

# MECHANICS (& AUTO SERVICE TECHNICIAN TRADE) COURSE SUMMARIES

## INTRODUCTORY

### **MEC1010: MODES & MECHANISMS**

Students research, design, build and test a model of a transportation vehicle, using a simple power source, common materials and tools.

*Prerequisite: None*

### **MEC1015: MECHANICS TOOLS & MATERIALS**

Students develop knowledge, skills and attitudes in the safe use of specialty hand tools, measuring tools and fasteners.

*Prerequisite: None*

### **MEC1020: VEHICLE SERVICE & CARE**

Students develop the knowledge, skills and attitudes to care for and service a motor vehicle.

*Prerequisite: None*

### **MEC1040: ENGINE FUNDAMENTALS**

Students investigate and describe operating principles, construction and applications of engines.

*Prerequisite: None*

### **MEC1090: ELECTRICAL FUNDAMENTALS**

Students identify and describe the operating principles and applications of electricity.

*Prerequisite: None*

### **MEC1110: PNEUMATICS & HYDRAULICS**

Students identify and describe the operating principles and applications of pneumatic and hydraulic systems.

*Prerequisite: None*

### **MEC1130: MECHANICAL SYSTEMS**

Students identify and describe the operating principles and applications of mechanisms used to transmit and control mechanical energy.

*Prerequisite: None*

### **MEC1150: RIDE & CONTROL SYSTEMS**

Students develop a basic knowledge of ride and control systems associated with vehicles.

*Prerequisite: None*

### **MEC1160: STRUCTURES & MATERIALS**

Students identify the types of materials and components used in vehicle construction.

*Prerequisite: None*

### **MEC1165: MECHANICS WELDING FUNDAMENTALS**

Students perform metal heating and cutting operations safely using oxyacetylene equipment, and perform non-structural welding using Gas Metal Arc Welding (GMAW) equipment.

*Prerequisite: MEC1015: Mechanics Tools & Materials*

### **MEC1170: METAL FORMING & FINISHING**

Students repair and re-form damaged metal panels.

*Prerequisite: MEC1160: Structures & Materials*

### **MEC1190: SURFACE PREPARATION 1**

Students assess the state of a painted surface and use appropriate restoration procedures.

*Prerequisite: None*

### **MEC1910: MEC PROJECT A**

Students develop project design and management skills to extend and enhance competencies and skills in other CTS courses through contexts that are personally relevant

*Prerequisite: None*

## INTERMEDIATE

### **MEC2010: VEHICLE DETAILING**

Students develop the skills required to restore and enhance the exterior finishes of a vehicle.

*Prerequisite: None*

### **MEC2020: VEHICLE MAINTENANCE**

Students perform the basic service requirements necessary to ensure adequate maintenance of a motor vehicle.

*Prerequisite: MEC1020: Vehicle Service & Care*

### **MEC2030: LUBRICATION & COOLING**

Students diagnose, maintain and service the lubrication and cooling systems of a typical four-cycle gasoline engine.

*Prerequisite: MEC1040: Engine Fundamentals*

### **MEC2040: FUEL & EXHAUST SYSTEMS**

Students diagnose, maintain and service the fuel and exhaust system of a typical four-cycle gasoline engine.

*Prerequisite: MEC1040: Engine Fundamentals*

### **MEC2050: ALTERNATIVE FUEL ENGINES**

Students determine alternative fuels used to power motor vehicles.

*Prerequisite: None*

### **MEC2060: IGNITION SYSTEMS**

Students identify the basic components and parts of ignition systems used on internal combustion engines, and service and repair an ignition system.

*Prerequisite: None*

### **MEC2070: EMISSION CONTROLS**

Students describe the importance of controlling emissions and the technology applied to vehicles to meet prescribed standards.

*Prerequisite: None*

### **MEC2090: ELECTRICAL COMPONENTS**

Students identify and describe the basic use and testing of the electrical components of a typical motor vehicle.

*Prerequisite: MEC1090: Electrical Fundamentals*

### **MEC2100: POWER ASSIST ACCESSORIES**

Students identify and explain the function of components and parts of power assist accessories.

*Prerequisite: MEC1110: Pneumatics & Hydraulics*

### **MEC2110: BRAKING SYSTEMS**

Students develop the necessary knowledge, skills and attitudes to diagnose, service and maintain a braking system according to accepted trade practices.

*Prerequisite: MEC1110: Pneumatics & Hydraulics*

### **MEC2120: HYDRAULIC ACCESSORIES**

Students develop a basic knowledge of hydraulic components, applications and servicing techniques.

*Prerequisite: MEC1110: Pneumatics & Hydraulics*

### **MEC2130: DRIVE LINE**

Students identify the purpose, describe the operation and perform the servicing of a vehicle drive line.

*Prerequisite: MEC1130: Mechanical Systems*

### **MEC2140: TRANSMISSIONS/TRANSAXLES**

Students perform inspection service and repair procedures on manual transmissions, transaxles and clutch assemblies.

*Prerequisite: MEC2130: Drive Line*

### **MEC2150: SUSPENSION SYSTEMS**

Students develop the knowledge, skills and attitudes necessary to service and maintain vehicle suspension systems.

*Prerequisite: MEC1150: Ride & Control Systems*

**MEC2160: STEERING SYSTEMS**

Students develop the knowledge, skills and attitudes necessary to maintain a steering system.

*Prerequisite:* MEC1150: Ride & Control Systems

**MEC2170: METAL REPAIR & FINISHING**

Students analyze and repair metal damage.

*Prerequisite:* MEC1170: Metal Forming & Finishing

**MEC2180: TRIM REPLACEMENT**

Students demonstrate the removal and repair of trim parts, with an emphasis on removal and installation without damage.

*Prerequisite:* None

**MEC2190: SURFACE PREPARATION 2**

Students perform advanced surface preparations.

*Prerequisite:* MEC1190: Surface Preparation 1

**MEC2200: REFINISHING 1**

Students demonstrate metal surface refinishing procedures.

*Prerequisite:* MEC2190: Surface Preparation 2

**MEC2210: TOUCH-UP & FINISHING**

Students determine and use the appropriate materials, tools and processes for minor surface repairs.

*Prerequisite:* MEC2200: Refinishing 1

**MEC2220: INTERIOR REPAIRS**

Students search for and use the appropriate products and techniques to maintain vehicle interior surface materials.

*Prerequisite:* MEC1160: Structures & Materials

**MEC2910: MEC PROJECT B**

Students develop project design and management skills to extend and enhance competencies and skills in other CTS courses through contexts that are personally relevant.

*Prerequisite:* None

**MEC2920: MEC PROJECT C**

Students develop project design and management skills to extend and enhance competencies and skills in other CTS courses through contexts that are personally relevant.

*Prerequisite:* None

**MEC2950: MEC INTERMEDIATE PRACTICUM**

Students apply prior learning and demonstrate the attitudes, skills and knowledge required by an external organization to achieve a credential/credentials or an articulation.

*Prerequisite:* None

**ADVANCED****MEC3010: BUYING & SELLING VEHICLES**

Students develop the skills required to make an informed purchase or sale of a vehicle.

*Prerequisite:* None

**MEC3020: VEHICLE VALUE APPRAISAL**

Students demonstrate the procedures used by the vehicle repair industry to estimate the cost of a repair and the market value of a vehicle.

*Prerequisite:* MEC2020: Vehicle Maintenance

**MEC3030: ENGINE DIAGNOSIS**

Students learn to diagnose the condition of an engine for worn or damaged parts and/or improper adjustments.

*Prerequisite:* MEC1040: Engine Fundamentals

**MEC3040: ENGINE TUNE-UP**

Students diagnose, service and repair engine, fuel, ignition, charging and starting systems.

*Prerequisite:* MEC3030: Engine Diagnosis

**MEC3050: ENGINE REPLACEMENT**

Students remove and install an engine in a chassis.

*Prerequisite:* MEC1040: Engine Fundamentals

**MEC3060: ENGINE RECONDITIONING – HEAD**

Students determine the need for service and perform the required service on the cylinder head and related components of an engine.

*Prerequisite:* MEC1040: Engine Fundamentals

**MEC3070: ENGINE RECONDITIONING – BLOCK**

Students determine the need for service and perform service on a cylinder block assembly and related components of an engine.

*Prerequisite:* MEC1040: Engine Fundamentals

**MEC3080: ALTERNATIVE ENERGY SYSTEMS**

Students describe why vehicle manufacturers continue to build the crank-piston internal combustion gasoline engine.

Students also identify and describe future engine designs.

*Prerequisite:* MEC2050: Alternative Fuel Engines

**MEC3090: COMPUTER SYSTEMS**

Students provide an overview of the applications of computer management systems used in modern vehicles.

*Prerequisite:* MEC2070: Emission Controls

**MEC3100: SAFETY SYSTEMS**

Students describe how safety systems can be tested, diagnosed, replaced or repaired.

*Prerequisite:* MEC2100: Power Assist Accessories

**MEC3110: CLIMATE CONTROL**

Students expand their knowledge of the purpose, operation and servicing of standard heating and air conditioning systems.

*Prerequisite:* MEC2030: Lubrication & Cooling

**MEC3120: POWER ASSISTING**

Students further develop their knowledge of the purpose, operation, service and repair of pneumatic, hydraulic and electric power assist devices.

*Prerequisite:* MEC2100: Power Assist Accessories

**MEC3130: AUTOMATIC TRANSMISSIONS**

Students develop knowledge of automatic transmissions and transaxles and skills in diagnosing and executing minor automatic transmission and transaxle repair requirements.

*Prerequisite:* MEC1110: Pneumatics & Hydraulics

**MEC3140: DRIVE TRAIN REPAIR**

Students perform overhauls on clutch, transmission and differential assemblies.

*Prerequisite:* MEC2130: Drive Line

**MEC3150: WHEEL ALIGNMENT**

Students develop the knowledge, skills and attitudes necessary for repairing and aligning various vehicle steering systems.

*Prerequisite:* MEC2150: Suspension Systems

**MEC3160: BODY REPAIR ESTIMATION**

Students apply knowledge in estimating, including paying close attention to detail in determining the cost of a repair.

*Prerequisite:* MEC1160: Structures & Materials

**MEC3170: DAMAGE ANALYSIS**

Students identify and examine physical damage caused by collisions and learn cost estimating procedures.

*Prerequisite:* MEC2170: Metal Repair & Finishing

**MEC3180: DAMAGE REPAIR 1**

Students examine the methods used to complete a repair involving removing, replacing and aligning body parts.

*Prerequisite:* MEC2170: Metal Repair & Finishing

**MEC3190: DAMAGE REPAIR 2**

Students examine methods used to complete a collision repair involving unibody parts replacement and frame correction

*Prerequisite:* MEC3180: Damage Repair 1

**MEC3200: REFINISHING 2**

Students demonstrate finishing skills and techniques related to the preparation and application of metallic paints.

*Prerequisite:* MEC2200: Refinishing 1

**MEC3210: PLASTIC & FIBREGLASS**

Students determine the types of plastic and fibreglass materials required for repairs and perform appropriate repair procedures.

*Prerequisite:* MEC1160: Structures & Materials

**MEC3220: GLASS REPLACEMENT**

Students demonstrate knowledge, skills and practice related to vehicle glass installation and adjustment.

*Prerequisite:* MEC2180: Trim Replacement

**MEC3230: REFINISHING 3**

Students demonstrate knowledge and skills of advanced finishing techniques, including custom painting, mixing, tinting, colour and texture matching.

*Prerequisite:* MEC3200: Refinishing 2

**MEC3910: MEC PROJECT D**

Students develop project design and management skills to extend and enhance competencies and skills in other CTS courses through contexts that are personally relevant.

*Prerequisite:* None

**MEC3920: MEC PROJECT E**

Students develop project design and management skills to extend and enhance competencies and skills in other CTS courses through contexts that are personally relevant.

*Prerequisite:* None

**MEC3950: MEC ADVANCED PRACTICUM**

Students apply prior learning and demonstrate the attitudes, skills and knowledge required by an external organization to achieve a credential/credentials or an articulation.

*Prerequisite:* None

**AUTO SERVICE TECHNICIAN APPRENTICESHIP (FIRST PERIOD APPRENTICESHIP)****ASA3400: BASIC TOOLS & MATERIALS**

Students develop knowledge, skills and attitudes in the practice of workshop safety, communication and the use of specialty hand tools, measuring tools and fasteners.

*Prerequisite:* None

**ASA3405: ELECTRICAL FUNDAMENTALS**

Students identify and describe the operating principles and applications of electricity.

*Prerequisite:* ASA3400: Basic Tools & Materials

**ASA3410: ELECTRICAL CIRCUITS & DIAGNOSIS**

Students develop the necessary knowledge, skills and attitudes to identify the applications of electricity in circuits to solve electrical problems in a vehicle

*Prerequisites:* ASA3405: *Electrical Fundamentals*

**ASA3415: FRAMES, SUSPENSION & STEERING LINKAGES**

Students develop the knowledge, skills and attitudes necessary to service and maintain vehicle frames, wheel hubs and tires, and suspension and linkage systems.

*Prerequisite:* ASA3400: *Basic Tools & Materials*

**ASA3420: MANUAL & POWER STEERING SYSTEMS**

Students develop the knowledge, skills and attitudes necessary to service and maintain manual and power steering systems.

*Prerequisites:* ASA3410: *Electrical Circuits & Diagnosis*

**ASA3425: STEERING ANGLES, STEERING COLUMNS & RESTRAINT SYSTEMS**

Students develop the necessary knowledge, skills and attitudes to describe steering angles, service and repair steering columns, and diagnose and service passive and active restraint systems.

*Prerequisites:* ASA3410: *Electrical Circuits & Diagnosis*

ASA3415: *Frames, Suspension & Steering Linkages*

**ASA3430: WHEEL ALIGNMENT PROCEDURES**

Students develop the necessary knowledge, skills and attitudes to diagnose and correct suspension and steering problems and to perform wheel alignments.

*Prerequisites:* ASA3415: *Frames, Suspension & Steering Linkages*

ASA3420: *Manual & Power Steering Systems*

**ASA3435: BRAKING SYSTEMS 1**

Students develop the necessary knowledge, skills and attitudes concerning the basic construction of braking systems and the application of hydraulics to braking components.

*Prerequisite:* ASA3400: *Basic Tools & Materials*

**ASA3440: BRAKING SYSTEMS 2**

Students develop the necessary knowledge, skills and attitudes to diagnose, service and maintain a braking system according to accepted trade practices.

*Prerequisites:* ASA3435: *Braking Systems 1*

**ASA3445: BRAKING SYSTEMS 3**

Students develop the necessary knowledge, skills and attitudes to identify, diagnose, service and maintain power brake and anti-lock braking system (ABS) components, as well as perform routine maintenance to the brake system according to accepted trade practices.

*Prerequisites:* ASA3410: *Electrical Circuits & Diagnosis*

ASA3440: *Braking Systems 2*

**ASA3450: DRIVELINES & INTRODUCTORY WELDING**

Students develop the necessary knowledge, skills and attitudes to identify the purpose, describe the operation and perform the servicing of a vehicle driveline. Students develop the necessary knowledge, skills, and attitudes to heat, cut (using oxyacetylene) and weld (using Gas Metal Arc Welding [GMAW]).

*Prerequisite:* ASA3400: *Basic Tools & Materials*

**ASA3455: ASA PRACTICUM COURSE A**

Students, on the work site, continue to develop and refine those competencies developed in related Career and Technology Studies (CTS) occupational areas, previous practicums and other experiences.

*Prerequisite:* None

**ASA3460: ASA PRACTICUM COURSE B**

Students, on the work site, continue to develop and refine those competencies developed in related Career and Technology Studies (CTS) occupational areas, previous practicums and other experiences.

*Prerequisite:* None

**ASA3465: ASA PRACTICUM COURSE C**

Students, on the work site, continue to develop and refine those competencies developed in related Career and Technology Studies (CTS) occupational areas, previous practicums and other experiences.

*Prerequisite: None*

**ASA3470: ASA PRACTICUM COURSE D**

Students, on the work site, continue to develop and refine those competencies developed in related Career and Technology Studies (CTS) occupational areas, previous practicums and other experiences.

*Prerequisite: None*