Grades 9 to 12
Automotive Technology

Manitoba Technical-Vocational
Curriculum Framework
of Outcomes

Manitoba

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Framework of Outcomes

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Available in alternate formats upon request.

Contents

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Technical-Vocational Education Overview

In 2013, Manitoba Education released the document Technical-Vocational Education Overview (see https://www.edu.gov.mb.ca/k12/cur/teched/sy_tech_program.html) to provide the philosophical and pedagogical underpinnings for curriculum development and the teaching of courses in the Senior Years Technology Education Program (SYTEP). This overview provides educators with the vision and goals of technical-vocational education (TVE) in Manitoba.

Topics include the following:

- curriculum revitalization and renewal
- curriculum framework and implementation
- articulation
- assessment and reporting
- safety
- employability/essential skills and career development
- sustainable development

TVE clusters of courses are designed to encourage students to explore career options in designated trades and trained occupations, and to address labour shortages in these areas. The TVE curriculum includes course clusters for both designated trades (those designated for apprenticeship training and certification by Apprenticeship Manitoba) and trained occupations (those not designated as trades). The TVE curriculum is significantly different from other subject areas such as industrial arts. It has distinct qualities that, when respected, will provide students with a uniquely valuable experience that they cannot receive from any other curriculum. TVE gives students the opportunity to learn the theoretical and practical aspects of one trained occupation in order to facilitate their transition from school to work or to post-secondary education in that trained occupation, or into an associated occupation. This transition is accomplished by having students complete an entire TVE cluster of courses, learning from industry-certified teachers with industry experience in a setting that, as much as possible, emulates an actual workplace.

The TVE curriculum includes Grades 9 to 12 courses in a variety of areas, including automotive technology.

Senior Years Technology Education Program (SYTEP) Diploma

To receive a SYTEP diploma, a student must complete eight departmentally developed courses from an approved technical-vocational cluster, together with 17 compulsory credits and five optional credits. The grade level in which the courses are offered is a local, school-based decision, but it is highly recommended that the sequencing of credits follow the schedule set out below. Cross-curricular learning outcomes include essential skills from subject areas including, but not limited to, English language arts, mathematics, and the sciences. These essential skills are to be integrated into the authentic activities of the course. Learning outcomes dealing with the following topics are also integrated into most courses:

- health and safety
- evolution, technological progression, and emerging trends
- sustainability
- ethical and legal standards
- employability skills
- the automotive industry

In most courses, the emphasis is on applied activities. For instructional purposes, the sequence of learning outcomes can vary based on the activities within the course. Teachers are advised to select the activities best suited to teach the learning outcomes, based on a variety of factors including access to resources or regional needs. The curriculum is not sequential. In other words, learning outcomes might be taught in an order different from how they appear in the document. In light of rapid changes in technology, teachers are encouraged to update their activities in order to meet the needs of students.

Automotive Technology as a TVE Cluster

Grades 9 to 12 Automotive Technology: Manitoba Technical-Vocational Curriculum Framework of Outcomes identifies the goals, general learning outcomes (GLOs), and specific learning outcomes (SLOs) for nine automotive technology courses. This framework is intended for use in all Manitoba schools teaching automotive technology as part of the Senior Years Technology Education Program. Like all other TVE courses, automotive technology courses can be taught only as part of a complete cluster by a school that Manitoba Education has approved for this program.

Students who have completed the automotive technology cluster will have completed all of the Level 1 Apprenticeship technical training requirements for Automotive Service Technician (AST) from Apprenticeship Manitoba (see www.gov.mb.ca/wd/apprenticeship/discover/mbtrades/autoservicetech.html).

Students who complete the cluster will be able to

- perform basic maintenance and service to vehicles
- perform a vehicle inspection
- complete repairs and service to vehicle systems
- complete preventative maintenance procedures
- perform repairs related to drivability concerns
- understand and use computerized systems
- communicate and work with peers, employers, and customers
- demonstrate logical thinking and decision making
- work independently or as part of a team
- demonstrate the ability for lifelong learning to enhance their skills
- demonstrate time management skills
- show mechanical aptitude and manual dexterity
- demonstrate problem-solving skills
- demonstrate employability skills

2019 Revisions to the Automotive Technology Curriculum

During the 2018/2019 school year, a committee of automotive technology teachers was struck to make revisions to the high school automotive technology curriculum in order to reflect the changes to the *Automotive Service Technician Level 1* technical training from Apprenticeship Manitoba. The *Automotive Service Technician Level 1* technical training had undergone revisions as part of the National Harmonization Initiative, which aligned trades training across Canada. The 2020 version of the automotive technology high school curriculum reflects these changes.

Employment Opportunities for Graduates of Automotive Technology

A student who has completed the automotive technology courses can seek entry-level employment as an apprentice automotive service technician, service consultant, parts advisor, parts rebuilder, maintenance technician, specialty/after-market technician, sales consultant, tools and equipment representative, or a military vehicle technician. In order to be qualified and continue as an automotive service technician, students must seek apprenticeship and continue post-secondary training. Automotive technology graduates are typically employed by dealerships and independent service centres, automotive specialty repair shops, parts suppliers, automotive sales and leasing companies, parts recyclers and manufacturers, large organizations with fleets of automobiles, the military, and automotive body repair companies.

The education requirements for entry to the automotive industry vary from high school graduation and/or completion of a technical vocational program at the secondary level for entry-level employment to college, apprenticeship, and university for related employment in the automotive technology industry.

Automotive technology provides a foundation for students to go directly to work, to continue into post-secondary education to become an automotive service technician, or to study automotive engineering, design manufacturing, management in the automotive industry, or automotive education.

Qualifications for Automotive Technology Teachers

Only vocationally certified teachers are allowed to teach TVE courses, including the ones in this cluster. Vocational certification for automotive technology includes three components:

1. **Automotive Service Technician (AST) Journeyperson Certification:** Automotive technology teachers need to have personally achieved certification as AST Journeypersons so that they can share that experience with their students. In order for students to have the option to complete their Level 1 technical training for Automotive Service Technologist, around which this cluster has been developed, the teachers must have gone

through the process of becoming AST journeypersons so that they can teach that process to students.

2. **Industry Experience:** Automotive technology teachers need to have been employed in the automotive industry for at least six years (including the time that they spent as apprentices). This will enable them to share their industry experience with students, which will, in turn, prepare them for working in the industry.
3. **Technical-Vocational Teaching Certificate:** TVE teachers need to earn their technical vocational teaching certificate, obtained by completing Red River College's one-year Technical-Vocational Teacher Education Diploma program. For information about this program, see https://catalogue.rrc.ca/Programs/WPG/FullTime/TECVF-DP.

Employing only vocationally certified teachers to teach TVE courses preserves the integrity of TVE programming by ensuring that teachers are able to share their first-hand experience, as well as their familiarity with industry certification. Students receive instruction from somebody who has been involved in that industry. School boards risk significant liability if they employ non-vocationally certified teachers to teach TVE courses. Vocational certification confirms that a teacher has the requisite skills and knowledge to teach the health, safety, and security concerns associated with the automotive industry. For further information, see "Professional Certification: Technical Vocational Teacher" on the Manitoba Education website at www.edu.gov.mb.ca/k12/profcert/certificates/vocational.html.

Level 1 Apprenticeship for Automotive Service Technician

Students completing the automotive service technician cluster of courses have the opportunity to complete their Level 1 apprenticeship technical training for automotive service technician, since this cluster may only be taught by a journeyperson automotive service technician, and the curriculum includes all of the objectives from *Automotive Service Technician Level 1* from Apprenticeship Manitoba, available on the Apprenticeship Manitoba website at www.gov.mb.ca/wd/apprenticeship/pdfpubs/pubs/discover/mb_trades/auto_service_tech/auto_service_tech_lev1.pdf.

Automotive Technology teachers should refer to the document entitled *Unit to Course Comparison (UCC) Form – Automotive Service Technician Level 1*, available on the department website at www.edu.gov.mb.ca/k12/cur/teched/sytep/automotive/index.html.

This Form lists under which learning outcome each apprenticeship objective is taught in this high school curriculum. Teachers will find this document helpful in applying to have their courses accredited with Apprenticeship Manitoba.

The Multi-Course and Individual-Course Formats

This curriculum has been developed in two different formats. The **multi-course format** (found in this document) is comprised of either five columns (one course each in Grades 9 and 10, and three in Grade 11) or four columns (the four Grade 12 courses). It is found in this document, starting on page 15.

The **individual-course files** are made up of one course per file. Those nine files are found at www.edu.gov.mb.ca/k12/cur/teched/sytep/automotive/index.html.

The multi-course and individual-course formats have been developed for different reasons and serve different purposes. The most important difference is that the multi-course files (containing four or five columns) **do not contain all of the content**. Specifically, while they contain all of the specific learning outcomes (SLOs), they **do not contain all of the detailed content** associated with each SLO. That detailed content is found only in the individual-course files. Therefore, **teachers need to use the individual-course files**.

The multi-course format does not contain all of the content simply because there is not enough room for it. If it were to contain all of the content, some individual SLOs and their content would fill a narrow column for several pages, making them impossible to read.

However, teachers find the multi-course format very useful, because it allows them to compare the four or five courses listed there, and to see how students progress from one course to the next within each goal and general learning outcome.

The SLOs in this curriculum that correspond with the Apprenticeship Manitoba objectives from *Automotive Technology Level 1* have an alpha-numeric code at the end, which indicates the unit and objective from which they were taken.

Here is an example of an SLO and its content taken from *Automotive Technology Level 1*. Each of those SLOs have an alphanumeric code at the end, which indicates exactly where the SLO was taken. For example, here is SLO 10.8.1.2 from 8696 Automotive Systems & Service:

> 12D.8.11 "describe the structure and scope of the automotive service technician trade. (A1.1)"

A1.1 indicates that the SLO is **Objective 1** from **Unit A1** Orientation I: Structure and Scope of Automotive Service Technician Trade Learning, from page 1 of *Automotive Service Technician Level 1*: www.gov.mb.ca/wd/apprenticeship/pdfpubs/pubs/discover/mb_trades/auto_service_tech/auto_service_tech_lev1.pdf.

The Level 1 document also includes the following essential content under A1.1:

1. Describe structure and scope of the Automotive Service Technician trade.
    a. The Apprenticeship and Certification Act
        - Apprenticeship and Certification Board and Provincial Advisory Committees
        - General and specific trade regulation

- Policies regarding attendance, evaluation procedures, conduct and progression requirements (Apprenticeship Manitoba, Training provider)

b. Uses of the (Red Seal Occupational Standard (RSOS))
   - Technical training in-school curriculum
   - On-the-job record book of hours (Manitoba blue book)
   - Examinations (level placement tests, final certification examinations)

c. Opportunities and future career options
   - Generalists and specialists. The move toward specialization is well known to modern tradespeople. Some prefer to specialize and others want to do it all. Supervisory positions require a broad scope.
   - Lead hands and other immediate supervisors. Apprentices need to know how to become a lead-hand as much as they need to know the benefits and pit-falls of leadership between management and shop floor workers.
   - Geographic mobility. What does it mean to a construction/industrial worker to have to travel to find work? Are there more opportunities if they do? What are they? What are the drawbacks to being away from home for several weeks at a time?
   - Job hierarchies and innovations. What trade specific special training opportunities are available in your trade? Is there travel involved? Is there an opportunity to move up the ladder on a work crew as opposed to staying in the shop?

These details are a necessary part of this curriculum. So, when teaching this SLO, teachers must ensure that they are covering each point listed. Teachers also need to become familiar with the Automotive Service Technician documents from Apprenticeship Manitoba. These documents provide invaluable background to this curriculum, and are found at www.gov.mb.ca/wd/apprenticeship/discover/mbtrades/autoservicetech.html.

For more information on accreditation, see "Information for Instructors and Educators" on the Apprenticeship Manitoba website at www.gov.mb.ca/wd/apprenticeship/generalinfo/instructoreducators.html.

Red Seal Resources

Because AST is a designated Red Seal trade across Canada, the Apprenticeship Manitoba curriculum is aligned with the Canada-wide Red Seal curriculum. High school automotive technology teachers, as well as students working towards their Level 1 apprenticeship for automotive service technician, can find valuable resources in the "Automotive Service Technician" section of the Red Seal Program website at www.red-seal.ca/trades/.1.5t.4t.2ch-eng.html.

Among other resources, teachers and students can find sample examination questions used on Red Seal examinations.

Trade Safety Awareness Manual

Apprenticeship Manitoba has developed a Trade Safety Awareness Unit that is intended to increase student awareness of trade safety in the workplace. All students, including those in high school, who are studying a designated trade must complete this seven-hour unit. The learning outcomes from the Trade Safety Awareness Unit have been incorporated into Goal 1 of this curriculum. For more information and to access the Trade Safety Awareness Unit and its tests and other resources, go to https://www.gov.mb.ca/wd/apprenticeship/pdfpubs/pubs/general/trade_safety/apprentice.pdf.

The Trade Safety Awareness Unit's alphanumeric designations are located after the outcomes. For example, the following SLO is found in *Automotive Systems & Service*:

- Explain the S.A.F.E. acronym. (TSA 6)

In this case, TSA 6 in parentheses indicates that this learning outcome is taken from the Trade Safety Awareness Unit from Apprenticeship Manitoba.

Comparison of TVE Automotive Technology with Industrial Arts Power Mechanics Technology

Like all TVE curricula, *Grades 9 to 12 Automotive Technology: Manitoba Technical-Vocational Framework of Outcomes* has been developed to prepare high school students for a career in one specific trade. In this case, students will learn the knowledge, skills, and attitudes required to work as automotive service technicians. It has not been developed as a general interest cluster of courses in power mechanics technology. Schools interested in teaching such a course are invited to teach the industrial arts curricula, which can be found on the department's website at www.edu.gov.mb.ca/k12/cur/teched/ind_arts.html.

Although automotive technology and industrial arts power mechanics technology curricula share some common content, they have been developed for completely different purposes and have significant differences. The chart on the following page summarizes some of the differences between automotive technology (as a TVE cluster) and power mechanics technology (as an industrial arts cluster).

Automotive Technology and Industrial Arts Power Mechanics Technology Comparison Chart

Frequently Asked Questions	TVE Automotive Technology	Industrial Arts Power Mechanics Technology
1. Is the purpose to facilitate students' transition to the automotive trade?	Yes	No
2. Does the instruction try to emulate, as far as possible, a regular workplace?	Yes	No
3. Does the curriculum mandate employability skills such as punctuality and time management?	Yes	No
4. Is the teacher required to be a journeyperson automotive service technician (AST)?	Yes	No
5. Is the teacher required to have experience working as an AST?	Yes	No
6. Does the cluster prepare students for certification as a journeyperson AST?	Yes	No
7. Does the cluster focus on preparing students for entry-level employment as an AST after high school?	Yes	No
8. Is the teacher required to have a Manitoba General Teacher Certificate?	No	Yes
9. Is the teacher required to have a Manitoba Vocational Teacher Certificate?	Yes	No
10. Do schools require special permission from Manitoba Education to offer the cluster of courses?	Yes	No
11. Do schools have to offer all of the courses in the cluster?	Yes	No
12. Does the cluster focus on **only one** trade or trained occupation?	Yes	No
13. Can schools offer hybrid clusters, made up of courses from several clusters?	No	Yes
14. Will students receive a Senior Years Technology Education Program (SYTEP) Diploma when they complete a cluster of courses?	Yes	No

Automotive Technology Goals and General Learning Outcomes (GLOs)

The learning outcomes for each course in the automotive technology cluster are based on the following curriculum goals and general learning outcomes (GLOs). **Please note that some courses do not address all of these goals and GLOs.**

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

- **GLO 1.1:** Describe and apply appropriate **health and safety** practices.
- **GLO 1.2:** Demonstrate awareness of safety as it pertains to the ***Trade Safety Awareness Manual***.

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

- **GLO 2.1:** Select, use, and manage **tools and equipment**.
- **GLO 2.2:** Select, use, and manage **materials and consumables**.

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

- **GLO 3.1:** **Describe** automotive components and systems.
- **GLO 3.2:** **Inspect and diagnose** automotive components and systems.
- **GLO 3.3:** **Service and repair** automotive components and systems.

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**.
- **GLO 4.2:** Describe and apply knowledge and skills from the **sciences**.
- **GLO 4.3:** **Read, interpret, and communicate** information.
- **GLO 4.4:** Describe and apply knowledge and skills from **mathematics**.

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

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

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

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

Goal 7: Demonstrate **employability skills**.

- **GLO 7.1:** Demonstrate **employability skills**.
- **GLO 7.2:** Demonstrate an understanding of the **business operation** of a repair/service facility.

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

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

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.

Specific Learning Outcomes (SLOs)

Grades 9 to 12 Automotive Technology: Manitoba Technical-Vocational Curriculum Framework of Outcomes identifies specific learning outcomes (SLOs) for use in all Manitoba schools teaching the Grades 9 to 12 Automotive Technology courses as part of the Senior Years Technology Education Program. SLO statements define what students are expected to achieve by the end of a course.

It is essential for students to learn and to demonstrate safety practices and employability skills; therefore, some SLOs related to safety and to employability skills are repeated in all courses.

Please note that SLOs are not identified for the goals and GLOs that are not addressed in a given course.

In order to emphasize and simplify the correlation between this document and the AST technical training from Apprenticeship Manitoba, this document has, as much as is practical, kept all of the objectives from each unit together under one GLO, even when some of the objectives might be more logically placed under a different GLO.

For example, all of the objectives under Apprenticeship Manitoba's Unit A3 (*Tools, Equipment, Materials, and Documentation*) have been placed under GLO 2.1 in course 8696 Automotive Systems and Service. Logically, Objective A3.1 (*Identify hazards and describe safe work practices pertaining to the use of tools and equipment*) could be placed under GLO 1.1, which focuses on health and safety practices. However, the review committee concluded that it would be most useful to have all of the objectives in Unit A3 together, in order, under the same GLO. Note that the AST technical training documents are found here: www.gov.mb.ca/wd/apprenticeship/discover/mbtrades/autoservicetech.html.

Course Descriptions

8695 Introduction to Automotive Technology — 15S/15E/15M or 10S/10E/10M

This is an optional course intended for students wishing to sample automotive technology. It may be delivered as a half-credit or full-credit course. The emphasis is on hands-on activities. Students are introduced to safety, tools and equipment, automotive systems, and service procedures.

8696 Automotive Systems and Service — 20S/20E/20M

A student wanting to develop skills in the automotive service and repair industry must have knowledge of the basic principles related to automotive systems and service. Students learn safety, tools and equipment, automotive systems, and service procedures; they are introduced to diagnostic strategies and learn about tires, wheels, and hubs. This course focuses on the following unit in the Apprenticeship Manitoba Level 1 technical training:

- Unit A1: Learning About Work
- Unit A3: Tools, Equipment, Materials, and Documentation
- Unit A11: Tires, Wheels, and Hubs

8697 Engine Fundamentals and Service 30S/30E/30M

A student wanting to develop skills in the automotive service and repair industry must have knowledge of the basic principles of the internal combustion engine and the inner workings and relations of the engine components, as well as how they relate to vehicle operation. The student will learn the procedures to service, repair, and replace engines and their components. They will also learn about the mathematics required for the automotive trade. This course focuses on the following unit in the Apprenticeship Manitoba Level 1 technical training:

- Unit A5: Trade-Related Mathematics
- Unit A6: Engine Fundamentals

It also focuses on the Trade Safety Awareness Manual.

8698 Chassis Fundamentals and Service 30S/30E/30M

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)

8699 Drivetrain Fundamentals and Service 30S/30E/30M

A student wanting to develop skills in the automotive industry must have knowledge of the basic principles of the vehicle drivetrain. The student will develop an understanding of the different drivetrain configurations and their components. The student will be able to diagnose and repair a variety of drivetrain components. This course focuses on the following unit in the Apprenticeship Manitoba Level 1 technical training:

- Unit A9: Driveshafts and Axles

8700 Automotive Electrical Systems 40S/40E/40M

A student wanting to develop skills in the automotive industry must have knowledge of the basic principles of automotive electrical systems. The student will understand the principles of electricity and electronics as they relate to automotive systems. The student will be able to diagnose, service, and repair automotive electrical circuits and components. This course focuses on the following unit in the Apprenticeship Manitoba Level 1 technical training:

- Unit A7: Electrical Systems I: Fundamentals

8701 Vehicle Systems Part 1 40S/40E/40M

A student wanting to develop skills in the automotive industry must have knowledge of the operation of the automotive electronic and control systems. Students' knowledge in electrical systems will be further enhanced by learning about the principles of ignition, control, and communications systems. The student will be able to diagnose, service, and repair ignition, control, and communications systems. This course does not focus on any of the units in the Apprenticeship Manitoba Level 1 technical training.

8702 Vehicle Systems Part 2 40S/40E/40M

A student wanting to develop skills in the automotive industry must have knowledge of engine management and emission systems. The student will understand the principles of fuel supply, metering, and vehicle emissions. The student will be able to use an electronic diagnostic interface to diagnose, service, and repair engine management and emission systems. The student will also learn about hybrid and electrical vehicles. This course focuses on the following unit in the Apprenticeship Manitoba Level 1 technical training:

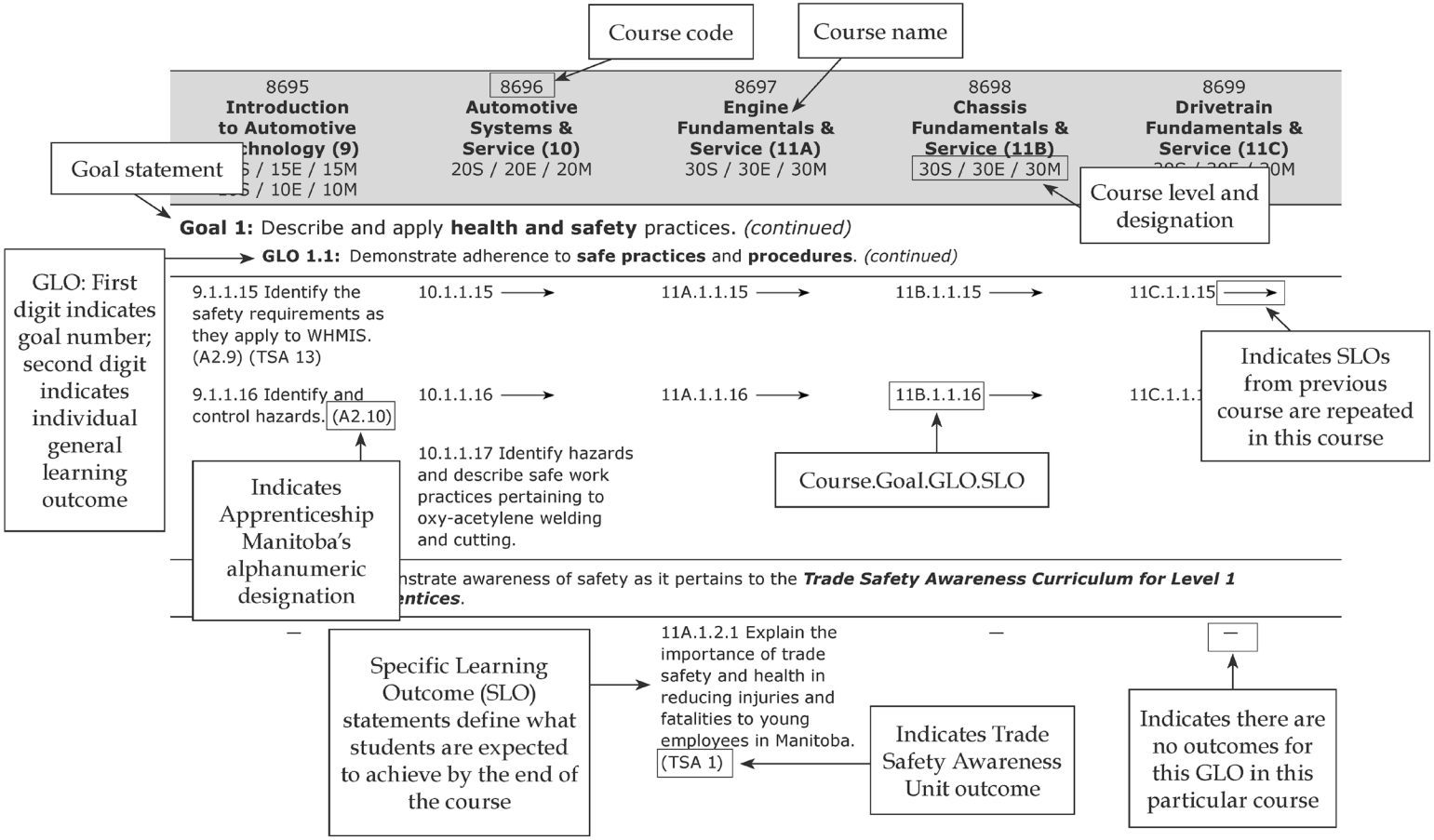
- Unit A13: Hybrid and Electrical Vehicle Systems I

8703 Applied Diagnostic Strategies 40S/40E/40M

A student wanting to expand skills in the automotive industry must be able to apply diagnostic strategies to a variety of vehicle systems and components. The student will demonstrate the ability to diagnose and correct customer concerns and to complete vehicle repairs to accepted industry standards. The student will also learn about body components and trim. This course focuses on the following unit in the Apprenticeship Manitoba Level 1 technical training:

- Unit A12: Body Components and Trim

Guide to Reading Automotive Technology Goals and Learning Outcomes



Grades 9 to 11
Automotive Technology

General and Specific Learning
Outcomes by Goal

Grades 9 to 11 Automotive Technology: General and Specific Learning Outcomes by Goal

8695 **Introduction to Automotive Technology (9)** 15S / 15E / 15M 10S / 10E / 10M	8696 **Automotive Systems & Service (10)** 20S / 20E / 20M	8697 **Engine Fundamentals & Service (11A)** 30S / 30E / 30M	8698 **Chassis Fundamentals & Service (11B)** 30S / 30E / 30M	8699 **Drivetrain Fundamentals & Service (11C)** 30S / 30E / 30M
Goal 1: Describe and apply appropriate **health and safety** practices.				
GLO 1.1: Describe and apply appropriate **health and safety** practices.				
9.1.1.1 Adhere to safe practices and procedures for facilities, processes, materials, tools, and equipment.	10.1.1.1 →	11A.1.1.1 →	11B.1.1.1 →	11C.1.1.1 →
9.1.1.2 Identify the process for reporting injuries.	10.1.1.2 →	11A.1.1.2 →	11B.1.1.2 →	11C.1.1.2 →
9.1.1.3 Identify hazards and adhere to safe work practices pertaining to hoisting and lifting.	10.1.1.3 →	11A.1.1.3 →	11B.1.1.3 →	11C.1.1.3 →
9.1.1.4 Create and maintain a safe and organized working environment.	10.1.1.4 →	11A.1.1.4 →	11B.1.1.4 →	11C.1.1.4 →
9.1.1.5 Demonstrate the ability to follow safety information on supplier labels.	10.1.1.5 →	11A.1.1.5 →	11B.1.1.5 →	11C.1.1.5 →

8695 **Introduction to Automotive Technology (9)** 15S / 15E / 15M 10S / 10E / 10M	8696 **Automotive Systems & Service (10)** 20S / 20E / 20M	8697 **Engine Fundamentals & Service (11A)** 30S / 30E / 30M	8698 **Chassis Fundamentals & Service (11B)** 30S / 30E / 30M	8699 **Drivetrain Fundamentals & Service (11C)** 30S / 30E / 30M
Goal 1: Describe and apply appropriate **health and safety** practices. *(continued)* **GLO 1.1:** Describe and apply appropriate **health and safety** practices. *(continued)*				
9.1.1.6 Demonstrate the ability to locate first aid and eyewash stations.	10.1.1.6 →	11A.1.1.6 →	11B.1.1.6 →	11C.1.1.6 →
9.1.1.7 Identify safety and health requirements. (A2.1)	10.1.1.7 →	11A.1.1.7 →	11B.1.1.7 →	11C.1.1.7 →
9.1.1.8 Identify personal protective equipment (PPE) and procedures. (A2.2) (TSA 16)	10.1.1.8 →	11A.1.1.8 →	11B.1.1.8 →	11C.1.1.8 →
9.1.1.9 Outline the safety principles for working on and around electrical or energized equipment. (A2.3) (TSA 18)	10.1.1.9 →	11A.1.1.9 →	11B.1.1.9 →	11C.1.1.9 →
9.1.1.10 Identify fire safety and outline workplace fire safety principles. (A2.4) (TSA 19)	10.1.1.10 →	11A.1.1.10 →	11B.1.1.10 →	11C.1.1.10 →
9.1.1.11 Identify ergonomics. (A2.5)	10.1.1.11 →	11A.1.1.11 →	11B.1.1.11 →	11C.1.1.11 →

8695 **Introduction to Automotive Technology (9)** 15S / 15E / 15M 10S / 10E / 10M	8696 **Automotive Systems & Service (10)** 20S / 20E / 20M	8697 **Engine Fundamentals & Service (11A)** 30S / 30E / 30M	8698 **Chassis Fundamentals & Service (11B)** 30S / 30E / 30M	8699 **Drivetrain Fundamentals & Service (11C)** 30S / 30E / 30M
Goal 1: Describe and apply appropriate **health and safety** practices. *(continued)* **GLO 1.1:** Describe and apply appropriate **health and safety** practices. *(continued)*				
9.1.1.12 Recognize, report, and control hazards. (A2.6)	10.1.1.12 →	11A.1.1.12 →	11B.1.1.12 →	11C.1.1.12 →
9.1.1.13 Identify the hazards in confined spaces and the preparation needed to work in them. (A2.7) (TSA 20)	10.1.1.13 →	11A.1.1.13 →	11B.1.1.13 →	11C.1.1.13 →
9.1.1.14 Identify first aid/CPR. (A2.8)	10.1.1.14 →	11A.1.1.14 →	11B.1.1.14 →	11C.1.1.14 →
9.1.1.15 Identify the safety requirements as they apply to WHMIS. (A2.9) (TSA 13)	10.1.1.15 →	11A.1.1.15 →	11B.1.1.15 →	11C.1.1.15 →
9.1.1.16 Identify and control hazards. (A2.10)	10.1.1.16 →	11A.1.1.16 →	11B.1.1.16 →	11C.1.1.16 →
	10.1.1.17 Identify hazards and describe safe work practices pertaining to oxy-acetylene welding and cutting.			

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Goal 1: Describe and apply **health and safety** practices. *(continued)*				
GLO 1.1: Demonstrate adherence to **safe practices** and **procedures**. *(continued)*				
	10.1.1.18 Identify hazards and describe safe work practices pertaining to vehicle maintenance inspections.			
GLO 1.2: Demonstrate awareness of safety as it pertains to the ***Trade Safety Awareness Curriculum for Level 1 Apprentices***.				
—	—	11A.1.2.1 Explain the importance of trade safety and health in reducing injuries and fatalities to young employees in Manitoba. (TSA 1) 11A.1.2.2 Describe the rights and responsibilities of employees, employers, and supervisors under the *Workplace Safety and Health Act*. (TSA 2)	—	—

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Goal 1: Describe and apply **health and safety** practices. *(continued)* **GLO 1.2:** Demonstrate awareness of safety as it pertains to the ***Trade Safety Awareness Curriculum for Level 1 Apprentices***. *(continued)*				
		11A.1.2.3 Describe the steps to use in the Right to Refuse process. (TSA 3) 11A.1.2.4 Explain how and where to find information on workplace safety and health. (TSA 4) 11A.1.2.5 Demonstrate how to handle a potentially dangerous work situation. (TSA 5) 11A.1.2.6 Explain the S.A.F.E. acronym. (TSA 6) 11A.1.2.7 Define workplace safety and health hazards. (TSA 7)		

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Goal 1: Describe and apply **health and safety** practices. *(continued)* **GLO 1.2:** Demonstrate awareness of safety as it pertains to the ***Trade Safety Awareness Curriculum for Level 1 Apprentices***. *(continued)*				
		11A.1.2.8 Give examples of trade-specific workplace safety and health hazards. (TSA 8) 11A.1.2.9 Give examples of five types of safety and health hazards. (TSA 9) 11A.1.2.10 Define workplace safety and health risk. (TSA 10) 11A.1.2.11 Give examples of trade-specific workplace safety and health risks. (TSA 11) 11A.1.2.12 Explain the principles of hazard recognition and control as they apply to the specific trade. (TSA 12)		

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Goal 1: Describe and apply **health and safety** practices. *(continued)* **GLO 1.2:** Demonstrate awareness of safety as it pertains to the ***Trade Safety Awareness Curriculum for Level 1 Apprentices***. *(continued)*				
		11A.1.2.13 Match the WHMIS hazardous materials symbols and their meanings. (TSA 14) 11A.1.2.14 Describe the importance of Material Safety Data Sheets (MSDS). (TSA 15) 11A.1.2.15 Demonstrate proper selection and use of a variety of personal protective equipment (PPE) and fall protection systems. (TSA 17)		

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Goal 2: Select, use, and manage **tools, equipment, materials, and consumables.** **GLO 2.1:** Select, use, and manage **tools and equipment**.				
9.2.1.1 Select, use, and manage tools and equipment used in automotive systems and service.	10.2.1.1 →	11A.2.1.1 Select, use, and manage tools and equipment used in engine fundamentals and service.	11B.2.1.1 Select, use, and manage tools and equipment used in chassis fundamentals and service.	11C.2.1.1 Select, use, and manage tools and equipment used in drivetrain fundamentals and service.
9.2.1.2 Identify, select, and operate tools and equipment.	10.2.1.2 Identify hazards and describe safe work practices pertaining to the use of tools and equipment. (A3.1)	11A.2.1.2 →	11B.2.1.2 →	11C.2.1.2 →
	10.2.1.3 Describe hand tools, power tools, and specialized test equipment, and procedures for their use. (A3.2) *(Note: This SLO is repeated in 8700.)*	11A.2.1.3 Describe and demonstrate measuring tools and procedures for their use. (A3.3)		

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Goal 2: Select, use, and manage **tools, equipment, materials, and consumables.** *(continued)* **GLO 2.1:** Select, use, and manage **tools and equipment**. *(continued)*				
	10.2.1.4 Describe and demonstrate measuring tools and procedures for their use. (A3.3) 10.2.1.5 Describe shop equipment and procedures for their use. (A3.4) 10.2.1.6 Describe welding, cutting, and heating equipment, as well as procedures for their use. (A3.5) 10.2.1.7 Identify types of fasteners, fittings, tubing, and hoses, and describe their applications and procedures for use. (A3.6)			

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Goal 2: Select, use, and manage **tools, equipment, materials, and consumables.** *(continued)* **GLO 2.1:** Select, use, and manage **tools and equipment**. *(continued)*				
	10.2.1.8 Describe and demonstrate the procedures used when operating, inspecting, maintaining, and storing hoisting and lifting equipment. (A3.7) 10.2.1.9 Identify and interpret identification codes found on the vehicle and vehicle components. (A3.8) 10.2.1.10 Identify types of trade-related documents and describe their applications. (A3.9) 10.2.1.11 Describe the procedures used to prepare and/or complete trade-related documents. (A3.10)			

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Goal 2: Select, use, and manage **tools, equipment, materials, and consumables.** *(continued)* **GLO 2.2:** Select, use, and manage **materials and consumables.**				
—	—	11A.2.2.1 Describe the use of gaskets, seals, and sealants in automotive applications.	—	—
Goal 3: Describe, inspect, diagnose, service, and repair automotive components and systems. **GLO 3.1: Describe** automotive components and systems.				
9.3.1.1 Identify various systems related to automotive technology.	10.3.1.1 Define terminology associated with tires, wheels, and hubs. (A11.1)	11A.3.1.1 Define terminology associated with engines. (A6.1)	11B.3.1.1 Define terminology associated with steering and suspension systems. (A8.1)	11C.3.1.1 Define terminology associated with driveshafts and axles. (A9.1)
	10.3.1.2 Identify hazards and describe safe work practices pertaining to tires and wheels. (A11.2)	11A.3.1.2 Explain internal combustion principles. (A6.2)	11B.3.1.2 Identify hazards and describe safe work practices pertaining to steering and suspension systems. (A8.2)	11C.3.1.2 Identify hazards and describe safe work practices pertaining to driveshafts and axles. (A9.2)
	10.3.1.3 Identify types of tires and describe their construction. (A11.3)	11A.3.1.3 Identify types of engine classifications. (A6.3)	11B.3.1.3 Identify tools and equipment relating to steering and suspension systems, and describe their applications and procedures for use. (A8.3)	11C.3.1.3 Identify tools and equipment relating to driveshafts and axles, and describe their applications and procedures for use. (A9.3)

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Goal 3: Describe, inspect, diagnose, service, and repair automotive components and systems. *(continued)*				
GLO 3.1: Describe automotive components and systems. *(continued)*				
	10.3.1.4 Identify types of tools and equipment related to tires. wheels, and hubs, and describe their applications and procedures for use. (A11.4)	11A.3.1.4 Identify types of engine configurations and describe their construction. (A6.4)	11B.3.1.4 Identify types of suspension systems and describe their components and operation. (A8.4)	11C.3.1.4 Identify types of driveshafts and describe their composition. (A9.4)
	10.3.1.5 Identify types of wheels and describe their construction. (A11.5)	11A.3.1.5 Identify types of valve train configurations and describe their construction. (A6.5)	11B.3.1.5 Identify types of frames and body construction. (A8.5)	11C.3.1.5 Identify types of driveshaft components and describe their purpose and operation. (A9.5)
	10.3.1.6 Identify types of tire pressure monitoring systems (TPMS). (A11.7)	11A.3.1.6 Identify engine components and describe their design, purpose, and operation. (A6.6)	11B.3.1.6 Identify types of steering and suspension systems, and describe their components and operation. (A8.6)	11C.3.1.6 Identify types of axles and describe their components and operation. (A9.6)
		11A.3.1.7 Identify types of fasteners, gaskets, seals, and sealants, and describe their applications and procedures for use. (A6.7)	11B.3.1.7 Identify types of steering-assist systems and describe their components. (A8.7)	11C.3.1.7 Describe and demonstrate the importance of multiple piece driveshaft phasing and indexing. (A9.7)

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Goal 3: Describe, inspect, diagnose, service, and repair automotive components and systems. *(continued)* **GLO 3.1: Describe** automotive components and systems. *(continued)*				
		11A.3.1.8 Calculate engine displacement, compression ratios, horsepower, area, and volume. (A6.8)	11B.3.1.8 Identify types of fluids and lubricants, fasteners, tubing, hoses, gaskets, and seals, and describe their applications. (A8.8)	11C.3.1.8 Identify types of lubricants, fasteners, gaskets, seals, and sealants, and describe their applications. (A9.8)
			Braking Systems: 11B.3.1.9 Define terminology associated with braking systems. (A10.1)	11C.3.1.9 Demonstrate an understanding of the location and function of clutch-assembly components.
			11B.3.1.10 Identify hazards and describe safe work practices pertaining to braking systems. (A10.2)	11C.3.1.10 Demonstrate an understanding of clutch action and common clutch problems.
			11B.3.1.11 Explain hydraulic principles related to braking systems. (A10.3)	11C.3.1.11 Demonstrate an understanding of shift linkages and their adjustments.

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Goal 3: Describe, inspect, diagnose, service, and repair automotive components and systems. *(continued)* **GLO 3.1: Describe** automotive components and systems. *(continued)*				
			11B.3.1.12 Identify types of tools and equipment relating to braking systems, and describe their applications and procedures for use. (A10.4)	11C.3.1.12 Demonstrate an understanding of types of transmissions and transaxles.
			11B.3.1.13 Identify types of braking systems, and describe their components and operation. (A10.5)	11C.3.1.13 Demonstrate an understanding of the operating principles and function of manual transmissions and transaxles.
			11B.3.1.14 Identify types of power assists, and describe their components and operation. (A10.6)	11C.3.1.14 Demonstrate an understanding of types of gears and power flows, and calculate gear ratios on drivetrains.

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Goal 3: Describe, inspect, diagnose, service, and repair automotive components and systems. *(continued)* **GLO 3.1: Describe** automotive components and systems. *(continued)*				
			11B.3.1.15 Identify types of fluids, and describe their applications and procedures for use. (A10.7)	11C.3.1.15 Demonstrate the ability to describe the basic operating principles and functions of automatic transmissions and transaxles.
			11B.3.1.16 Identify types of fittings, flaring, tubing, and hoses, and describe their applications and procedures for use. (A10.8)	11C.3.1.16 Demonstrate an understanding of the operation principles of drivetrain components (e.g., 4WD, AWD, CVTs).
			Hubs: 11B.3.1.17 Identify types of hubs and bearing assemblies, and describe their components and operation. (A11.6)	

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Goal 3: Describe, inspect, diagnose, service, and repair automotive components and systems. *(continued)* **GLO 3.2: Inspect and diagnose** automotive components and systems.				
9.3.2.1 Demonstrate the ability to identify service procedures.	10.3.2.1 Demonstrate the ability to define terminology associated with vehicle maintenance inspections.	11A.3.2.1 Demonstrate the ability to perform a cooling system pressure test.	11B.3.2.1 Demonstrate the ability to perform basic diagnostic procedures of steering and suspension systems and components.	11C.3.2.1 Demonstrate the ability to perform visual fluid analyses on drivetrain components.
	10.3.2.2 Demonstrate the ability to describe the importance of regular vehicle maintenance inspections.	11A.3.2.2 Demonstrate the ability to perform an engine-compression test.	11B.3.2.2 Demonstrate the ability to perform a pre-alignment inspection.	11C.3.2.2 Demonstrate the ability to diagnose causes of fluid leaks and recommend repair options.
	10.3.2.3 Demonstrate the ability to describe and demonstrate the procedures used to perform vehicle maintenance inspections.	11A.3.2.3 Demonstrate the ability to perform a cylinder leak-down test.	11B.3.2.3 Demonstrate the ability to diagnose and interpret wheel alignment readings.	11C.3.2.3 Demonstrate the ability to demonstrate familiarity with proper clutch operation.
		11A.3.2.4 Demonstrate the ability to analyze engine test results to determine suitable repair procedures.		

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Goal 3: Describe, inspect, diagnose, service, and repair automotive components and systems. *(continued)*				
GLO 3.2: Inspect and diagnose automotive components and systems. *(continued)*				
		11A.3.2.5 Demonstrate the ability to diagnose engine components and isolate sub-system malfunctions.		
GLO 3.3: Service and repair automotive components and systems.				
9.3.3.1 Demonstrate the ability to service and repair automotive components and systems.	10.3.3.1 Demonstrate the ability to check vehicle fluid levels.	11A.3.3.1 Demonstrate the ability to create an estimate and parts list for engine repairs.	11B.3.3.1 Describe the procedures used to perform wheel alignments.	11C.3.3.1 Describe and demonstrate the procedures used to diagnose and repair driveshafts and axle systems. (A9.9)
9.3.3.2 Demonstrate the ability to check vehicle fluid levels.	10.3.3.2 Demonstrate the appropriate use of fasteners used in automotive applications.	11A.3.3.2 Demonstrate the ability to disassemble, assess, and reassemble engine components for allowable tolerances, wear, and damage.	11B.3.3.2 Demonstrate the ability to perform wheel alignments.	11C.3.3.2 Demonstrate awareness of the diagnosis, adjustment, and replacement of clutch assemblies and related components.
9.3.3.3 Demonstrate an awareness of the application of torque and the units used to measure torque in automotive fasteners.	10.3.3.3 ⟶	11A.3.3.3 Demonstrate the ability to clean engine block and cylinder head components.	11B.3.3.3 Describe the procedures used to adjust, repair, and replace suspension system components.	11C.3.3.3 Demonstrate awareness of the inspection, servicing, and adjustment of shift mechanisms.

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Goal 3: Describe, inspect, diagnose, service, and repair automotive components and systems. *(continued)* **GLO 3.3: Service and repair** automotive components and systems. *(continued)*				
	10.3.3.4 Demonstrate the ability to service and repair components and systems (i.e., scheduled maintenance and inspection).	11A.3.3.4 Demonstrate the ability to inspect and measure engine blocks, cylinder heads, and related components.	11B.3.3.4 Demonstrate the ability to adjust, repair, and replace suspension system components.	11C.3.3.4 Demonstrate awareness of the diagnosis, adjustment, and replacement of transmissions and transaxles.
	10.3.3.5 Perform basic scan-tool fundamentals (i.e., DTC retrieval).	11A.3.3.5 Demonstrate an understanding of the procedures required for final testing and inspection.	11B.3.3.5 Describe the procedures used to adjust, repair, and/or replace steering system components.	11C.3.3.5 Demonstrate awareness of the diagnosis, adjustment, and replacement of differential assemblies.
	10.3.3.6 Demonstrate the ability to perform oil, lube, and filter service.		11B.3.3.6 Demonstrate the ability to adjust, repair, and/or replace steering system components.	11C.3.3.6 Demonstrate awareness of differential maintenance procedures.
	10.3.3.7 Demonstrate the ability to perform basic scan-tool fundamentals (i.e., DTC retrieval).		11B.3.3.7 Describe and demonstrate the procedures used to diagnose and repair braking systems. (A10.9)	

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Goal 3: Describe, inspect, diagnose, service, and repair automotive components and systems. *(continued)*				
GLO 3.3: Service and repair automotive components and systems. *(continued)*				
	10.3.3.8 Describe and demonstrate the procedures used to diagnose, adjust, repair, and/or replace tires and wheels. (A11.8) *(Note: This SLO is repeated in 8698 with reference to hubs.).*		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.)*	
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.**				
—	10.4.1.1 Demonstrate the ability to use service information retrieval systems.	11A.4.1.1 Demonstrate awareness of shop management software (e.g., electronic work order software).	11B.4.1.1 Demonstrate the ability to use online resources to find technical bulletins and information on automotive service and repair.	11C.4.1.1 Demonstrate the ability to use online and/or printed service manuals to locate, interpret, and apply service procedures.

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Goal 4: Describe and apply transferable **cross-curricular** knowledge and skills. *(continued)* **GLO 4.2:** Describe and apply knowledge and skills from the **sciences.**				
9.4.2.1 Describe and apply knowledge and skills from the sciences.	10.4.2.1 Demonstrate awareness of how science principles (e.g., ideal gas laws, viscosity, coefficient of friction, atomic model of matter, etc.) apply to automotive systems and service.	11A.4.2.1 Demonstrate knowledge of science as it relates to engine fundamentals and service.	11B.4.2.1 Demonstrate an understanding of science as it relates to chassis fundamentals and service. 11B.4.2.2 Demonstrate an understanding of the application of Pascal's law as it relates to the functioning of brakes. 11B.4.2.3 Demonstrate an understanding of the conservation of energy as it relates to chassis fundamentals and service. 11B.4.2.4 Demonstrate awareness of Newton's laws of motion as they apply to chassis fundamentals and service.	11C.4.2.1 Demonstrate an understanding of science as it relates to drivetrains.

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Goal 4: Describe and apply transferable **cross-curricular** knowledge and skills. *(continued)*				
GLO 4.3: Read, interpret, and communicate information.				
9.4.3.1 Demonstrate the ability to read, interpret, and communicate information.	—	—	—	11C.4.3.1 Demonstrate the ability to read, interpret, and communicate automotive product information.
GLO 4.4: Describe and apply knowledge and skills from **mathematics**.				
—	10.4.4.1 Demonstrate the ability to identify the units of measurement on a ruler. 10.4.4.2 Demonstrate the ability to measure the length and width of various articles using a ruler.	11A.4.4.1 Demonstrate the ability to apply imperial and metric units (e.g., volume, torque). 11A.4.4.2 Describe the practical importance of math disciplines to the automotive service technician trade. (A5.1) 11A.4.4.3 Describe "math anxiety" and its remedies. (A5.2)	—	—

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Goal 4: Describe and apply transferable **cross-curricular** knowledge and skills. *(continued)* **GLO 4.4:** Describe and apply knowledge and skills from **mathematics**. *(continued)*				
		11A.4.4.4 Review general math concepts and the use of electronic calculators. (A5.3) 11A.4.4.5 Demonstrate trade-related calculations as specified by the instructor. (A5.4)		
Goal 5: Demonstrate an understanding of **sustainability**. **GLO 5.1:** Demonstrate an understanding of **sustainability**.				
9.5.1.1 Demonstrate awareness of the automotive service and repair industry's sustainability practices and impact on the environment.	10.5.1.1 Demonstrate awareness of efficient materials usage and disposal practices.	11A.5.1.1 Demonstrate an understanding of how and why lightweight and recyclable materials are used in vehicle production.	11B.5.1.1 Demonstrate awareness of the impact of chemical hazards on the environment.	11C.5.1.1 Demonstrate knowledge of efficient material usage to reduce waste and its impact on the environment.
	10.5.1.2 Demonstrate the ability to apply efficient materials usage and disposal practices.		11B.5.1.2 Demonstrate awareness of the recycling processes for materials.	

8695 **Introduction to Automotive Technology (9)** 15S / 15E / 15M 10S / 10E / 10M	8696 **Automotive Systems & Service (10)** 20S / 20E / 20M	8697 **Engine Fundamentals & Service (11A)** 30S / 30E / 30M	8698 **Chassis Fundamentals & Service (11B)** 30S / 30E / 30M	8699 **Drivetrain Fundamentals & Service (11C)** 30S / 30E / 30M
Goal 6: Demonstrate awareness of **ethical and legal standards.** **GLO 6.1:** Demonstrate awareness of **ethical and legal standards.**				
9.6.1.1 Demonstrate awareness of the ethical and legal expectations of automotive technicians.	10.6.1.1 Demonstrate awareness of liability concerns related to automotive systems and service.	11A.6.1.1 Demonstrate awareness of legislation related to automotive systems and service.	—	—
Goal 7: Demonstrate **employability skills.** **GLO 7.1:** Demonstrate **employability skills.**				
9.7.1.1 Demonstrate problem-solving skills.	10.7.1.1 →	11A.7.1.1 →	11B.7.1.1 →	11C.7.1.1 →
9.7.1.2 Demonstrate critical-thinking skills.	10.7.1.2 →	11A.7.1.2 →	11B.7.1.2 →	11C.7.1.2 →
9.7.1.3 Demonstrate regular attendance and punctuality.	10.7.1.3 →	11A.7.1.3 →	11B.7.1.3 →	11C.7.1.3 →
9.7.1.4 Demonstrate accountability by taking responsibility for their actions.	10.7.1.4 →	11A.7.1.4 →	11B.7.1.4 →	11C.7.1.4 →
9.7.1.5 Demonstrate adaptability, initiative, and effort.	10.7.1.5 →	11A.7.1.5 →	11B.7.1.5 →	11C.7.1.5 →

8695 **Introduction to Automotive Technology (9)** 15S / 15E / 15M 10S / 10E / 10M	8696 **Automotive Systems & Service (10)** 20S / 20E / 20M	8697 **Engine Fundamentals & Service (11A)** 30S / 30E / 30M	8698 **Chassis Fundamentals & Service (11B)** 30S / 30E / 30M	8699 **Drivetrain Fundamentals & Service (11C)** 30S / 30E / 30M
Goal 7: Demonstrate **employability skills.** *(continued)* **GLO 7.1:** Demonstrate **employability skills.** *(continued)*				
9.7.1.6 Accept and follow direction and feedback.	10.7.1.6 →	11A.7.1.6 →	11B.7.1.6 →	11C.7.1.6 →
9.7.1.7 Demonstrate teamwork skills.	10.7.1.7 →	11A.7.1.7 →	11B.7.1.7 →	11C.7.1.7 →
9.7.1.8 Stay on task and use time effectively.	10.7.1.8 →	11A.7.1.8 →	11B.7.1.8 →	11C.7.1.8 →
9.7.1.9 Communicate respectfully and effectively.	10.7.1.9 →	11A.7.1.9 →	11B.7.1.9 →	11C.7.1.9 →

8695 **Introduction to Automotive Technology (9)** 15S / 15E / 15M 10S / 10E / 10M	8696 **Automotive Systems & Service (10)** 20S / 20E / 20M	8697 **Engine Fundamentals & Service (11A)** 30S / 30E / 30M	8698 **Chassis Fundamentals & Service (11B)** 30S / 30E / 30M	8699 **Drivetrain Fundamentals & Service (11C)** 30S / 30E / 30M
Goal 8: Demonstrate an understanding of **educational and career opportunities**.				
GLO 8.1: Demonstrate an understanding of **educational and career opportunities.**				
9.8.1.1 Demonstrate awareness of the employment and educational opportunities related to automotive technology.	10.8.1.1 Demonstrate awareness of the career and employment opportunities related to automotive technology.	11A.8.1.1 Demonstrate awareness of specialized occupations in the automotive service and repair industry.	11B.8.1.1 Demonstrate an understanding of the working conditions and dynamics of the automotive service and repair industry.	11C.8.1.1 Demonstrate an understanding of the career and employment opportunities related to automotive technology.
	10.8.1.2 Describe structure and scope of the automotive service technician trade. (A1.1)	11A.8.1.2 Demonstrate awareness of apprenticeship.		11C.8.1.2 Demonstrate awareness of career paths related to the automotive service and repair industry.
	10.8.1.3 Describe two levels of workplace competency. (A1.2)			
	10.8.1.4 Describe accommodation for apprentices with disabilities. (A1.3)			

8695 **Introduction to Automotive Technology (9)** 15S / 15E / 15M 10S / 10E / 10M	8696 **Automotive Systems & Service (10)** 20S / 20E / 20M	8697 **Engine Fundamentals & Service (11A)** 30S / 30E / 30M	8698 **Chassis Fundamentals & Service (11B)** 30S / 30E / 30M	8699 **Drivetrain Fundamentals & Service (11C)** 30S / 30E / 30M

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.

9.9.1.1 Demonstrate awareness of the evolution, technological progression, and emerging trends in automotive technology.	10.9.1.1 Demonstrate awareness of changes to vehicle design and their effect on safety, fuel economy, emissions, and vehicle performance.	11A.9.1.1 Demonstrate awareness of the evolution, technological progression, and emerging trends in engine fundamentals and service.	11B.9.1.1 Demonstrate awareness of the evolution, technological progression, and emerging trends in chassis fundamentals and service.	11C.9.1.1 Demonstrate awareness of the evolution, technological progression, and emerging trends in drivetrain fundamentals and service.

Grade 12
Automotive Technology

General and Specific Learning
Outcomes by Goal

Grade 12 Automotive Technology: General and Specific Learning Outcomes by Goal

8700 **Automotive Electrical Systems (12A)** 40S / 40E / 40M	8701 **Vehicle Systems Part 1 (12B)** 40S / 40E / 40M	8702 **Vehicle Systems Part 2 (12C)** 40S / 40E / 40M	8703 **Applied Diagnostic Strategies (12D)** 40S / 40E / 40M
Goal 1: Describe and apply appropriate **health and safety** practices.			
GLO 1.1: Describe and apply appropriate **health and safety** practices.			
12A.1.1.1 Adhere to safe practices and procedures for facilities, processes, materials, tools, and equipment.	12B.1.1.1 →	12C.1.1.1 →	12D.1.1.1 →
12A.1.1.2 Identify the process for reporting injuries.	12B.1.1.2 →	12C.1.1.2 →	12D.1.1.2 →
12A.1.1.3 Identify hazards and adhere to safe work practices pertaining to hoisting and lifting.	12B.1.1.3 →	12C.1.1.3 →	12D.1.1.3 →
12A.1.1.4 Create and maintain a safe and organized working environment.	12B.1.1.4 →	12C.1.1.4 →	12D.1.1.4 →
12A.1.1.5 Demonstrate the ability to follow safety information on supplier labels.	12B.1.1.5 →	12C.1.1.5 →	12D.1.1.5 →
12A.1.1.6 Demonstrate the ability to locate first aid and eyewash stations.	12B.1.1.6 →	12C.1.1.6 →	12D.1.1.6 →

8700 **Automotive Electrical Systems (12A)** 40S / 40E / 40M	8701 **Vehicle Systems Part 1 (12B)** 40S / 40E / 40M	8702 **Vehicle Systems Part 2 (12C)** 40S / 40E / 40M	8703 **Applied Diagnostic Strategies (12D)** 40S / 40E / 40M
Goal 1: Describe and apply appropriate **health and safety** practices. *(continued)* **GLO 1.1:** Describe and apply appropriate **health and safety** practices. *(continued)*			
12A.1.1.7 Identify safety and health requirements. (A2.1)	12B.1.1.7 Identify hazards and describe safe work practices pertaining to the use of tools and equipment. (A3.1)	12C.1.1.7 →	12D.1.1.7 →
12A.1.1.8 Identify personal protective equipment (PPE) and procedures. (A2.2) (TSA 16)	12B.1.1.8 Describe hybrid vehicle safety hazards. (A13.2)		12D.1.1.8 Describe hybrid vehicle safety hazards. (A13.2)
12A.1.1.9 Outline the safety principles for working on and around electrical or energized equipment. (A2.3) (TSA 18)			12D.1.1.9 Demonstrate awareness of the long-term health concerns related to the automotive service industry.
12A.1.1.10 Identify fire safety and outline workplace fire safety principles. (A2.4) (TSA 19)			
12A.1.1.11 Identify ergonomics. (A2.5)			
12A.1.1.12 Recognize, report, and control hazards. (A2.6)			

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Goal 1: Describe and apply appropriate **health and safety** practices. *(continued)* **GLO 1.1:** Describe and apply appropriate **health and safety** practices. *(continued)*			
12A.1.1.13 Identify the hazards in confined spaces and the preparation needed to work in them. (A2.7) (TSA 20) 12A.1.1.14 Identify first aid/ CPR. (A2.8) 12A.1.1.15 Identify the safety requirements as they apply to WHMIS. (A2.9) (TSA 13) 12A.1.1.16 Identify and control hazards. (A2.10) 12A.1.1.17 Identify hazards and describe safe work practices pertaining to the use of tools and equipment. (A3.1) 12A.1.1.18 Describe hybrid vehicle safety hazards. (A13.2)			

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Goal 2: Select, use, and manage **tools, equipment, materials, and consumables.** **GLO 2.1:** Select, use, and manage **tools and equipment.**			
12A.2.1.1 Describe hand tools, power tools, and specialized test equipment, and procedures for their use. (A3.2) *(Note: This SLO is repeated in 8696.)*	12B.2.1.1 Demonstrate the ability to select, use, and maintain tools and equipment used in ignition systems, electronic control systems, and vehicle communication systems.	12C.2.1.1 Demonstrate the ability to select, use, and maintain tools and equipment used in fuel, engine management, emission, and exhaust systems. 12C.2.1.2 Demonstrate the ability to explain advanced functions of scan tools.	12D.2.1.1 Demonstrate the ability to select, operate, and maintain shop tools and equipment used in applied diagnostic strategies.
Goal 3: Describe, inspect, diagnose, service, and repair automotive components and systems. **GLO 3.1: Describe** automotive components and systems.			
Starting Systems: 12A.3.1.1 Demonstrate an understanding of the purpose and operation of the starter motor.	12B.3.1.1 Demonstrate an understanding of the purpose of ignition systems.	12C.3.1.1 Demonstrate an understanding of the fuel-combustion process.	12D.3.1.1 Define terminology associated with body components and trim. (A12.1)
12A.3.1.2 Demonstrate an understanding of the starting system components.	12B.3.1.2 Demonstrate an understanding of the components of ignition systems.	12C.3.1.2 Demonstrate an understanding of vehicle emissions.	12D.3.1.2 Identify hazards and describe safe work practices pertaining to body components and trim. (A12.2)
12A.3.1.3 Demonstrate an understanding of the components of the starter motor.	12B.3.1.3 Demonstrate an understanding of the operation of ignition systems.	12C.3.1.3 Demonstrate an understanding of emission control systems and components.	12D.3.1.3 Identify tools and equipment relating to body components and trim, and describe their applications and procedures for use. (A12.3)

8700 **Automotive Electrical Systems (12A)** 40S / 40E / 40M	8701 **Vehicle Systems Part 1 (12B)** 40S / 40E / 40M	8702 **Vehicle Systems Part 2 (12C)** 40S / 40E / 40M	8703 **Applied Diagnostic Strategies (12D)** 40S / 40E / 40M
Goal 3: Describe, inspect, diagnose, service, and repair automotive components and systems. *(continued)* **GLO 3.1: Describe** automotive components and systems. *(continued)*			
Electrical Systems: 12A.3.1.4 Define terminology associated with electrical, electronic, and magnetic principles. (A7.1)	12B.3.1.4 Demonstrate an understanding of the purpose of vehicle control systems (e.g., supplemental restraint systems, ABS, traction control).	12C.3.1.4 Demonstrate an understanding of fuel types, grades, additives, and applications.	12D.3.1.4 Explain the principles of basic aerodynamics related to body design. (A12.4)
12A.3.1.5 Identify hazards and describe safe work practices pertaining to electrical and electronic components. (A7.2)	12B.3.1.5 Demonstrate an understanding of the components of vehicle control systems.	12C.3.1.5 Demonstrate an understanding of fuel-delivery systems and related components (e.g., lines, tanks, pumps).	12D.3.1.5 Identify body components and accessories, and describe their purpose and operation. (A12.5)
12A.3.1.6 Interpret information pertaining to electrical and electronic components found on drawings and specifications. (A7.3)	12B.3.1.6 Demonstrate an understanding of the operation of vehicle control systems.	12C.3.1.6 Demonstrate an understanding of fuel management systems (e.g., carburetors, fuel injection systems, diesel).	12D.3.1.6 Identify types of electrical/electronic systems, and describe their components and operation. (A12.6)
12A.3.1.7 Explain basic electrical theory. (A7.4)	12B.3.1.7 Demonstrate an understanding of the purpose of vehicle data communication systems (e.g., CANBUS, multiplexing).	12C.3.1.7 Demonstrate an understanding of the operation of engine management–related input and output devices.	12D.3.1.7 Identify materials used to dampen or interrupt vibration. (A12.8)
12A.3.1.8 Explain Ohm's law and its applications to electrical circuits. (A7.5)	12B.3.1.8 Demonstrate an understanding of the components of vehicle data communication systems (e.g., CANBUS, multiplexing).	12C.3.1.8 Demonstrate an understanding of onboard diagnostic systems and their function.	12D.3.1.8 Identify types of seals, adhesives, cleaners, and sealing materials, and describe their applications and procedures for use. (A12.10)

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Goal 3: Describe, inspect, diagnose, service, and repair automotive components and systems. *(continued)* **GLO 3.1: Describe** automotive components and systems. *(continued)*			
12A.3.1.9 Describe batteries and their characteristics. (A7.7)		12C.3.1.9 Demonstrate an understanding of the components of fuel-injection systems.	
12A.3.1.10 Identify types of wire and describe their characteristics, composition, and applications. (A7.8)		12C.3.1.10 Demonstrate an understanding of safety components utilized to disable fuel delivery.	
12A.3.1.11 Identify types of electrical components and describe their purpose and operation. (A7.9)		12C.3.1.11 Demonstrate an understanding of air induction system concepts and components. 12C.3.1.12 Demonstrate an understanding of exhaust system designs and components. 12C.3.1.13 Describe alternative propulsion technologies (e.g., electrical, hybrid). 12C.3.1.14 Describe the fundamentals of hybrid technology. (A13.1)	

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Goal 3: Describe, inspect, diagnose, service, and repair automotive components and systems. *(continued)*			
GLO 3.1: Describe automotive components and systems. *(continued)*			
		12C.3.1.15 Describe hybrid vehicle safety standards. (A13.2) 12C.3.1.16 Describe tools for hybrid vehicle safety. (A13.3) 12C.3.1.17 Describe differences with high-voltage batteries. (A13.4)	
GLO 3.2: Inspect and diagnose automotive components and systems.			
12A.3.2.1 Demonstrate the ability to inspect and diagnose batteries.	12B.3.2.1 Demonstrate the ability to inspect and diagnose vehicle control systems (e.g., supplemental restraint systems, ABS, traction control).	12C.3.2.1 Demonstrate the ability to inspect and diagnose management fuel systems.	12D.3.2.1 Demonstrate the ability to verify and document a customer complaint.
12A.3.2.2 Demonstrate the ability to inspect and diagnose starting systems.	12B.3.2.2 Demonstrate the ability to inspect and diagnose vehicle data communication systems (e.g., CANBUS, multiplexing).	12C.3.2.2 Demonstrate the ability to inspect and diagnose fuel delivery systems.	12D.3.2.2 Demonstrate the ability to select the appropriate diagnostic strategies to isolate the cause of a customer complaint.

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Goal 3: Describe, inspect, diagnose, service, and repair automotive components and systems. *(continued)* **GLO 3.2: Inspect and diagnose** automotive components and systems. *(continued)*			
12A.3.2.3 Demonstrate the ability to inspect and diagnose charging systems.	12B.3.2.3 Demonstrate the ability to service, repair, or replace ignition system components.	12C.3.2.3 Demonstrate the ability to inspect and diagnose engine management systems.	12D.3.2.3 Demonstrate the ability to interpret diagnostic test results.
12A.3.2.4 Demonstrate the ability to diagnose wiring harnesses.		12C.3.2.4 Demonstrate the ability to inspect and diagnose emission systems.	12D.3.2.4 Demonstrate the ability to determine additional maintenance or repairs required.
12A.3.2.5 Demonstrate the ability to diagnose electrical protection devices.		12C.3.2.5 Demonstrate the ability to inspect and diagnose exhaust systems.	12D.3.2.5 Demonstrate the ability to select an appropriate repair procedure to correct a customer complaint.
12A.3.2.6 Demonstrate the ability to inspect and diagnose automotive electrical systems.		12C.3.2.6 Demonstrate the ability to perform advanced scan-tool information retrieval and analysis (e.g., component testing, reset, live signals).	12D.3.2.6 Identify types and sources of noise, vibration, and harshness (NVH). (A12.7)
12A.3.2.7 Demonstrate the ability to calculate circuit values using Ohm's law.		12C.3.2.7 Demonstrate the ability to interpret diagnostic trouble codes (DTCs).	12D.3.2.7 Identify types and sources of wind and water leaks. (A12.9)

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Goal 3: Describe, inspect, diagnose, service, and repair automotive components and systems. *(continued)*			
GLO 3.2: Inspect and diagnose automotive components and systems. *(continued)*			
		12C.3.2.8 Demonstrate the ability to follow diagnostic procedures based on diagnostic trouble codes (DTCs). 12C.3.2.9 Demonstrate the ability to perform driveability diagnostic procedures with and without DTCs.	12D.3.2.8 Describe and demonstrate the procedures used to diagnose body components and trim. (A12.11)
GLO 3.3: Service and repair automotive components and systems.			
12A.3.3.1 Demonstrate the ability to service and repair starting systems.	12B.3.3.1 Demonstrate the ability to service or repair vehicle control systems (e.g., supplemental restraint systems, ABS, traction control).	12C.3.3.1 Demonstrate the ability to service and repair fuel management systems.	12D.3.3.1 Demonstrate the ability to complete required repairs.
12A.3.3.2 Demonstrate the ability to service and repair charging systems.	12B.3.3.2 Demonstrate the ability to service or repair a variety of vehicle data communication systems (e.g., CANBUS, multiplexing).	12C.3.3.2 Demonstrate the ability to service and repair fuel delivery systems.	12D.3.3.2 Demonstrate the ability to verify and document repairs.

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Goal 3: Describe, inspect, diagnose, service, and repair automotive components and systems. *(continued)* **GLO 3.3: Service and repair** automotive components and systems. *(continued)*			
12A.3.3.3 Demonstrate the ability to service and/or replace electrical protection devices.		12C.3.3.3 Demonstrate the ability to service and repair engine management systems.	12D.3.3.3 Describe and demonstrate the procedures used to adjust, repair, and/or replace body components and trim. (A12.12)
12A.3.3.4 Demonstrate the ability to measure and interpret electrical values in automotive circuits.		12C.3.3.4 Demonstrate the ability to service and repair emission systems.	
12A.3.3.5 Demonstrate the ability to retrieve and interpret wiring diagrams (e.g., colour coding systems, wire size).		12C.3.3.5 Demonstrate the ability to service and repair exhaust systems.	
12A.3.3.6 Identify types of tools and equipment used to test and charge batteries, and describe/demonstrate their applications and procedures for use. (A7.6)			
12A.3.3.7 Identify tools and equipment used to test circuits and components, and describe/ demonstrate their applications and procedures for use. (A7.10)			

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Goal 3: Describe, inspect, diagnose, service, and repair automotive components and systems. *(continued)* **GLO 3.3: Service and repair** automotive components and systems. *(continued)*			
12A.3.3.8 Identify methods of wire repair and describe/ demonstrate their associated procedures. (A7.11)			
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.**			
12A.4.1.1 Demonstrate the ability to use automotive service information retrieval systems unique to the automotive service and repair industry.	—	—	12D.4.1.1 Demonstrate awareness of shop management software. 12D.4.1.2 Demonstrate the ability to use online resources to find technical bulletins and other information related to automotive service and repair. 12D.4.1.3 Demonstrate an understanding of the methods to reprogram or update control modules.

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Goal 4: Describe and apply transferable **cross-curricular** knowledge and skills. *(continued)*			
GLO 4.1: Describe and apply knowledge and skills from **information and communication technologies.** *(continued)*			
			12D.4.1.4 Demonstrate the ability to select and interpret the service information documents relevant to the fault. 12D.4.1.5 Demonstrate the ability to interpret service information and bulletins.
GLO 4.2: Describe and apply knowledge and skills from the **sciences.**			
12A.4.2.1 Demonstrate an understanding of atomic structure. 12A.4.2.2 Demonstrate an understanding of electricity. 12A.4.2.3 Demonstrate an understanding of conventional and electron theory. 12A.4.2.4 Demonstrate an understanding of the principles of magnetism.	—	12C.4.2.1 Demonstrate an understanding of the chemistry of combustion and emissions.	—

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Goal 4: Describe and apply transferable **cross-curricular** knowledge and skills. *(continued)* **GLO 4.2:** Describe and apply knowledge and skills from the **sciences.** *(continued)*			
12A.4.2.5 Demonstrate an understanding of Ohm's law. 12A.4.2.6 Demonstrate an understanding of the properties of electromagnetism related to automotive components.			
Goal 5: Demonstrate an understanding of **sustainability.** **GLO 5.1:** Demonstrate an understanding of **sustainability.**			
12A.5.1.1 Demonstrate an understanding of efficient materials usage and disposal practices. 12A.5.1.2 Comply with efficient materials usage and disposal practices.	—	12C.5.1.1 Demonstrate an understanding of the requirements and responsibilities for proper battery recycling. 12C.5.1.2 Demonstrate an understanding of the impact of chemical hazards on the environment. 12C.5.1.3 Demonstrate an understanding of the relationship between sustainability and the production and use of electric and hybrid-electric vehicles.	—

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Goal 5: Demonstrate an understanding of **sustainability.** *(continued)* **GLO 5.1:** Demonstrate an understanding of **sustainability.** *(continued)*			
		12C.5.1.4 Demonstrate an understanding of the relationship between emission controls and environmental sustainability. 12C.5.1.5 Demonstrate an understanding of ethical and legal standards related to catalytic converters.	
Goal 6: Demonstrate awareness of **ethical and legal standards.** **GLO 6.1:** Demonstrate awareness of **ethical and legal standards.**			
12A.6.1.1 Demonstrate awareness of liability concerns related to automotive systems and service.	12B.6.1.1 ⟶	12C.6.1.1 ⟶	12D.6.1.1 ⟶ 12D.6.1.2 Demonstrate ethical behaviour while working on customers' vehicles.

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Goal 7: Demonstrate **employability skills.** **GLO 7.1:** Demonstrate **employability skills.**			
12A.7.1.1 Demonstrate problem-solving skills.	12B.7.1.1 →	12C.7.1.1 →	12D.7.1.1 →
12A.7.1.2 Demonstrate critical-thinking skills.	12B.7.1.2 →	12C.7.1.2 →	12D.7.1.2 →
12A.7.1.3 Demonstrate regular attendance and punctuality.	12B.7.1.3 →	12C.7.1.3 →	12D.7.1.3 →
12A.7.1.4 Demonstrate accountability by taking responsibility for their actions.	12B.7.1.4 →	12C.7.1.4 →	12D.7.1.4 →
12A.7.1.5 Demonstrate adaptability, initiative, and effort.	12B.7.1.5 →	12C.7.1.5 →	12D.7.1.5 →
12A.7.1.6 Demonstrate the ability to accept and follow directions and feedback.	12B.7.1.6 →	12C.7.1.6 →	12D.7.1.6 →
12A.7.1.7 Demonstrate teamwork skills.	12B.7.1.7 →	12C.7.1.7 →	12D.7.1.7 →
12A.7.1.8 Demonstrate the ability to stay on task and effectively use time in class and shop environments.	12B.7.1.8 →	12C.7.1.8 →	12D.7.1.8 →

8700 **Automotive Electrical Systems (12A)** 40S / 40E / 40M	8701 **Vehicle Systems Part 1 (12B)** 40S / 40E / 40M	8702 **Vehicle Systems Part 2 (12C)** 40S / 40E / 40M	8703 **Applied Diagnostic Strategies (12D)** 40S / 40E / 40M
Goal 7: Demonstrate **employability skills.** *(continued)* **GLO 7.1:** Demonstrate **employability skills.** *(continued)*			
12A.7.1.9 Communicate respectfully and effectively with coworkers and customers.	12B.7.1.9 →	12C.7.1.9 →	12D.7.1.9 →
GLO 7.2: Demonstrate an understanding of the **business operation** of a repair/service facility.			
—	—	—	12D.7.2.1 Demonstrate an understanding of the procedures used to prepare and/or complete trade-related documents. 12D.7.2.2 Demonstrate the ability to prepare estimates and communicate information to customers. 12D.7.2.3 Identify audiences and describe techniques for effective verbal and non-verbal communication. (A4.1) 12D.7.2.4 Identify types of communication devices and describe their purpose and operation. (A4.2)

8700 **Automotive Electrical Systems (12A)** 40S / 40E / 40M	8701 **Vehicle Systems Part 1 (12B)** 40S / 40E / 40M	8702 **Vehicle Systems Part 2 (12C)** 40S / 40E / 40M	8703 **Applied Diagnostic Strategies (12D)** 40S / 40E / 40M
Goal 7: Demonstrate **employability skills.** *(continued)* **GLO 7.2:** Demonstrate an understanding of the **business operation** of a repair/service facility. *(continued)*			
			12D.7.2.5 Describe the importance of communicating job requirements. (A4.3) 12D.7.2.6 Identify types of trade-related documents and describe their applications. (A4.4)
Goal 8: Demonstrate an understanding of **educational and career opportunities.** **GLO 8.1:** Demonstrate an understanding of **educational and career opportunities.**			
12A.8.1.1 Demonstrate awareness of specialized occupations in automotive electrical systems.	12B.8.1.1 Demonstrate awareness of specialized occupations related to vehicle systems.	12C.8.1.1 Demonstrate an understanding of career and educational opportunities related to electric and hybrid-electric vehicles.	12D.8.1.1 Demonstrate an understanding of career opportunities related to emerging automotive technology.
	12B.8.1.2 Demonstrate an understanding of changes in technology related to computerized vehicle systems.	12C.8.1.2 Demonstrate an understanding of the evolution, technological progression, and emerging trends in vehicle systems.	12D.8.1.2 Demonstrate the skills and resources used to obtain and sustain employment in the automotive service and repair industry.

8700 **Automotive Electrical Systems (12A)** 40S / 40E / 40M	8701 **Vehicle Systems Part 1 (12B)** 40S / 40E / 40M	8702 **Vehicle Systems Part 2 (12C)** 40S / 40E / 40M	8703 **Applied Diagnostic Strategies (12D)** 40S / 40E / 40M
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.			
12A.9.1.1 Demonstrate an understanding of the evolution, technological progression, and emerging trends in automotive electrical systems.	—	—	12D.9.1.1 Demonstrate an understanding of the evolution, technological progression, and emerging trends in diagnostic strategies.

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