Manitoba Grade 12D Automotive Technology Applied Automotive Technologies (Course Code 8703)
Course Outline

Course Description

This applied course consolidates automotive diagnostic and repair skills through supervised service tasks and projects. Students interpret technical information, choose tests, diagnose faults, complete approved repairs, and verify operation across mechanical and electrical systems. Professional communication, tool selection, precise measurements, career readiness, and responsible shop practices support increasingly independent work within instructor-approved limits.

Course Objectives

- Demonstrate consistent safety and professional shop practices.
- Select, inspect, and use automotive service equipment.
- Interpret technical information and document job requirements.
- Use measurements and test results to diagnose faults.
- Test and repair driveline and engine systems.
- Diagnose electrical, starting, charging, and battery concerns.
- Service steering, suspension, and braking systems.
- Service tires, wheels, bearings, TPMS, and body components.
- Explain advanced systems and complete approved procedures.
- Verify repair quality and communicate recommendations.

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: Workplace Readiness, Safety, and Tools

Estimated Time: 12 hours

Topics:

- Workers' rights, responsibilities, PPE, and WHMIS
- Injury prevention, ergonomics, confined-space awareness, and emergency response
- Apprenticeship, Red Seal, accessibility, and workplace competencies
- Tool inspection, maintenance, and appropriate selection
- Hoisting, lifting, facility equipment, and specifications
- Material stewardship and Indigenous sustainability perspectives

Assessment: Safety and tool demonstrations; career-readiness task

Unit 2: Service Information and Diagnostic Planning

Estimated Time: 10 hours

Topics:

- Customer concerns and professional communication
- Work orders, estimates, specifications, and technical bulletins
- Developing safe work procedures using SAFE Work Manitoba resources
- Measurements, tolerances, calculations, and evidence
- Repair verification, reporting, and ethical recommendations

Assessment: Diagnostic plan; sample estimate and work order

Unit 3: Driveline and Engine Diagnostics

Estimated Time: 18 hours

Topics:

- Driveshaft angle and runout measurements
- Universal/CV joint replacement, phasing, and indexing
- Visual inspection, OBD-II scanning, and test selection
- Compression, leak-down, vacuum, and fuel-system tests
- Cooling-system and exhaust/emissions tests
- Approved repairs and verification of engine operation

Assessment: Driveline practical; engine diagnostic report

Unit 4: Electrical, Starting, and Charging Diagnostics

Estimated Time: 16 hours

Topics:

- Voltage, current, resistance, and voltage-drop tests
- Circuit analysis using schematics and specifications
- Electrical and electronic fault isolation
- Starting, charging, and low-voltage battery testing
- Approved repairs and post-repair verification

Assessment: Electrical diagnostic practical; test record

Unit 5: Steering, Suspension, and Brake Service

Estimated Time: 18 hours

Topics:

- Steering and suspension inspection and adjustment
- Ball joints, bushings, tie rods, and sway-bar linkages
- Brake component measurement and service decisions
- Hydraulic flushing and bleeding
- Brake-line flaring and bending; approved component repairs
- Quality checks against manufacturer specifications

Assessment: Chassis and brake practical; service documentation

Unit 6: Tires, Wheels, Bearings, and Body Service

Estimated Time: 14 hours

Topics:

- Tire removal, installation, indexing, balancing, and rotation
- Radial and lateral runout measurement
- TPMS diagnosis, servicing, and reset/programming
- Hub and wheel-bearing inspection and service
- Door, window, trunk-lid, and hood adjustment
- Interior trim panel removal and installation

Assessment: Wheel-system practical; body-service task

Unit 7: Advanced Automotive Technology

Estimated Time: 12 hours

Topics:

- ABS components and operation
- Fuel management and ignition systems
- Supplementary restraint systems (SRS)
- Advanced driver assistance systems (ADAS)
- Manufacturer precautions and equipment requirements
- Instructor-approved repair procedures and verification

Assessment: Technology assignment; supervised system-specific practical

Unit 8: Comprehensive Automotive Service Project

Estimated Time: 10 hours

Topics:

- Confirming the concern and planning the job
- Using technical information and diagnostic evidence
- Completing approved repairs and quality checks
- Recording labour, parts, measurements, and results
- Explaining recommendations and reflecting on readiness for work

Assessment: Capstone service project; portfolio and presentation

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, safety information, and approved vehicle-support equipment
- Hand, power, stationary, and specialized service tools
- Precision measuring and torque equipment
- Scan tool, multimeter, and electrical test equipment
- Compression, leak-down, vacuum, fuel, and cooling-system testers
- Driveline, chassis, brake, tire, bearing, and TPMS equipment
- Body and trim service tools
- Manufacturer service information and approved advanced-system training equipment

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 comprehensive service project and supporting skills portfolio. For the project, they will confirm a concern, research technical information, develop a test plan, diagnose the cause, complete instructor-approved repairs, and verify the result. The portfolio will include practical evidence from mechanical, electrical, wheel, body, and advanced-system tasks, together with work orders, measurements, parts and labour records, and a professional explanation of recommendations.

Recommended Prerequisite

Foundational Grade 11 automotive courses and Grade 12 electrical and mechanical preparation, completed previously or concurrently as approved by the school. This is a suggested preparation pathway, not a provincial prerequisite stated in the supplied curriculum.

Curriculum Reference

Based on Manitoba's Grade 12D Applied Automotive Technologies curriculum (Course Code 8703; supplied auto_gr12D_eng.pdf).

Curriculum alignment: A1 Learning About Work; A2 Trade Safety Awareness; A3 Tools and Equipment; A4 Trade Related Communications and Documents, together with the supplied applied outcomes in strands G–N and P.