



8698

CHASSIS FUNDAMENTALS
AND SERVICE (11B)

30S/30E/30M

An Automotive Technology Course

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Course Description

A student wanting to develop skills in the automotive industry must have knowledge of the basic principles of the vehicle chassis and its braking system. The student will be able to describe, diagnose, and repair braking, steering, and suspension systems. The student will develop an understanding of the principles of wheel and steering alignment and be able to apply the principles to diagnose and align steering systems. This course focuses on the following unit in the Apprenticeship Manitoba Level 1 technical training:

- Unit A8: Steering and Suspension Systems I
- Unit A10: Braking Systems I (Non-ABS)

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

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

- SLO 11B.1.1.1 Adhere to safe practices and procedures for facilities, processes, materials, tools, and equipment.
- SLO 11B.1.1.2 Identify the process for reporting injuries.
- SLO 11B.1.1.3 Identify hazards and adhere to safe work practices pertaining to hoisting and lifting.
- SLO 11B.1.1.4 Create and maintain a safe and organized working environment.
- SLO 11B.1.1.5 Demonstrate the ability to follow safety information on supplier labels.
- SLO 11B.1.1.6 Demonstrate the ability to locate first aid and eyewash stations.
- SLO 11B.1.1.7 Identify safety and health requirements. (A2.1)
 - overview of *The Workplace Safety and Health Act*
 - rights and responsibilities of employees under the *Act*
 - rights and responsibilities of employers under the *Act*
 - rights and responsibilities of supervisors under the *Act*
 - fourteen (14) regulations
 - codes of practice
 - guidelines

- right to refuse
 - explanation of right to refuse process
 - rights and responsibilities of employees
 - rights and responsibilities of employers
 - rights and responsibilities of supervisors under the *Act*

SLO 11A.1.1.8 Identify personal protective equipment (PPE) and procedures. (A2.2) (TSA 16)

- employer and employee responsibilities as related to personal protective equipment
- standards: ANSI (U.S.A. standards), etc.
- work protective clothing and danger if it fits poorly
- gloves—importance of proper glove selection (when handling chemicals, cold items, slivers, etc.)
- headwear—appropriate protective headwear when required and the approved type of headwear
- eye protection—comparison and distinction of everyday eyeglasses, industrial safety glasses, and safety goggles
- foot protection—when required according to safety standards
- hearing protection
 - hazards of various noise levels (hearing protection must be worn)
 - laws
 - types of hearing protection
- respiratory protection—types, overview of proper selection
- fall protection—Manitoba requirements standards guidelines
 - ANSI (U.S.A. standards), etc.
- ladders and scaffolding
- safety principles for working with or around industrial trucks site-specific (forklifts, pallet trucks, etc.)

- SLO 11A.1.1.9 Outline the safety principles for working on and around electrical or energized equipment. (A2.3) (TSA 18)
- effects of electric current on the human body
 - three factors that affect the severity of an electric shock
 - the effects of ARC and blast on the human body and equipment
 - work with energized equipment
- SLO 11A.1.1.10 Identify fire safety and outline workplace fire safety principles. (A2.4) (TSA 19)
- types of fires
 - types of firefighting equipment
 - classifications of fire extinguishers (A, B, and C)
 - location of fire extinguishers and fire exits
 - fire alarms and drills
- SLO 11A.1.1.11 Identify ergonomics. (A2.5)
- definition of ergonomics and conditions that may affect the body
 - working postures
 - repetition
 - force
 - lifting
 - tools
 - identify tool and safety equipment
 - causes of hand-tool accidents
 - equipment
- SLO 11A.1.1.12 Recognize, report, and control hazards. (A2.6)
- safe-work practices
 - basic risk assessment
 - injury prevention and control measures
 - identification of hazards involved in pneumatic tool use and explanation of how to guard against them

SLO 11A.1.1.13 Identify the hazards in confined spaces and the preparation needed to work in them. (A2.7) (TSA 20)

- identification of a confined space
- hazards of a confined space
 - physical
 - biological
- working in a confined space
- emergency response plan
- self-contained breathing apparatus (SCBA)

SLO 11A.1.1.14 Identify first aid/CPR. (A2.8)

- overview of first-aid regulation
- obligations of employers regarding first aid
 - Who is certified to provide first aid?
 - What to do while waiting for help?
 - Where is the first-aid kit?
- describe basic first-aid requirements and techniques
 - scope and limits of first-aid intervention
 - specific interventions (cuts, burns, abrasions, fractures, suffocation, shock, electrical shock, etc.)
 - What is it?
 - interface with other services and agencies (e.g., Workers Compensation claims)
- describe basic CPR requirements and techniques
 - How do you get certified?
 - scope and limits of CPR intervention (include varieties of CPR certification)

SLO 11A.1.1.15 Identify the safety requirements as they apply to WHMIS with emphasis on: (A2.9) (TSA 13)

- WHMIS is a system
- provincial regulation under *The Workplace Safety and Health Act*
 - each province has a WHMIS regulation
- federal *Hazardous Products Act*
- WHMIS generic training:
 - WHMIS defined and the format used to convey information about hazardous materials in the workplace

- information found on supplier and workplace labeling using WHMIS
- hazardous materials in accordance with WHMIS
- compliance with government safety standards and regulations
- description of WHMIS (include varieties of WHMIS certification)
 - typology of WHMIS labels, symbols, and classifications
 - scope and use of Materials Safety Data Sheets (MSDS)

SLO 11A.1.1.16 Identify and control hazards. (A2.10)

- basic control measures (injury prevention)
- safe-work procedures
- explanation on the importance of industrial housekeeping
- employer responsibilities
- how and where to store materials
- safety measures related to walkways, stairs, and floor openings
- explanation of how to protect the worker and others when working in traffic paths

GLO 1.2: Demonstrate awareness of safety as it pertains to the ***Trade Safety Awareness Curriculum for Level 1 Apprentices.***

No applicable SLOs.

Goal 2: Select, use, and manage **tools, equipment, materials, and consumables.**

GLO 2.1: Select, use, and manage **tools and equipment.**

SLO 11B.2.1.1 Select, use, and manage tools and equipment used in chassis fundamentals and service.

SLO 11B.2.1.2 Identify hazards and describe safe work practices pertaining to the use of tools and equipment. (A3.1)

GLO 2.2: Select, use, and manage **materials and consumables.**

No applicable SLOs.

Goal 3: Describe, inspect, diagnose, service, and repair automotive components and systems.

GLO 3.1: Describe automotive components and systems.

- SLO 11B.3.1.1 Define terminology associated with steering and suspension systems. (A8.1)
- SLO 11B.3.1.2 Identify hazards and describe safe work practices pertaining to steering and suspension systems. (A8.2)
- SLO 11B.3.1.3 Identify tools and equipment relating to steering and suspension systems, and describe their applications and procedures for use. (A8.3)
- SLO 11B.3.1.4 Identify types of suspension systems and describe their components and operation. (A8.4)
 - independent
 - solid axle
- SLO 11B.3.1.5 Identify types of frames and body construction. (A8.5)
- SLO 11B.3.1.6 Identify types of steering and suspension systems, and describe their components and operation. (A8.6)
 - steering
 - linkage
 - rack-and-pinion
 - recirculating ball
 - suspension
 - coil springs
 - leaf springs
 - torsion bar springs
 - air springs
 - struts
 - shocks
- SLO 11B.3.1.7 Identify types of steering-assist systems and describe their components. (A8.7)
 - electric
 - hydraulic
 - variable
- SLO 11B.3.1.8 Identify types of fluids and lubricants, fasteners, tubing, hoses, gaskets, and seals, and describe their applications. (A8.8)

Braking Systems:

- SLO 11B.3.1.9 Define terminology associated with braking systems. (A10.1)
- SLO 11B.3.1.10 Identify hazards and describe safe work practices pertaining to braking systems. (A10.2)
 - hydraulic pressure
- SLO 11B.3.1.11 Explain hydraulic principles related to braking systems. (A10.3)
 - Pascal's law
- SLO 11B.3.1.12 Identify types of tools and equipment relating to braking systems, and describe their applications and procedures for use. (A10.4)
- SLO 11B.3.1.13 Identify types of braking systems, and describe their components and operation. (A10.5)
 - disc
 - drum
 - parking
- SLO 11B.3.1.14 Identify types of power assists, and describe their components and operation. (A10.6)
 - vacuum
 - hydraulic
 - electric
- SLO 11B.3.1.15 Identify types of fluids, and describe their applications and procedures for use. (A10.7)
- SLO 11B.3.1.16 Identify types of fittings, flaring, tubing, and hoses, and describe their applications and procedures for use. (A10.8)

Hubs:

- SLO 11B.3.1.17 Identify types of hubs and bearing assemblies, and describe their components and operation. (A11.6)
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GLO 3.2: Inspect and diagnose automotive components and systems.

- SLO 11B.3.2.1 Demonstrate the ability to perform basic diagnostic procedures of steering and suspension systems and components.
 - SLO 11B.3.2.2 Demonstrate the ability to perform a pre-alignment inspection.
 - SLO 11B.3.2.3 Demonstrate the ability to diagnose and interpret wheel alignment readings.
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GLO 3.3: Service and repair automotive components and systems.

- SLO 11B.3.3.1 Describe the procedures used to perform wheel alignments.
 - SLO 11B.3.3.2 Demonstrate the ability to perform wheel alignments.
 - SLO 11B.3.3.3 Describe the procedures used to adjust, repair, and replace suspension system components.
 - SLO 11B.3.3.4 Demonstrate the ability to adjust, repair, and replace suspension system components.
 - SLO 11B.3.3.5 Describe the procedures used to adjust, repair, and/or replace steering system components.
 - SLO 11B.3.3.6 Demonstrate the ability to adjust, repair, and/or replace steering system components.
 - SLO 11B.3.3.7 Describe and demonstrate the procedures used to diagnose and repair braking systems. (A10.9)
 - flush and bleed hydraulic brakes
 - measure and machine components
 - adjust, inspect, repair, and/or replace braking system components
 - SLO 11B.3.3.8 Describe and demonstrate the procedures used to diagnose, adjust, repair, and/or replace hubs. (A11.8)
(Note: This SLO is repeated in 8696 with reference to tires and wheels.)
 - hubs
 - application
 - original equipment manufacturer (OEM) procedures
 - servicing and inspection of bearing assembly parts
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Goal 4: Describe and apply transferable **cross-curricular** knowledge and skills.

GLO 4.1: Describe and apply knowledge and skills from **information and communication technologies**.

SLO 11B.4.1.1 Demonstrate the ability to use online resources to find technical bulletins and information on automotive service and repair.

GLO 4.2: Describe and apply knowledge and skills from the **sciences**.

SLO 11B.4.2.1 Demonstrate an understanding of science as it relates to chassis fundamentals and service.

SLO 11B.4.2.2 Demonstrate an understanding of the application of Pascal's law as it relates to the functioning of brakes.

SLO 11B.4.2.3 Demonstrate an understanding of the conservation of energy as it relates to chassis fundamentals and service.

SLO 11B.4.2.4 Demonstrate awareness of Newton's laws of motion as they apply to chassis fundamentals and service.

GLO 4.3: Read, interpret, and communicate information.

No applicable SLOs.

GLO 4.4: Describe and apply knowledge and skills from **mathematics**.

No applicable SLOs.

Goal 5: Demonstrate an understanding of **sustainability**.

GLO 5.1: Demonstrate an understanding of **sustainability**.

SLO 11B.5.1.1 Demonstrate awareness of the impact of chemical hazards on the environment.

SLO 11B.5.1.2 Demonstrate awareness of the recycling processes for materials.

Goal 6: Demonstrate awareness of **ethical and legal standards**.

GLO 6.1: Demonstrate awareness of **ethical and legal standards**.

No applicable SLOs.

Goal 7: Demonstrate employability skills.

GLO 7.1: Demonstrate employability skills.

- SLO 11B.7.1.1 Demonstrate problem-solving skills.
 - SLO 11B.7.1.2 Demonstrate critical-thinking skills.
 - SLO 11B.7.1.3 Demonstrate regular attendance and punctuality.
 - SLO 11B.7.1.4 Demonstrate accountability by taking responsibility for their actions.
 - SLO 11B.7.1.5 Demonstrate adaptability, initiative, and effort.
 - SLO 11B.7.1.6 Accept and follow direction and feedback.
 - SLO 11B.7.1.7 Demonstrate teamwork skills.
 - SLO 11B.7.1.8 Stay on task and use time effectively.
 - SLO 11B.7.1.9 Communicate respectfully and effectively.
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GLO 7.2: Demonstrate an understanding of the business operation of a repair/service facility.

No applicable SLOs.

Goal 8: Demonstrate an understanding of educational and career opportunities.

GLO 8.1: Demonstrate an understanding of educational and career opportunities.

- SLO 11B.8.1.1 Demonstrate an understanding of the working conditions and dynamics of the automotive service and repair industry.
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Goal 9: Demonstrate awareness of the evolution, technological progression, and emerging trends in the automotive industry.

GLO 9.1: Demonstrate awareness of the evolution, technological progression, and emerging trends in the automotive industry.

- SLO 11B.9.1.1 Demonstrate awareness of the evolution, technological progression, and emerging trends in chassis fundamentals and service.
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