Manitoba Grade 11B Automotive Technology Chassis Fundamentals and Service (Course Code 8698)
Course Outline

Course Description

This course introduces the principles, components, and service requirements of automotive chassis and non-ABS braking systems. Students study frame and body construction, steering, suspension, braking principles, hydraulic components, and service materials. Supervised practical work develops safe inspection, repair, and replacement skills supported by accurate measurement and technical documentation.

Course Objectives

- Demonstrate safe practices for chassis and brake service.
- Identify frame and body construction types.
- Explain steering-system components and operation.
- Explain suspension designs and component operation.
- Apply braking principles and basic hydraulic concepts.
- Identify disc, drum, parking-brake, and power-assist components.
- Select compatible fluids, fittings, tubing, hoses, and seals.
- Perform supervised steering, suspension, and brake repairs.
- Use measurements and service information to check work.
- Demonstrate teamwork and responsible material handling.

Course Units

Unit hours are suggested planning allocations totalling 110 hours, including assessment and project work. Adjust to the school timetable. Safety, communication, mathematics, and environmental responsibility are reinforced throughout.

Unit 1: Chassis Safety and Shop Procedures

Estimated Time: 10 hours

Topics:

- PPE selection and safe work procedures
- Hazard identification, injury prevention, and emergency response
- Safe tool use, vehicle support, and housekeeping
- WHMIS, materials handling, and waste management
- Respectful communication and reporting unsafe conditions

Assessment: Safety quiz; lifting and equipment demonstrations

Unit 2: Frames, Body Construction, and Service Information

Estimated Time: 10 hours

Topics:

- Frame and body construction types
- Chassis terminology and component relationships
- Service information, specifications, and work orders
- Measurement, tolerances, and torque values
- Career skills, communication, and respectful workplaces

Assessment: Construction identification; service-information assignment

Unit 3: Steering Systems

Estimated Time: 18 hours

Topics:

- Steering-system types and operating principles
- Steering components and their functions
- Tools and inspection procedures
- Fluids, lubricants, hoses, seals, and fasteners
- Supervised steering component repair and replacement

Assessment: Component identification; steering service lab

Unit 4: Suspension Systems

Estimated Time: 18 hours

Topics:

- Suspension designs and component operation
- Springs, shocks, struts, and linkages
- Safe tool selection and stored-energy hazards
- Inspection, wear, and manufacturer specifications
- Supervised component repair and replacement

Assessment: Suspension theory test; practical evaluation

Unit 5: Braking Principles and System Components

Estimated Time: 14 hours

Topics:

- Pascal’s law and hydraulic force
- Friction and kinetic energy
- Disc, drum, and parking-brake systems
- Master cylinder, lines, calipers, pads, shoes, and drums
- Vacuum, hydraulic, and electric power assist

Assessment: Braking theory test; component identification

Unit 6: Brake Service Materials and Hydraulic Lines

Estimated Time: 12 hours

Topics:

- Brake-fluid selection and contamination prevention
- Fittings, tubing, hoses, and flares
- Double-flare and ISO bubble-flare applications
- Safe line preparation and component installation
- Environmental responsibility and Indigenous sustainability perspectives

Assessment: Materials quiz; hydraulic-line practical task

Unit 7: Brake Inspection and Component Service

Estimated Time: 18 hours

Topics:

- Brake-system tools and measurement
- Disc and drum inspection
- Supervised repair and component replacement
- Parking-brake and power-assist service considerations
- Manufacturer checks and documentation of completed work

Assessment: Brake service lab; measurement record

Unit 8: Chassis Service Project

Estimated Time: 10 hours

Topics:

- Planning a steering, suspension, or brake task
- Collecting measurements and comparing specifications
- Completing approved service work
- Checking operation with instructor approval
- Writing a clear repair report

Assessment: Chassis project; practical evaluation

Assessment Breakdown

The weighting follows the supplied course-outline template; project tasks are adapted to this course.

Component	Weight
Theory Tests & Quizzes	25%
Practical Shop Skills	35%
Labs & Assignments	20%
Culminating Project	10%
Employability & Safety Practices	10%

Required Tools and Equipment

- PPE and automotive service information
- Approved hoist or jack and stands
- Hand tools and torque wrenches
- Steering and suspension service tools
- Approved spring compressor where required
- Brake service tools and measuring equipment
- Tubing cutter, bender, and flaring tools
- Brake bleeding equipment and fluid collection containers

Employability Skills

- Workplace safety and responsible decision-making
- Problem-solving, critical thinking, and creativity
- Clear communication, active listening, and teamwork
- Time management, organization, and independent learning
- Professional conduct, inclusion, and respect for others
- Environmental responsibility and global citizenship
- Career awareness within the automotive service industry

Culminating Project

Students will complete a teacher-approved steering, suspension, or non-ABS brake service project. They will identify the system, inspect components, record measurements, select appropriate service materials, perform approved repairs, and document verification against manufacturer specifications. Final operational checks will be supervised by the instructor.

Recommended Prerequisite

Grade 10 Automotive Systems and Service or equivalent introductory automotive experience. This is a suggested preparation pathway, not a provincial prerequisite stated in the supplied curriculum.

Curriculum Reference

Based on Manitoba's Grade 11B Chassis Fundamentals and Service curriculum (Course Code 8698; supplied auto_gr11B_eng.pdf).

Curriculum alignment: A10 Steering and Suspension Systems I and A11 Braking Systems I (Non-ABS), supported by safety, careers, communications, mathematics, tools, and materials outcomes.