

Course Parameters for Mechanics

Facilities

Several courses in the Mechanics scope and sequence can be delivered in a typical classroom setting. Refer to Attachment 4: CTS without Labs in this appendix. The majority require access to more specialized in-school and off-campus facilities, such as:

- space for vehicle work stations, overhead doors and hoists
- space for instruction and resources
- space for equipment and tool storage
- provision for exhaust/fume/dust extraction—depending on courses chosen
- provision for water, drainage and electrical services.

Also desirable, though not essential, are instructional facilities that have:

- whiteboards, bulletin boards and display cabinets
- access to a parking compound
- communication service—telephone, computer/modem and networking.

Courses that require access to facilities in addition to those present in a typical classroom setting are identified in the Course Parameters. For more information, see the corresponding course in Sections D, E and F of the *Guide to Standards and Implementation*.

Most courses in Mechanics—those identified with an asterisk—require special facilities to accommodate instruction and maintenance of vehicles. Needed facilities vary according to the type of vehicles used for instruction and the courses undertaken.

Equipment

A recommended equipment list is provided in the Course Parameters chart. Though not exhaustive, the list identifies equipment recommended as necessary to meet the course outcomes when using the automobile as the vehicle. Make and models of equipment need to be determined locally.

Equipment for courses in Mechanics can be obtained through a combination of purchasing, borrowing, renting, improvising and constructing. When choosing a suitable option for obtaining equipment, give consideration to:

- adequacy of budgets for purchase
- capabilities regarding in-school maintenance and storage
- the logistics and cost of renting
- potential for loan from industry, government or post-secondary agencies
- joint purchases with other organizations in the community
- opportunities for improvising or constructing.

Teachers may find it desirable to develop a list of additional materials and supplies required for specific learning activities planned within each course.

Safety and Security Considerations

Maintaining a safe and secure environment is essential when delivering a Mechanics program. The following issues need to be addressed:

- procedures for laboratory/shop management
- provision for electrical power lockout in the absence of teacher/facilitator
- procedures for proper use of tools and equipment
- procedures to follow when an accident occurs
- preventative accident/equipment maintenance program
- safe laboratory/shop equipment layout.

Instructional Qualifications

Facilitation of the Mechanics program requires teachers having expertise in classrooms as well as lab/shop settings. Trade training and experience are essential for many courses. For students seeking apprenticeship articulation, instruction must be provided by teachers with trade qualifications, such as a journeyman certificate. To ensure compliance with industry safety standards, selected courses in brakes, steering and suspension require supervision by a journeyman when work is performed on road licensed vehicles.

Courses requiring additional instructor credentials are identified in the Course Parameters chart. For more information regarding each teacher/instructor credential, see the corresponding course in Sections D, E and F of the *Guide to Standards and Implementation*.

Credentialing Opportunities

Students may earn credentials recognized by business, industry and post-secondary institutions by demonstrating a specific set of competencies. Based on an articulation agreement established with the Apprenticeship and Industry Training Division, Alberta Advanced Education and Career Development, students who complete specified CTS courses may be eligible to obtain advanced standing in the apprenticeship program for Automotive Service Technician. Further details regarding each articulation agreement, including a correlation to CTS strands and courses, are provided in Appendix 5: Planning Ahead—CTS Transitions into Post-secondary Programs and the Workplace. Additional information can be obtained by contacting the Apprenticeship and Industry Training Division, Alberta Advanced Education and Career Development. A list of local Career Development Centres throughout Alberta is also provided in Appendix 5: Planning Ahead—CTS Transitions into Post-secondary Programs and the Workplace.

For more information regarding the credential, requirement/qualification and credentialing agency, see the corresponding course in Sections D, E and F of the *Guide to Standards and Implementation*.

Course Parameters

MECHANICS

LEVEL

- 1 – Introductory
- 2 – Intermediate
- 3 – Advanced

THEME

- A. Vehicle Design and Ownership
- B. Propulsion Systems
- C. Guidance and Control Systems
- D. Suspension and Structural Systems

EQUIPMENT

- ✓ Recommended in order to meet course outcomes
- Optional in providing access to supportive learning environments

LEVEL	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
THEME	A	A	B	C	C	C	D	D	D	D	A	A	B	B	B	B	B	C	C	C	C	C	C	D	D	D	
INSTRUCTIONAL QUALIFICATIONS											*	*						*	*				*	*			
INSTRUCTIONAL FACILITY	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
CREDENTIALLING OPPORTUNITIES		*	*	*	*	*	*	*				*	*	*	*	*	*	*	*	*	*	*	*	*	*		
EQUIPMENT	Modes & Mechanisms	Vehicle Service & Care	Engine Fundamentals	Electrical Fundamentals	Pneumatics & Hydraulics	Mechanical Systems	Ride & Control Systems	Structures & Materials	Metal Forming & Finishing	Surface Preparation 1	Vehicle Detailing	Vehicle Maintenance	Lubrication & Cooling	Fuel & Exhaust Systems	Alternative Fuel Engines	Ignition Systems	Emission Controls	Electrical Components	Power Assist Accessories	Braking Systems	Hydraulic Accessories	Drive Trains	Transmissions/Transaxles	Suspension Systems	Steering Systems	Metal Repair & Finishing	
	1010	1020	1040	1090	1110	1130	1150	1160	1170	1190	2010	2020	2030	2040	2050	2060	2070	2090	2100	2110	2120	2130	2140	2150	2160	2170	
Drill, portable, heavy duty, variable speed, reversible	✓	✓	○	○	✓	✓	○	✓	✓	✓	○	✓	○	○	○	○	○	○	○	○	○	○	○	○	○	○	✓
Dust collection system									✓	✓																✓	
Engine analyzer																											
Flusher, cooling system		○										○	✓														
Frame straightener																											
Grinder, portable angle tool (bench)	✓	✓	○	○	○	○	○	○	○			✓	○	○	○	○	○	○	○	○	○	○	○	○	○	○	✓
valve reface			○																								
valve seat			○																								
Headlight, aimer		○										✓															

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LEVEL	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
THEME	D	D	D	D	D	A	A	B	B	B	B	B	B	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D
INSTRUCTIONAL QUALIFICATIONS															*	*	*	*	*			*	*					
INSTRUCTIONAL FACILITIES	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
CREDENTIALLING OPPORTUNITIES								*	*	*	*	*							*	*								
EQUIPMENT	Trim Replacement	Surface Preparation 2	Refinishing 1	Touch-up & Finishing	Interior Repairs	Buying & Selling Vehicles	Vehicle Value Appraisal	Engine Diagnosis	Engine Tune-up	Engine Replacement	Engine Reconditioning 1	Engine Reconditioning 2	Alternative Energy Systems	Computer Systems	Safety Systems	Climate Control	Power Assisting	Automatic Transmissions	Drive Train Repair	Wheel Alignment	Body Repair-Estimation	Damage Analysis	Damage Repair 1	Damage Repair 2	Refinishing 2	Plastic & Fibreglass	Glass Replacement	Refinishing 3
	2180	2190	2200	2210	2220	3010	3020	3030	3040	3050	3060	3070	3080	3090	3100	3110	3120	3130	3140	3150	3160	3170	3180	3190	3200	3210	3220	3230
Drill, portable, heavy duty, variable speed, reversible	○	○		✓	✓			○		○	✓	✓											✓	✓	✓	✓		
Dust collection system		✓		○																			✓	✓		✓		✓
Engine analyzer						○		✓	✓																			
Flusher, cooling system																												
Frame straightener																									✓			
Grinder, portable angle		○	○																				✓	✓		✓		○
tool (bench)		○	○	○	○			○			✓	✓											○	○	○			
valve reface											✓																	
valve seat											✓																	
Headlight, aimer																												

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LEVEL	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
THEME	D	D	D	D	D	A	A	B	B	B	B	B	B	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	
INSTRUCTIONAL QUALIFICATIONS															*	*	*	*	*			*	*						
INSTRUCTIONAL FACILITIES	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
CREDENTIALLING OPPORTUNITIES								*	*	*	*	*							*	*									
EQUIPMENT	Trim Replacement	Surface Preparation 2	Refinishing 1	Touch-up & Finishing	Interior Repairs	Buying & Selling Vehicles	Vehicle Value Appraisal	Engine Diagnosis	Engine Tune-up	Engine Replacement	Engine Reconditioning 1	Engine Reconditioning 2	Alternative Energy Systems	Computer Systems	Safety Systems	Climate Control	Power Assisting	Automatic Transmissions	Drive Train Repair	Wheel Alignment	Body Repair Estimation	Damage Analysis	Damage Repair 1	Damage Repair 2	Refinishing 2	Plastic & Fibreglass	Glass Replacement	Refinishing 3	
	2180	2190	2200	2210	2220	3010	3020	3030	3040	3050	3060	3070	3080	3090	3100	3110	3120	3130	3140	3150	3160	3170	3180	3190	3200	3210	3220	3230	
Hoist, auto, electric engine						○	○	○	○	○	○	○			○		○	○	○	✓	○	○							
Honing machine											○	✓																	
Hydrolauncher																													
Individual testers; e.g., battery, charging, infrared, volt/ohm etc.								✓	✓					✓	✓	✓	✓												
Jack, stands						○	○	○	○	✓	○	○			○	○	○	○	○	○	○	○	○	○	○				
automotive (floor)						○	○	○	○	✓	○	○			○	○	○	○	○	○	○	○	○	○					
body and frame						○	○	○	○												○	○	○	○					
Mask, fresh air		○	○	○																					✓	○		✓	
Mixer, paint			○	○																					✓	○		✓	

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LEVEL	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
THEME	A	A	B	C	C	C	D	D	D	D	A	A	B	B	B	B	B	C	C	C	C	C	C	D	D	D	
INSTRUCTIONAL QUALIFICATIONS											*	*						*	*				*	*			
INSTRUCTIONAL FACILITY	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
CREDENTIALLING OPPORTUNITIES		*	*	*	*	*	*	*				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
EQUIPMENT	Modes & Mechanisms	Vehicle Service & Care	Engine Fundamentals	Electrical Fundamentals	Pneumatics & Hydraulics	Mechanical Systems	Ride & Control Systems	Structures & Materials	Metal Forming & Finishing	Surface Preparation 1	Vehicle Detailing	Vehicle Maintenance	Lubrication & Cooling	Fuel & Exhaust Systems	Alternative Fuel Engines	Ignition Systems	Emission Controls	Electrical Components	Power Assist Accessories	Braking Systems	Hydraulic Accessories	Drive Trains	Transmissions/Transaxles	Suspension Systems	Steering Systems	Metal Repair & Finishing	
	1010	1020	1040	1090	1110	1130	1150	1160	1170	1190	2010	2020	2030	2040	2050	2060	2070	2090	2100	2110	2120	2130	2140	2150	2160	2170	
Mobile lift (air operated)		○										○												○	○		
Nibbler								○	✓																	✓	
Oil drain (mobile)		○	○		✓																						
Paper machine									○	○																	
Polisher, portable		○									✓	○															
Press, arbor				○	○	○	○											○				✓	○	○	○		
hydraulic																						○		✓			
Pump, car wash (high pressure washer)		○			○	○					✓	✓	○						○	○	○	○	○	○	○		
Raceway, manual start	○																										
Roller, forming	○							○	○																	✓	
Sander, disc (portable)																										✓	

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LEVEL	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
THEME	D	D	D	D	D	A	A	B	B	B	B	B	B	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	
INSTRUCTIONAL QUALIFICATIONS															*	*	*	*	*	*	*	*	*	*	*	*	*	*	
INSTRUCTIONAL FACILITIES	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
CREDENTIALLING OPPORTUNITIES								*	*	*	*	*							*	*									
EQUIPMENT	Trim Replacement	Surface Preparation 2	Refinishing 1	Touch-up & Finishing	Interior Repairs	Buying & Selling Vehicles	Vehicle Value Appraisal	Engine Diagnosis	Engine Tune-up	Engine Replacement	Engine Reconditioning 1	Engine Reconditioning 2	Alternative Energy Systems	Computer Systems	Safety Systems	Climate Control	Power Assisting	Automatic Transmissions	Drive Train Repair	Wheel Alignment	Body Repair-Estimation	Damage Analysis	Damage Repair 1	Damage Repair 2	Refinishing 2	Plastic & Fibreglass	Glass Replacement	Refinishing 3	
	2180	2190	2200	2210	2220	3010	3020	3030	3040	3050	3060	3070	3080	3090	3100	3110	3120	3130	3140	3150	3160	3170	3180	3190	3200	3210	3220	3230	
Mobile lift (air operated)							○													○	○	○	○	○					
Nibbler																							✓	✓					
Oil drain (mobile)									○	○	○																		
Paper machine			✓	○																						✓	✓		✓
Polisher, portable			○	✓																					✓				✓
Press, arbor											○	○						○											
hydraulic																				✓	○								
Pump, car wash (high pressure washer)										○	○							✓	✓										
Raceway, manual start																													
Roller, forming																							✓	✓					
Sander, disc (portable)		✓																							✓	✓			✓

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LEVEL	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
THEME	A	A	B	C	C	C	D	D	D	D	A	A	B	B	B	B	B	C	C	C	C	C	C	D	D	D	
INSTRUCTIONAL QUALIFICATIONS											*	*						*	*				*	*			
INSTRUCTIONAL FACILITY	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
CREDENTIALLING OPPORTUNITIES		*	*	*	*	*	*	*				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
EQUIPMENT	Modes & Mechanisms	Vehicle Service & Care	Engine Fundamentals	Electrical Fundamentals	Pneumatics & Hydraulics	Mechanical Systems	Ride & Control Systems	Structures & Materials	Metal Forming & Finishing	Surface Preparation 1	Vehicle Detailing	Vehicle Maintenance	Lubrication & Cooling	Fuel & Exhaust Systems	Alternative Fuel Engines	Ignition Systems	Emission Controls	Electrical Components	Power Assist Accessories	Braking Systems	Hydraulic Accessories	Drive Trains	Transmissions/Transaxles	Suspension Systems	Steering Systems	Metal Repair & Finishing	
	1010	1020	1040	1090	1110	1130	1150	1160	1170	1190	2010	2020	2030	2040	2050	2060	2070	2090	2100	2110	2120	2130	2140	2150	2160	2170	
Sander, oscillating (portable)									○	○																✓	
Shaker, paint									○																	○	
Shear, squaring	○								○																	✓	
Spray booth									○																	○	
gun									✓		○															✓	
Storage tank, waste oil		✓	✓		○							✓	✓														
Tap and die set (NC/NF, met/imp)	○	✓	○	○	○	○		○	○			○				○	○	✓								✓	
Tester, alternator				○														✓									
armature				○														✓									
circuit		○		✓							○							✓									
engine performance											○			✓		✓	✓										

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LEVEL	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
THEME	D	D	D	D	D	A	A	B	B	B	B	B	B	C	C	C	C	C	C	C	D	D	D	D	D	D	D	D
INSTRUCTIONAL QUALIFICATIONS															*	*	*	*	*	*	*	*	*	*	*	*	*	*
INSTRUCTIONAL FACILITIES	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
CREDENTIALLING OPPORTUNITIES								*	*	*	*	*							*	*								
EQUIPMENT	Trim Replacement	Surface Preparation 2	Refinishing 1	Touch-up & Finishing	Interior Repairs	Buying & Selling Vehicles	Vehicle Value Appraisal	Engine Diagnosis	Engine Tune-up	Engine Replacement	Engine Reconditioning 1	Engine Reconditioning 2	Alternative Energy Systems	Computer Systems	Safety Systems	Climate Control	Power Assisting	Automatic Transmissions	Drive Train Repair	Wheel Alignment	Body Repair-Estimation	Damage Analysis	Damage Repair 1	Damage Repair 2	Refinishing 2	Plastic & Fibreglass	Glass Replacement	Refinishing 3
	2180	2190	2200	2210	2220	3010	3020	3030	3040	3050	3060	3070	3080	3090	3100	3110	3120	3130	3140	3150	3160	3170	3180	3190	3200	3210	3220	3230
Sander, oscillating (portable)		✓	✓																						✓	✓		✓
Shaker, paint			✓	✓																					✓			✓
Shear, squaring																							✓	✓				
Spray booth			✓	○																						✓		✓
gun			✓	✓																					✓			✓
Storage tank, waste oil																												
Tap and die set (NC/NF, met/imp)					○					○	○	○								○			○	○	✓			✓
Tester, alternator								✓	✓																			
armature																												
circuit							○	✓	✓						✓	✓	✓											
engine performance							○	✓	✓																			

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THEME	A	A	B	C	C	C	D	D	D	D	A	A	B	B	B	B	B	C	C	C	C	C	C	D	D	D	
INSTRUCTIONAL QUALIFICATIONS											*	*						*	*				*	*			
INSTRUCTIONAL FACILITY	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
CREDENTIALLING OPPORTUNITIES		*	*	*	*	*	*	*				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
EQUIPMENT	Modes & Mechanisms	Vehicle Service & Care	Engine Fundamentals	Electrical Fundamentals	Pneumatics & Hydraulics	Mechanical Systems	Ride & Control Systems	Structures & Materials	Metal Forming & Finishing	Surface Preparation 1	Vehicle Detailing	Vehicle Maintenance	Lubrication & Cooling	Fuel & Exhaust Systems	Alternative Fuel Engines	Ignition Systems	Emission Controls	Electrical Components	Power Assist Accessories	Braking Systems	Hydraulic Accessories	Drive Trains	Transmissions/Transaxles	Suspension Systems	Steering Systems	Metal Repair & Finishing	
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Tester, power steering																			✓								
Tire changer		○										✓													○	○	
balancer		○										✓													✓	✓	
Trainer, electrical				○														○									
fluid power					○																						
mechanical						○																					
Vacuum cleaner	○	✓				○	○	✓			✓	✓															
Vise, machinist	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Washer, parts		○	○		○	○	○					○						○			○	○	○	○	○	○	
Welder, GMAW	○							✓	✓																	✓	
GMAW, semi-automatic									○																	○	
oxyacetylene c/w accessories	○	○						✓	✓					✓						○						○	

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Course Parameters

MECHANICS

LEVEL

- 1 – Introductory
- 2 – Intermediate
- 3 – Advanced

THEME

- A. Vehicle Design and Ownership
- B. Propulsion Systems
- C. Guidance and Control Systems
- D. Suspension and Structural Systems

EQUIPMENT

- ✓ Recommended in order to meet course outcomes
- Optional in providing access to supportive learning environments

LEVEL	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
THEME	A	A	B	C	C	C	D	D	D	D	A	A	B	B	B	B	B	C	C	C	C	C	C	D	D	D	
INSTRUCTIONAL QUALIFICATIONS											*	*						*	*				*	*			
INSTRUCTIONAL FACILITY	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
CREDENTIALLING OPPORTUNITIES		*	*	*	*	*	*	*				*	*	*	*	*	*	*	*	*	*	*	*	*	*		
EQUIPMENT	Modes & Mechanisms	Vehicle Service & Care	Engine Fundamentals	Electrical Fundamentals	Pneumatics & Hydraulics	Mechanical Systems	Ride & Control Systems	Structures & Materials	Metal Forming & Finishing	Surface Preparation 1	Vehicle Detailing	Vehicle Maintenance	Lubrication & Cooling	Fuel & Exhaust Systems	Alternative Fuel Engines	Ignition Systems	Emission Controls	Electrical Components	Power Assist Accessories	Braking Systems	Hydraulic Accessories	Drive Trains	Transmissions/Transaxles	Suspension Systems	Steering Systems	Metal Repair & Finishing	
	1010	1020	1040	1090	1110	1130	1150	1160	1170	1190	2010	2020	2030	2040	2050	2060	2070	2090	2100	2110	2120	2130	2140	2150	2160	2170	
Welder, spot	○								○																	✓	
Wheel alignment (portable) balancer		○									✓													✓	○	○	
Zip gun									✓																	○	

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