

Title	Demonstrate knowledge of helicopter principles of flight and performance for commercial aircraft operations		
Level	5	Credits	15

Purpose	People credited with this unit standard are able to, for commercial aircraft operations in accordance with Subject No 24, demonstrate knowledge of: helicopter principles of flight and performance; power, range, and endurance; and hazardous factors of rotary flight conditions.
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Classification	Aviation > Aircraft Operation
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Available grade	Achieved
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Guidance Information

- 1 This unit standard is aligned with the relevant parts of the prescribed syllabi of the Civil Aviation Authority of New Zealand (CAA) for Subject No 24, published in CAA Advisory Circular 61-5, for a commercial pilot licence (helicopter). Credit will be awarded on meeting the requirements of the CAA-approved assessment or examination.
- 2 Commercial aircraft operations are those which are performed for hire or reward.
- 3 Definitions, abbreviations, and acronyms used in this unit standard are to be found in:
 - a *Civil Aviation Rules Part 1* on the CAA website at <https://www.caa.govt.nz>, and
 - b *Aeronautical Information Publication (AIP)* published by Aeronautical Information Management (AIM), PO Box 294, Wellington 6140 or on the AIM website at <http://www.aip.net.nz>.
- 4 All references to the CAA refer specifically to the Civil Aviation Authority of New Zealand.
- 5 Industry standards and recommended practices are those set in place by the CAA.
- 6 Industry texts may include but are not limited to – aircraft flight manuals, CAA Rules, CAA Advisory Circulars, CAA Flight Test Standards Guides, operator exposition.
- 7 For the purpose of this unit standard, *knowledge* refers to the knowledge, understanding, and application of the subject matter.
- 8 Industry requirements are that the candidate must meet the eligibility requirements of the Civil Aviation Act 1990 and the Civil Aviation Rules Part 61 for a commercial pilot licence.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of helicopter principles of flight and performance for commercial aircraft operations in accordance with Subject No 24.

Performance criteria

- 1.1 Aeroscience is defined and described in accordance with industry texts and standards.
- Range includes but is not limited to – units of measurement, speed, velocity, acceleration, Newton's three laws of motion.
- 1.2 The atmosphere is described in accordance with industry texts and standards.
- Range includes but is not limited to – air density, ISA sea-level pressure, density altitude.
- 1.3 Basic aerodynamic theory and its associated principles are described in accordance with industry texts and standards.
- 1.4 Lift and its associated principles are described in accordance with industry texts and standards.
- 1.5 Drag and its associated principles are described in accordance with industry texts and standards.
- 1.6 Lift/drag ratio and their principles and effects on flight are explained in accordance with industry texts and standards.
- 1.7 Helicopter rotor discs and their principles of operation are identified and explained in accordance with industry texts and standards.
- 1.8 The forces acting on a helicopter rotor are explained in accordance with industry texts and standards.
- 1.9 The anti-torque tail rotor and its function and effect on flight are described in accordance with industry texts and standards.
- 1.10 Disc control is explained in accordance with industry texts and standards.
- Range includes but is not limited to – collective pitch/control, cyclic pitch/control, swashplate.
- 1.11 Hovering flight is defined and described in accordance with industry texts and standards.
- 1.12 Forward flight is explained and described in accordance with industry texts and standards.

- 1.13 Climbing and descending, and the factors affecting climb performance, are described in accordance with industry texts and standards.
- 1.14 Turning is described in accordance with industry texts and standards.
- 1.15 Transitioning to the hover is explained and described in accordance with industry texts and standards.
- Range includes but is not limited to – purpose of flare; rotor RPM, total rotor thrust, rotor drag.
- 1.16 Autorotation and its effects are defined and described in accordance with industry texts and standards.

Outcome 2

Demonstrate knowledge of power, range, and endurance in accordance with Subject No 24.

Performance criteria

- 2.1 Power required is explained and described in accordance with industry texts and standards.
- Range includes but is not limited to – ancillary power, profile power, induced power, parasite power.
- 2.2 Power available is described and explained in accordance with industry texts and standards.
- Range includes but is not limited to – power available curve.
- 2.3 Flying for range is explained in accordance with industry texts and standards.
- 2.4 Flying for endurance is explained in accordance with industry texts and standards.

Outcome 3

Demonstrate knowledge of hazardous factors of rotary flight conditions in accordance with Subject No 24.

Performance criteria

- 3.1 Retreating blade stall is defined and described in accordance with industry texts and standards.
- 3.2 Vortex ring state (settling with power) is defined and described in accordance with industry texts and standards.

- 3.3 Ground resonance is described in accordance with industry texts and standards.
- 3.4 Blade sailing is described in accordance with industry texts and standards.
- 3.5 Dynamic rollover is described in accordance with industry texts and standards.
- 3.6 Cyclic limitations are explained in accordance with industry texts and standards.
- 3.7 Mast bumping is described in accordance with industry texts and standards.
- 3.8 Exceeding rotor RPM limits is explained in accordance with industry texts and standards.
- 3.9 Rotor stalls are described in accordance with industry texts and standards.
- 3.10 Stability is described in accordance with industry texts and standards.
- Range includes but is not limited to – static stability, dynamic stability, neutral stability.
- 3.11 Special techniques and the factors involved are described in accordance with industry texts and standards.
- Range techniques include but are not limited to – crosswind take-off and landing, downwind take-off and landing, running take-off and landing, cushion creep take-off, confined area (towering) take-off, maximum performance take-off, zero speed landing, take-off and landing on sloping ground, sling load operations; sling load operations include but are not limited to – consequences of, and precautions for, cable/strop snag during take-off; effect on Vne; actions to take in case of helicopter oscillation.
- 3.12 Helicopter performance is calculated and explained in accordance with industry texts and standards.
- 3.13 Performance planning graphs are interpreted in accordance with the aircraft flight manual and industry texts and standards.

This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	18 June 2010	31 December 2018
Revision	2	18 February 2011	31 December 2018
Review	3	20 October 2016	31 December 2027
Review	4	28 September 2023	31 December 2027

Consent and Moderation Requirements (CMR) reference

0169

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