Title	**Describe light motor vehicle components, systems, dynamics, and handling characteristics**		
Level	**4**	**Credits**	**8**

Purpose	People credited with this unit standard are able to describe: the vehicle systems and components that can influence the handling and purpose of a light motor vehicle; the dynamics affecting a light motor vehicle in motion; and light motor vehicle handling characteristics and driver responses to these.

Classification	Driving > Driver Educator

Available grade	Achieved

Guidance Information

1 Legislation, regulations and/or industry standards relevant to this unit standard include but are not limited to the:
Land Transport Act 1998;
The *Learning System for Driving Instructors* (LSFDI) (2015) available from Waka Kotahi NZ Transport Agency at https://www.nzta.govt.nz/assets/resources/learning-systems-driving-instructors/docs/learning-systems-for-driving-instructors.pdf.

Any existing, new, amended or replacement Acts, regulations, standards, codes of practice, guidelines, Waka Kotahi NZ Transport Agency requirements, authority requirements or conditions affecting this unit standard will take precedence for assessment purposes, pending review of this unit standard.

2 Definitions
Advanced driver-assistance system (ADAS) refers to the use of automated technology, such as sensors and cameras, to detect nearby obstacles or driver errors, and respond accordingly.
Handling characteristics for the purposes of this unit standard, refer to how a motor vehicle behaves as a result of the interaction of its design and the dynamics present at the time.
Light motor vehicle refers to a vehicle that has a gross vehicle mass or gross combination mass less than or equal to 3,500 kg. Light motor vehicles include cars, vans, utes, and minibuses.
Motor vehicle dynamics refer to the motion of a motor vehicle, and the interaction of the various physical forces that affect that motion.

3 Range vehicle systems – electric and hydrogen.

Outcomes and performance criteria

Outcome 1

Describe the vehicle systems and components that can influence the handling and purpose of a light motor vehicle.

Performance criteria

1.1 The purpose of the engine and the potential effects of motor performance characteristics on light motor vehicle handling are described.

Range power, torque, acceleration, deceleration.

1.2 The transmission system is described in terms of relating to vehicle component functions and its influence on light motor vehicle handling.

Range gearbox – purposes, manual, automatic, automotive manual;
differential – purposes, traction and stability control devices, front wheel drive, rear wheel drive, all-wheel drive.

1.3 Brake systems are described in terms of brake types, their functions, and their implications for light motor vehicle dynamics.

Range systems – anti-lock braking system (ABS), non-ABS vehicle braking system;
types – drum, disc, regenerative.

1.4 The ADAS available in modern vehicles are described.

Range may include but is not limited to – sensors, cameras, automated technology.

1.5 The electric and hydraulic steering are described in terms of purpose, operation, and effects on light motor vehicle handling.

1.6 Tyres and wheels are described in terms of their purpose, types, and effects on light motor vehicle dynamics.

Range tyres – construction, inflation, wear, mixed type, profile, uni-directional tyres, run flat tyres;
wheels – width, diameter, space saver.

1.7 The suspension systems are described in terms of their purpose, benefits, and effects on light motor vehicle handling.

Range independent suspension, non-independent suspension

1.8 The effects of wheel balance and wheel alignment on vehicle handling are described.

Range camber, castor, toe-in, toe-out, wheel balance.

Outcome 2

Describe the dynamics affecting a light motor vehicle in motion.

Performance criteria

2.1 Mass, gravity, centre of gravity, momentum, velocity, kinetic energy, friction, and centrifugal force of a light motor vehicle are described.

2.2 The effects of dynamic forces on the performance and handling of a moving light motor vehicle are described.

Range straight line, cornering, grades, low friction surfaces, aerodynamics, weight transfer.

Outcome 3

Describe light motor vehicle handling characteristics and driver responses to these.

Performance criteria

3.1 The handling characteristics of light motor vehicles and driver responses to associated risks in relation to load considerations are described.

Range centre of gravity, mass, lateral stability, towing trailers, weight transfer.

3.2 The handling characteristics of light motor vehicles, and application of system, driver responses to associated risks are described in terms of speed and steering.

Range straight line – acceleration, deceleration/braking, aerodynamics; cornering – acceleration, deceleration/braking, understeer, oversteer.

3.3 Advantages and disadvantages of front wheel drive, rear wheel drive, and all-wheel drive light motor vehicles in relation to performance and handling are described.

Replacement information	This unit standard replaced unit standard 14512 and unit standard 14513.

Planned review date	31 December 2027

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	28 July 2003	31 December 2024
Review	2	16 April 2010	31 December 2024
Review	3	30 June 2022	N/A

Consent and Moderation Requirements (CMR) reference	0014

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Comments on this unit standard

Please contact Hanga-Aro-Rau Manufacturing, Engineering and Logistics Workforce Development Council qualifications@hangaarorau.nz if you wish to suggest changes to the content of this unit standard.