



9029

INTRODUCTION TO COLLISION
REPAIR AND REFINISHING
TECHNOLOGY (10)

20S/20E/20M

A Collision Repair and Refinishing Technology Course

9029: INTRODUCTION TO COLLISION REPAIR AND REFINISHING TECHNOLOGY (10) 20S/20E/20M

Course Description

In this entry-level course, the emphasis is on hands-on learning activities. Students will learn to follow safety procedures, select and use hand and power tools and abrasives, operate a metal inert gas (MIG) welder on sheet metal, operate oxyacetylene welding and cutting equipment, repair minor damage, apply body filler, prepare panels for painting, and detail vehicles.

Goal 1: Describe and apply appropriate **health and safety** practices.

GLO 1.1: Describe and apply appropriate **health and safety** practices.

- SLO 10.1.1.1: Identify safety and health requirements. (A2.1)
- SLO 10.1.1.2: Identify personal protective equipment (PPE) and procedures and describe the importance of using them. (A2.2) (TSA 16)
- SLO 10.1.1.3: Identify electrical safety and outline the safety principles for working on and around electrical equipment. (A2.3) (TSA 18)
- SLO 10.1.1.4: Identify fire safety practices and outline workplace fire safety principles. (A2.4) (TSA 19)
- SLO 10.1.1.5: Recognize and control hazards. (A2.6)
- SLO 10.1.1.6: Identify the hazards in confined spaces and the preparation needed to work in a confined space. (A2.7) (TSA 20)
- SLO 10.1.1.7: Identify First Aid/CPR. (A2.8)
- SLO 10.1.1.8: Explain the Workplace Hazardous Material Information System (WHMIS) and identify the WHMIS safety requirements. (A2.9) (TSA 13)
- SLO 10.1.1.9: Identify and control hazards. (A2.10)
- SLO 10.1.1.10: Identify safety precautions related to gas metal arc welding. (C2.2)
- SLO 10.1.1.11: Identify and describe safety considerations and procedures related to fasteners and adhesives. (D2.1)
- SLO 10.1.1.12: Practise safety precautions related to batteries. (B2.8)
- SLO 10.1.1.13: Identify safety considerations when working with body fillers and abrasives. (F2.4)

- SLO 10.1.1.14: Create and maintain a safe and organized working environment.
 - SLO 10.1.1.15: Follow guidelines listed in the Safe Work Procedure for specific tasks.
 - SLO 10.1.1.16: Describe and demonstrate safety considerations when using cutting and heating equipment. (C1.1)
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GLO 1.2: Demonstrate knowledge of the *Trade Safety Awareness Manual*.

- SLO 10.1.2.1: Explain the importance of trade safety and health in reducing injuries and fatalities to young employees in Manitoba. (TSA 1)
 - SLO 10.1.2.2: Describe the rights and responsibilities of employees, employers, and supervisors under *The Workplace Safety and Health Act*. (TSA 2)
 - SLO 10.1.2.3: Describe the steps to use in the Right to Refuse process. (TSA 3)
 - SLO 10.1.2.4: Explain how and where to find information on workplace safety and health. (TSA 4)
 - SLO 10.1.2.5: Demonstrate how to handle a potentially dangerous work situation. (TSA 5)
 - SLO 10.1.2.6: Explain the S.A.F.E. acronym. (TSA 6)
 - SLO 10.1.2.7: Define workplace safety and health hazards. (TSA 7)
 - SLO 10.1.2.8: Give examples of trade-specific (collision repair and refinishing technology) workplace safety and health hazards. (TSA 8)
 - SLO 10.1.2.9: Give examples of five types of safety and health hazards. (TSA 9)
 - SLO 10.1.2.10: Define workplace safety and health risks. (TSA 10)
 - SLO 10.1.2.11: Give examples of trade-specific (collision repair and refinishing technology) workplace safety and health risks. (TSA 11)
 - SLO 10.1.2.12: Explain the principles of hazard recognition and control as they apply to collision repair and refinishing technology. (TSA 12)
 - SLO 10.1.2.13: Match the WHMIS hazardous materials symbols and their meanings. (TSA 14)
 - SLO 10.1.2.14: Describe the importance of the Material Safety Data Sheets (MSDS). (TSA 15)
 - SLO 10.1.2.15: Demonstrate proper selection and use of a variety of personal protective equipment and fall protection systems. (TSA 17)
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Goal 2: Select, use, and manage tools and equipment.**GLO 2.1: Select and manage tools and equipment.**

SLO 10.2.1.1: Identify, describe, and demonstrate care and maintenance procedures related to tools and equipment. (A4.10, A4.17)

GLO 2.2: Use tools and equipment.

SLO 10.2.2.1: Identify types of hand tools, and demonstrate their applications and procedures for use. (A4.1, A4.11)

SLO 10.2.2.2: Identify types of basic measuring equipment, and demonstrate their applications and procedures for use. (A4.2, A4.12)

SLO 10.2.2.3: Identify and describe gas metal arc welding equipment and accessories. (C2.3)

SLO 10.2.2.4: Identify types of power tools and demonstrate their applications and procedures for use. (A4.5, A4.14)

SLO 10.2.2.5: Identify and demonstrate the use of types of shop equipment, and describe their applications. (A4.6, A4.15)

SLO 10.2.2.6: Identify types of refinishing and detailing tools and equipment, and describe their applications. (A4.9)

Goal 3: Demonstrate vehicle damage analysis and repair estimation.**GLO 3.1: Demonstrate vehicle damage analysis.**

SLO 10.3.1.1: Identify damage on sheet metal surfaces.

GLO 3.2: Demonstrate vehicle repair estimation.

No applicable SLOs.

Goal 4: Demonstrate **welding** procedures.**GLO 4.1:** Demonstrate **welding** procedures.

- SLO 10.4.1.1: Prepare surfaces for welding.
 - SLO 10.4.1.2: Identify cutting and heating processes, and describe their application. (C1.2)
 - SLO 10.4.1.3: Identify and describe equipment, components, and accessories used in cutting and heating processes. (C1.3)
 - SLO 10.4.1.4: Describe the procedures to set up, maintain, and shut down oxyacetylene equipment. (C1.4)
 - SLO 10.4.1.5: Describe the procedures to set up, maintain, and shut down plasma arc cutting equipment. (C1.5)
 - SLO 10.4.1.6: Describe the procedures used to cut with oxyacetylene equipment. (C1.6)
 - SLO 10.4.1.7: Describe the procedures used to cut with plasma arc cutting equipment. (C1.7)
 - SLO 10.4.1.8: Describe the procedures used to heat with oxyacetylene equipment. (C1.8)
 - SLO 10.4.1.9: Set up and shut down oxyacetylene equipment. (C1.9)
 - SLO 10.4.1.10: Perform heating and cutting procedures with plasma arc equipment. (C1.10)
 - SLO 10.4.1.11: Define and describe GMAW (gas metal arc welding), related terminology, and its applications. (C2.1)
 - SLO 10.4.1.12: Identify the types of welds performed using GMAW equipment. (C2.4)
 - SLO 10.4.1.13: Describe the procedures used to gas metal arc weld various substrates. (C2.5)
 - SLO 10.4.1.14: Identify weld defects, their causes, and the procedures to prevent and correct them. (C2.6)
 - SLO 10.4.1.15: Operate, troubleshoot, and maintain GMAW equipment. (C2.7)
 - SLO 10.4.1.16: Describe and perform various types of welds (lap, butt, flat, plug, recessed, tack, stitch, and continuous) in various positions (overhead, horizontal, and vertical). (C2.8)
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Goal 5: Demonstrate structural repair.**GLO 5.1: Demonstrate an understanding of vehicle construction.**

No applicable SLOs.

GLO 5.2: Demonstrate measuring and gauging.

SLO 10.5.2.1: Identify and describe point-to-point measuring tools and accessories. (Level 2, F7.1)

GLO 5.3: Perform structural repairs.

SLO 10.5.3.1: Identify the importance of restoring vehicles to manufacturer's specifications.

SLO 10.5.3.2: Describe the procedures and techniques used to protect electrical and electronic systems and components during repair. (Level 3, F5.9)

Goal 6: Demonstrate sheet metal repair.**GLO 6.1: Demonstrate an understanding of the properties of metal.**

SLO 10.6.1.1: Identify the types of automotive sheet metal. (F1.1)

SLO 10.6.1.2: Identify alternative construction materials.

GLO 6.2: Repair sheet metal.

SLO 10.6.2.1: Identify and describe types of damage to sheet metal. (F1.2)

SLO 10.6.2.2: Identify considerations when performing metal work on sheet metal. (F1.3)

SLO 10.6.2.3: Describe the methods used to detect surface irregularities. (F1.6)

SLO 10.6.2.4: Describe the procedures used to rough out and align damaged sheet metal. (F1.7)

SLO 10.6.2.5: Describe the procedures used to prepare sheet metal for application of fillers. (F1.8)

SLO 10.6.2.6: Describe the procedure for correcting rust perforation. (F1.9)

Goal 7: Select, use, and manage **seam sealers, fillers, and adhesives.**

GLO 7.1: Select, use, and manage **seam sealers** and **adhesives.**

No applicable SLOs.

GLO 7.2: Select, use, and manage **fillers.**

- SLO 10.7.2.1: Identify the types of body fillers, and describe their characteristics and applications. (F2.3)
 - SLO 10.7.2.2: Describe the techniques and procedures used to apply body fillers. (F2.5)
 - SLO 10.7.2.3: Describe the procedures and techniques for shaping and finishing body fillers. (F2.6)
 - SLO 10.7.2.4: Demonstrate proper surface preparations for application of body fillers. (F2.7)
 - SLO 10.7.2.5: Demonstrate mixing and applying fillers. (F2.8)
 - SLO 10.7.2.6: Demonstrate procedures and methods for detecting high and low spots. (F2.9)
 - SLO 10.7.2.7: Demonstrate the procedures and techniques for shaping and finishing fillers. (F2.10)
 - SLO 10.7.2.8: Perform procedures used to detect surface irregularities. (F2.11)
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Goal 8: Select, use, and manage **fasteners.**

GLO 8.1: Select, use, and manage **fasteners.**

No applicable SLOs.

Goal 9: Demonstrate **glass repair and replacement.**

GLO 9.1: Demonstrate **glass repair and replacement.**

No applicable SLOs.

Goal 10: Demonstrate repair and replacement of **upholstery, trim, and hardware.**

GLO 10.1: Repair and replace **upholstery.**

No applicable SLOs.

GLO 10.2: Repair and replace **trim and hardware.**

No applicable SLOs.

Goal 11: Demonstrate **surface preparation.**

GLO 11.1: Select, use, and manage **materials other than abrasives** used in surface preparation.

SLO 10.11.1.1: Identify products used to clean surfaces, their applications, and the procedures for use. (H1.2)

SLO 10.11.1.2: Identify substrate types, and describe the procedures and considerations for evaluating their condition. (H1.3)

SLO 10.11.1.3: Describe and demonstrate surface preparation of substrates. (H1.6)

SLO 10.11.1.4: Describe and demonstrate masking and unmasking techniques. (H1.7)

GLO 11.2: Select, use, and manage **abrasives** used in surface preparation.

SLO 10.11.2.1: Identify the types of abrasives, and describe their characteristics and applications. (F2.1)

SLO 10.11.2.2: Describe the procedures and techniques for using abrasives. (F2.2)

GLO 11.3: Prepare substrates.

SLO 10.11.3.1: Describe ideal working conditions for surface preparation. (H1.1)

SLO 10.11.3.2: Identify topcoats and undercoats, and describe the procedures and considerations for evaluating their condition. (H1.4)

SLO 10.11.3.3: Identify and describe the methods involved in stripping topcoats, undercoats, and paint. (H1.5)

Goal 12: Demonstrate **refinishing.****GLO 12.1: Demonstrate **refinishing** processes.**

SLO 10.12.1.1: Demonstrate the ability to apply primers. (H1.8)

SLO 10.12.1.2: Demonstrate the ability to use proper spray gun technique and to maintain equipment. (H1.9)

Goal 13: Demonstrate **cleaning and detailing.****GLO 13.1: Demonstrate **cleaning and detailing**.**

SLO 10.13.1.1: Clean vehicles in order to prepare them for repair and refinishing.

Goal 14: Describe **vehicle systems.****GLO 14.1: Describe **vehicle systems**.**

No applicable SLOs.

Goal 15: Describe and demonstrate transferable **cross-curricular knowledge and skills.****GLO 15.1: **Read, interpret, and communicate** information.**

SLO 10.15.1.1: Read, interpret, and communicate terminology and acronyms related to collision repair and refinishing.

SLO 10.15.1.2: Identify sources of related information. (A5.1)

SLO 10.15.1.3: Identify and interpret information found on the vehicle. (A5.2)

GLO 15.2: Apply knowledge and skills from **mathematics.**

SLO 10.15.2.1: Demonstrate trade-related calculations as specified by instructor. (B2.4)

SLO 10.15.2.2: Perform basic arithmetic. (B1.6)

SLO 10.15.2.3: Demonstrate proficiency in the use of fractions, decimals, percentages, and ratios.

SLO 10.15.2.4: Convert between imperial and metric units of measurement.

SLO 10.15.2.5: Demonstrate proficiency in the use of measurement tools such as tape measures and rulers.

GLO 15.3: Apply knowledge and skills from **information and communication technology.**

No applicable SLOs.

GLO 15.4: Apply knowledge and skills from the **sciences**.

No applicable SLOs.

Goal 16: Understand **career opportunities** and the **working environment**.

GLO 16.1: Describe **education, career opportunities, professional organizations, and working environments** related to collision repair and refinishing technology and associated fields.

SLO 10.16.1.1: Describe the structure and scope of the trade. (A1.1)

SLO 10.16.1.2: Describe the Manitoba apprenticeship program. (A1.2)

Goal 17: Demonstrate an awareness of **sustainability**.

GLO 17.1: Describe the effects of collision repair and refinishing technology on **human health and well-being**, including on tradespersons working in the field and those who use their services.

SLO 10.17.1.1: Demonstrate the use of dust collection systems.

SLO 10.17.1.2: Identify ergonomics. (A2.5)

SLO 10.17.1.3: Discuss the health effects of exposure to chemicals found in the collision repair and refinishing industry.

GLO 17.2: Describe collision repair and refinishing technology's **sustainability practices** and **impact on the environment**.

SLO 10.17.2.1: Discuss the importance of following environmentally appropriate procedures in the disposing and recycling of hazardous materials.

Goal 18: Demonstrate an awareness of **ethical and legal standards** as they pertain to collision repair and refinishing technology.

GLO 18.1: Practise **ethical and legal standards** as they pertain to collision repair and refinishing technology.

SLO 10.18.1.1: Discuss ethics.

SLO 10.18.1.2: Discuss the legal requirements for restoring vehicles to pre-accident conditions.

Goal 19: Demonstrate **employability skills.****GLO 19.1: Demonstrate fundamental **employability skills**.**

- SLO 10.19.1.1: Demonstrate regular and punctual attendance.
 - SLO 10.19.1.2: Demonstrate the ability to communicate respectfully and effectively with teachers, supervisors, co-workers, and students.
 - SLO 10.19.1.3: Demonstrate accountability by taking responsibility for own actions.
 - SLO 10.19.1.4: Demonstrate adaptability, initiative, and effort.
 - SLO 10.19.1.5: Demonstrate teamwork skills.
 - SLO 10.19.1.6: Demonstrate the ability to stay on task and effectively use time in class and work environments.
 - SLO 10.19.1.7: Demonstrate the responsible use of wireless communication devices.
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GLO 19.2: Demonstrate an awareness of **cultural proficiency and its importance in the workplace.**

- SLO 10.19.2.1: Demonstrate an awareness of culture.
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GLO 19.3: Demonstrate an understanding of the **business operation of a collision repair and refinishing technology facility.**

No applicable SLOs.

GLO 19.4: Demonstrate **critical thinking skills in planning, procedures, analysis, and diagnosis.**

- SLO 10.19.4.1: Discuss the need for critical thinking.
 - SLO 10.19.4.2: Discuss the need for problem-solving skills.
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Goal 20: Demonstrate an understanding of the **evolution of collision repair and refinishing technology, including its **technological progression and emerging trends**.****GLO 20.1: Describe the **evolution** of collision repair and refinishing technology, including its **technological progression and emerging trends**.**

- SLO 10.20.1.1: Discuss the need to adapt to changing technologies.
 - SLO 10.20.1.2: Discuss the need for lifelong learning in collision repair and refinishing technology.
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