Manitoba Grade 11C Automotive Technology Drivetrain Fundamentals and Service (Course Code 8699)
Course Outline

Course Description

This course develops students' understanding of driveshafts, CV shafts, axles, tires, wheels, hubs, and wheel bearings. Students learn how these components transmit motion and support vehicle operation, then practise supervised inspection, repair, and replacement. Service information, trade mathematics, safe equipment use, and responsible material handling support accurate workmanship.

Course Objectives

- Apply safe practices when servicing driveline and wheel components.
- Explain driveshaft and CV-shaft operation.
- Identify axle designs and component functions.
- Select appropriate driveline tools and service materials.
- Use measurement, ratio, and proportion in service tasks.
- Perform supervised driveshaft and axle repairs.
- Inspect and service tires and wheels.
- Service adjustable and non-adjustable hub and bearing assemblies.
- Use TPMS service and diagnostic procedures.
- Document findings and demonstrate professional work habits.

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: Driveline Safety and Work Practices

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 review; lifting and tool-use checks

Unit 2: Driveline Principles and Measurement

Estimated Time: 12 hours

Topics:

- Front-wheel-drive and rear-wheel-drive arrangements
- Power flow and driveline terminology
- Metric and imperial measurements, ratios, and proportions
- Dial indicators, inclinometers, and vibration-analysis tools
- Service information, specifications, and work orders

Assessment: Theory quiz; measurement and service-information lab

Unit 3: Driveshafts and CV Shafts

Estimated Time: 18 hours

Topics:

- Slip yokes, flanges, and support bearings
- Flex, single-cardan, and double-cardan joints
- CV shafts and viscous couplings
- Inspection and component condition
- Supervised driveshaft repair and replacement

Assessment: Component identification; driveshaft service evaluation

Unit 4: Axles and Service Materials

Estimated Time: 18 hours

Topics:

- Half-shaft, floating, and semi-floating axle designs
- Axle housings, differentials, shafts, hubs, and bearings
- CV joints, universal joints, seals, and gaskets
- Lubricants, fasteners, sealants, and compatibility
- Supervised axle repair and replacement

Assessment: Axle lab; materials selection exercise

Unit 5: Tires and Wheels

Estimated Time: 18 hours

Topics:

- Tire types, construction, and applications
- Wheel sizing, construction, offset, and backspacing
- Tire and wheel tools and equipment
- Inspection, repair, replacement, and installation
- Waste reduction and Indigenous perspectives on resource use

Assessment: Tire and wheel practical; theory test

Unit 6: Hubs and Wheel Bearings

Estimated Time: 14 hours

Topics:

- Adjustable and non-adjustable designs
- Inspection and measurement
- Bearing service tools and safe use
- Manufacturer adjustment and installation requirements
- Supervised repair and replacement procedures

Assessment: Bearing service lab; inspection record

Unit 7: Tire Pressure Monitoring Systems

Estimated Time: 12 hours

Topics:

- Direct and indirect TPMS operation
- TPMS components and service equipment
- Manufacturer service and diagnostic information
- Supervised servicing, diagnosis, and repair
- System verification and documentation

Assessment: TPMS quiz; service demonstration

Unit 8: Driveline and Wheel Service Project

Estimated Time: 8 hours

Topics:

- Selecting a driveline or wheel-system concern
- Recording inspection results and specifications
- Planning and completing approved repairs
- Checking the repair and explaining findings
- Professional service records and teamwork

Assessment: Service project; written repair report

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

- Approved lifting and vehicle-support equipment
- Automotive hand tools and torque wrenches
- Dial indicator and inclinometer
- Vibration-analysis equipment where available
- Driveshaft, CV-joint, and axle service tools
- Bearing pullers, press, and appropriate adapters
- Tire changer, balancer, and inspection gauges
- TPMS service tool and manufacturer information

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 driveline, tire, wheel, hub, bearing, or TPMS service project. They will identify component operation, gather measurements, select correct tools and materials, complete approved repair or replacement, verify the result, and submit a professional service record.

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 11C Drivetrain Fundamentals and Service curriculum (Course Code 8699; supplied auto_gr11C_eng.pdf).

Curriculum alignment: A6 Driveline Systems I: Drive Shafts and CV Shafts and A12 Tires, Wheels, Hubs and Wheel Bearings, supported by common trade outcomes.