

New Zealand Certificate in Heavy Automotive Engineering (Level 4) with strands in Road Transport, Plant and Equipment, Agricultural Equipment, and Materials Handling [Ref: 3118]			
Level	4	Credits	240
Assessment standards aligned with qualification outcomes			
Outcomes		Assessment Standards	
Core Graduate Profile Outcomes			
Outcome 1 Monitor the workplace and respond to issues as required to maintain a safe and effective workplace (Credits 15)		29582 - Demonstrate knowledge of customer service requirements and business responsibilities in the automotive industry (Level 3, credits 4) 31065 - Demonstrate knowledge of estimates and quotations in the automotive industry (Level 4, credits 3)	
Outcome 2 Apply the appropriate precautionary measures when servicing and repairing high risk heavy automotive systems (Credits 50)		30879 - Demonstrate knowledge of hybrid electric and battery electric vehicle or machine systems and safety (Level 4, credits 5) 31061 - Demonstrate knowledge of diagnosing faults in Supplemental Restraint Systems (Level 3, credits 3) 31052 - Diagnose and repair a Supplemental Restraint System fault (Level 4, credits 4) 30885 - Demonstrate knowledge of automotive diagnostic and repair procedures (Level 3, credits 5) 30880 - Describe automotive electronic components, actuators, sensors and signals (Level 3, credits 5) 30881 - Describe automotive scan tools and oscilloscopes (Level 4, credits 5) 30873 - Carry out diagnostic procedures using an automotive scan tool (Level 4, credits 8)	
Road Transport Strand			
Outcome 3 Service and repair trucks, buses, heavy trailers and combination units (Credits 175)		31056 - Demonstrate knowledge of engine management system fault diagnosis (Level 4, credits 4) 31057 - Demonstrate knowledge of diagnosing automotive emission control system faults (Level 3, credits 4) 31058 - Demonstrate knowledge of a diesel engine management system (Level 4, credits 2) 31048 - Diagnose and repair engine management system faults (Level 4, credits 10)	

	<p>31049 - Diagnose and repair automotive emission control system faults (Level 4, credits 10)</p> <p>31125 - Diagnose and repair vehicle or machine cooling system faults (Level 4, credits 6)</p> <p>31221 - Describe diesel engine tuning (Level 3, credits 6)</p> <p>31223 - Demonstrate knowledge of a diesel engine braking system and an exhaust brake (Level 3, credits 4)</p> <p>31224 - Describe heavy diesel engine cylinder head removal, inspection and refitting (Level 3, credits 2)</p> <p>31214 - Tune a diesel engine (Level 4, credits 8)</p> <p>30888 - Remove, inspect and refit a cylinder head (Level 4, credits 4)</p> <p>31229 - Describe a heavy vehicle or machine induction system, turbochargers and induction and exhaust system diagnosis (Level 4, credits 5)</p> <p>31218 - Diagnose and repair heavy vehicle or machine induction, forced induction and exhaust system faults (Level 4, credits 12)</p> <p>31062 - Demonstrate knowledge of automotive body electrical and electronic systems (Level 4, credits 6)</p> <p>31053 - Diagnose and repair automotive body electrical and electronic system faults (Level 4, credits 5)</p> <p>30882 - Describe servicing requirements of multiple automotive batteries and traction batteries (Level 3, credits 3)</p> <p>30883 - Describe charging and starting system diagnosis (Level 3, credits 3)</p> <p>30876 - Diagnose and rectify faults in vehicle or machine charging and starting systems (Level 4, credits 6)</p> <p>30877 - Service multiple automotive batteries (Level 4, credits 3)</p> <p>31127 - Demonstrate knowledge of an automotive climate control system (Level 3, credits 3)</p> <p>31124 - Diagnose and repair faults in an automotive climate control system (Level 4, credits 6)</p> <p>2316 - Describe heavy vehicle and machine driveshafts and final drives (Level 3, credits 4)</p> <p>15418 - Demonstrate knowledge of heavy vehicle and machine clutches (Level 3, credits 4)</p> <p>31227 - Describe heavy vehicle and machine transmissions and diagnosis (Level 4, credits 6)</p> <p>31228 - Demonstrate knowledge of driveline retarders (Level 3, credits 3)</p> <p>2331 - Diagnose and repair heavy vehicle or machine clutch faults (Level 4, credits 5)</p>
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	<p>31216 - Diagnose and repair heavy vehicle or machine driveline and final drive assembly faults (Level 4, credits 8)</p> <p>31217 - Diagnose and repair heavy vehicle manual transmission faults (Level 4, credits 5)</p> <p>31276 - Demonstrate knowledge of heavy vehicle and machine hydraulic systems (Level 4, credits 6)</p> <p>31277 - Demonstrate knowledge of machine hydrostatic drive systems (Level 4, credits 3)</p> <p>31233 - Describe automotive pneumatic principles and systems (Level 3, credits 6)</p> <p>31230 - Demonstrate knowledge of common heavy vehicle or machine tyres and wheels (Level 3, credits 3)</p> <p>31231 - Describe heavy vehicle and machine steering and suspension systems, and system diagnosis (Level 4, credits 4)</p> <p>31219 - Diagnose and repair heavy vehicle or machine steering and suspension system faults (Level 4, credits 8)</p> <p>31232 - Describe heavy vehicle braking systems (Level 4, credits 8)</p> <p>31220 - Diagnose and repair heavy vehicle braking system faults (Level 4, credits 14)</p>
<p>Plant and Equipment Strand</p>	
<p>Outcome 3 Service and repair construction, off-road, and earth moving equipment (Credits 175)</p>	<p>31056 - Demonstrate knowledge of engine management system fault diagnosis (Level 4, credits 4)</p> <p>31057 - Demonstrate knowledge of diagnosing automotive emission control system faults (Level 3, credits 4)</p> <p>31058 - Demonstrate knowledge of a diesel engine management system (Level 4, credits 2)</p> <p>31048 - Diagnose and repair engine management system faults (Level 4, credits 10)</p> <p>31049 - Diagnose and repair automotive emission control system faults (Level 4, credits 10)</p> <p>31125 - Diagnose and repair vehicle or machine cooling system faults (Level 4, credits 6)</p> <p>31221 - Describe diesel engine tuning (Level 3, credits 6)</p> <p>31223 - Demonstrate knowledge of a diesel engine braking system and an exhaust brake (Level 3, credits 4)</p> <p>31224 - Describe heavy diesel engine cylinder head removal, inspection and refitting (Level 3, credits 2)</p> <p>31214 - Tune a diesel engine (Level 4, credits 8)</p> <p>30888 - Remove, inspect and refit a cylinder head (Level 4, credits 4)</p>

	<p>31229 - Describe a heavy vehicle or machine induction system, turbochargers and induction and exhaust system diagnosis (Level 4, credits 5)</p> <p>31218 - Diagnose and repair heavy vehicle or machine induction, forced induction and exhaust system faults (Level 4, credits 12)</p> <p>31062 - Demonstrate knowledge of automotive body electrical and electronic systems (Level 4, credits 6)</p> <p>30884 - Demonstrate knowledge of a heavy vehicle or machine air starting system (Level 3, credits 2)</p> <p>30882 - Describe servicing requirements of multiple automotive batteries and traction batteries (Level 3, credits 3)</p> <p>30883 - Describe charging and starting system diagnosis (Level 3, credits 3)</p> <p>30876 - Diagnose and rectify faults in vehicle or machine charging and starting systems (Level 4, credits 6)</p> <p>30877 - Service multiple automotive batteries (Level 4, credits 3)</p> <p>31127 - Demonstrate knowledge of an automotive climate control system (Level 3, credits 3)</p> <p>31124 - Diagnose and repair faults in an automotive climate control system (Level 4, credits 6)</p> <p>2316 - Describe heavy vehicle and machine driveshafts and final drives (Level 3, credits 4)</p> <p>15418 - Demonstrate knowledge of heavy vehicle and machine clutches (Level 3, credits 4)</p> <p>31227 - Describe heavy vehicle and machine transmissions and diagnosis (Level 4, credits 6)</p> <p>31228 - Demonstrate knowledge of driveline retarders (Level 3, credits 3)</p> <p>2331 - Diagnose and repair heavy vehicle or machine clutch faults (Level 4, credits 5)</p> <p>31216 - Diagnose and repair heavy vehicle or machine driveline and final drive assembly faults (Level 4, credits 8)</p> <p>31276 - Demonstrate knowledge of heavy vehicle and machine hydraulic systems (Level 4, credits 6)</p> <p>31277 - Demonstrate knowledge of machine hydrostatic drive systems (Level 4, credits 3)</p> <p>31233 - Describe automotive pneumatic principles and systems (Level 3, credits 6)</p> <p>31230 - Demonstrate knowledge of common heavy vehicle or machine tyres and wheels (Level 3, credits 3)</p> <p>31231 - Describe heavy vehicle and machine steering and suspension systems, and system diagnosis (Level 4, credits 4)</p>
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	<p>31219 - Diagnose and repair heavy vehicle or machine steering and suspension system faults (Level 4, credits 8)</p> <p>31275 - Demonstrate knowledge of machine hydraulic power assisted braking system (Level 4, credits 3)</p> <p>31263 - Diagnose and repair faults in machine hydraulic power assisted braking systems (Level 4, credits 6)</p> <p>31264 - Diagnose and repair faults in a machine hydraulic or hydrostatic system (Level 4, credits 10)</p> <p>31279 - Demonstrate knowledge of machine operator protective structures (Level 3, credits 2)</p> <p>31280 - Demonstrate knowledge of machine frame, undercarriage and track systems (Level 4, credits 4)</p> <p>31281 - Demonstrate knowledge of machine attachments and ground engagement devices (Level 3, credits 2)</p> <p>31262 - Diagnose and repair faults in machine ground engagement devices (Level 4, credits 4)</p> <p>31390 - Diagnose and repair a fault in a machine undercarriage system (Level 4, credits 6)</p>
<p>Materials Handling Strand</p>	
<p>Outcome 3</p> <p>Service and repair all electric and non-electric forklifts and other fuel or electric powered equipment designed for the movement of goods</p> <p>(Credits 175)</p>	<p>31056 - Demonstrate knowledge of engine management system fault diagnosis (Level 4, credits 4)</p> <p>31057 - Demonstrate knowledge of diagnosing automotive emission control system faults (Level 3, credits 4)</p> <p>31058 - Demonstrate knowledge of a diesel engine management system (Level 4, credits 2)</p> <p>31048 - Diagnose and repair engine management system faults (Level 4, credits 10)</p> <p>31049 - Diagnose and repair automotive emission control system faults (Level 4, credits 10)</p> <p>31125 - Diagnose and repair vehicle or machine cooling system faults (Level 4, credits 6)</p> <p>31221 - Describe diesel engine tuning (Level 3, credits 6)</p> <p>31223 - Demonstrate knowledge of a diesel engine braking system and an exhaust brake (Level 3, credits 4)</p> <p>31224 - Describe heavy diesel engine cylinder head removal, inspection and refitting (Level 3, credits 2)</p> <p>31214 - Tune a diesel engine (Level 4, credits 8)</p> <p>30888 - Remove, inspect and refit a cylinder head (Level 4, credits 4)</p> <p>31229 - Describe a heavy vehicle or machine induction system, turbochargers and induction and exhaust system diagnosis (Level 4, credits 5)</p>

	<p>31218 - Diagnose and repair heavy vehicle or machine induction, forced induction and exhaust system faults (Level 4, credits 12)</p> <p>31062 - Demonstrate knowledge of automotive body electrical and electronic systems (Level 4, credits 6)</p> <p>30882 - Describe servicing requirements of multiple automotive batteries and traction batteries (Level 3, credits 3)</p> <p>30883 - Describe charging and starting system diagnosis (Level 3, credits 3)</p> <p>30876 - Diagnose and rectify faults in vehicle or machine charging and starting systems (Level 4, credits 6)</p> <p>30877 - Service multiple automotive batteries (Level 4, credits 3)</p> <p>2316 - Describe heavy vehicle and machine driveshafts and final drives (Level 3, credits 4)</p> <p>15418 - Demonstrate knowledge of heavy vehicle and machine clutches (Level 3, credits 4)</p> <p>31227 - Describe heavy vehicle and machine transmissions and diagnosis (Level 4, credits 6)</p> <p>2331 - Diagnose and repair heavy vehicle or machine clutch faults (Level 4, credits 5)</p> <p>31216 - Diagnose and repair heavy vehicle or machine driveline and final drive assembly faults (Level 4, credits 8)</p> <p>31276 - Demonstrate knowledge of heavy vehicle and machine hydraulic systems (Level 4, credits 6)</p> <p>31277 - Demonstrate knowledge of machine hydrostatic drive systems (Level 4, credits 3)</p> <p>31230 - Demonstrate knowledge of common heavy vehicle or machine tyres and wheels (Level 3, credits 3)</p> <p>31231 - Describe heavy vehicle and machine steering and suspension systems, and system diagnosis (Level 4, credits 4)</p> <p>31219 - Diagnose and repair heavy vehicle or machine steering and suspension system faults (Level 4, credits 8)</p> <p>31222 - Describe petrol engine tuning (Level 3, credits 2)</p> <p>31266 - Tune a machine petrol engine (Level 4, credits 3)</p> <p>31194 - Demonstrate knowledge of carburettor operation (Level 3, credits 5)</p> <p>31271 - Demonstrate knowledge of automotive liquefied petroleum gas (LPG) and liquefied natural gas (LNG) fuel systems (Level 3, credits 3)</p> <p>31267 - Diagnose and repair carburettor faults (Level 4, credits 4)</p> <p>24182 - Diagnose and repair faults in an automotive liquefied petroleum gas (LPG) fuel system (Level 4, credits 5)</p>
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	<p>30878 - Service traction batteries (Level 4, credits 3)</p> <p>31264 - Diagnose and repair faults in a machine hydraulic or hydrostatic system (Level 4, credits 10)</p> <p>31063 - Demonstrate knowledge of hydraulic brake system fault diagnosis (Level 4, credits 2)</p> <p>31064 - Describe the operation of vehicle electronic braking systems (Level 4 credits 4)</p> <p>31054 - Diagnose and repair hydraulic braking system faults (Level 4, credits 4)</p> <p>31274 - Describe a materials handling machine frame (Level 3, credits 2)</p> <p>31279 - Demonstrate knowledge of machine operator protective structures (Level 3, credits 2)</p> <p>31272 - Demonstrate knowledge of materials handling equipment attachments (Level 3, credits 2)</p> <p>31273 - Demonstrate knowledge of materials handling equipment masts and carriages (Level 3, credits 3)</p> <p>31269 - Diagnose and repair faults in materials handling equipment attachments (Level 4, credits 3)</p> <p>31270 - Diagnose and repair faults in materials handling equipment masts and carriages (Level 4, credits 5)</p>
<p>Agricultural Equipment Strand</p>	
<p>Outcome 3 Service and repair tractors, land maintenance and cultivation implements, and harvesting equipment (Credits 175)</p>	<p>31056 - Demonstrate knowledge of engine management system fault diagnosis (Level 4, credits 4)</p> <p>31057 - Demonstrate knowledge of diagnosing automotive emission control system faults (Level 3, credits 4)</p> <p>31058 - Demonstrate knowledge of a diesel engine management system (Level 4, credits 2)</p> <p>31048 - Diagnose and repair engine management system faults (Level 4, credits 10)</p> <p>31049 - Diagnose and repair automotive emission control system faults (Level 4, credits 10)</p> <p>31125 - Diagnose and repair vehicle or machine cooling system faults (Level 4, credits 6)</p> <p>31221 - Describe diesel engine tuning (Level 3, credits 6)</p> <p>31223 - Demonstrate knowledge of a diesel engine braking system and an exhaust brake (Level 3, credits 4)</p> <p>31224 - Describe heavy diesel engine cylinder head removal, inspection and refitting (Level 3, credits 2)</p> <p>31214 - Tune a diesel engine (Level 4, credits 8)</p>

	<p>30888 - Remove, inspect and refit a cylinder head (Level 4, credits 4)</p> <p>31229 - Describe a heavy vehicle or machine induction system, turbochargers and induction and exhaust system diagnosis (Level 4, credits 5)</p> <p>31218 - Diagnose and repair heavy vehicle or machine induction, forced induction and exhaust system faults (Level 4, credits 12)</p> <p>31062 - Demonstrate knowledge of automotive body electrical and electronic systems (Level 4, credits 6)</p> <p>31053 - Diagnose and repair automotive body electrical and electronic system faults (Level 4, credits 5)</p> <p>30882 - Describe servicing requirements of multiple automotive batteries and traction batteries (Level 3, credits 3)</p> <p>30883 - Describe charging and starting system diagnosis (Level 3, credits 3)</p> <p>30876 - Diagnose and rectify faults in vehicle or machine charging and starting systems (Level 4, credits 6)</p> <p>30877 - Service multiple automotive batteries (Level 4, credits 3)</p> <p>31127 - Demonstrate knowledge of an automotive climate control system (Level 3, credits 3)</p> <p>31124 - Diagnose and repair faults in an automotive climate control system (Level 4, credits 6)</p> <p>2316 - Describe heavy vehicle and machine driveshafts and final drives (Level 3, credits 4)</p> <p>15418 - Demonstrate knowledge of heavy vehicle and machine clutches (Level 3, credits 4)</p> <p>31227 - Describe heavy vehicle and machine transmissions and diagnosis (Level 4, credits 6)</p> <p>2331 - Diagnose and repair heavy vehicle or machine clutch faults (Level 4, credits 5)</p> <p>31216 - Diagnose and repair heavy vehicle or machine driveline and final drive assembly faults (Level 4, credits 8)</p> <p>31276 - Demonstrate knowledge of heavy vehicle and machine hydraulic systems (Level 4, credits 6)</p> <p>31277 - Demonstrate knowledge of machine hydrostatic drive systems (Level 4, credits 3)</p> <p>31264 - Diagnose and repair faults in a machine hydraulic or hydrostatic system (Level 4, credits 10)</p> <p>31233 - Describe automotive pneumatic principles and systems (Level 3, credits 6)</p> <p>31230 - Demonstrate knowledge of common heavy vehicle or machine tyres and wheels (Level 3, credits 3)</p>
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	<p>31231 - Describe heavy vehicle and machine steering and suspension systems, and system diagnosis (Level 4, credits 4)</p> <p>31219 - Diagnose and repair heavy vehicle or machine steering and suspension system faults (Level 4, credits 8)</p> <p>31275 - Demonstrate knowledge of a machine hydraulic power assisted braking system (Level 4, credits 3)</p> <p>31263 - Diagnose and repair faults in machine hydraulic power assisted braking systems (Level 4, credits 6)</p> <p>31278 - Demonstrate knowledge of agricultural equipment undercarriage (Level 3, credits 4)</p> <p>31279 - Demonstrate knowledge of machine operator protective structures (Level 3, credits 2)</p> <p>31281 - Demonstrate knowledge of machine attachments and ground engagement devices (Level 3, credits 2)</p> <p>31262 - Diagnose and repair faults in machine ground engagement devices (Level 4, credits 4)</p> <p>31265 - Diagnose and repair faults in agricultural equipment frame and three-point linkage components (Level 4, credits 6)</p>
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