Mechanical Technician - Welding Fitter

PROGRAM INFORMATION

Academic Year	2024 – 2025
Credential	Ontario College Diploma (2 Year)
Program Delivery	Full - Time
Length	3 Semesters
Program Code	W251 (KL) – Kirkland Lake

DESCRIPTION

Vital to every industrial process.

From mining to manufacturing, Northern's Mechanical Technician – Welding Fitter diploma will set you up with a top-notch skillset and a rewarding career to match. Thanks to a hands-on apprentice-style curriculum, you'll spend three semesters learning how to diagnose, install and maintain a wide range of industrial machinery. And along the way, you'll learn to fabricate and weld a variety of parts and shapes – including cones, chutes and hoppers. Beyond your critical training in the shop, you'll also hone your freehand and computer-assisted drafting skills. You'll nail trade related math problems and learn to make precision measurements. And you'll master the techniques, codes and standards that keep you safe on the job – all while delivering the consistent, high quality results that are guaranteed to set you apart.

Welding Program Pathways (PDF)

Welding Information (PDF, 114Kb)

CAREER OPPORTUNITIES

Mechanical Technician – Welding Fitters install, repair and maintain a variety of machinery and are vital to various plant operations. The Mechanical Technician – Welding Fitter may find employment in the mining, manufacturing, steel, construction and hydro industries, as well as various others.

VOCATIONAL LEARNING OUTCOMES

1. Complete all work in compliance with current legislation, standards, regulations and guidelines.
2. Apply quality control and quality assurance procedures to meet organizational standards and requirements.
3. Comply with current health and safety legislation, as well as organizational practices and procedures.
4. Apply sustainability best practices in workplaces.
5. Use current and emerging technologies to implement mechanical and manufacturing projects.
6. Analyze and solve mechanical problems by applying mathematics and fundamentals of mechanics.
7. Interpret, prepare and modify mechanical drawings and other related technical documents.
8. Perform technical measurements accurately using appropriate instruments and equipment.
9. Manufacture, assemble, maintain and repair mechanical components according to required specifications.
10. Contribute to the planning, implementation and evaluation of projects.

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PROGRAM COURSES

The following reflects the planned course sequence for full-time offerings of the program. Programs at Northern College are delivered using a variety of instruction modes. Courses may be offered in the classroom or lab, entirely online, or in a hybrid mode which combines classroom sessions with virtual learning activities.

Semester 1	**Hours**
EN1592 Communication Fundamentals	28
GN1033 Health and Safety	42
GN2043 Health and Wellness	42
MA1032 Mathematics for Welder Fitters I	30
MM1024 Welding Technical Drawings I	60
MW1004 Welding Theory I	60
PS3033 Abnormal Psychology	42
WE1010 Welding Skills I	132
WE1013 Introduction to Welding	48
Semester 2	
EN1582 Applied Communications I	28
GN1443 Indigenous Culture and Awareness	42
MA2032 Mathematics for Welder Fitters II	30
MM2044 Welding Technical Drawings II	60
MW2002 Codes and Standards	30
MW2004 Welding Theory II	60
MW2012 Welding Skills II	180
Semester 3	
MA3003 Mathematics & Precision Measurements III	44
MW3003 CNC Controls	44
MW3008 Welding Skills III	114
MW3013 Quality Control	44
MW3023 Technical Drawing III	44

PROGRAM PROGRESSION

The following reflects the planned progression for full-time offerings of the program.

Fall Intake
Sem 1: Fall 2024
Sem 2: Winter 2025

Winter Intake
Sem 1: Winter 2025
Sem 2: Summer 2025

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WORK INTEGRATED LEARNING OPPORTUNITIES

N/A

ARTICULATION/TRANSFER AGREEMENTS

A number of articulation agreements have been negotiated with universities and other institutions across Canada, North America and internationally. These agreements are assessed, revised and updated on a regular basis. Please contact the program coordinator for specific details if you are interested in pursuing such an option. Additional information can be found at Articulation Agreements.

ADDITIONAL INFORMATION

N/A

PROGRAM SPECIFIC REQUIREMENTS

N/A

ADMISSION REQUIREMENTS

- Ontario Secondary School Diploma (OSSD)
- Grade 12 English (C, U)
- Grade 11 Math (C, M, U)
- Or equivalent

Academic prerequisites for this program may be obtained free of charge through Academic Upgrading. Applicants who do not have a high school diploma or equivalent and will have reached the age of 19 years on or before the start of the program must undergo academic testing and may be required to complete Prior Learning Assessment & Recognition (PLAR) process to demonstrate equivalency of admission requirements prior to admission into a program. For more details, please contact the Admissions Office at 705-235-7222 or admissions@northern.on.ca.

GRADUATION REQUIREMENTS

18 Program Courses
2 Communications Courses
3 General Education Courses

GRADUATION ELIGIBILITY

To graduate from this program, a student must attain a minimum of 60% or a letter grade of CR (Credit) in each course in each semester unless otherwise stated on the course outline. Students should consult departmental policies and manuals for additional detail and exceptions.

GRADUATION WINDOW

Students unable to adhere to the program duration of two years (as stated above) may take a maximum of four years to complete their credential. After this time, students must be re-admitted into the program, and follow the curriculum in place at the time of re-admission.

CONTACT INFORMATION

For questions about being admitted into the program, please contact Northern College Admissions at admissions@northern.on.ca or by phone at 705-235-3211 ext. 7222. For questions about the content of the program, contact the Program Coordinator.

Joshua Fuller, Program Coordinator
Tel: 705-567-9291 ext. 3750
Email: welding@northern.on.ca

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COURSE DESCRIPTIONS

Semester 1

EN1592 Communication Fundamentals
Communication Fundamentals will provide students with an opportunity to reinforce their use of Standard English, develop their abilities to communicate effectively in the workplace and improve their capabilities with computer technology, particularly in using Word, Excel and ProDemand to produce accurate and professional documents. As well, students will be required to use information technology like Blackboard and their own computing devices to research information online to learn about their trade pathway, find technical information using an industry system like ProDemand, and to complete course assignments.

GN1033 Health and Safety
This course introduces the student to health and safety in their home, in society and within an occupational setting. Students learn about the social and personal benefits of safe work practices and the methods to best prevent accidents or injuries. Students will review the role, right and responsibilities of an individual in today's health and safety conscious world. Students also learn how to read and interpret the Occupational Act and Regulations.

GN2043 Health and Wellness
To Be Updated

MA1032 Mathematics for Welder Fitters I
The Mathematics & Precision Measurement I course for the Mechanical Technician – Welding Fitter program consists of trade related mathematical problems and their solutions. The course begins with a review of essential mathematical concepts required in a variety of trade-related practices and applications and moves into a introduction to precision measurement tools. Early concepts include a brief review of BEDMAS, averages, and estimation and then study units deal with fraction, decimal, and percent uses relevant to work carried out in the workplace.

MM1024 Welding Technical Drawings I
In this introductory course, students will develop the ability to draw, sketch, read, and interpret engineering drawings and schematics similar to those found in the machine or welding fabrication industry. The course introduces students to structural steel shapes as well as basic layout and fitting techniques. Topics include: basic drafting skills, shape description (orthographic and pictorial), sections, structural steel shapes, sketching, layout, fitting, joint design and welding symbols.

MW1004 Welding Theory I
Students will describe the function and controls of welding power sources in accordance with safety regulations and approved industry standards, and will be introduced to the fundamentals, equipment requirements, and characteristics of the welding processes: SMAW, GMAW, FCAW, MCAW, and GTAW.

MW1012 Welding Skills I
Students will learn to work in a shop environment in accordance with safety regulations and industry standards, and will be able to describe all methods of safe handling of material in the shop or in field situations. Students will describe the use and safe handling of small hand tools, power tools and fabrication machinery; describe

and correctly use manual and machine oxy-fuel cutting methods; and will set-up and use the following processes: SMAW, FCAW, and GMAW. They will apply this to various weld joint configurations.

PS3033 Abnormal Psychology
This course examines various perspectives of abnormal psychology. We seek to understand the nature, causes, and treatment of abnormal behaviour. Several theoretical viewpoints will frame our discussion of abnormal psychology. The patterns of abnormal (maladaptive) behaviour to be examined are: behaviour and emotional disorders of childhood and adolescence, eating disorders, substance-related disorders, anxiety disorders, dissociative and somatoform disorders, personality disorders, mood disorders, and schizophrenia. Students will also study treatment strategies and mental health law in Canada.

WE1010 Welding Skills I
To Be Updated

WE1013 Introduction to Welding
This practical skills course begins with an introduction to welding safety. Students are provided an opportunity to learn the basics of oxy-acetylene welding and cutting, including assembly and disassembly. Shielded Metal Arc Welding (SMAW) and Flux Cored Arc Welding (FCAW) are also introduced at a basic level.

Semester 2

EN1582 Applied Communications I
This course is required in the second semester of the Motive Power Technician – Automotive Service, Heavy Equipment Techniques, Motive Power Technician – Heavy Equipment and Mechanical Technician and Techniques – Industrial Millwright and Mechanical Technician – Welding Fitter trades programs at Northern College. The purpose of this course is to give students an opportunity to develop and enhance basic communication skills as required in the workplace. Students will also be required to use a computer to complete assignments and other course work, work independently and collaboratively, follow instructions and complete assigned tasks on time.

GN1443 Indigenous Culture and Awareness
This general education course will provide students with an introduction to Canadian Indigenous Nations' history, sovereignty, land titles, cultural history and current critical issues. Topics addressed include the content of Indigenous rights, economic and social development, community and political processes, and business law and policies, justice & social services. Canadian Indigenous History and Relations is a general education course that has been incorporated into all programs at Northern College.

MA2032 Mathematics for Welder Fitters II
The Mathematics course consists of trade related mathematical problems and their solutions. Realistic mathematical problems in welding and fabrication are used to strengthen both mathematical and technical skills. The student will be required to keep pace throughout the course and tests must be written on the specified dates. Adequate notification of all tests will be given.

MM2044 Welding Technical Drawings II
Students learn the use of computer aided drafting with hands on practical with the latest version of AutoCAD.

MW2002 Codes and Standards
This course will cover the terms code, standard and specification. The student will learn the advantages of standardization; identify the agencies that set codes and standards; identify and understand codes governing welding in Canada for structural steel, boilers and pressure vessels, piping systems, pipelines and transmission systems, and storage tanks. The student will be able to understand and follow welding procedure and performance qualifications.

MW2004 Welding Theory II
In accordance with safety regulations and industry standards, this course provides a working knowledge of brazing of deoxidized copper with oxy-fuel equipment, characteristics of metals and their alloys, classifications and effects of welding, and the functions and application of destructive and non-destructive testing methods for welds.

MW2012 Welding Skills II
Students will advance their knowledge in the use of the SMAW, FCAW and GMAW processes by applying it to welding in all four positions: flat, horizontal, vertical and overhead, and will complete bend tests, and tests for all CWB test coupons. Students will learn all aspects of the use and set up of the GTAW process and use these on the following materials: mild steel, stainless steel and aluminum. Students will perform the safe set up, operation and correction of common cutting faults for the PAC and CAC-A processes.

Semester 3

MA3003 Mathematics & Precision Measurements III
The Mathematics course for the Mechanical Technician – Welding Fitter consists of trade related mathematical problems and their solutions. Realistic mathematical problems in welding and fabrication are used to strengthen both mathematical and technical skills.

MW3003 CNC Controls
Students will demonstrate the basics of programming for robots with CNC custom macros, and will understand and apply G&M codes used in some automated systems. Students will understand and apply methods used in programming automated cutting equipment and welding equipment.

MW3008 Welding Skills III
Students will apply their knowledge to the welding of open joints such as high pressure pipe, and will work on using the walk-the-cup technique for tig welding on pipe. They will use the method of destructive testing to test the quality of the weld, and will learn how to minimize distortion by welding around the neutral axis of a weld joint; and will learn to program and run programmable cutting equipment. Students will contribute to the completion of a welding manufacturing project.

MW3013 Quality Control
Students will understand and use common non-destructive inspection techniques and equipment: visual, dye penetrant, magnetic particle, ultrasonic and radiographic examination. The students will demonstrate a basic proficiency in the use of visual, dye penetrant and magnetic particle inspection. Students will develop knowledge of jigs and fixtures to control distortion and to ensure multiple parts dimensions remain consistent.

MW3023 Technical Drawing III
Students learn the advanced use of computer aided drafting with hands on practical with the latest version of AutoCAD.