# 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 of a light motor vehicle;
- the dynamics affecting a light motor vehicle in motion;
- light motor vehicle handling characteristics and driver responses to these.

**Subfield** Driving

**Domain** Driver Educator

**Status** Registered

**Status date** 16 April 2010

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**Entry information** Open.

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

**Accreditation** Evaluation of documentation and visit by NZQA and industry.

**Standard setting body (SSB)** NZ Motor Industry Training Organisation (Incorporated)

**Accreditation and Moderation Action Plan (AMAP) reference** 0092

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

## Special notes

1 Reference
The *Learning System for Driving Instructors* (LSFDI) (1992) published by and available from the NZ Transport Agency, Private Bag 6995, Wellington 6141, or telephone 0800 822 422.

2 Definitions

*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* means 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.

## Elements and performance criteria

### Element 1

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

### Performance criteria

1.1 Description includes the purpose of the engine and the potential effects of engine performance characteristics on light motor vehicle handling.

Range power, torque, acceleration, deceleration.

1.2 Description includes transmission system in terms of component functions and its influence on light motor vehicle handling.

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

1.3 Description includes brake systems in terms of brake types, their functions, and their implications for light motor vehicle dynamics.

Range systems – ABS, non-ABS;
types – drum, disc.

1.4 Description includes power steering in terms of purpose and operation, and effects on light motor vehicle handling.

1.5 Description includes tyres and wheels in terms of their purpose, types, and effects on light motor vehicle dynamics.

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

1.6 Description includes suspension systems in terms of their purpose, benefits, and effects on light motor vehicle handling.

Range independent suspension, non-independent suspension.

1.7 Description includes the effects of wheel balance and wheel alignment on vehicle handling.

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

**Element 2**

Describe the dynamics affecting a light motor vehicle in motion.

**Performance criteria**

2.1 Description defines mass, gravity, centre of gravity, momentum, velocity, kinetic energy, friction, and centrifugal force.

2.2 Description includes the effects of dynamic forces on the performance and handling of a moving light motor vehicle.

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

**Element 3**

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

**Performance criteria**

3.1 Description includes handling characteristics of light motor vehicles and driver responses to associated risks in relation to load considerations.

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

3.2 Description includes handling characteristics of light motor vehicles, and driver responses to associated risks in terms of speed and steering.

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

3.3 Description includes advantages and disadvantages of front wheel drive, rear wheel drive, and all-wheel drive light motor vehicles in relation to performance and handling.

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**Please note**

Providers must be accredited by NZQA, or an inter-institutional body with delegated authority for quality assurance, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be accredited by NZQA before they can register credits from assessment against unit standards.

Accredited providers and Industry Training Organisations assessing against unit standards must engage with the moderation system that applies to those standards.

Accreditation requirements and an outline of the moderation system that applies to this standard are outlined in the Accreditation and Moderation Action Plan (AMAP). The AMAP also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

**Comments on this unit standard**

Please contact NZ Motor Industry Training Organisation (Incorporated) info@mito.org.nz if you wish to suggest changes to the content of this unit standard.