrodes, tools, and materials.
- Explain SMAW principles, terminology, electrical characteristics, and common applications.
- Interpret basic electrode classifications and select suitable electrodes, polarity, and amperage.
- Set up, inspect, operate, and shut down SMAW equipment safely.
- Strike, maintain, stop, and restart an arc while producing consistent weld beads.
- Prepare, fit, tack, and weld basic joints in the flat and horizontal positions.
- Remove slag and identify causes and corrections for common weld discontinuities.
- Inspect completed welds and demonstrate consistent workmanship and workplace professionalism.

Course Content

SMAW Safety and Shop Procedures (8 Hours)

Students review electrical shock, arc-radiation, fumes, fire, hot-metal, electrode-stub, slag, and grinding hazards. They apply PPE, ventilation, equipment inspection, cable management, and housekeeping procedures.

SMAW Principles, Power Sources and Polarity (10 Hours)

Students examine SMAW terminology, constant-current power sources, duty cycle, open-circuit voltage, amperage, arc characteristics, AC, DCEP, DCEN, and the applications and limitations of the process.

Electrodes and Consumable Control (10 Hours)

Students interpret basic AWS electrode classifications and compare electrode types, coverings, operating characteristics, positions, polarity, storage requirements, and applications, with emphasis on E6010/E6011 and E7018.

Equipment Setup and Arc Control (10 Hours)

Students inspect cables, electrode holders, work leads, and connections; select settings; strike and maintain an arc; control arc length; make starts and stops; restart welds; and shut down equipment safely.

Flat-Position Beads (14 Hours)

Students produce stringer and overlapping beads while controlling arc length, work angle, travel angle, travel speed, bead width, tie-in, slag removal, and restart quality.

Flat-Position Fillet Welds (18 Hours)

Students prepare and weld lap joints, T-joints, and corner joints in the flat position using suitable electrodes and techniques. Emphasis is placed on fusion, leg size, profile, and slag control.

Horizontal-Position Fillet Welds (16 Hours)

Students perform horizontal fillet welds while controlling bead placement, electrode angles, arc force, undercut, slag inclusions, overlap, and distortion.

Basic Groove Welds and Joint Assembly (10 Hours)

Students prepare, align, tack, and weld square-groove or basic prepared-groove joints as appropriate, using correct sequencing and cleaning between passes.

Quality Inspection, Repair and Final Assessment (14 Hours)

Students visually inspect weld size and profile, identify discontinuities, determine likely causes, adjust technique or settings, repair welds when appropriate, and complete final practical assessments or a small welded project.

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, 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, and teacher instructions.
- Wear required PPE before entering the shop.
- Respect classmates, instructors, equipment, materials, and facilities.
- Maintain a clean and organized work area.
- Participate fully in classroom and shop activities.
- Demonstrate responsibility, teamwork, communication, and professionalism.
- Complete assignments, weld samples, tests, and projects 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 11C Basic SMAW (ARC) Procedures curriculum and is aligned with selected Apprenticeship Manitoba Level 1 technical-training outcomes.

Primary Apprenticeship Manitoba units addressed include:

- A8 Weld Process and Quality Inspection I
- A11 Shielded Metal Arc Welding I

Supporting outcomes related to trade safety, career education, trade communication, trade mathematics, tools and equipment, materials and consumables, and workplace professionalism are integrated throughout the course.