Australian Government

Civil Aviation Safety Authority

DAY (VFR) SYLLABUS
HELICOPTERS

Issue 3.1 – 01 October 2008

CASADOC 214

Day VFR Syllabus (Helicopters)

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Issue 3.1: October 2008

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DAY VFR SYLLABUS – HELICOPTERS

PRIVATE AND COMMERCIAL PILOT LICENCES

ISSUE 3.1 – 01 October 2008

Issue 3.0 introduction significant changes to the previous issue that involve:

- Changes to the KDR requirements
- The inclusion of flight standards in a competency based format, that aligns with the standards that will be introduced when the Part 61 Flight Crew Licensing regulations are promulgated
- The introduction of English language, threat and error management (TEM) and single-pilot human factors standards as recommended by the International Civil Aviation Organisation (ICAO)
- Explanation of the competency standards and assessment criteria
- Definitions of terms used in competency standards
- Addition of Achievement Records
- Introduction of aeronautical knowledge requirements for TEM.

Revision History

Issue	Date	Section(s)	Details of Change
Issue 3.1	October 2008	Section 1 and 2 Section 3	Minor updates and corrections. Updated and rewritten.
Issue 3.0	March 2008	Section 1 Section 2	Change to KDR requirement Introduction of flying standards in a competency based format. Introduction of English language, human factors and threat and error management flying standards. Explanatory material for the new standards. Explanation of competency standards and assessment methods. Introduction of Achievement Records.
		Section 3	Introduction of aeronautical knowledge requirements for Threat and Error Management (TEM)
Issue 2.0	June 2004	All	Introduces tethered helicopter trainers into the flying training syllabus.
Issue 1.4.1	February 2002		
Issue 1.4			
Issue 1.3			
Issue 1.2			
Issue 1.1			
Issue 1	January 1993	All	Document developed from information in CAOs.

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Subsections:

1. Introduction

This document details the progressive flying and ground training standards required to exercise the following privileges for VFR (Day) operations in a single-engine helicopter:

(a) Student pilot licence (SPL):
- Solo
- Passenger carrying privileges under supervision, within the local area in accordance with CAR 61.

(b) Private pilot licence (PPL):
- Restricted to operations outside controlled airspace
- Permitted to operate in any class of airspace.

(c) Commercial pilot licence (CPL).

The ground and flying syllabuses in this document have been set out in a behavioural/objective form so that the level of required performance for each item or topic, appropriate to the level of licence or privilege being sought, can be readily understood by both students and instructional staff.

While the syllabuses apply in general to both the private and commercial pilot licences, a difference in licence standards will occur because of the extent of the application of all syllabus items, a difference in the flying hours of aeronautical experience required for each licence and a different completion standard for each licence.

Passenger carrying privileges may be granted to the holder of an SPL on the successful completion of ground and flight tests at the PPL general flying phase.

Students should be encouraged to read and be conversant with this syllabus, as well as the associated CAAPS, and to understand the requirements, performance standards and knowledge levels specified with a view to:

(a) Stimulating increased student participation during training

(b) Using the syllabus as a reference for refresher training.

This document should also be read in conjunction with the CAAP 61 series, which provide more detailed information on the flight crew qualifications.

2. Flying Training

The syllabus of flying training is given at Section 2 of this document. Each syllabus item has been accorded four levels in order to give guidance for the alignment of training and performance standards appropriate to the particular level of licence or privilege being sought.

The definitions of the four standards are given in the Introduction to Section 2.

3. Aeronautical Knowledge

The Aeronautical knowledge Syllabus (Section 3) specifies the knowledge required for each of the flying qualifications. It is recommended that students undertake a course of ground training with a reputable ground training organisation to ensure that they have adequate knowledge to safely conduct flying operations. CASA sets the written examinations for PPLH and CPLH, based on the syllabus, to check that a candidate has the required knowledge. Knowledge deficiencies identified in written examinations are retested orally as part of the flight test. The knowledge deficiency report (KDR) assessment may be completed by a flight training organisation, and certified by the Chief Flying Instructor (CFI) prior to the flight test. Alternatively, the KDR may be assessed by an Approved Testing Officer (ATO) during the flight test.

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SECTION 2 – Flying Training Syllabus

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1. Introduction

1.1. General

This flying training syllabus specifies the sequences and standards that must be met by applicants for helicopter pilot licences. The requirements for each sequence/manoeuvre has been set out in competency standards format, so that the level of required performance for each item can be readily understood by both students and instructional staff.

In this document:

(a) **GFP** means the general flying phase, and the knowledge and flight tests appropriate to the completion of the phase.

(b) **PPL** means private pilot licence – helicopters.

(c) **CPL** means commercial pilot licence – helicopters.

1.2. Competency Standards

Competency Standards (flight skills) including tolerances, where applicable, are specified for each sequence items required for the appropriate stage of training and level of privilege or licence. Students should be able to demonstrate an ability to consistently perform the manoeuvres within the specified tolerances. Occasional short-term excursions outside the specified tolerances may be accepted if:

(a) Reasonable and appropriate corrective action is taken to compensate for the excursions.

(b) Correct techniques/procedures are used.

(c) The excursions are not gross and errors in height, heading, IAS, power settings and rotor RPM are not sustained.

(d) The helicopter is operated within the flight manual limitations.

(e) sound airmanship is displayed by the student.

If the student is unable to perform within the above parameters, a ”fail” assessment and appropriate additional remedial training must be given.

1.3. Competency

Competency itself is defined as the combination of knowledge, skills and behaviour required to perform a task to the standard required by industry. The competency standards specify all those skills that must be demonstrated by pilots in order to obtain a PPLH or a CPLH.

1.4. Units and Elements of Competency

- **Units** – specify all the competencies required for private and commercial pilots to fly a helicopter under the VFR by day.
- **Unit of competency** – is a discrete job or function that is written as a measurable outcome—eg, Navigate Aircraft
- **Element of Competency** – describes what must actually be done—eg, Prepare chart and flight plan
- **Performance Criteria** – is an evaluative statement that specifies what is to be assessed and the required level of performance – eg selects and prepares appropriate visual navigation charts suitable for the intended flight.

1.5. Changes to the Day VFR Syllabus (Helicopter)

This version of the syllabus brings the introduction of competency-based flight standards into helicopter training. In addition three extra requirements in the form of flight standards recommended by the International Civil Aviation Organisation (ICAO) have been included. Those standards are:

- Unit C1 English Communication in the Aviation Environment
- Unit C6 Manage Flight
- Unit C7 Threat and Error Management.

The competency standards developed by CASA are comprised of:

- Units
- Elements
- Performance Criteria
- Range of Variables (ROV)
- Underpinning Knowledge.

Units and *elements* are the same as described in paragraph 1.4. The *performance criteria* are the markers that are used to assess a person's performance. The performance criteria are the primary means of assessment and specify the level of performance that must be achieved. The *Range of Variables* add definition to the performance criteria by elaborating critical or significant aspects of the unit of competency and detail conditions and contexts that should be applied during assessment. The *Underpinning Knowledge* is knowledge specific to a unit that may not be covered by a CASA licence or rating examination.

A Generic Range of Variables table appears before the common and category units of competency. This Generic ROVs should be applied to every unit of competency and was designed to avoid repetition in each of the units.

1.6. Determination of Pilot Standards

The competency standards contained in this syllabus are organised into units of competency that represent the areas of skill and knowledge required to perform the task of piloting a helicopter. For example, **Unit H5** of the PPLH standards is **Control helicopter in normal flight**.

The units of competency are further subdivided into the elements of skill that go to make up the unit. For example the elements listed for **Unit H5** are:

- Climb helicopter
- Maintain straight and level flight
- Descend helicopter
- Turn helicopter
- Perform circuits and approaches
- Comply with airspace requirements.

The units and elements that must be achieved at each stage of training are specified in the Achievement Records in this Section Subsection 2.

Achievement records are included for each of the following phases of training:

- GFPT
- PPLH
- CPLH.

1.7. Definition of Achievement Standards

For first solo flights and the GFPT, the standards that must be met may not necessarily be as high as those required for the issue of the licence. Therefore the Achievement Record for GFPT lists the standard at which each element must be met as a number from 1 to 4. The numbers used to denote standard in the achievement record have the following significance:

1 Achieved standard required for Commercial Pilot as detailed in the Day (VFR) Syllabus Helicopters.

2 Achieved standard required for Private Pilot as detailed in the Day (VFR) Syllabus Helicopters

3 Able to achieve the private pilot standard on the majority of occasions and is safe to operate under direct supervision.

4 Has received training in the element but not able to consistently achieve the PPL standard.

The assessment of a pilot's competency (skills and knowledge) must be based on evidence obtained by observation, questioning, examinations results, training records and other approved sources. This evidence must be consistent by being demonstrated on more than one flight and should address all the Performance Criteria and the ROVs that relate to the Unit of competency that is examined.

Private pilots should demonstrate that control of the aircraft or procedure is maintained at all times but if the successful outcome is in doubt, corrective action is taken promptly to recover to safe flight.

Commercial and air transport pilots should demonstrate that control of the aircraft or procedure is maintained at all times so that the successful outcome is assured.

1.8. Achievement Record

Each phase of training incorporates an Achievement Record listing the units and elements of competency relating to that phase. Before being recommended for any flight test, a student must have been assessed as competent in each element listed in the appropriate Achievement Record, at the standard specified for that phase. The instructor making the assessment at the time that the student achieves competency in the element should certify the Achievement Record to this effect.

The Achievement Records in this version of the Day VFR Syllabus (Helicopter) have three new units of competency added and the standards have been renumbered to align with those proposed for the CASR Part 61 regulations. The standards are divided into common standards, which apply to all aircraft types (numbered C1 to C8) and aircraft category standards that refer specifically to helicopters (numbered H1 to H8).

To avoid a requirement for duplicate certifications in successive phases, any elements that have been listed at the same standard in a previous phase are not repeated in subsequent phases.

The standard specified in each achievement record is the minimum required for the particular phase but, if a student can consistently achieve a higher standard, then the element may also be certified in the achievement records for any or all higher levels up to the PPLH. However it should be noted that certification for elements at the CPLH level must not be made until all PPLH elements in the PPLH phase have been completed and certified.

The Achievement Record is to be retained by the student and must be checked by the person conducting a flight test as having been completed for all items. A copy of the relevant record must be appended to a flight test form. The Achievement Record is additional to, and does not replace, the flying training records maintained by the flying school.

1.9. Technique and Judgement

Assessment should be based on the technique used by the candidate and not just the ability to perform the task within specified numerical tolerances. Technique involves smooth and accurate control application in adjusting power, attitude, trim and balance in a timely and coordinated fashion whilst following correct procedures. Additionally, sound judgement and decision-making should be displayed. It may be that on some occasions flight conditions (eg, turbulence) are such that even though the pilot's technique is sound the helicopter may deviate outside specified tolerances for short periods. In such cases the assessment of technique should be the determining factor.

1.10. English Language Assessment

With effect from 5 March 2008, all pilot licences have been issued only if the applicant has demonstrated at least a Level four (Operational) English language proficiency in accordance with the standard of the ICAO Standards and Recommended Practices (SARP). The licence includes the language endorsement detailing the level of proficiency of the holder’s English language. Only a minimum Level four (Operational) is accepted by CASA for the issue of a flight crew licence.

Approved Testing Officers may only conduct the assessment if a candidate is recommended by the CFI as capable of achieving a Level six (Expert) proficiency. Such a candidate is usually (but not automatically) an English native or expert speaker without any speech impediment or strong regional accent that makes comprehension difficult for others. The ATO may only assess the candidate as either proficient at Level six or not proficient at Level six, and must not recommend any other level of proficiency.

For a candidate whom the CFI assesses as unlikely to attain a Level six (Expert) proficiency, the candidate shall be directed to a language specialist centre approved by CASA. The ATO may only conduct the flight test when the candidate produces evidence of being assessed with at least a Level four (Operational) proficiency.

However, flight instructors will be required to make a judgement on a student pilot's English language proficiency to decide if additional language training is required and when the student pilot may fly on solo navigation. The English standard should be used as a tool to make this judgement. A special training package for CASA language proficiency implementation may also be used as a guide.

1.11. Threat and Error Management (TEM) and Single Pilot Human Factors (Manage Flight)

ICAO has recommended that TEM should be introduced into flight training at all licence levels. For TEM to be effective, human factors skills must be practiced. The human factors skills that are required to achieve this are listed at paragraph 1.12.

TEM is an operational concept applied to the conduct of a flight that includes the traditional roles of human factors and airmanship, but provides for a structured and pro-active approach for pilots to use in identifying and managing threats and errors (hazards) that may affect the safety of the flight. The key to successful TEM is the effective use of the human factors elements detailed in paragraph 1.12. Therefore flight instructors and assessors must teach and measure these items of competency. A Civil Aviation Advisory Publication (CAAP) will be produced to explain methods of teaching and assessing TEM and human factors. Assessment of single pilot human factors and threat and error management will commence on 1 July 2009.

1.12. Airmanship and Human Factors

Simply defined, airmanship is the ability to fly safely. The same outcome applies to the results of good human factors practices; safe flight. The flight standards in the Day VFR Syllabus have linked airmanship and human factors. The unit of competency titled 'Manage Flight' is comprised of five elements which when properly applied, can be a measure of the effects of airmanship. These elements are:

- Maintain effective lookout
- Maintain situation awareness
- Assess situations and make decisions
- Set priorities and manage tasks
- Maintain effective communications and interpersonal relationships.

As a practical example, appropriately positioning an aircraft in the circuit area to avoid conflict with preceding traffic is considered good airmanship. Alternatively, the result could be seen as a function of good human factors practice. 'Effective lookout' locates the other aircraft in the circuit, good 'situation awareness' could be used to predict the possibility of future conflict, and timely 'decision making' could also be used by the pilot to adjust the position or performance of his or her aircraft to ensure a trouble free final approach. Therefore, although the term 'airmanship' does not appear in the competency standards, the effect of good airmanship can be measured by applying competent human factors practices.

1.13. Aeronautical Experience

Civil Aviation Regulations 5.93 and 5.127 specify the aeronautical experience for a private and commercial helicopter pilot licence. However, exemption 02/2002 issued under CAR 308 allows for persons complying with the requirements of this syllabus to meet some of the aeronautical experience needed for licence issue on a tethered helicopter trainer as specified below (see *Tethered Helicopter Trainer).*

No provision is made within either the PPL or CPL syllabus for type endorsements as such, because endorsement training is essentially type familiarisation for qualified pilots and is not considered to contribute towards syllabus objectives. However, some advantages may be gained from exposure to a different type of helicopter or power plant. Consequently, CPL courses that include training on two types of helicopter may be approved. There is no upper limit on the amount of training that may be conducted on each type. For a course of training involving two types of helicopter to be approved:

(a) The training is to be conducted in accordance with this syllabus.

(b) The training is not to be conducted on more than two types of helicopter.

(c) There is to be no change of helicopter type during the first 15 hours of training.

(d) There is to be a minimum of 20 hours of training in each type of helicopter.

(e) A maximum of 10 hours of training in specified flying sequences might be counted towards the issue of a licence using a tethered helicopter trainer, although there is no limit to the number of hours that may be flown in the trainer. These hours are recorded in a pilot's log book in the 'Record of Flight Simulator and Synthetic Trainer Practice' section of the log book; and

(f) Provide up to 10 hours of visual ground time towards the aeronautical experience requirements for the issue of a helicopter pilot licence, or 8 hours of visual ground time in the case of a person holding an aeroplane or gyroplane pilot licence.

1.14. Flight Tests

A student is required to pass flight tests/checks appropriate to the level of licence and/or privileges being sought. A student progressing directly to a CPL is not required to undergo the flight test and the final examination for a PPL before completing the CPL syllabus.

The flight test for the GFPT will consist of those general flying manoeuvres indicated on the PPL flight test form. No part of any flight test may be conducted using a tethered helicopter trainer. The person conducting the flight test is to complete this form at the conclusion of the test.

As an integral part of the licence flight test prescribed below, students may be required to answer questions either orally or in writing on any aspect of helicopter performance and operation, fight rules and procedures, navigation and meteorology covered by this syllabus. The purpose of these questions is to assess the student's practical knowledge of items which can be more appropriately examined during the planning stages of a flight or of those items which cannot be readily simulated during the flight.

The flight test itself will normally consist of a period of general flying manoeuvres and a cross-country flight of which at least one leg will be conducted in controlled airspace. Where, however, in the opinion of the examining officer the conduct of a flight in controlled airspace is impracticable, the applicant's ability to plan and conduct such a flight may be assessed during the preliminary testing referred to above, and a simulation of the operation during the cross-country portion of the flight test. Flight within CTA, or simulation thereof is not necessary if the student does not wish his/her PPL to be endorsed with those privileges.

1.15. Certification Requirements

A student pilot must be certified by logbook entry as competent to:

(a) To operate in accordance with OCTA, GAAP, or CTA procedures, (as applicable to the area of operation) for flights to and from the training area(s). This requirement also applies whenever a student pilot operates solo from an unfamiliar aerodrome for the first time; and

(b) Prior to commencing solo navigation training:

(i) OCTA and into CTAF aerodromes

(ii) Into GAAP aerodromes

(iii) Within CTAF(R) aerodromes

(iv) In CTA and controlled aerodromes

As required by the navigation training syllabus and in accordance with the requirements of subsection 2.9.

Where an applicant completes a minimum of five hours of low flying training in accordance with subsection 2.17 (Operate Helicopter at Low Level (CPL only) Flight Standard), his/her CFI may certify the applicant by log book entry as competent in low flying.

Where an applicant completes sling load operations training in subsection 2.18 (Sling Load - Helicopter - Flight Standard) his/her CFI may certify the applicant by log book entry as competent in sling load operations.

1.16. Flying School Instructional Syllabuses

Flying schools will need to produce a detailed instructional syllabus showing allocation of dual/solo hours against each specific sequence and enabling objective as well as show the detailed routes and objectives to be achieved in each navigation exercise.

1.17. Limitations in Training

Where the type of helicopter used for training has characteristics which would make it dangerous to practice a particular air exercise, then such an air exercise is to be addressed by oral or written briefing or discussion; e.g., the practice of anti-torque failure in the hover should not be carried out in a Robinson R22 helicopter.

1.18. Tethered Helicopter Trainer

A tethered helicopter trainer is a helicopter, which is tethered to a base that allows hovering and taxing capabilities, but not free flight. The trainer must have provision for control by a qualified flight instructor acting under the AOC of a flying school, and must have safety features, which eliminate the possibility of loss of control of the helicopter.

The Cicare SVH-3 tethered helicopter trainer is the only device that has been demonstrated to CASA to meet this requirement and is the only tethered helicopter trainer currently approved to provide training in accordance with this syllabus.

This paragraph constitutes approval to use the Cicare SVH-3 tethered helicopter trainer provided the following conditions are met:

1 The trainer is operated in accordance with the Cicare SVH-3 Training Manual.

2 The training is provided by an authorised helicopter flight instructor who is at all times able to operate the remote control functions of the trainer and has continuous two-way communication with the student pilot.

3 The instructor must have been found competent and approved by the Chief Flying Instructor to provide dual instruction in the Cicare SVH-3 trainer.

4 The flying sequences that may be taught in a tethered helicopter trainer are limited to the following units and elements:

Unit H1

Unit H2 elements 2.1, 2.1, 2.3 and 2.4

Unit H3 elements 3.1 and 3.2

Unit H6 element 6.3

Unit H7 elements 7.4 (from the hover), 7.5 (jammed tail rotor at the hover) and 7.6.

1.19. Terminology Used During Assessment

The following terms are used in the standards to assess competency. The terms used are specifically related to flight activities.

The checks and actions detailed in these definitions are advisory. Approved checklists, placards, Flight Manual/POHs, or Operations Manuals have precedence and must be complied with.

Some definitions and terms that appear in competency standards are underlined; to alert assessors that clarification is available from this table.

Definition or Term	Meaning
Aiming point	The 'aiming point' related to a visual approach and landing of an aircraft, is that point at which a pilot looks, to achieve a predetermined touchdown/termination point.
Aircraft is balanced	The skid ball in the balance indicator is less than a quarter of the ball diameter from the centre.
Aircraft is trimmed/trims aircraft	The aircraft is trimmed within 10 seconds of achieving stabilised and balanced flight, after an attitude, power or configuration change, so that no control input is required in the relevant axis from the pilot to maintain this state.
Airspace cleared	Collision avoidance must always be practiced and a procedure followed to ensure a collision does not occur. This procedure is performed before all turns and manoeuvres. A commonly used technique for this procedure is: - when turning left, "Clear right, clear ahead, clear left-turning left" or - when turning right, "Clear left, clear ahead, clear right-turning right". If an object is closing and remains on a line of constant bearing (stays at the same point on the windscreen), a collision will occur if avoiding action is not taken.
Approach to hover	The process of maintaining a specified track and glide slope at reducing ground speed to a nominated termination point at the hover.
Approved checklist	A checklist derived from information set out in the Flight Manual/POH, placards or other documents provided with the aircraft, necessary to ensure the safe operation of the aircraft.
Avoid area	The area delineated on the height-velocity envelope chart in a helicopter or gyroplane flight manual/ POH which shows the parameters within which operations should be avoided.

Definition or Term	Meaning
Closure rate	The apparent speed at which a helicopter or gyroplane moves towards a specified point or object.
Competency standards	The defined competencies required for effective performance in the workplace expressed in outcome terms.
Configures aircraft for bad visibility	The aircraft speed and configuration are adjusted to achieve best manoeuvring speed, forward visibility and safety margin above stall speed.
Controlled corrective action	Timely and coordinated use of controls, without abrupt control inputs or manoeuvring is made to achieve specified performance.
Controlled rate of descent	'Controlled rate of descent' associated with a landing means that the touchdown is without harshness and the successful outcome of the landing is not in doubt.
Controlling ballooning during roundout and bouncing after touchdown	This is achieved if control of the aircraft is maintained by adjusting the attitude of an aircraft without the application of power.
Effect of turbulence	The effect of turbulence must be considered when measuring standards of flying competency. Assessors must evaluate each situation and then apply considered judgement to compensate for variations to the published standards.
Errors	Action or inaction that result in deviation from appropriate intentions.
Evaluation	The process of measuring competency to meet specified outcomes and to provide feedback that ensures achievement of the required competency.
Final approach checklist	The checklist in accordance with the flight manual or company operations manual that is completed on final approach before landing.
Flight environment	The environments internal and external to the aircraft that may affect the outcome of the flight. The aircraft's internal environment may include but is not limited to aircraft attitude and performance, instruments, observations, flight controls, equipment, warning and alerting devices, crewmembers, aircraft position, procedures, publications, checklists and automation. The external environment may include but is not limited to airspace, meteorology, stakeholders and operating culture.
Flight manoeuvre envelope	The area contained within the V-n diagram (speed-load factor) applicable to the aircraft type.
Full panel	Flight instrument array of at least an artificial horizon (AH), stabilised heading indicator, air speed indicator (ASI), vertical speed indicator (VSI), altimeter, turn and balance indicator/turn coordinator and an engine power indicator.
Hand-over/take- over procedure	The process of a pilot in command positively giving control of the aircraft to another pilot or positively assuming control from another pilot and the acknowledgement of this action by the pilot or co-pilot.
Hover helicopter	Means to maintain the helicopter over the hover point at nominated height and heading.
Hover point	Means that point on the surface of the earth over which a nominated part of the helicopter is maintained.
Human factors	Optimising the relationships within systems between people, activities and equipment

Definition or Term	Meaning
Immediate actions	These actions are performed immediately after an engine failure, while maintaining control of the aeroplane, as detailed in the Flight Manual/POH, operations manual or approved checklist. The purpose of these actions is to re-establish engine power.
In ground effect (IGE)	Hovering the helicopter less than 2/3 rotor diameter above a surface that restricts the induced flow.
Judgement	An opinion formed after analysis of relevant information
Leadership*	The ability of the pilot in command to induce the crewmember(s) to use their skills and knowledge to pursue a defined objective.
Lift off	Is the process of lifting the helicopter vertically from the surface to a stabilised hover.
Light on the skids or wheels	Means that with collective pitch (power) applied, and the helicopter still in contact with the ground, any application of cyclic pitch or anti torque pedal will produce a discernible movement by the helicopter
Limited panel	Flight instrument array of at least a magnetic compass, air speed indicator (ASI), vertical speed indicator (VSI), altimeter, turn and balance indicator/turn coordinator and an engine power indicator.
Line up checks	Line up checks are performed before take-off when lined up in the runway or take-off direction. The checks should include: Compass checked and aligned with take-off direction; Engine instruments indicate engine within operating limits.
Manage-(ment)*	To plan, direct and control an operation or situation.
Minimum power speed	Means the speed at which level flight can be maintained with minimum power required.
Mishandled landing	Means to recognise an abnormal landing and recover the aircraft to controlled flight. Often associated with a 'go around'.
Operational requirements	The effect that weather forecasts, availability and serviceability of radio navigation aids and aerodrome lighting status have on the determination of fuel, holding and alternate aerodrome requirements.
Orientation	To be aware of the position of the aircraft relative to navigation aid or feature, based on the direction and estimated distance of the aircraft from the navigation aid or feature.
Pedal/spot turn	Turning a hovering helicopter about a vertical axis, which passes through a nominated part (normally the mast) of the aircraft.
Pre-descent or navigation turning point checks	These checks are completed as detailed in the Flight Manual/POH, operations manual or approved checklist before descending for approach and landing or operations at low level.
Pre-manoeuvre checks	These checks are completed before performing manoeuvres which involve rapid changes of altitude, attitude or heading. The mnemonic "HASELL" may be used as a reminder for this check: H Height is sufficient to safely complete all manoeuvres. A Airframe configuration is appropriate for manoeuvres. S Security of harnesses and loose objects is ensured. E Engine instruments are checked, RPM, mixture, boost pumps and carburettor heat are set as required. Fuel remaining is adequate. L Location is correct, clear of built up areas, controlled airspace and restricted areas. L Maintain lookout before and during manoeuvres.
Pre-stall buffet	The aerodynamic vibration felt in an aircraft when manoeuvring at $C_{LMAX.}$

Definition or Term	Meaning
Recall items	An item specified in an approved checklist that must be stated and actioned from memory.
Safe-(ly)	Means that a manoeuvre or flight is completed without injury to persons, damage to aircraft or breach of aviation safety regulations, while meeting the flight standards specified by the regulator.
Safest outcome	Means that the manoeuvre or flight is completed with minimum damage or injury under the prevailing circumstances.
Shut down checks	These checks are completed as detailed in the Flight Manual/POH, operations manual or approved checklist when committed to a forced landing after an engine failure. The purpose is to isolate fuel and electrical sources that could lead to a fire.
Situation awareness	Monitor and evaluate the flight environment to identify all threats relevant to the safe progress of a flight.
Stake holder	Any person involved with, or affected by the flying operation to be performed.
Standard operating procedures	Any procedure included in the operations manual of an AOC or OC holder.
Stress-(ors)	A disturbing physiological or psychological influence on human performance that may impact adversely on the safe conduct of a flight or situation.
Student pilot area limit	In relation to a flight undertaken by a student pilot, means: a traffic pattern; or the area within 10 miles from the aerodrome reference point of the aerodrome from which the flight commenced; or a flight training area associated with the aerodrome from which the flight commenced; the most direct route between the aerodrome from which the flight commenced and a flight training area associated with the aerodrome.
Termination point	The 'termination point' associated with a landing, is the point at which the helicopter terminates the approach to the hover.
Terminate with power (and recover to the hover)	When associated with autorotative flight this term means that the application of collective pitch with engine and rotor RPM coordinated (needles joined) brings the helicopter to a stabilised hover (auto to powered flight).
Threats	Events or hazards whose occurrence is outside the control of the pilot(s) and which may threaten the safety of the flight.
Touchdown point	The 'touchdown point ' associated with a landing, is the point at which the aircraft landing gear first contacts the runway or landing area.
Trouble checks	The checks detailed in the Flight Manual/POH, operations manual or approved checklist that are performed to prepare the engine for a restart after an engine failure.
True horizon/earth's horizon	The reference that is used to measure the pitch and bank attitude of an aircraft.
Undesired aircraft state	Undesired aircraft states are flight crew-induced aircraft position or speed deviations, misapplication of flight controls, or incorrect systems configuration, associated with a reduction in margins of safety
Upset Aircraft State	Upset aircraft state occurs when an aircraft unintentionally exceeds: • A pitch angle of 25 degrees nose up • A pitch angle of 10 degrees nose down • A bank angle of more than 45 degrees; or • Flight within these parameters at airspeeds inappropriate for the conditions.

Definition or Term	Meaning
Violations	Intentional deviations from rules or standards.
Visual cues – Helicopter and Gyroplane	Any visual features or references that are used to determine the position or movement relative to the aiming point, touchdown point, obstacles and, for helicopters, the hover point.
Visual references	'Visual references' associated with hovering means the features within the visual range of the pilot that are used as visual cues to maintain the helicopter over a hover point.
Wings level	Means that a line joining the wing tips is kept parallel to the earth's horizon.
Workplace environment	Any physical environment in which an aircrew member conducts aviation-related work.

***Note 1 Leadership**

One of the most important qualities that the pilot in command of a multi crew aircraft must possess is leadership.

In this document leadership is defined as 'the ability of the pilot in command to induce the crewmember(s) to use their skills and knowledge to pursue a defined objective'. To ensure standardisation and objectivity, assessors must keep this definition in mind when determining the leadership qualities of a pilot in command or a crewmember.

The Macquarie Dictionary defines the word 'induce' as:

1. 'To lead or move by persuasion or influence, as to some action, state of mind'.
2. 'To bring about, produce or cause, etc.'

The term 'pursue a defined objective' is used because the role of a pilot in command is to pursue a defined objective but not necessarily achieve that objective, as changing circumstances may dictate alternative actions and revised objectives to ensure the safe progress of a flight.

A 'defined objective' could be a flight, manoeuvre, procedure or action that is clearly identified and required to be achieved to ensure a safe outcome.

Therefore, in the aviation context, a pilot in command would be deemed competent as a leader when able to consistently cause the crewmember(s) to use their skills, knowledge and behaviour to successfully try to achieve a flight, manoeuvre, procedure or action in an ever-changing environment.

Of course, leadership is not limited to interaction with crewmembers only, but may involve any stakeholder.

***Note 2 Management**

Throughout the Day VFR Syllabus the term 'manage' or 'management' is used. The definition in the syllabus for manage is 'plan, direct and control an operation or situation'. When assessing competency standards that involve management, evidence should be sought to ensure that a plan is developed, implemented (direction) and re evaluated (control), throughout the activity.

The application of this skill when managing an abnormal situation may involve a plan of maintaining control of the aircraft, identifying the problem and determining the action to be taken to reduce or eliminate any threat. Direction may, in the case of a single place aircraft, require self-direction to ensure actions are conducted in accordance with checklist procedures, Approved Flight Manual/POH, SOPs or other acceptable means, or in a multi crew environment, directing other crewmembers as well as participating in those actions. Control

would involve monitoring the progress of events to ensure a safe outcome. The last step may require modification of plans and actions.

2. FLIGHT STANDARDS FOR PRIVATE AND COMMERCIAL PILOT LICENCE HELICOPTERS

2.1. Table 1: Generic Range of Variables

Range of Variables

• Performance standards are to be demonstrated in flight in an aircraft of the appropriate category equipped with dual flight controls and electronic intercommunication between the trainee and the instructor or examiner.
• Consistent performance is achieved when competency is demonstrated on more than one flight.
• Flight accuracy tolerances specified in the standards apply under flight conditions from smooth air up to, and including light turbulence.
• Where flight conditions exceed light turbulence appropriate allowances as determined by the assessor may be applied to the tolerances specified.
• When minimum descent altitudes (MDA) and not below or above heights are specified, the tolerance for straight and level height must be adjusted to (+100 –0 ft) or (+0 –100 ft) as applicable.
• Infrequent temporary divergence from specified tolerances is acceptable if the pilot applies controlled corrective action[1].
• Units and elements may be assessed separately or in combination with other units and elements that form part of the job function.
• Assessment of an aircraft operating standard also includes assessment of the threat and error management and human factors standards applicable to the unit or element.
• Standards are to be demonstrated while complying with approved checklists, placards, aircraft flight manuals, operations manuals, standard operating procedures and applicable regulations.
• Performance of emergency procedures is demonstrated in flight following simulation of the emergency by the instructor or examiner, except where simulation of the emergency cannot be conducted safely or is impractical.
• Assessment should not involve simulation of more than one emergency at a time.
• **Private pilots** should demonstrate that control of the aircraft or procedure is maintained at all times but if the successful outcome is in doubt, corrective action is taken promptly to recover to safe[2] flight.
• **Commercial and air transport pilots** should demonstrate that control of the aircraft or procedure is maintained at all times so that the successful outcome is assured.
• The following evidence is used to make the assessment:
  o The trainee's licence and medical certificate as evidence of identity and authorisation to pilot the aircraft.
  o For all standards, the essential evidence for assessment of a standard is direct observation by an instructor or examiner of the trainee's performance in the specified units and elements, including aircraft operation and threat and error management.
  o Oral and written questioning of underpinning knowledge standards.
  o Completed flight plan, aircraft airworthiness documentation, appropriate maps and charts and aeronautical information.
  o Aircraft operator's completed flight records to support records of direct observation.
  o Completed achievement records for evidence of consistent achievement of all specified units and elements of competency.
  o The trainee's flight training records, including details of training flights and instructors comments, to support assessment of consistent achievement.
  o The trainee's log book for evidence of flight training completed.
• For licence and rating issue:
  o Completed application form, including, licence or rating sought, aeronautical experience, CFI recommendation and the result of the flight test.
  o Completed flight test report indicating units and elements completed.
  o Examination results and completed knowledge deficiency reports.

[1] Timely and coordinated use of controls, without abrupt manoeuvring is made to achieve specified performance.

[2] Means that a manoeuvre or flight is completed without injury to persons, damage to aircraft or breach of aviation safety regulations, while meeting the requirements of the Manual of Standards Part 61.

2.2. Unit C1: English Communication in the Aviation Environment – Flight Standard

Unit Description: Skills and knowledge required to communicate effectively with all stakeholders within a flight operations environment and to ensure messages are clearly understood and responded to appropriately.

Element	Performance Criteria
C1.1 Communicate effectively face to face using clear and precise English	• Pronounces words clearly, using an accent that does not cause difficulties in understanding • Conveys information in clearly structured sentences without confusion or ambiguity • Uses an extensive vocabulary to accurately communicate on general and technical topics, without excessive use of jargon, slang or colloquial language • Speaks fluently without long pauses, repetition or excessive false starts • Responds to communications with actions that demonstrate that the information has been received and understood • Exchanges information clearly in a variety of situations with both expert and non-expert English speakers while giving and receiving timely and appropriate responses • Recognises and manages communication errors and/or misunderstandings effectively • Maintains effective communication with crewmembers and other personnel in flight and on the ground on operational matters • Communicates effectively in unfamiliar, stressful or non-standard situations.
C1.2 Communicate effectively in voice-only R/T communications using standard aviation phraseology	• Makes appropriate transmissions using standard aviation phraseology • Uses plain English effectively when standard phraseology is inadequate • Receives appropriate responses to transmissions • Responds to transmissions and takes appropriate action • Identifies and manages communication errors and/or misunderstandings promptly and effectively • Seeks clarification in the time available if message is unclear or uncertainty exists • Reacts appropriately to a variety of regional accents • Communicates effectively in unexpected, stressful or non-standard situations using standard phraseology or plain English.
Range of Variables	
• Includes oral and written communication in English • Communication standards are demonstrated in flight and related activities on the ground while acting as a pilot in any capacity during communications with crewmembers, ATS and other aircraft • Situations include disruptions to communication normally encountered in the flight environment including background noise levels, equipment malfunctions and distractions • In flight communication is conducted in a timely manner consistent with operational safety. • Assessment at an expert level (ICAO Level 6) requires all the criteria of elements C1.1 and C1.2 to be demonstrated consistently in the operational environment and in a range of non-operational situations with only rare occurrences of errors or misunderstandings • Assessment at an operationally competent level (ICAO Level 4) requires all criteria of element C1.2 to be demonstrated in the operational environment, but occasional loss of fluency, errors and/or misunderstandings are permissible in demonstrating the criteria of element C1.1 providing effective communication is maintained	

Underpinning Knowledge
• Demonstrate oral and written English vocabulary sufficient to converse on a wide range of common and technical topics • Apply English grammatical construction • Apply aviation terminology • Use standard aviation R/T phraseology.

2.3. Unit C2 Manage Pre and Post Flight Actions– Flight Standard (PPL and CPL)

Unit Description: Knowledge and skills to obtain required information and authority, ensure maintenance requirements are met and perform required functions before and after flight and to ensure that the helicopter meets maintenance and safety requirements prior to flight.

Element	Performance Criteria
C2.1 Complete pre and post flight administration	***Pre flight*** • Obtains, interprets and applies meteorological and NOTAM information • Completes pre-flight planning and documentation in accordance with regulations and/or operations manual • Calculates helicopter take-off and landing performance in accordance with performance and weight and balance charts • Selects optimum cruise altitude determined by operational, safety[3] or efficiency requirements • Interprets maintenance release (Flight Technical Log) and Minimum Equipment List (MEL) and determines aircraft serviceability for proposed flight. ***Post flight*** • Completes flight maintenance release (Flight Technical Log) and flight administration and enters identified unserviceabilities in accordance with regulations and/or operations manual.
C2.2 Perform pre-flight inspection	• Identifies and secures equipment and documentation as required by regulation in the aircraft • Completes internal and external checks in accordance with approved checklist • Ensures removal of all aircraft locking devices • Identifies defects or damage to the aircraft that could compromise safety • Certifies Flight Technical Log entering any defects or endorsements to Permissible Unserviceabilities (PUS). • Completes and certifies daily inspection.
Range of Variables	
• Single or multi engine aircraft • Day Visual Flight Rules.	
Underpinning Knowledge	
N/A	

3 Means that a manoeuvre or flight is completed without injury to persons, damage to aircraft or breach of aviation safety regulations, while meeting the requirements of the Manual of Standards Part 61.

2.4. Unit C3 Operate Radio– Flight Standard (PPL and CPL)

Unit Description: Knowledge and skills to operate and manage radiotelephone and intercom equipment under normal and emergency flight conditions.

Element	Performance Criteria
C3.1 Use R/T equipment	• Ensures serviceability of radio telephone equipment • Conducts transmission and receipt of R/T messages in accordance with procedures and phraseology detailed in the FROL syllabus and Aeronautical Information Publications (AIP) • Maintains a listening watch and responds appropriately to applicable transmissions • Performs loss of radio transmitter or receiver procedures in accordance with AIP, ERS(A), VFR Flight Guide • Conducts emergency and urgency transmissions and procedures in accordance with Enroute Supplement Australia (ERS(A) current edition) and AIP and all messages are reacted to appropriately.
C3.2 Maintain R/T equipment	• Performs R/T equipment failure procedures in accordance with Flight Manual/POH • Employs fault finding procedures and corrective actions not involving special tools or instruments.
C3.3 Operate transponder	• Operates and monitors transponder in accordance with AIP during normal, abnormal and emergency operations.
Range of variables	
• Single or multi engine aircraft • VFR,IFR or simulated IMC • Propeller/rotor wash and jet blast noise • Up to and including light turbulence.	
Underpinning knowledge	
• English language • To recognise, interpret and react appropriately to light signals.	

2.5. Unit C4 Manage Fuel – Flight Standard (PPL and CPL)

Unit Description: Knowledge and skills to determine aircraft fuel requirements and perform the necessary calculations, to refuel the helicopter and to ensure the fuel system is configured and operated for maximum safety and efficiency in the prevailing flight conditions, and to calculate requirements, configure and make adjustments to achieve best range and best endurance.

Element	Performance Criteria
C4.1 Plan fuel requirements	• Determines fuel reserve requirement in accordance with CASRs • Ensures fuel allowance is sufficient for operational requirements and applicable abnormal or emergency situations • Calculates total fuel requirement in accordance with CASRs.
C4.2 Manage fuel system	• Verifies fuel quantity by visual inspection when possible or other methods appropriate to the aircraft type • Ensures fuel is the correct grade and is free from contamination • Ensures fuel drain cocks closed • Operates fuel system in accordance with Flight Manual/POH • Operates fuel cross feed in accordance with Flight Manual/POH to ensure aircraft balance • Operates fuel pumps and engine controls in accordance with Flight Manual/POH • Configures aircraft to achieve best range and calculates revised range • Configures aircraft to achieve best endurance and calculates revised endurance.
C4.3 Refuel aircraft	• Refuels aircraft in accordance with CASRs, Flight Manual/POH, workplace health and safety and local procedures • Ensures all fuel caps are closed and secured • Ensures aircraft is earthed before refuelling.
Range of Variables	
• Day Visual Flight Rules in variable weather conditions • Fuel sources • Fire extinguishers • Locations.	
Underpinning knowledge	
• Health & safety requirements during refuelling • Local procedures for refuelling.	

2.6. Unit C5 Manage Passengers and Cargo - Flight Standard (PPL and CPL)

Unit Description: Skills and knowledge to ensure that passengers are informed, controlled, and that provision has been made for their comfort and well being, and that cargo is managed in accordance with regulations.

Elements	Performance Criteria
C5.1 Brief passengers	• Briefs passengers before flight and in emergencies in accordance with CASRs, and company operations man • Explains and confirms conduct and procedures to avoid contact of personnel or articles with propellers, rotor blades or jet blast • Explains procedures to avoid interference with flight controls when applicable • Explains and demonstrates the use of seat belts/safety harness. • Explains and demonstrates use of escape hatches, exits and emergency equipment.
C5.2 Aid and assist passengers	• Establishes and maintains clear communications with passengers. • Provides passenger comfort and well-being within the limits of aircraft safety controls passengers on the ground and in the air in accordance with CASRs, occupational health and safety requirements and operations manual.
C5.3 Manage cargo	• Manages loading, unloading and security of cargo throughout flight operations • Identifies dangerous goods and applies procedures to ensure safety and security.
Range of Variables	
• Single or multi engine aircraft • Propeller/rotor wash and jet blast • Simulated abnormal or emergency situations • Real or simulated passengers and cargo.	
Underpinning Knowledge	
• Explain your actions in relation to managing passengers during an abnormal or emergency situation • Health & safety regulations • Local procedures for movement of passengers • Security requirements.	

2.7. Unit C6 Manage Flight – Flight Standard

Unit Description: Skills, knowledge and behaviour to plan, direct and control all aspects of a flight.

Element	Performance Criteria
C6.1 Maintain effective lookout	• Maintains lookout and traffic separation using a systematic scan technique at a rate determined by traffic density, visibility and terrain • Maintains radio listening watch and interprets transmissions to determine traffic location and intentions of traffic • Performs airspace cleared procedure before commencing any manoeuvres.
C6.2 Maintain situation awareness	• Monitors all aircraft systems using a systematic scan technique • Collects information to facilitate ongoing system management • Monitors flight environment for deviations from planned operations • Collects flight environment information to update planned operations.
C6.3 Assess situations and make decisions	• Identifies problems • Analyses problems • Identifies solutions • Assesses solutions and risks • Decides on a course of action • Communicates plans of action - if appropriate • Allocates tasks for action – if appropriate • Takes actions to achieve optimum outcomes for the operation • Monitors progress against plan • Re evaluates plan to achieve optimum outcomes.
C6.4 Set priorities and manage tasks	• Organises workload and priorities to ensure completion of all tasks relevant to the safety of the flight • Puts the safe and effective operation of the aircraft ahead of competing priorities and demands • Plans events and tasks to occur sequentially • Anticipates critical events and tasks to ensure completion • Uses technology to reduce workload and improve cognitive and manipulative activities • Avoids fixation on single actions, tasks or functions.
C 6.5 Maintain effective communications and interpersonal relationships	• Establishes and maintains effective and efficient communications and interpersonal relationships with all stakeholders to ensure the safe outcome of the flight • Defines and explains objectives to applicable/involved stakeholders • Demonstrates a level of assertiveness that ensures the safe completion of the flight • Encourages passengers to participate in and contribute to the safe outcome of the flight.
Range of Variables	
• All flight and ground operations • Interactivity with stakeholders • Single or multi engine aircraft.	
Underpinning Knowledge	
N/A.	

2.8. Unit C7 Threat and Error Management – Flight Standard

Unit Description: Skills, knowledge and behaviour to recognise and plan, direct and control threats and errors.

Element	Performance Criteria
C7.1 Recognise and manage threats	• Identifies relevant environmental or operational threats that are likely to affect the safety of the flight • Develops and implements countermeasures to manage threats • Monitors and assesses flight progress to ensure a safe outcome; or modifies actions when a safe outcome is not assured.
C7.2 Recognise and manage errors	• Applies checklists and standard operating procedures to prevent aircraft handling, procedural or communication errors; and identifies committed errors before safety is affected or aircraft enters an undesired aircraft state • Monitor aircraft systems, flight environment and crewmembers, collects and analyses information to identify potential or actual errors • Implements countermeasures to prevent errors or takes action in the time available to correct errors before the aircraft enters an undesired aircraft state.
C7.3 Recognise and manage undesired aircraft state	• Recognises undesired aircraft state • Prioritises tasks to ensure management of undesired aircraft state • Manipulates aircraft controls or systems, or modifies actions or procedures to maintain control of the aircraft and return to normal flight operations, in the time available.
Range of Variables	
• All flight and ground operations	
Underpinning Knowledge	
• Explain the principles of threat and error management detailing a process to follow to identify and mitigate or control threats and errors during multi crew operations • Give an example of how an undesired aircraft state can develop from an unmanaged threat or error • What aspects of multi crew operations can prevent an undesired aircraft state • Explain how the use of checklists and standard procedures prevents errors • Give an example of a committed error and how action could be taken to ensure safety of flight • Explain how prioritising and managing workload can reduce the commission of errors • Explain how establishing and maintaining interpersonal relationships can ensure safe flight • Explain how checklists and standard operating procedures can help to recognise, prevent and/or correct errors.	

2.9. Unit C8: Navigate Aircraft – Flight Standard

Unit Description: To develop the knowledge and skills to plan and conduct a flight to a destination aerodrome, or alternate aerodrome, navigating the aircraft under the VFR. This will include pre-flight planning, compliance with airspace procedures and departure and arrival procedures, and navigation under normal and abnormal conditions.

Element	Performance Criteria
C8.1 Prepare chart and flight plan	• Selects and prepares appropriate visual navigation charts suitable for the intended flight • Determines and allows for beginning and end of daylight • Obtains and interprets meteorological forecasts and NOTAMs • Selects a suitable route and altitude considering weather, terrain, airspace, NOTAMs and alternate landing areas • Obtains and analyses operational information that is valid for the intended flight • Determines whether the intended flight can be conducted under the VFR • Completes flight plan to destination and any planned alternates • Provides flight notification for SAR purposes • Calculates fuel requirements in accordance with CASRs.
C8.2 Comply with airspace procedures	• Obtains and complies with air traffic clearances • Complies with procedures applicable to airspace classification.
C8.3 Conduct departure procedures	• Performs pre-flight planning and cockpit organisation to ensure charts, documentation and navigational calculator are accessible from the control seat • Intercepts track within five nautical miles of airfield • Calculates ETA for first waypoint • Complies with all departure clearances and instructions • Observes local and published noise abatement requirements and curfews.
C8.4 Navigate aircraft en route	• Maintains a navigation cycle that ensures accurate tracking and applies track correctional technique to re-establish track prior to waypoint or destination • Maintains heading (±10° directional indicator aligned with compass) • Maintains and revises ETAs ±2 minutes for waypoint or destination • Maintains track ±1 nm in controlled airspace • Maintains navigation log to monitor tracking, ETAs and fuel status • Monitors fuel consumption and revises fuel reserves • Recognises deteriorating situations and initiates early corrective action • Positively identifies ground fixes by two or more features • Obtains a positive fix at intervals not greater than 30 minutes • Performs pre-descent and turning point checks • Maintains awareness of route and destination weather conditions and reacts appropriately to adverse weather changes • Maintains radio communications and listening watch with ATS/ATC • Maintains lookout using a systematic scan technique at a rate determined by traffic density, visibility and terrain • Monitors aircraft systems and engine handling to ensure that the aircraft is operated in accordance with the Flight Manual/POH.

Element	Performance Criteria
C8.5 Navigate at low level and in reduced visibility	• Maintains aircraft in visual meteorological conditions • Maintains separation from terrain and obstacles, allowing for wind and turbulence (minimum height 500 ft AGL) • Configures aircraft for bad visibility • Advises ATS and establishes a SARTIME, if applicable • Fixes position at least once every 30 minutes • Avoids noise-sensitive areas, if applicable.
C8.6 Perform lost procedure	• Configures aircraft to achieve best endurance speed at present or most efficient altitude • Fixes position • Revises plan to either destination or alternate considering weather, terrain and fuel available whilst maintaining reserve (ETA ±2 minutes) • Maintains minimum height of 500 ft AGL • Uses radio and transponder to request assistance, if applicable • Plans a timely precautionary search and landing if still lost/minimum fuel/darkness.
C8.7 Perform diversion procedure	• Diverts around weather or to an acceptable aerodrome • Revises plan to either destination or alternate considering weather, terrain and fuel available whilst maintaining reserves (ETA ±2 minutes) • Identifies and plans for CTA, CTR and Prohibited, Restricted and Danger Areas • Selects most suitable cruising altitude/level (±150 ft) • Amends SARWATCH if required • Advises of intention to divert for traffic separation.
C8.8 Use radio navigation aids	• Tunes, identifies and tests all navigation aids before use • Determines aircraft is within rated coverage of applicable radio navigation aids • Fixes aircraft position and solves aircraft orientation problems using radio navigation aids • Tracks/homes to the ground station • Verifies integrity of GPS signal • Enters and checks waypoint entry into GPS system • Confirms waypoints and fixes from all radio navigation aids with flight plan and identified ground fixes during en route navigation at least once every 60 minutes.
C8.9 Execute arrival procedures	• Obtains aerodrome information from ERS (A), ATIS/ATS and NOTAMs for applicable aerodrome • Obtains and complies with airways clearance requirements or makes broadcasts applicable to the airspace by nominated distance or position in accordance with AIPs • Identifies and avoids all air traffic • Establishes landing direction and airfield serviceability • Enters a circuit at circuit height via published approach points and flies a minimum of three legs of the circuit, except in circumstances when a straight-in approach is acceptable in accordance with AIPs • Performs a circuit and landing • Cancels SARWATCH • Observes local and published noise abatement requirements and curfews.

Element	Performance Criteria
Range of Variables	
• Day VFR • Terrain • Airspace • Simulated weather conditions • Simulated abnormal and emergency situations.	
Underpinning Knowledge	
N/A.	

2.10. Unit H1: Control Helicopter on the Ground – Flight Standard (PPL and CPL)

Unit Description: Skills and knowledge to start and stop a helicopter engine; perform all safety requirements; and engage the rotor and manipulate the throttle, collective, cyclic and anti-torque controls on the ground to maintain control of the helicopter.

Element	Performance Criteria
H1.1 Start and stop engine	• Ensures clearance of helicopter from obstructions, buildings and other aircraft • Performs pre-start, start, rotor engagement, shutdown, after-shutdown and emergency checklists in accordance with Flight Manual/POH • Starts hot and cold engine in accordance with Flight Manual/POH • Controls blade sailing during start and shutdown by appropriate positioning of helicopter and use of cyclic pitch • Shuts down engine in accordance with Flight Manual/POH • Complies with manufacturer's limitations and reports deviations when appropriate • Manages emergencies in accordance with Flight Manual/POH.
H1.2 Engage rotor	• Sets engine RPM within limits before rotor engagement • Engages rotor in accordance with Flight Manual/POH • Maintains engine RPM within limits during rotor engagement • Maintains disc position within operating limits as RPM increases • Operates rotor brake in accordance with Flight Manual/POH • Monitors and reacts appropriately to transmission, hydraulic system and engine indications if applicable.
H1.3 Control main rotor disc and anti-torque system	• Maintains main rotor disc parallel to the landing surface at flat pitch at idle RPM • Sets throttle at idle RPM in accordance with Flight Manual/POH • Sets anti-torque pedals to compensate for main rotor torque • Controls rotor disc and RPM while performing any other required tasks or actions.
Range of Variables	
• Approved helicopter with dual controls, electronic intercom and dual control brakes, if fitted. • Day VFR • Aerodromes or HLS • Sealed, gravel or grass surfaces • Obstructions and personnel • Wind effects on rotors • Limitations, such as those imposed by local noise abatement procedures and curfews.	
Underpinning Knowledge	
• Recall helicopter operational and starter motor limitations • State the effect of wind on rotor blade control (blade sailing) • Describe fitted fire extinguisher systems and explain their application • State causes of and avoidance measures for ground resonance.	

2.11. Unit H2: Control Helicopter in Hovering Flight and Landing – Flight Standard (PPL and CPL)

Unit Description: Skills and knowledge to complete pre-take-off checks, lift-off helicopter to the hover, complete hover checks, perform aborted take-off, perform hovering turns and land from the hover.

Element	Performance Criteria
H2.1 Lift-off and hover helicopter, perform hover checks and abort take-off	• Calculates aircraft performance for the flight to be undertaken • Performs pre-take-off checks in accordance with Flight Manual/POH. ***Lift-off helicopter*** • Increases collective pitch (power) until helicopter is light on the skids or wheels • Controls heading (±5°) • Controls forward, aft and sideways movement using cyclic pitch control • Increases collective pitch to lift helicopter off the surface. ***Hover helicopter*** • Anticipates wind effect by adjusting collective and cyclic pitch and anti-torque pedals to maintain position over hover point • Controls hover heading using anti-torque pedals (specified heading ±5°) • Maintains helicopter over hover point using controlled corrective action and visual references. o (PPL maintain hover position within ±1 metre o CPL maintain hover position within ±0.5 metre.) • Adjust collective pitch (power) to maintain nominated hover height (PPL and CPL: hovering height ±20% of the nominated height.) • Remains clear of the manufacturer's height–velocity diagram avoid area when applicable. ***Perform hover checks*** • Performs hover checks to ensure RPM, engine instruments and warning/caution lights are normal; centre of gravity and power margin are observed; and controls are operating normally. ***Perform aborted take-off*** • Recognises from helicopter attitude, or power available, that take-off cannot be achieved safely • Decides to discontinue take-off • Lowers collective pitch (power) to lower both skids/wheels to the ground • Adjusts cyclic pitch to control disc attitude.
H2.2 Hover helicopter in crosswind and tailwind	• Maintains helicopter in flight over a nominated hover point at a nominated height and heading in crosswind and tailwind • Prevents sideways, backwards or forward movement using cyclic pitch • Maintains direction using anti-torque pedals (±5°) • Maintains nominated height • Maintains RPM within limits during hover operations • Applies controlled corrective action to control the effects of wind gusts • Trims helicopter where applicable.

Element	Performance Criteria
H2.3 Perform turn around the mast	• Nominates hover point • Turns helicopter around the mast while maintaining a constant height ±20% • Turns helicopter at a constant rate of turn using anti-torque pedals • Maintains helicopter over hover point (±1.0 metre for PPL, ±0.5 metre for CPL) • Stops turn on required heading using anti-torque pedals (±5°) • Maintains RPM within limits during the turn • Applies controlled corrective action to control the effects of wind.
H2.4 Perform turns around nose and tail	• Turns helicopter around a nominated point on or forward of the nose or on or aft of the tail while maintaining a constant height and specified rate of movement around the point • Initiates rate of movement in the specified direction with cyclic pitch • Maintains desired ground track ±2 metres • Applies anti-torque pedal to ensure helicopter is pointed at the nominated turning point (±20°) • Maintains nominated height using collective pitch control (power) (PPL and CPL: hovering height ±20% of the nominated height • Maintains RPM within limits during the turn • Applies controlled corrective action to maintain a constant rate of turn and to counter the effects of wind • Stops turn on required heading (±5°).
H2.5 Perform sideways and backwards flight	• Transitions from static hover to sideways and backwards flight and terminates this movement over a nominated hover point • Ensures direction of travel is clear of obstructions and conducts backward movement only after visually checking behind helicopter and adjusting height as required • Maintains sideways or backwards directional control • Maintains height by adjusting collective pitch (power) (PPL and CPL: hovering height ±20% of the nominated height) • Maintains RPM within limits • Maintains rate of movement of helicopter at a safe speed • Maintains lookout in direction of travel • Terminates sideways or backwards movement at desired hover point.

Element	Performance Criteria
H2.6 Land from the hover	• Nominates touchdown point • Reduces collective pitch (power) and establishes a controlled rate of descent • Maintains heading (±5°) • Maintains helicopter over hover point • Lowers helicopter onto touchdown point from hovering flight using controlled corrective action • Ensures helicopter is stable on the ground prior to lowering collective fully • Maintains RPM until collective is fully lowered • Prevents yaw during reduction of collective pitch (power) • Performs after-landing checks in accordance with Flight Manual/POH/approved checklist. ***Mishandled landing procedure*** • Recognises that the landing standard cannot be achieved • Decides to discontinue landing and returns to the hover • Re-establishes a stabilised hover • Lands from stabilised hover.
Range of Variables	
• Approved helicopter with dual controls, electronic intercom and dual control brakes, if fitted • Day VFR • Aerodromes or HLS • Sealed, gravel or grass surfaces • Obstructions and personnel • Wind effects on hovering • Limitations, such as those imposed by local noise abatement procedures and curfews.	
Underpinning Knowledge	
• Recall helicopter limitations • Identify aerodrome and HLS markings • React appropriately to light and marshalling signals • Interpret height–velocity diagram • Recall effects of rotor wash.	

2.12. Unit H3: Taxi Helicopter – Flight Standard (PPL and CPL)

Unit Description: Skills and knowledge to complete pre-taxi functions and manoeuvre a helicopter on the ground and in the air while air taxiing and air transiting in compliance with any air traffic instructions, without incident.

Element	Performance Criteria
H3.1 Ground taxi helicopter	• Uses appropriate combination of disc attitude and power to initiate and control taxi • Performs brake checks in accordance with approved checklist, if applicable • Manoeuvres helicopter while allowing for prevailing conditions, without incident, on the ground over a prescribed track • Performs flight instrument checks while taxiing, if applicable • Avoids adverse effects of rotor wash on personnel, aircraft, structures and loose objects • Maintains track within 1.0 metre • Stops helicopter within 1.0 metre of a specified point • Maintains landing gear in contact with taxi surface • Adjusts taxi speed to suit helicopter type, surface conditions, congestion, and maintenance of control and to avoid collision with obstacles or other aircraft • Maintains rotor RPM within normal operating limits • Observes mast operating limits, if applicable • Ensures final approach path is clear of conflicting traffic on specified or appropriate runway or take-off direction.
H3.2 Air taxi helicopter	• Manoeuvres helicopter, while allowing for prevailing conditions, over a prescribed track at a constant height • Applies collective pitch to maintain taxi height (±20% of nominated height) • Maintains specified ground track within 1.0 metre • Applies and coordinates anti-torque pedals to maintain landing gear in alignment with direction of travel • Remains clear of height–velocity diagram avoid area • Maintains RPM within operating limits • Adjusts air taxi speed to suit helicopter type, surface conditions, congestion, and maintenance of control and to avoid collision with obstacles or other aircraft • Ensures final approach path is clear of conflicting traffic on specified or appropriate runway or take-off direction.

Element	Performance Criteria
H3.3 Air transit helicopter	• Obtains transit clearance and complies with ATC instructions, if applicable • Manoeuvres helicopter, while allowing for prevailing conditions, over a prescribed track at a height not above 100 ft AGL at airspeeds greater than speeds used for air taxiing • Limits movement within the aerodrome boundaries, without incident • Remains clear of height–velocity diagram avoid area • Maintains height (±20% of nominated height) • Manipulates any instrument, switch or device requiring the release of the collective pitch lever while airborne, without change to height, heading, speed, attitude; or exceeding RPM or power limits when safe to do so • Avoids conditions that could lead to loss of tail rotor or anti-torque effectiveness • Aligns helicopter with track, or balances, as applicable • Adjusts air transit ground speed to suit helicopter type, traffic conditions, congestion, and maintenance of control and to avoid collision with obstacles or other aircraft • Maintains rotor RPM within normal operating limits • Avoids adverse effect of rotor wash on other aircraft, facilities, loose objects and personnel • Ensures final approach path is clear of conflicting traffic on specified or appropriate runway or take-off direction.

Range of Variables

- Approved helicopter with dual controls, electronic intercom and dual control brakes, if fitted
- Day VFR
- Aerodromes or HLS
- Sealed, gravel or grass surfaces
- Obstructions and personnel
- Wind effects on hovering
- Limitations, such as those imposed by local noise abatement procedures and curfews.

Underpinning Knowledge

- Interpret height–velocity diagram
- Recall adverse effects of rotor wash
- Explain cause and effect of ground resonance and action to be taken for rectification
- Interpret and react appropriately to taxiway and runway markings
- Explain cause and effect of loss of tail rotor effectiveness and action to be taken to regain control
- Explain hazards and risks associated with taxiing a helicopter.

2.13. Unit H4: Take-Off Helicopter and Approach to Hover – Flight Standard (PPL and CPL)

Unit Description: Skills and knowledge to complete pre-take-off checks, take-off helicopter from the hover, perform after-take-off checks and approach helicopter to termination at hover.

Element	Performance Criteria
H4.1 Carry out pre-take-off checks	• Performs pre-take-off checks in accordance with approved checklist • Performs clearing turn, if applicable • Selects safe take-off path • Aligns helicopter in take-off direction • Positions helicopter at the optimum location within the HLS • Performs line-up checks in accordance with approved checklist when appropriate • Ensures final approach path is clear of conflicting traffic on specified or appropriate runway or take-off direction.
H4.2 Take-off helicopter	***Normal and crosswind take-off*** • Accelerates helicopter in take-off direction on a prescribed track • Recognises and controls translational lift • Applies climb power and adjusts attitude to maintain climb speed (±5 kts) appropriate to obstacle clearance requirements • Aligns helicopter landing gear with the planned take-off direction until the point at which balanced flight is required • Maintains helicopter outside the height–velocity diagram avoid area • Retracts undercarriage at a safe height and airspeed, if applicable • Trims helicopter if applicable • Balances helicopter • Performs after-take-off checks in accordance with approved checklist.
H4.3 Approach to hover	• Identifies termination point • Performs all checklist actions in accordance with approved checklist • Intercepts and maintains appropriate approach angle and track • Adjusts power and attitude to achieve a controlled decreasing closure rate to the termination point • Balances helicopter until the point at which the landing gear is aligned with the planned approach direction • Recognises and controls loss of translational lift • Maintains RPM within limits • Terminates approach to the hover over the termination point (PPL ±1.0 metre for PPL, ±0.5 metre for CPL of nominated point) (hovering height ±20% of nominated height, specified heading ± 5°).
H4.4 Perform go-around procedure	• Identifies adverse situation requiring a go-around • Initiates go-around in the time available • Sets climb attitude, power and speed • Controls helicopter • Aligns helicopter landing gear with the planned take-off direction until the point at which balanced flight is required • Performs after-take-off checks in accordance with approved checklist.

Range of Variables
• Approved helicopter with dual controls, electronic intercom and dual control brakes, if fitted • Day VFR • Aerodromes or HLS • Sealed, gravel or grass surfaces • Obstructions and personnel • Wind effects on hovering • Windsocks • Limitations, such as those imposed by local noise abatement procedures and curfews.
Underpinning Knowledge
N/A.

2.14. Unit H5: Control Helicopter in Normal Flight – Flight Standard (PPL and CPL)

Unit Description: Skills and knowledge to control a helicopter while climbing, descending and turning, in straight and level flight ,and to perform circuits and approaches, while complying with airspace requirements.

Element	Performance Criteria
H5.1 Climb helicopter	• Clears airspace above • Sets and maintains climb power (collective) and attitude (cyclic pitch) to achieve specified climb performance for the following profiles: o Maintains IAS for best angle of climb (V_X) (+5, -0 kts) o Maintains IAS for best rate of climb (V_Y) (+5, -0 kts) o Maintains IAS for cruise climb (±5 kts) o Maintains heading (±5°). • Applies controlled corrective action • Identifies and avoids terrain and traffic threats and complies with altimeter setting procedures specified in AIPs • Balances helicopter • Trims helicopter when IAS is stabilised (if applicable) • Maintains power as altitude is increased.
H5.2 Maintain straight and level flight	• Sets and maintains power (collective) and attitude (cyclic pitch) to achieve specified straight and level performance for the following profile: o straight and level flight at normal cruise (±5 kts) o Maintains heading (±5°) • Applies controlled corrective action • Sets collective pitch (power) to maintain straight and level flight at nominated IAS • Maintains nominated altitude (±100 ft) • Balances helicopter • Trims helicopter if applicable.
H5.3 Descend helicopter	• Clears airspace below • Sets and maintains power and attitude to achieve specified descent performance during straight flight for the following profile: o Maintains cruise descent IAS (±5 kts). • Applies controlled corrective action • Sets cruise descent power (collective pitch) • Maintains cruise descent ±100 ft/minute of nominated rate of descent • Identifies and avoids terrain and traffic threats and complies with altimeter setting procedures specified in AIPs • Maintains heading (± 5°) • Balances helicopter • Trims helicopter if applicable.

H5.4 Turn helicopter	• Performs airspace cleared procedure
	• Sets and maintains power (collective), attitude (cyclic pitch) and angle of bank to achieve specified turn performance to the left and right for the following profiles:
	  o Level turn (±100 ft)
	  o Climbing turn (±5 kts, rate one or 20° bank ±5°)
	  o Powered descent turn (±5 kts, 30° bank ±5°)
	• Applies controlled corrective action
	• Manoeuvres aircraft over specified ground tracks
	• Turns aircraft onto specified heading or geographical feature (±10° on exit)
	• Turns aircraft onto specified heading or geographical feature using magnetic compass only (±10° on exit)
	• Balances helicopter
	• Trims helicopter prior to commencing turn if applicable.

H5.5 Perform circuits and approaches	• Maintains lookout and traffic separation using a systematic scan technique at a rate determined by traffic density • Monitors and reacts appropriately to engine performance and indications • Tracks upwind on extended runway centreline to 500 ft • Adjusts circuit to ensure spacing with preceding traffic • Establishes helicopter on crosswind tracking 90° to the runway • Establishes helicopter on downwind at circuit height (±100 ft) tracking parallel to the runway at a specified distance from the runway • Performs pre-landing checklist • Establishes aircraft on base leg a specified distance from HLS • Commences and controls rate of descent to maintain approach path • Ensures helicopter is aligned with specified or appropriate runway when applicable • Establishes helicopter on final approach in approach configuration not below 500 ft AGL • Identifies and selects a termination point • Maintains closure rate to the termination point • Maintains helicopter on extended centreline and coordinates power and attitude to maintain approach slope and speed • Applies speed allowances for wind gusts when applicable • Performs final approach checklist • Anticipates and allows for wind on all legs of the circuit • Completes approach at the termination point • Balances helicopter • Trims helicopter if applicable.

H5.6 Comply with airspace requirements	• Explains, using a chart, geographical limits of the designated area • Identifies prominent geographical features using a chart • Identifies the limits of the designated area on the ground • Determines the position of controlled airspace using a chart and geographical features • Identifies and avoids restricted areas and controlled airspace using a chart and geographical features when applicable • Completes departure from the circuit area and transits to the designated area without incident • Completes departure from the designated area and transits to the circuit area without incident • Maintains orientation by geographical features.
Range of Variables	
• Approved helicopter with dual controls, electronic intercom and dual control brakes, if fitted • Day VFR • Aerodromes or HLS • Sealed, gravel or grass surfaces • Obstructions and personnel • Wind effects on hovering • Limitations, such as those imposed by local noise abatement procedures and curfews.	
Underpinning Knowledge	
• Explain function and further effects of all helicopter controls • Recall conditions leading to loss of tail rotor/anti-torque control • Explain how to recognise and avoid settling with power/vortex ring state • Perform circuit patterns and procedures • Explain the dangers of wind shear, turbulence and wake turbulence • Explain how to use and interpret flight instruments to monitor helicopter performance.	

2.15. Unit H6: Execute Advanced Manoeuvres and Procedures – Flight Standard (PPL and CPL)

Unit Description: Skills and knowledge to control a helicopter by the application of advanced manoeuvres and procedures.

Element	Performance Criteria
H6.1 Turn helicopter steeply	• Completes airspace cleared procedure • Performs level steep turns of nominated bank angle (45°) without altitude change (±100 ft) • Performs descending steep turn of nominated bank angle (45°) to a nominated heading or geographical feature through a minimum descent of 500 ft • Exits on specified heading or geographical feature (±15° initially, then ±5°) • Balances helicopter.
H6.2 Perform autorotative flight	***Entry and maintenance of autorotative flight*** • Enters and maintains autorotative flight at nominated speed in balanced flight for the following profiles: o Descent at nominated heading (±5°) and manufacturer's recommended speed (±5 kts) o Steep turn altering heading through 360° using 45° of bank at a nominated speed (±5 kts) o Autorotative flight at best range speed and minimum descent rate speed (±5 kts). • Maintains rotor RPM within limitations. ***Power recovery*** • Anticipates and complies with nominated minimum descent altitude (±100 ft) • Rejoins engine RPM and rotor RPM 'needles' • Sets climb power • Controls yaw • Sets climb speed (±5 kts). ***Power termination*** • Commences flare at appropriate height for the prevailing conditions and reduces ground speed and rate of descent • Rejoins engine and rotor RPM needles • Controls attitude to achieve a decreasing closure rate and reducing rate of descent • Introduces power, not before the point where the initial pitch pull would be applied in an autorotative landing • Controls yaw, engine and rotor RPM • Terminates the helicopter to a hover or hover taxi within (±25 metres) of termination point without lateral or rearward movement. ***Autorotative landing*** • Commences flare at appropriate height for the prevailing conditions and reduces ground speed and rate of descent • Controls rotor RPM • Selects and maintains helicopter at the hover attitude without lateral or backward movement • Controls touchdown rate • Controls yaw • Lands helicopter within ±25 metres of nominated touchdown point without lateral or backward movement.

Element	Performance Criteria
H6.3 Land on and lift off from sloping ground	***Land on sloping ground from the hover*** • Lowers the helicopter's up slope skid to the surface • Controls heading and position • Lowers the helicopters down slope skid to the surface • Determines slope surface does not exceed helicopter limitations under the prevailing conditions • Maintains helicopter position on the slope while lowering collective and centralising the cyclic • Ensures security of the helicopter on the sloping surface prior to reducing rotor RPM ***Lift off from sloping ground*** • Determines slope surface does not exceed helicopter limitations • Coordinates use of controls to achieve a take-off from the slope, avoiding lateral movement and dynamic rollover • Controls heading and position • Lifts off vertically to the hover.
H6.4 Land, take off and manoeuvre in a confined area	***Land in a confined area*** • Confirms helicopter performance, which includes power checks as applicable • Inspects confined area and determines a plan, including an appropriate approach and departure path • Intercepts and maintains appropriate approach path to the termination point • Operates helicopter within performance limitations • Lands at a suitable landing and lift-off area. ***Take off from a confined area*** • Calculates and confirms take-off performance is adequate for the confined area • Determines an appropriate abort point • Conducts a safe take-off from the confined area • Maintains a safe clearance from obstacles • Maintains helicopter within performance limitations. ***Manoeuvre in a confined area*** • Manoeuvres helicopter in a confined area while identifying and remaining clear of obstacles • Maintains helicopter within performance limitations.
H6.5 Execute limited power take-off, approach and landing	***Perform limited power take-off*** • Confirms helicopter performance using performance charts • Applies maximum, or nominated, power • Accelerates helicopter at an appropriate rate • Maintains direction • Recognises and controls passage through translational lift • Establishes and maintains climb • Identifies and avoids obstacles ***Perform limited power approach and landing*** • Confirms helicopter performance, which includes power checks as applicable • Determines landing area available is sufficient for safe limited power approach and landing • Determines appropriate plan for approach, which includes the

Element	Performance Criteria
	nomination of a suitable touchdown point • Intercepts planned approach path appropriate for the performance of the helicopter in the prevailing conditions • Sets optimum RPM • Maintains effective translational lift until touchdown is assured • Touches down on nominated touchdown point ± one helicopter length • Controls helicopter on the ground.
H6.6 Land on and take off from a pinnacle or ridge line (CPL only)	***Land on a pinnacle or ridge line*** • Confirms helicopter performance, which includes power checks as applicable.\ • Assesses and selects a suitable pinnacle or ridgeline • Determines wind velocity and assesses the effects of terrain on the local wind and turbulence • Formulates an appropriate plan, including suitable escape route • Intercepts and maintains appropriate approach path to the termination point • Terminates to a hover over the selected landing and lift-off area • Identifies and avoids obstacles. ***Take off from a pinnacle or ridge line.*** • Determines take-off performance is adequate for take-off from pinnacle or ridgeline • Formulates an appropriate departure plan • Identifies and avoids obstacles • Conducts a safe take-off from the pinnacle or ridge line.
Range of Variables	
• Approved helicopter with dual controls, electronic intercom and dual control brakes, if fitted. • Day VFR. • Aerodromes or HLS. • Confined HLS. • Terrain with sloping ground or pinnacles or ridge lines. • Sealed, gravel or grass surfaces. • Simulated abnormal or emergency situations. • Simulated hazardous weather. • Obstructions and personnel. • Wind effects on hovering. • Effect of gross weight, density altitude and power margin. • Limitations, such as those imposed by local noise abatement procedures and curfews. • For PPL: autorotative landings may be replaced by a power termination.	
Underpinning Knowledge	
• Recall the crosswind and rotor control limits for the aircraft type. • Explain power required and power available curves. • Recall hazards and risks that may occur when conducting advanced helicopter manoeuvres and identify precautions to control the risks. • Obtain and interpret instructions, procedures and information relevant to executing advanced manoeuvres and procedures.	

2.16. Unit H7 Manage Abnormal and Emergency Situations – Flight Standard (PPL and CPL)

Unit Description: Skills and knowledge to identify an abnormal or emergency situation and take action to maintain control of the helicopter and manage the situation.

Element	Performance Criteria
H7.1 Manage forced landing from level flight.	• Controls helicopter • Identifies engine failure • Establishes and maintains helicopter in autorotative flight (nominated speed ±5 kts, ±5° heading) • Balances helicopter • Controls rotor RPM within limitations • Selects suitable landing area • Positions helicopter to land in selected area • Declares an emergency (Mayday call) on appropriate frequency • Performs emergency checks in accordance with Flight Manual/POH or approved checklist • Briefs passengers about the situation, bracing positions and harness security • Lands helicopter to achieve safest outcome.
H7.2 Manage engine failure during take-off and final approach.	• Controls helicopter • Identifies engine failure • Enters autorotative flight • Maintains skids parallel to direction of travel • Performs autorotative landing or power termination.
H7.3 Manage engine failure during hover or hover taxi	***During hover*** • Identifies engine failure • Controls yaw and drift • Controls touchdown. ***During hover taxi*** • Identifies engine failure • Controls yaw and drift • Maintains skids parallel to direction of travel • Controls touchdown • Stops forward movement.
H7.4 Manage tail rotor malfunctions	***During flight*** • Identifies tail rotor malfunction • Controls helicopter in accordance with Flight Manual/POH • Selects suitable landing area • Manoeuvres helicopter to a position where a landing is assured • Lands helicopter. ***During the hover*** • Identifies tail rotor malfunction • Controls helicopter in accordance with Flight Manual/POH or approved checklist • Lands helicopter.

H7.5 Manage jammed flight control system	• Identifies jammed controls • Locates and removes any objects jamming controls • Maintains control of helicopter and rectifies the malfunction if appropriate • Manages control malfunction in accordance with Flight Manual/POH • Lands helicopter.
H7.6 Manage helicopter systems malfunctions	• Controls helicopter • Identifies and confirms systems malfunction • Performs emergency procedures in accordance with Flight Manual/POH.

Range of Variables

- Approved helicopter with dual controls, electronic intercom and dual control brakes, if fitted
- Day VFR
- Aerodromes or HLS
- Confined HLS
- Sealed, gravel or grass surfaces
- Wind effects on hovering
- Propeller/rotor wash and jet blast
- Windsocks
- Simulated abnormal or emergency situations
- Simulated hazardous weather
- Limitations, such as those imposed by local noise abatement procedures and curfews
- Simulated manoeuvres that would be terminated by forced landing or ditching may be discontinued when the assessor is satisfied that the landing standard could be achieved
- Decision to land is taken immediately after the need becomes apparent.

Underpinning Knowledge

- Recall emergency procedures and applicable checklist items
- Explain practical plans for use in the event of an engine failure
- Give examples of emergency radio procedures.

2.17. Unit H8 Operate Helicopter at Low Level (CPL Only) – Flight Standard

Unit Description: Skills and knowledge to manoeuvre a helicopter safely and effectively at low level.

Element	Performance Criteria
H8.1 Plan low level operations	• Identifies, evaluates and manages risks for low level operations • Completes consultation with all stakeholders involved in the low level operations to confirm task requirements • Ensures aircraft type and performance are appropriate for the task • Assesses and allows for the effects of fatigue and physical health on pilot performance • Analyses and applies actual or forecast weather conditions to low level operations • Identifies area of flying operations using chart and geographical features • Assesses geographical characteristics of the area of flying operations to ensure safe completion of the task • Identifies and avoids all obstructions • Identifies and avoids buildings, personnel, vehicles, animals and nuisance areas.
H8.2 Manoeuvre and navigate helicopter at low level	• Manoeuvres helicopter below 500 ft AGL to the CPL standard specified in this chapter, and within the helicopter limitations, for the helicopter category • Navigates helicopter at or below 500 ft AGL to the CPL standard specified in Unit C8 in MOS Part 61, Chapter 6 for the helicopter category.
H8.3 Operate helicopter at low level	• Performs aerial reconnaissance of operating area, where applicable. ***Manage wind effects, mountainous terrain and illusions*** • Identifies wind velocity • Recognises and manages the adverse effects of wind caused by terrain and obstructions • Recognises and controls the illusion of increasing or decreasing TAS when changing direction in windy conditions • Manages the effects of gradient wind • Manages aircraft inertia caused by increasing gradient wind • Recognises and controls the illusion of slipping or skidding during turns in windy conditions • Recognises and manages the effect of rising and descending terrain on aircraft performance • Recognises and manages the false horizon illusion • Maintains a constant altitude over featureless terrain or water. ***Operate adjacent to powerlines and wires*** • Identifies the necessity to operate in the vicinity of, and crossing, powerlines and wires and assesses risk • Identifies and avoids all powerlines and wires • Identifies poles, cross trees, wires, stays and insulators to assist power line and wire location • Identifies and avoids power pole stay wires. ***Perform quick stop manoeuvres, into-wind entry*** • Identifies termination point • Decelerates helicopter and controls rotor RPM • Balances helicopter and maintains direction and altitude

	• Hovers helicopter over the termination point. ***Perform quick stop manoeuvres, downwind entry*** • Identifies termination point • Turns helicopter into wind and initiates deceleration as applicable • Controls rotor RPM • Balances helicopter and maintains direction and altitude • Maintains helicopter outside height–velocity diagram requirements • Hovers helicopter over the termination point. ***Execute reversal turn*** • Performs airspace cleared procedure • Increases pitch attitude to a maximum of 30° • Turns 180° by controlled corrective action • Balances helicopter • Recovers helicopter to straight and level flight at commencement height and speed.
H8.4 Execute forced landing from below 200 ft AGL	• Enters autorotative flight • Positions helicopter to land into wind, where possible • Balances helicopter • Aligns helicopter with landing area • Performs trouble checks in accordance with Flight Manual/POH or approved checklist • Performs autorotative power termination, or landing, to achieve safest outcome.

Range of Variables

- Day VFR
- Approved helicopter with dual controls, electronic intercom and dual control brakes, if fitted.
- Aerodromes or HLS
- Hazards, which may include variable terrain and weather, surface conditions, other aircraft, loose objects, personnel, animals, birds, propeller/rotor wash, jet blast and negative ‘g-force’ in teetering rotor systems
- Limitations, such as those imposed by local noise abatement procedures and curfews
- Simulated emergency and abnormal situations
- Simulated hazardous weather.

Underpinning Knowledge

- Conduct wind velocity assessment and apply to low level operations
- Anticipate and allow for aircraft inertia at low level
- Manage effects of illusions
- Identify and avoid obstructions
- Explain critical operational conditions, including retreating blade stall, vortex ring, over pitching loss of anti-torque effectiveness and negative ‘g-force’ effects
- Explain meteorological factors affecting helicopter performance at low level
- Explain terrain-following techniques
- Detail safety hazards and risks of low level operations and methods of control
- Identify and justify a decision to operate at low level
- Monitor and anticipative hazards and risks and take appropriate mitigating action
- Modify activities depending on different workplace and environmental conditions
- Solve problems associated with the operation of a helicopter at low level.

2.18. Sling Load – Helicopter – Flight Standard (Optional)

Unit Description: Skills and knowledge to operate a helicopter on external load lifting operations in VMC using a sling length less than 50 ft and/or by using pilot vertical reference long-lining procedures using sling length greater than 100 ft.

Element		Performance Criteria
1	Prepare and rig a sling load	• Identifies load task requirement • Rigs a sling load that is secure and stable in accordance with Flight Manual/POH and company operations manual.
2	Plan external load operations	• Determines type of external load procedure and personnel required for the task • Determines helicopter performance is capable of the task • Plans flight routes • Ensures that arrangements are in place to prepare the load for security and for in-flight stability • Ensures that the cargo hook, swivels, shackles, load lifting strop/s and nets are of sufficient strength and in suitable condition for the task.
3	Brief and de-brief external load operations	• Pre-flight briefing and self-brief – crewed operation or solo flight • Explains and confirms the requirements of the load task • Specifies the person to inspect cargo hook and role equipment for serviceability and the load for security • Explains communication and hook-up procedure • Specifies hook-up person and hook-up procedure • Explains departure procedure with the load • Explains transit, approach, termination and load release procedures • Explains and confirms emergency procedures • *Pilot Vertical Reference long line procedure* • Self-briefs and briefs ground loadmaster on above 7 points • Confirm suitability of helicopter configuration for observing the external load and ensure pilot's seating position to fully exercise flight control • Arrange removal of doors as required and security of internal equipment • Post-Flight De-brief • Monitors load for security and stability during flight and reacts appropriately to insecure load • Analyses objectives and outcomes of flight and reviews operating procedures • Analyses effectiveness and efficiency in the use of and performance of role equipment • Ensures inspection, servicing and stowage arrangements for equipment used.

Element		Performance Criteria
4	Operate the helicopter in external load operations	• Performs functional and safety checks on role equipment • Calculates fuel and cargo load combinations to achieve task • Determines adequacy of power margin and adequacy of directional control • Maintains stable hover over load during hook up procedures • Lifts an external load with a cable of less than 50 ft sling length and transports load safely to a separate location, hovers and places the load on a specified position • Monitors load for security and stability during flight and reacts appropriately to insecure load • Avoids excessive sling load swing during transit.
5	Conduct Vertical Reference (long line) operations	• Maintains stable hover over load during hook up procedures • Lifts an external load slung at least 100 ft below the helicopter, without a loadmaster, transports load to a designated confined area and place load on a specified position • Monitors load for security and stability during flight and reacts appropriately to insecure load • Avoids excessive sling load swing during transit.
6	Manage abnormal and emergency situations during sling flight	• Controls helicopter and load • Identifies abnormal or emergency situations • Jettisons load when appropriate • Manage abnormal or emergency situations in accordance with standard operating procedures or Flight Manual/POH.

Range of Variables

- Helicopter configured to perform sling load lifting
- Sling load length less than 50 ft
- Sling load length greater than 100 ft
- Variable terrain, obstructions and pick up points
- Personnel to assist load preparation and attachment.

Underpinning Knowledge

- Calculate or interpret hover performance and power available/power required graphs or charts
- Explain how engine performance checks are performed for the helicopter type to be flown
- Explain “loss of tail rotor effectiveness”
- State external load limitations for the helicopter type to be flown
- Explain procedures for damping cable swing
- Explain the operation of role equipment used (relevant strops, swivels and cables, and external load hook)
- What flight conditions are associated with a risk of vortex ring?
- State advantages and disadvantages of pilot vertical reference long line operations (applicants for this authorisation only)
- Explain scan techniques to assist height perception when long lining (applicants for this authorisation only)
- Explain what is meant in long lining by the term “ follow the hook” (applicants for this authorisation only)
- Explain what features would be use to determine the suitability and serviceability of swivels, shackles, strops and nets for a particular external load.

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5 DAY VFR SYLLABUS (HELICOPTER) – FIRST SOLO ACHIEVEMENT RECORD

Units and elements of competency that must be achieved prior to the first solo flight. Each element must be certified as having been achieved at the specified standard by the instructor responsible for the assessment.

Unit	Element	Standard	Instructor/ ARN/ Date
C1 English communication in the aviation environment	• Communicate effectively face to face using clear and precise English • Communicate effectively in voice-only R/T communications using standard aviation phraseology	3 3	
C2 Manage Pre and Post Flight Actions	• Complete pre and post flight actions Excluding: o Weight and balance; o TO and landing performance; o Access Met and NOTAM data. • Perform pre-flight inspection • Completes and certifies daily inspection	3 3 4	
C3 Operate Radio	• Use R/T equipment (As applicable to circuit airspace) • Maintain R/T equipment • Operate transponder	3 4 3	
C4 Manage Fuel	• Plan fuel requirements (Applicable to circuit area) • Manage fuel system (Excluding range and endurance and refuelling requirements) • Refuel aircraft	3 3 4	
C6* Manage Flight	• Maintain effective lookout • Maintain situation awareness • Assess situations and make decisions • Set priorities and manage tasks • Maintain effective communications and interpersonal relationships	2 3 3 3 3	
C7* Threat and Error Management	• Recognise and manage threats • Recognise and manage errors • Recognise and manage undesired aircraft state	3 3 3	
H1 Control helicopter on the ground	• Start and stop engine • Engage rotor • Control main rotor disc and anti-torque system	3 3 3	

Unit		Element	Standard	Instructor/ ARN/ Date
H2	Control helicopter in hovering flight and landing	• Lift off and hover helicopter and perform hover checks	3	
		• Hover helicopter in crosswind and tailwind	3	
		• Perform turn around the mast	4	
		• Perform turns around nose and tail	3	
		• Perform sideways and backwards flight	4	
		• Land from the hover	3	
H3	Taxi helicopter	• Ground taxi helicopter	3	
		• Air taxi helicopter	3	
		• Air transit helicopter	3	
H4	Take-off helicopter and approach to hover	• Carry out pre-take-off checks	3	
		• Take-off helicopter	3	
		• Approach to hover	3	
H5	Control helicopter in normal flight	• Climb helicopter	3	
		• Maintain straight and level flight	3	
		• Descend helicopter	3	
		• Turn helicopter	3	
		• Perform circuits and approaches	3	
		• Comply with airspace requirements	3	
H6	Execute advanced manoeuvres and procedures	• Perform autorotative flight	3	
H7	Manage abnormal situations	• Manage engine failure during take-off and final approach	3	
		• Manage engine failure during hover or hover taxi	3	

* These elements will not be assessed on flight tests until 1 July 2009.

I have completed the training specified in the elements, which have been certified on this Achievement Record.

…… (Signature)

Achievement Standard

3 Able to achieve the private pilot standard on the majority of occasions; safe to operate under direct supervision.

4 Has received training in the element but not able to consistently achieve the PPL standard.

NAME:……**ARN:**……

6 DAY VFR SYLLABUS (HELICOPTER) – FIRST AREA SOLO ACHIEVEMENT RECORD

Units and elements of competency that must be achieved prior to the first area solo flight. Each element must be certified as having been achieved at the specified standard by the instructor responsible for the assessment.

All first solo competencies must have been completed. Elements already completed to the required standard are not repeated in this record.

Unit		Element	Standard	Instructor/ ARN/ Date
C3	Operate Radio	• Use R/T equipment (As applicable to area airspace) • Maintain R/T equipment • Operate transponder	3 3 3	
H2	Control helicopter in hovering flight and landing	• Lift off and hover helicopter and perform hover checks • Hover helicopter in crosswind and tailwind • Perform turn around the mast • Perform turns around nose and tail • Perform sideways and backwards flight • Land from the hover	3 3 3 3 4 3 3	
H4	Take-off helicopter and approach to hover	• Carry out pre-take-off checks • Take-off helicopter • Approach to hover	3 3 3	
H5	Control Helicopter in normal flight in normal flight	• Comply with airspace requirements (Applicable to area)	3	
C4	Manage Fuel	• Plan fuel requirements (For flight to area)	3	
C8	Navigate Aircraft	• Comply with airspace procedures (For route and area) • Conduct departure procedures • Navigate aircraft enroute • Execute arrival procedures	3 3 3 3	
H6	Execute advanced manoeuvres and procedures	• Turn helicopter steeply • Perform autorotative flight	3 3	
H7	Manage Abnormal Situations	• Perform forced landing	3	

I have completed the training specified in the elements, which have been certified on this Achievement Record.

…… (Signature)

Achievement Standard

3 Able to achieve the private pilot standard on the majority of occasions; safe to operate under direct supervision.

4 Has received training in the element but not able to consistently achieve the PPL standard.

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GFPT (HELICOPTER) – ACHIEVEMENT RECORD

Units and elements of competency that must be achieved prior to the GFPT. Each element must be certified as having been achieved at the specified standard by the instructor responsible for the assessment.

All first solo and first area solo competencies must have been completed. Elements already completed to the required standard are not repeated in this record.

Unit	Element	Standard	Instructor/ ARN/ Date
C1 English communication in the aviation environment	• Communicate effectively face to face using clear and precise English	2	
	• Communicate effectively in voice-only R/T communications using standard aviation phraseology.	2	
C2 Manage Flight Administration	• Complete pre and post flight actions	2	
	• Perform pre-flight inspection	2	
	• Perform and certify daily inspection.	3	
C3 Operate Radio	• Use R/T equipment	2	
	• Maintain R/T equipment	2	
	• Operate transponder	2	
C4 Manage Fuel	• Plan fuel requirements	2	
	• Manage fuel system	2	
	• Refuel aircraft.	3	
C5 Manage Passengers and Cargo	• Brief passengers	2	
	• Aid and assist passengers	2	
	• Manage cargo.	2	
C6* Manage Flight	• Maintain effective lookout	2	
	• Maintain situation awareness	2	
	• Assess situations and make decisions	2	
	• Set priorities and manage tasks	2	
	• Maintain effective communications and interpersonal relationships.	2	
C7* Threat and Error Management	• Recognise and manage threats	2	
	• Recognise and manage errors	2	
	• Recognise and manage undesired aircraft state.	2	

NAME:……**ARN**:……

GFPT (HELICOPTER) – ACHIEVEMENT RECORD (CONT)

Unit		Element	Standard	Instructor/ ARN/ Date
H1	Control helicopter on the ground	• Start and stop engine • Engage rotor • Control main rotor disc and anti-torque system.	2 2 2	
H2	Control helicopter in hovering flight and landing	• Lift off and hover helicopter and perform hover checks • Hover helicopter in crosswind and tailwind • Perform turn around the mast • Perform turns around nose and tail • Perform sideways and backwards flight • Land from the hover.	2 2 2 2 2 2	
H3	Taxi helicopter	• Ground taxi helicopter • Air taxi helicopter • Air transit helicopter.	2 2 2	
H4	Take-off helicopter and approach to hover	• Carry out pre-take-off checks • Take-off helicopter • Approach to hover.	2 2	
H5	Control helicopter in normal flight	• Climb helicopter • Maintain straight and level flight • Descend helicopter • Turn helicopter • Perform circuits and approaches • Comply with airspace requirements.	2 2 2 2 2	
H6	Execute advanced manoeuvres and procedures	• Turn helicopter steeply • Perform autorotative flight • Land on and lift off from sloping ground • Land, take off and manoeuvre in a confined area • Execute limited power take-off, approach and landing.	2 2 2 2 2	
H7	Manage abnormal situations	• Manage forced landing from level flight • Manage engine failure during take-off and final approach • Manage engine failure during hover or hover taxi • Manage tail rotor malfunctions • Manage jammed flight control system • Manage helicopter systems malfunctions.	2 2 2 2 2	

* These elements will not be assessed on flight tests until 1 July 2009.

I have completed the training specified in the elements, which have been certified on this Achievement Record.

…… (Signature)

Achievement Standard

3 Able to achieve the private pilot standard on the majority of occasions; safe to operate under direct supervision.

NAME: ..... ARN: .....

PPL ACHIEVEMENT RECORD – HELICOPTER

The standard for certification of each element is that all performance criteria for that element are met.

Unit	Element	Instructor/ARN/Date	Student/Date
C1 English communication in the aviation environment	• Communicate effectively face to face using clear and precise English • Communicate effectively in voice-only R/T communications using standard aviation phraseology.		
C2 Manage pre- and post-flight actions	• Complete pre- and post-flight administration • Perform pre-flight inspection • Perform and certify daily inspection.		
C3 Operate radio	• Use R/T equipment • Maintain R/T equipment • Operate transponder.		
C4 Manage fuel	• Plan fuel requirements • Manage fuel system • Refuel aircraft.		
C5 Manage passengers and cargo	• Brief passengers • Aid and assist passengers • Manage cargo.		
C6* Manage flight	• Maintain effective lookout • Maintain situation awareness • Assess situations and make decisions • Set priorities and manage tasks • Maintain effective communications and interpersonal relationships.		
C7* Threat and error management	• Recognise and manage threats • Recognise and manage errors • Recognise and manage undesired aircraft states.		
C8 Navigate aircraft	• Prepare chart and flight plan • Comply with airspace procedures • Conduct departure procedures • Navigate aircraft en route • Navigate at low level and in reduced visibility • Perform lost procedure • Perform diversion procedure • Use radio navigation aids • Execute arrival procedures.		
H1 Control helicopter on the ground	• Start and stop engine • Engage rotor • Control main rotor disc and anti-torque system.		

PPL ACHIEVEMENT RECORD – HELICOPTER (CONTD)

Unit		Element	Instructor/ARN/Date	Student/Date
H2	Control helicopter in hovering flight and landing	• Lift off and hover helicopter and perform hover checks • Hover helicopter in crosswind and tailwind • Perform turn around the mast • Perform turns around nose and tail • Perform sideways and backwards flight • Land from the hover.		
H3	Taxi helicopter	• Ground taxi helicopter • Air taxi helicopter • Air transit helicopter.		
H4	Take-off helicopter and approach to hover	• Carry out pre-take-off checks • Take-off helicopter • Approach to hover.		
H5	Control helicopter in normal flight	• Climb helicopter • Maintain straight and level flight • Descend helicopter • Turn helicopter • Perform circuits and approaches • Comply with airspace requirements.		
H6	Execute advanced manoeuvres and procedures	• Turn helicopter steeply • Perform autorotative flight • Land on and lift off from sloping ground • Land, take off and manoeuvre in a confined area • Execute limited power take-off, approach and landing.		
H7	Manage abnormal situations	• Manage forced landing from level flight • Manage engine failure during take-off and final approach • Manage engine failure during hover or hover taxi • Manage tail rotor malfunctions • Manage jammed flight control system • Manage helicopter systems malfunctions		

* These elements will not be assessed on flight tests until 1 July 2009.

I have completed the training specified in the elements, which have been certified on this Achievement Record

…… (Signature)

NAME: ..... ARN: .....

CPL ACHIEVEMENT RECORD – HELICOPTER

The standard for certification of each element is that all performance criteria for that element are met.

Unit	Element	Instructor/ARN/Date	Student/Date
C1 English communication in the aviation environment	• Communicate effectively face to face using clear and precise English • Communicate effectively in voice-only R/T communications using standard aviation phraseology.		
C2 Manage pre- and post-flight actions	• Complete pre- and post-flight administration • Perform pre-flight inspection.		
C3 Operate radio	• Use R/T equipment • Maintain R/T equipment • Operate transponder.		
C4 Manage fuel	• Plan fuel requirements • Manage fuel system • Refuel aircraft.		
C5 Manage passengers and cargo	• Brief passengers • Aid and assist passengers • Manage cargo.		
C6* Manage flight	• Maintain effective lookout • Maintain situation awareness • Assess situations and make decisions • Set priorities and manage tasks • Maintain effective communications and interpersonal relationships.		
C7* Threat and error management	• Recognise and manage threats • Recognise and manage errors • Recognise and manage undesired aircraft states.		
C8 Navigate aircraft	• Prepare chart and flight plan • Comply with airspace procedures • Conduct departure procedures • Navigate aircraft en route • Navigate at low level and in reduced visibility • Perform lost procedure • Perform diversion procedure • Use radio navigation aids • Execute arrival procedures.		
H1 Control helicopter on the ground	• Start and stop engine • Engage rotor • Control main rotor disc and anti-torque system.		

CPL ACHIEVEMENT RECORD – HELICOPTER (CONT)

Unit	Element	Instructor/ARN/Date	Student/Date
H2 Control helicopter in hovering flight and landing	• Lift off and hover helicopter and perform hover checks • Hover helicopter in crosswind and tailwind • Perform turn around the mast • Perform turns around nose and tail • Perform sideways and backwards flight • Land from the hover.		
H3 Taxi helicopter	• Ground taxi helicopter • Air taxi helicopter • Air transit helicopter.		
H4 Take-off helicopter and approach to hover	• Carry out pre-take-off checks • Take-off helicopter • Approach to hover.		
H5 Control helicopter in normal flight	• Climb helicopter • Maintain straight and level flight • Descend helicopter • Turn helicopter • Perform circuits and approaches • Comply with airspace requirements.		
H6 Execute advanced manoeuvres and procedures	• Turn helicopter steeply • Perform autorotative flight • Land on and lift off from sloping ground • Land, take off and manoeuvre in a confined area • Execute limited power take-off, approach and landing • Land on and take off from a pinnacle or ridge line.		
H7 Manage abnormal situations	• Manage forced landing from level flight • Manage engine failure during take-off and final approach • Manage engine failure during hover or hover taxi • Manage tail rotor malfunctions • Manage jammed flight control system • Manage helicopter systems malfunctions.		
H8 Operate helicopter at low level	• Plan low level operations • Manoeuvre and navigate helicopter at low level • Operate helicopter at low level • Execute forced landing from below 200 ft AGL.		

* These elements will not be assessed on flight tests until 1 July 2009.

I have completed the training specified in the elements, which have been certified on this Achievement Record

…… (Signature)

NAME: ..... ARN: .....

SLING LOAD – HELICOPTER – ACHIEVEMENT RECORDS

External loads (sling attachment< 50 ft length) and long-lining authorisations are to be separately examined, approved and endorsed. The Long-Line procedure shall be applied for only after completing listed units and elements with slings less than 50 ft below the helicopter. The long-lining applicant is to achieve the listed units and elements of competency with an external load at least 100 ft below the helicopter using the pilot Vertical reference procedure. Only the applicable Achievement Record is to be signed by the instructor and student.

The standard for certification of each element is that all performance criteria for that element are met.

Unit	Element	Instructor/ARN/Date	Student/Date
Sling Load – Helicopter	• Prepare and rig a sling load • Plan external load operations. • Brief and de-brief external load operations • Operate the helicopter in external load operations • Manage abnormal and emergency situations during sling flight.		
Underpinning Knowledge Examined and Satisfactory			

I have completed the training specified in the elements, which have been certified on this Achievement Record.

(Signature) ..... Date .....

Unit	Element	Instructor/ARN/Date	Student/Date
Sling Load-Helicopter Vertical Reference (long line) operations	• Plan external load operations. • Brief and de-brief external load operations • Operate the helicopter in external load operations • Conduct Vertical Reference (long-line) operations • Manage abnormal and emergency situations during sling flight.		
Underpinning Knowledge Examined and Satisfactory			

I have completed the training specified in the elements, which have been certified on this Achievement Record.

..... (Signature) Date .....

Go To Section 1 Go To Section 3

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SECTION 3 – AERONAUTICAL KNOWLEDGE TRAINING SYLLABUS

Go To Section 1 | Go To Section 2

CONTENTS

1. Introduction

1.1 General

This syllabus of aeronautical knowledge specifies the aeronautical knowledge objectives that must be met by applicants for helicopter pilot licences. The level for each knowledge item has been set out in an objective form so that both students and instructional staff can readily understand the level of knowledge for each item.

To integrate theory training with flight training, the Aeronautical Knowledge syllabus has been divided into two ground training blocks as indicated below:

Pre PPL:

Contains the knowledge requirements to be taught prior to the General Flying Progress Test and nominates specific objectives to be met prior to undertaking the following flights:

- 1st Solo
- General Flying Progress Test (GFPT).

PPL and CPL:

Specifies the knowledge requirements prior to the completion of the:

- PPL training phase
- CPL training phase.

The Performance Standards used to define the relative importance of each syllabus objective are:

STANDARD	LEVEL	DESCRIPTION
A	Essential	Must be known completely relates directly to the safety of the helicopter and occupants.
B	Important	Must be known in considerable depth relates to the efficient and practical operation of a helicopter.
C	Additional	Pre-PPL background knowledge only PPL basic principles should be known CPL should be known in considerable depth.

Note: *Where a sequence is left blank the preceding standard applies.*

1.2. Interpreting the Syllabus

This syllabus is designed to integrate flight and ground training, and provide guidance on the relative importance of particular topics.

The following example illustrates how to obtain maximum value from the ground training syllabus:

		S	GFPT	PPL	CPL
8.5	**Helicopter Landing Sites (HLS)** Recall the requirements of Basic and Standard helicopter landing sites (HLS) in respect to: (a) physical specifications (b) operational requirements (c) general conditions for use.		A	A	A

Explanation:

Topics 8.5 (a) (b) and (c) are an ESSENTIAL item of knowledge which must be learnt prior to the GFPT flight and is required knowledge for ALL SUBSEQUENT PHASES of training.

Topics 8.5 (a) (b) and (c):

- may be taught prior to first solo (S), but
- are deemed to be ESSENTIAL knowledge which must be taught prior to the GFPT, and is required knowledge for all SUBSEQUENT PHASES of training.

1.3. Study References

The syllabus itself remains the authority for the content of examinations. However, both mandatory and suggested references will be listed on the CASA web page for CPL examination.

1.4. Industry Examinations

1.4.1. To maintain a measure of ground/flight integration, a student must pass the following examinations, set and marked by the industry, prior to progressing to the next training phase:

- Prior to first solo:

  An oral or written examination.

- Prior to the general flying progress test (GFPT):

  A written Basic Aeronautical Knowledge (BAK) examination.

1.4.2. Results of the above examinations are to be recorded in a student's flying training record. A pass in the BAK also should be recorded by the CFI in the pilot's log book.

1.4.3. Industry examination – guidance

1.4.3.1. It is suggested that examinations should sample approximately 60% to 70% of "A" topics. The pass mark may be nominated by the training organisation but should not be less than 70%.

1.4.3.2 Though these examinations should, in the main, sample topics appropriate to the phase of training, it is advisable to include some ESSENTIAL knowledge topics from earlier phases, particularly if there has been a prolonged break in training.

1.4.3.3. The three examinations mentioned in paragraph 1.4.1 may be compiled by training organisations other than the flying training organisation using them.

1.5. CASA Examinations

1.5.1. Prior to the PPL or CPL flight test, a person must pass the following CASA examinations:

(a) For PPL, a single-multiple choice examination which will sample any topic of the syllabus from "1st solo" up to and including topics listed under the "PPL flight test" column

(b) For CPL, a single-multiple choice examination consisting of a number of subject-part examination, each of which is to be sat separately. The subject-part examination will in general sample any of the respective subject topics of the syllabus.

1.5.2. The pass standards for these examinations are:

(a) PPL – **70%**

(b) CPL – **80%** for Flight Rules and Air Law subject-part examination and **70%** for each of the other subject-parts, unless amended by changes to regulations.

ITEM	STAGE/LICENCE			
	S	GFP	PPL	CPL
2. Aircraft General Knowledge (AGK)				
2.1 Terminology				
With respect to the items listed below recall the standard abbreviations used and meet the objectives stated:				
Direction				
(a) express direction as a three figure group and in the clock code	B	B	B	B
(b) as a two-figure group for runways	B	B	B	B
(c) define True (T), Magnetic (M), and Compass (C) North	B	B	B	B
(d) define heading (HDG), wind velocity (W/V).				
Distance, Speed and Velocity:		B	B	B
(e) state the units used for distance: • navigation - nautical miles(nm) • visibility - metres (m), kilometres (km)				
(f) define a knot (kt)				
(g) define wind velocity (W/V).				
Time	B	B	B	B
(h) express time as a 4, 6 and 8 figure group and mentally convert local time (EST, CST, WST), to UTC and vice versa.				
Vertical Measurement	B	B	B	B
(i) state the unit used (ft) for vertical measurement and differentiate between: • height • altitude • elevation				
(j) state the units used for: • runway direction and dimensions - as per ERSA • temperature - degrees Celsius (C) • pressure - hectopascals (hPa) • weight - kilograms (kg), pounds (lb) • volume - litres (l), gallons (gal).				
2.2 Fuels and Oils				
(a) explain the terms: • octane rating/performance number • Avgas, Avtur and indicate how to identify Avtur and Avgas • multi grade oils, viscosity and vegetable/mineral/synthetic based oils		B	B	A
(b) list sources of fuel contamination i.e. water, ice, other impurities		A	A	A
(c) state the advantage of filling tanks prior to overnight parking		B	B	B
(d) state when and how a fuel system should be inspected		A	A	A

ITEM	STAGE/LICENCE			
	S	GFP	PPL	CPL
(e) list the potential consequences of: • mixing vegetable, mineral and synthetic based oils • using automobile gasoline or AVGAS of a lower than recommended octane rating.				
2.3 Engine Icing State the atmospheric conditions conducive to the formation of: (d) throttle ice (e) fuel evaporation ice (f) impact ice: • in a carburettor.		A	A	A
2.4 Engines and Associated Systems Select from a list the statement which best describes: (a) the effects of carburettor heat on mixture and power (b) the need to monitor cylinder head temp and oil temperature in the climb, cruise & descent (c) the potential dangers to engine operation of excessively high or low oil temperatures or pressures (d) the seasonal influence on the choice of appropriate grades of oil viscosity (e) the symptoms of fuel vaporisation and the methods of rectification.		A	A	A
2.5 Engine and Transmission Systems In respect of the following systems and their major components, identify correct statements regarding: (f) the purpose of the system or component (g) the pilot actions necessary to make it function (h) indications of malfunction (i) the precautions which may be taken to prevent malfunction (j) the pilot actions, if any, which can be taken with regard to trouble shooting and rectification of malfunction:			B	B
(i) exhaust driven supercharger systems (turbochargers): • compressors • turbines • waste gates			B	B
(ii) main and tail rotor systems: • abnormal vibrations from main and tail rotor systems • control systems • trimming devices • stabilisers		A	A	A
(iii) transmissions: • clutches • free-wheel units • rotor brakes		A	A	A
(iv) oil systems:		A	A	A

ITEM	STAGE/LICENCE			
	S	GFP	PPL	CPL
• reservoirs • pressure pumps and filters • pressure gauges • temperature gauges • scavenge pumps • oil coolers • pressure relief valves • oil cooler by-pass valves • dipsticks.				
2.6 Helicopter Systems In respect of the following systems and their major components, identify correct statements regarding: (a) the purpose of the system or component (b) the pilot actions necessary to make it function (c) the indications of malfunction (d) the precautions which may be taken to prevent malfunction (e) the pilot actions, if any, which can be taken with regard to trouble shooting and rectification of malfunction:				
(i) electrical systems: • generators • alternators • batteries • battery or master switches • generator or alternator switches • alternator field switches • ignition switches • voltage regulators • overvoltage relays • voltammeters • ammeters • battery busbars • main busbars • circuit breakers • circuit breakers and fuses • switches (push button, toggle, micro and rheostat) • piston engine starting systems • dual magneto • external power receptacles • inverters.		B	B	B
(ii) fuel systems: • pump fed and gravity fed systems • tank venting and pressurisation • booster pumps • tank selectors and crossfeed systems • system drains • fuel quantity transmitters and gauges • fuel filters • fuel pressure gauges • fuel flow gauges.		B	B	B

ITEM	STAGE/LICENCE			
	S	GFP	PPL	CPL
(iii) hydraulic systems: • reservoirs • pumps (engine driven, electrically driven and hand operated) • shut off valves • unloader valves • pressure relief valves • shuttle valves • restrictors • control valves • actuators • accumulators • emergency air bottles.		B	B	B
(iv) fixed skid and wheel undercarriage systems.		B	B	B
(v) anti-icing and de-icing systems: • pitot heat • carburettor heat • intake heat		A	A	A
(vi) heating systems: • fuel heaters • hot air shrouds • bleed air		B	B	B
(vii) fire warning and fire extinguishing systems: • heat sensitive detectors • warning bells, lights and circuitry • extinguishers and actuators.		A	A	A
2.7 Instruments In respect of the following engine, flight and navigational instruments identify correct statements regarding:				
(a) the purpose of the instrument and the information displayed		B	B	B
(b) the inputs required to make the engine and flight instruments function		B	B	B
(c) the pilot actions, if any, to make if function		B	B	B
(d) the indications of malfunction		B	B	B
(e) the limitations and errors of the flight and navigational instruments		B	B	B
(f) the precautions which may be taken to prevent malfunction or erroneous indications		B	B	B
(g) the pilot actions, if any, which can be taken with regard to trouble-shooting and rectification of malfunctioning:		B	B	B
(i) engine instruments: • manifold pressure gauges • tachometers and tachometer generators • cylinder head temperature gauges		B	B	B
(ii) flight instruments: • artificial horizons/attitude indicators • direction indicators • turn and balance indicators		B	B	B

ITEM	STAGE/LICENCE			
	S	GFP	PPL	CPL
• airspeed indicators • altimeters • vertical speed indicators • inertial lead vertical speed indicators • magnetic compasses • remote magnetic compasses.				
3. Flight Rules and Air Law				
3.1 Documentation				
3.1.1 Know the requirements for and the method of maintaining a pilot's log book and the purpose of flight progress records.		B	B	B
3.1.2 Given an item of operational significance:		B	B	B
(a) Select the appropriate reference document from the list below • CAR CAO AIP CAAP ERSA NOTAMS AIC				
(b) Extract relevant and current information from these documents.				
3.1.3 Extract/decode information contained in ERSA and NOTAMS.		A	A	A
3.1.4 Understand the terms and abbreviations that are relevant to flight in accordance with VFR.		A	A	A
3.2 Pilot licences, Privileges & Limitations				
3.2.1 Decide whether a flight can be conducted in accordance with the rules relating to: (a) privileges & limitations of the licence held (b) recent experience requirements.			A	A
3.2.2 Extract/apply the rules pertaining to flight and duty time limitations.				B
3.3 Flight Rules and Conditions of Flight				
3.3.1 Select documents that shall be carried on board an aircraft during flight in Australian airspace.			B	B
3.3.2 Extract/apply the rules relating to:				
(a) carriage and discharge of firearms			A	A
(b) aerodromes where operations are not restricted to runways		A	A	A
(c) the conditions relating to flight in PRD areas.		A	A	A
3.3.3 (deleted)				
3.3.4 Recall/apply the following rules:				
(a) rules of the air	A	A	A	A
(b) the requirements relating to the operation of aircraft on and in the vicinity of an aerodrome and the conditions relating to turns after take-off and their application to helicopters	A	A	A	A
(c) separation minima between aircraft for take-off and landing at a non-controlled aerodrome	A	A	A	A
(d) visual meteorology conditions for operations below 10,000ft and below 700ft AGL (in relation to helicopters)	A	A	A	A
(e) relating to restrictions on smoking in aircraft during take-off, landing and refuelling	A	A	A	A

ITEM		STAGE/LICENCE			
		S	GFP	PPL	CPL
	(f) altimetry procedures for flight below 10,000ft.		A	A	A
3.3.5	Extract/apply the rules relating to:				
	(a) the use of drugs and alcohol and recall the minimum period between alcohol consumption and flight departure	A	A	A	A
	(b) temporary medical unfitness.		A	A	A
3.3.6	Recall the requirements relating to the minimum heights for flights over: • populated areas • other areas.		A	A	A
3.3.7	Recall the meaning of the following light signals directed at an aircraft: • steady "green" and steady "red" • "green" "red" and "white" flashes.	A	A	A	A
3.3.8	Extract/apply the limitations imposed on: (a) acrobatic flight (b) flights over public gatherings.		A	A	A
3.3.9	Recall the requirement to plan to land prior to the end of daylight.		A	A	A
3.4	**Air Service Operations**				
3.4.1	Extract/apply the rules relating to:				
	(c) a pilot's responsibilities before flight			A	A
	(d) aerodrome meteorological minima			A	A
	(e) flights over water and in designated remote areas			A	A
	(f) carriage of: (iii) cargo (iv) sick and handicapped persons (v) parachutists (vi) dangerous goods (vii) animals (viii) flotation and survival equipment for helicopters			B	B
	(g) dropping of articles from aircraft in flight		A	A	A
	(h) requirements for first aid kits			A	A
	(i) requirements for passenger lists.				B
3.4.2	State the requirements to test radio equipment prior to taxi and maintain a listening watch.			A	A
3.4.3	Extract the restrictions pertaining to the carriage of passengers on certain flights.		A	A	A
3.4.4	Extract/apply the following rules relating to the responsibilities of a pilot in command: (a) before flight: (i) requirements of: • fuels and oils • fuelling of aircraft • starting and ground operation of engines (ii) appropriate passenger briefing (b) during flight:		A	A	A

ITEM		STAGE/LICENCE			
		S	**GFP**	**PPL**	**CPL**
	(i) requirements regarding the operation & safety of the aircraft & the authority of the PIC.				
3.4.5	Recall the following requirements: (a) before flight: (i) the conditions regarding the: • removal of locking devices • security of doors, hatches, tank caps • testing of flight controls • removals of frost and ice • instrument checks (ii) fuel system inspection: • when and how (iii) carriage of passengers in a control seat (iv) carriage of infants and children. (b) during flight: (i) seat occupation/seat belts: • occupation of seats • wearing of seat belts • adjustment of seat belts (ii) manipulation of aircraft controls: • by pilots • not permitted by unauthorised persons.		A	A	A
3.4.6	Recall the precautions pertaining to the security of safety harnesses and other equipment prior to solo flight in dual control aircraft.	A	A	A	A
3.5	**Aerodromes**				
3.5.1	Identify and explain the purpose of the following aerodrome, LA and HLS markings: (a) runway markers (b) runway threshold markings (c) runway end markers (d) cone and gable markers (e) taxiway markings (f) holding points/bays (g) a double white cross adjacent to a primary wind indicator (h) a horizontal white dumbbell (i) movement areas (j) HLS markings.		A	A	A
3.5.2	Identify the following positions in a circuit: (a) downwind leg (b) base leg (c) crosswind leg (d) upwind leg and (e) dead side of the circuit.	A	A	A	A
3.5.3	Explain the significance of a white cross on the movement area.	A	A	A	A
3.6	**Airspace and Traffic Services – General**				
3.6.1	Differentiate between the various classifications of airspace.			B	B

ITEM		STAGE/LICENCE			
		S	GFP	PPL	CPL
3.6.2	Explain the terms: (a) flight information service (b) air traffic control service (c) radio “reports” and “broadcasts” (d) VFR route and lanes of entry (e) PRD areas (f) CTAF(R) areas.			B	B
3.6.3	Extract/apply permitted tracking tolerances for VFR aircraft to avoid controlled airspace.			B	B
3.6.4	Know the requirements and procedures to be adopted when operating: (a) in any class of airspace (b) from or into: • any licensed aerodrome • a CTAF(R).			A	A
3.6.5	Altimetry: (a) recall the datum height from which an altimeter indicates height when the following are set on the sub-scale: • Area QNH • Local QNH • QFE • Standard Pressure Setting (b) recall the procedures that are carried out with the altimeter at the Transition Altitude and the Transition Level on climb and descent (c) derive from AIP the Transition Level for any given area QNH (d) recall the method of using an altimeter to derive Local QNH		A	A	A
	(e) calculate height error caused by setting the altimeter sub-scale incorrectly (f) recall the meaning of the following: • height • altitude • flight level (g) recall the following parameters from the ICAO Standard Atmosphere: • mean sea level temperature and pressure lapse rate.				
3.7	**Emergencies, Accidents and Incidents**				
3.7.1	Extract emergency procedures from the ERSA.			A	A
3.7.2	State the conditions under which a pilot may declare a mercy flight and select occasions when a mercy flight must not be undertaken.			B	B
3.7.3	Extract from AIP the responsibilities of a pilot regarding the notification of accidents and incidents.			B	B
3.7.4	(deleted)				
3.7.5	Cite examples of “hazards to navigation” that must be reported by pilots.			B	B

ITEM		STAGE/LICENCE			
		S	GFP	PPL	CPL
3.8	**Security**				
3.8.1	Explain the term ADIZ and extract: (a) the general requirements for operations in this zone (b) the action by the pilot of the intercepted aircraft.			A	A
3.8.2	State the powers vested in a pilot in command.			A	A
3.9	**Emergencies and SAR**				
3.9.1	Recall the intermittent use of navigation and landing lights by an aircraft to indicate that it is in difficulty.	A			
3.9.2	Differentiate between an accident and an incident.		B		
3.9.3	Extract the requirements applicable to the notification of accidents and incidents.		B		
3.9.4	Explain the terms: • FULLSAR, SARTIME • INCERFA, ALERFA, DETRESFA.		B		
4.	**Radio Telephony**				
4.1	Recall the phonetic alphabet and the method of transmitting numerals. Recall pertinent (local) procedures and radio phraseology for: (a) circuit flying (b) flights to and from the local training area(s).	A	A	A	A
4.2	State the purpose of the following radio controls: (a) avionics master switch (b) on/off switches (c) frequency selector (d) squelch control (e) transmit button (f) mute switch.	A	A	A	A
4.3	Extract from the ERSA transponder codes for radio failure and an emergency.		A	A	A
4.4	Given an area of operation decide whether it is necessary to use a transponder.			A	A
4.5	Emergencies: (a) recall the procedures to be adopted in the event of loss of radio (b) explain the difference between a distress message and an urgency message (c) given an operational situation where an aircraft is experiencing an emergency, list in the correct order the information that should be transmitted, if time permits, in a distress message.	A	A	A	A
4.6	Know the limitations of VHF and HF in terms of quality of reception and range.			B	B
4.7	List the factors that may affect VHF and HF reception.			B	B
5.	**Aircraft Type Knowledge**				
5.1	Know the limitations and all normal and emergency procedures specified in the flight manual of the helicopter for which a student pilot has been approved to fly as pilot in	A	A	A	A

ITEM		STAGE/LICENCE			
		S	GFP	PPL	CPL
	command.				
5.2	Use the helicopter loading system to distribute load and ensure that the helicopter will not exceed CG limits.		A	A	A
6.	**Helicopter Aerodynamics**				
6.1	Match each of the following terms with an appropriate definition: (a) aerofoil (b) chord (c) span (d) camber.		B	B	B
6.2	Recall the aerodynamic properties of a rotor blade in respect to: (a) aerofoil shape (b) blade twist and (c) blade taper.		B	B	B
6.3	**Bernoulli's Theorem:** Recall the relationship between dynamics pressure, static pressure and total pressure in a streamlined flow of an ideal fluid and state how pressure alters in a venturi.				C
6.4	**General Helicopter Aerodynamics** Match each of the following terms with an appropriate definition: (a) rotor thrust (b) rotor drag (c) total reaction (d) relative airflow (e) rotational airflow (f) induced airflow (g) centrifugal reaction (h) rotor disc (i) coning angle.		B	B	B
6.5	**Hovering flight** Label a diagram showing the vectors acting on a rotor blade in hovering flight.		B	B	B
6.6	Match each of the following items with an appropriate definition: (a) ground effect (b) tail rotor drift (c) rotor shaft tilt effect (d) re-circulation.		B	B	B
6.7	Select from a list the statement which best describes: (a) vortex ring state (settling with power) (b) loss of tail rotor effectiveness (LTE) (c) the conditions leading thereto (d) the appropriate recovery action.		A	A	A
6.8	**Rotor Blade Freedom of Movement** Match each of the following terms with an appropriate		B	B	B

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		S	GFP	PPL	CPL
	statement: (a) feathering (b) flapping (c) flapping to equality (d) dragging (e) advance angle (f) phase lag.				
6.9	**Forward Flight** Match each of the following terms with an appropriate definition: (a) dissymmetry of lift (b) flapback (c) cyclic limits (d) airflow reversal (e) retreating blade stall (f) compressibility (g) inflow roll (h) translational lift.		B	B	B
6.10	Label a diagram showing the vectors acting on various sections of a rotor blade in forward flight.		B	B	B
6.11	**Power Requirements** Match each of the following terms with an appropriate definition: (a) rotor profile drag (b) induced drag (c) parasite drag.		B	B	B
6.12	Recall the power available and power required curves and best speeds for range and endurance, best rate of climb and best angle of climb.		A	A	A
6.13	Select from a list the statement which best describes: (a) over-pitching (b) the conditions leading thereto (c) the appropriate recovery action.		A	A	A
6.14	**Autorotative Flight** Match each of the following terms with an appropriate definition: (a) autorotative force (b) autorotative section.		B	B	B
6.15	Select from a list the statement which best describes the effect on autorotative flight of variations in: (a) all-up-weight (b) density altitude (c) airspeed (d) rotor RPM.		A	A	A

ITEM		STAGE/LICENCE			
		S	GFP	PPL	CPL
6.16	Label a diagram showing the vectors acting on a rotor blade section during forward autorotative flight.		B	B	B
6.17	Label a diagram showing the vectors acting on a rotor blade section during an autorotative flare.		B	B	B
6.18	**Other Conditions** Select from a list the statement which best describes: (a) ground resonance (b) mast bumping (c) dynamic roll-over (d) the condition leading thereto (e) the appropriate recovery action.		A	A	A
7.	**Navigation**				
7.1	**Form of the Earth**				
7.1.1	Understand the following items and their relationship to the position of the earth, time differences and distances and direction: (a) the shape and rotation of the earth (b) latitude, longitude (c) meridians of longitude, parallels of latitude (d) equator, Greenwich meridian (e) great circles, small circles, rhumb lines (f) difference between true and magnetic north (g) terrestrial magnetism, magnetic variation and the change in variation with time (h) distance on the earth - relationship between minute of latitude and a nautical mile.			B	B
7.2	**Time**				
7.2.1	Explain the terms UTC, Local Mean Time, Local (standard) Time, Local summer time.			B	B
7.2.2	Extract (within +/-5 min) the beginning and end of civil twilight from AIP daylight and darkness graphs.			B	B
7.2.3	Carry out conversion between LMT, UTC, Local (standard) times including local summer time.			B	B
7.2.4	List factors which may cause daylight to end earlier than the time extracted from darkness graphs.			B	B
7.2.5	Describe the effect of the earth's rotation and revolution around the sun on the: (a) beginning and end of daylight (b) period of daylight and (c) variation in local mean time with changes in latitude and longitude.				C
7.3	**Charts and Publications**				
7.3.1	From the list below, select the chart(s)/document(s) which contain information about a given item of operational significance: • ERC Low VTC PCA AIP ERSA.				

ITEM	STAGE/LICENCE			
	S	GFP	PPL	CPL
7.3.2 Extract, decode symbols and apply information displayed on a ERC Low and PCA.			B	B
7.3.3 Interpret topographic detail and decode symbols displayed on a WAC and VTC.			B	B
7.3.4 On a WAC, ERC Low, VTC:			B	B
(a) measure rhumb line track				
(b) measure distance using chart and latitude scale and				
(c) plot a position given				
(i) latitude & longitude				
(iii) bearing & distance.				
7.3.5 Apply magnetic variation to obtain magnetic direction.			B	B
7.3.6 Have a basic understanding of the theory of map projections and:				C
(a) identify the following properties of a Lamberts Conformal, Mercator, and Transverse Mercator:				
• appearance of rhumb lines, great circles				
• distortion of shapes & areas				
• scale variation				
(b) describe the methods of representing scale.				
7.4 Computations				
7.4.1 Understand the basic principles of circular slide rule including the scales and graduations and the importance of rough estimates to determine the correct value of the answer eg, whether the answer is 0.7 7 70 or 700:				
(a) carry out conversions between:		B	B	B
(i) feet/metres				
(ii) nm/km				
(iii) lbs/kg				
(iv) US gal/litres/kg of avgas/avtur				
(b) determine head/tail, and x-wind components given W/V and HDG			B	B
(c) GS, distance, fuel used, fuel required, fuel remaining and fuel consumption problems, given appropriate combinations of these factors			B	B
(d) CAS/TAS problems given air temp & pressure height			B	B
(e) HDG, GS and drift given TAS, W/V, TR			B	B
(f) TR given HDG, TAS, W/V			B	B
(g) problems relating to rates/gradients of climb and descent			B	B
(h) TOPC and TOPD position using average airspeed, W/V and rates of climb/descent.			B	B
7.5 Pilot Navigation				
7.5.1 Principles of map reading:			B	B
(a) describe the method of chart orientation				
(b) list situations when a pilot should read:				
(i) from map to ground				
(ii) from ground to map				

	ITEM	STAGE/LICENCE			
		S	GFP	PPL	CPL
	(c) select appropriate position lines to assist in determining: (i) ground speed (ii) track error (iii) a fix (d) select appropriate ground features to establish position when flying: (i) at low level (500 ft AGL) (ii) between (approximately) 2000 and 10,000ft AGL (iii) over mountainous terrain, coastal areas, densely populated and sparsely populated areas.				
7.5.2	With reference to a planned or given track and at least fixes or position lines on a WAC: (a) determine track made good (TMG) (b) calculate drift (c) determine alteration of heading or HDG(M) to: (i) parallel track (ii) intercept track at a nominated point (iii) maintain track once track is intercepted (d) revise/confirm estimates or ETA using latest ground speed or time/distance proportion (e) establish a DR position using latest TR & GS (f) mentally apply the one in sixty rule (g) mentally revise estimates and ETAs and (h) estimate TR and ETI to a selected diversion point.			B	B
7.5.3	Monitor flight progress by maintaining an in-flight navigation log.			B	B
7.5.4	Monitor fuel consumption and revise fuel reserves.			A	A
7.5.5	Plan in-flight diversions: (a) around adverse weather (b) to a suitable aerodrome.			A	A
7.6	**Radio Navigation Aids**				
7.6.1	Describe how to identify an aid and state the frequency of a nominated NDB or VOR.				B
7.6.2	Extract NDB and VOR information from ERSA and ERC Low and state the rated coverage of a VOR up to 10,000 ft.				B
7.6.3	State the effect (in Australia) of the following errors on the reliability of ADF cockpit indications: (a) co-channel interference (b) mountain effect (c) effect of thunderstorms (d) coastal refraction.				B
7.6.4	Explain why information pertaining to broadcasting stations is included in ERSA.				C
7.6.5	Recall the “aggregate” error of a VOR and explain what is meant by “scalloping”.				C

ITEM	STAGE/LICENCE			
	S	GFP	PPL	CPL
7.6.6 Establish a position line given: (a) HDG & ADF data (b) VOR indications.				B
7.6.7 Describe how to use the VOR to determine TR to or from a station.				B
7.6.8 Describe how to use an ADF or VOR to home to a station, and recognise instrument indications that signify station passage. Note: CPL students are expected to apply drift when tracking inbound to an NDB.				B
7.6.9 Establish fixes using a DME distance and: (a) HDG & ADF data or (b) VOR indications and use these fixes to make off track corrections.				B
8. Operations, Performance and Planning				
8.1 Helicopter Limitations Recall the reason for: (a) maximum rotor RPM - power on (b) maximum rotor RPM - power off (c) minimum rotor RPM - power on (d) minimum rotor RPM - power off (e) never exceed speed - power on (f) never exceed speed - power off (g) maximum sideways speed (h) maximum rearward speed (i) maximum take-off weight (j) maximum all up weight (k) minimum operating weight (l) maximum positive and negative flight load factors.		A	A	A
8.2 Flight Manual Select from a list the information, which may be obtained from a flight manual.		B	B	B
8.3 Density Altitude Match each of the following terms with an appropriately worded definition: (a) pressure altitude (b) density altitude (c) ambient conditions (d) forecast conditions		B	B	B
8.4 Calculate density altitude given pressure altitude (or elevation and QNH) and temperature.		B	B	B

ITEM	STAGE/LICENCE			
	S	GFP	PPL	CPL
8.5 Helicopter Landing Sites (HLS) Recall the requirements of Basic and Standard helicopter landing sites (HLS) in respect to: (a) physical specifications (b) operational requirements (c) general conditions for use.		A	A	A
8.6 Take-off and Landing Weight Select from a list the statement which best describes: (a) the effect of the following variables on the take-off and/or landing performance of a helicopter: (i) weight (iv) power (v) ground effect (vi) density altitude and (vii) ambient wind component and (b) the easiest way of determining pressure altitude from a sensitive altimeter.		A	A	A
8.7 Determine hover performance in and out of ground effect given the following: (a) gross weight (b) pressure altitude (c) temperature (d) flight manual performance charts.		A	A	A
8.8 Forward Climb Performance Given graphical or tabular information typical of that provided in a flight manual for a single-engine helicopter extract: (a) the best rate of climb for various conditions of pressure altitude, temperature and weight (b) the service ceiling for various conditions of pressure altitude, temperature and weight.		A	A	A
8.9 Cruise Performance Given graphical or tabular information typical of that provided in a flight manual for a single-engine helicopter, calculate: (a) maximum payload which may be carried after determining the fuel requirements and the nature of the operation (b) endurance for holding or search for various combinations of helicopter weight and fuel (c) the maximum range, given weight, fuel carried and cruising altitude.		B	B	B

ITEM		STAGE/LICENCE			
		S	GFP	PPL	CPL
8.10	**Weight and Balance.**				
	Recall the meaning of the following terms used in the computation of weight and balance data: (a) datum (b) arm (c) moment (d) station (e) centre of gravity range (f) lateral centre of gravity range (g) empty weight (h) operating weight (i) maximum take-off weight (MTOW).		B	B	B
8.11	Given a typical manual for a single-engine helicopter: (a) extract the following weight and balance information: (i) MTOW (ii) capacity and arm of the baggage lockers (iii) capacity, arm, grade and specific gravity of the fuel (iv) location and arms of the seating (b) determine the forward, aft and lateral limits of the C of G for a given weight in the case of the above helicopter (c) determine whether the helicopter is safely loaded for flight given various combinations of weight and balance data using arithmetical methods or the specified loading system for the helicopter (d) calculate the adjustment of load required to achieve a C of G within specified limits if previously determined to be outside limits (e) calculate where to position additional load items so that the C of G is retained within the specific limits.		A	A	A
8.12	**Flight Plan Preparation** Extract/apply the responsibilities of a pilot in command with regard to weather and operational briefing prior to planning a VFR flight.			A	A
8.13	Given a route applicable to: • the level of licence • type of operation viz: OCTA/CTA: (f) select appropriate charts for the flight (g) list the operations for which it is mandatory to obtain a weather briefing (h) list the weather services available, and nominate the sources and methods of obtaining this information (i) state the minimum flight notification required, the method(s) of submitting this notification, and identify flight plan details that must be submitted.			A	A
8.14	Given an aerodrome forecast, decide whether it is necessary to: (a) nominate an alternate aerodrome or (b) carry additional fuel for holding and if so: • nominate an appropriate alternate aerodrome • determine the quantity of additional fuel required for holding or flight to the alternate.			A	A

ITEM		STAGE/LICENCE			
		S	GFP	PPL	CPL
8.15	Given a typical flight scenario including: • departure and landing points within and outside controlled airspace • weather and operational briefing • appropriate performance data: (a) select safe route/cruise levels to comply with VFR (b) select cruise levels: • to comply with VFR and the table of cruising levels • which meets passenger and fuel economy requirements			A	A
	(c) determine: (i) the minimum fuel required (ii) the maximum payload (passengers/cargo and fuel) that may be carried whilst meeting the appropriate requirements (iii) whether intermediate refuelling is necessary (iv) ETD/ETA after considering VFR (Day) requirements and flight/duty time limitations (d) complete a Flight Plan and a loading system.				
8.16	Equi-time point (ETP), Point of no return (PNR), Diversions. (a) cite/recognise situations which may require the calculation of an ETP or PNR (b) assuming a constant cruise altitude and TAS, indicate the position of an ETP between two points (c) given fuel on board, use planned/given ground speed to decide which of the following courses of action would require the least fuel (including reserves): (i) proceed to destination (v) return to the departure aerodrome (vi) proceed to a suitable alternate.				B
8.17	Calculate time and distance to an ETP or PNR between two points, using planned or given data.				B
8.18	**Airworthiness and Equipment**				
	(a) state the purpose of certificates of airworthiness and registration			B	B
	(b) given a typical scenario, extract the communication and normal and emergency equipment required to be on board an aircraft			A	A
	(c) state the responsibilities of a pilot in command with regard to: (d) daily inspections (e) recording/reporting aircraft defects			A	A
	(f) know the types of maintenance that may be carried out by a PPL or CPL holder, as appropriate			B	B
	(g) given a copy of a maintenance release: (i) determine its validity (vii) list the class(es) of operation applicable to the aircraft		A	A	A

ITEM		STAGE/LICENCE			
		S	GFP	PPL	CPL
	(viii) list outstanding defects/endorsements and decide whether these affect the airworthiness of the aircraft.				
9.	**Meteorology**				
9.1	**Local Weather**				
	Demonstrate a basic knowledge of local weather, in particular the likely occurrence of: • thunderstorms • low cloud • poor visibility • turbulence and describe how these phenomena may affect the safe operation of an aircraft.		B	B	B
9.2	Demonstrate an understanding of weather forecasts, reports and broadcasts that are pertinent to the area of operation.		B	B	B
9.3	Recognise signs which may indicate the presence of: (a) turbulence, thermals, dust devils (b) wind gradient, wind shear and describe the effect of these phenomena on flight characteristics. Note: "Signs" means forecast conditions and pilot observations.		B	B	B
9.4	**Composition of the Atmosphere**				
	Know the vertical divisions of the atmosphere viz: (a) troposphere (b) tropopause (c) stratosphere (d) and that most weather effects occur below the stratosphere.			B	B
9.5	In the standard atmosphere, recall: (a) sea level temperature and pressure (b) temperature and pressure lapse rates in the troposphere.			B	B
9.6	**Heat, Temperature, Pressure and Humidity**				
	Know the means of measurement of surface air temperature, and that actual local temperatures may differ eg, higher immediately above a runway.			B	B
9.7	Know the meaning of the terms: (a) isotherm, temperature inversions (b) radiation, advection, convection, conduction (c) isobar, horizontal pressure gradient (d) saturated air, relative humidity, dew point (e) evaporation, condensation, freezing.			B	B
9.8	List the effects of changes in temperature, pressure and humidity on air density.			A	A
9.9	List the factors that influence the diurnal variation of surface air temperature and explain the temperature gradient between land and sea surfaces.				C

ITEM		STAGE/LICENCE			
		S	GFP	PPL	CPL
9.10	**Atmospheric Stability**				
	Differentiate between stable, unstable and conditionally stable and unstable atmospheric conditions.				C Note 1
9.11	Understand the adiabatic processes and the parcel method of assessing stability.				C
9.12	**Clouds and Precipitation**				
	Identify and "classify" cloud "types". Classifications required are: (a) high, medium, low (b) cumuloform, stratoform. Examples of cloud types are Cu, Ci, etc. Note 1: At the PPL level a basic understanding may be necessary to meet the requirements of item 9.27(j)			B	B
9.13	Identify cloud types and know the standard abbreviation for each cloud type, where applicable: (a) cirrus (b) cirrocumulus (c) cirrostratus (d) altocumulus (e) altostratus (f) nimbostratus (g) stratocumulus (h) stratus (i) cumulus (j) cumulonimbus (k) lenticular and rota clouds.			B	B
9.14	Know the method of reporting cloud coverage.			B	B
9.15	Describe the weather associated with each cloud type.			B	B
9.16	Differentiate between drizzle, rain, showers and virga. A general description will be sufficient ie, actual droplet size is NOT required.			B	B
9.17	Select statements which describe the conditions necessary for the formation/dispersal of various types of cloud.				B
9.18	**Visibility**				
	Know the method used in meteorological forecasts and reports to describe visibility.			B	B
9.19	Describe the term "Runway Visual Range".			B	B
9.20	Give reasons for differences between "in-flight" and "reported" visibility.			B	B
9.21	List the meteorological factors that will reduce in-flight visibility.			B	B
9.22	**Winds – General**				
	Describe the relationship between pressure and wind and apply Buys Ballot's law to assess the approximate location of high and low pressure systems.			B	B
9.23	Differentiate between: (a) squalls and gusts (b) backing and veering.			B	B

ITEM		STAGE/LICENCE			
		S	GFP	PPL	CPL
9.24	Compare surface and gradient winds in terms of direction and strength.			B	B
9.25	List the "factors" which affect the diurnal variation of wind and describe typical "variations" in surface wind strength during a 24-hour period.			B	B
9.26	**Air Masses and Fronts** Describe typical "flying weather" associated with: (a) cold fronts (b) warm fronts (c) wave depressions (d) occluded fronts (e) tropical cyclones (f) the equatorial trough. Note: The term 'flying weather' embraces: • temperature (warm/cooler) • wind changes (back/veer, stronger/weaker) • stability and turbulence • cloud type(s) and approximate amount(s), precipitation.			A	A
9.27	**Flight Considerations** With respect to the phenomena listed below: • state the conditions favourable to their development and, where applicable, their dispersal • recognise signs which may indicate their presence • describe their affect on flight condition • where applicable, state the pilot actions required to minimise their affect on an aircraft in flight: (a) thermals, turbulence (b) dust devils and dust storms (c) wind gradient, wind shear and low level jet streams (d) anabatic and katabatic winds (e) mountain waves and fohn winds (f) land and sea breezes (g) inversions and fog (h) thunderstorms and microbursts (i) downdrafts associated with terrain/cloud (j) atmospheric stability and instability (k) hoar frost, rime and clear airframe ice.			B	B
9.28	**Synoptic Meteorology** Given a Mean Sea level analysis chart, identify: (a) high and low pressure systems (b) a trough, a ridge, a col (c) warm, cold and occluded fronts (d) a tropical cyclone.			B	B

ITEM		STAGE/LICENCE			
		S	GFP	PPL	CPL
9.29	Describe typical weather characteristics associated with the items listed in sub-paras 9.28 (a) and (b). Items (c) and (d) are covered in 9.26. The term "weather characteristics" embraces: (a) approximate wind direction (b) moisture content (dry/humid) (c) cloud (stratoform or cumuloform) (d) clear skies (e) turbulent or smooth air (f) good or poor visibility.			B	B
9.30	**Weather Services** For given locations, extract from AIP the availability of aviation forecasts, meteorological reports and weather briefing, and state the method of obtaining this information.			B	B
9.31	State/select the conditions under which it is mandatory to obtain a forecast.			A	A
9.32	With reference to AIP extract, decode and apply information contained in: (a) ARFOR (b) TAF (c) METAR (d) SPECI (e) AIRMET (f) SIGMET. "Decode" means ability to: • decide whether a particular forecast is valid for a flight • interpret any coded information into plain language.			B	B
9.33	Given a typical weather briefing, evaluate weather information applicable to a flight: (a) assessing likely changes in weather during the flight (b) list those phenomena which could adversely affect the flight. "Weather" is defined in sub-para 9.29 and includes "fine weather".			B	B
9.34	List the conditions that require a pilot to submit a short AIREP.			B	B
9.35	State the purpose of VOLMET, AERIS and ATIS broadcasts and indicate how this information is obtained.			B	B
9.36	State what is meant by a TAT or TAST service.			B	B
9.37	**Climatology** Describe typical seasonal weather conditions in different regions of Australia with reference to: (a) visibility (good/poor) (b) prevailing winds (c) typical cloud patterns and precipitation (d) seasonal pressure and frontal systems - including the ITCZ and equatorial trough.			B	B

ITEM	STAGE/LICENCE			
	S	GFP	PPL	CPL
10. Recommended Pre-study				
10.1 A knowledge of mathematics and physics is necessary to meet the aeronautical knowledge objectives in this syllabus. The subjects are not examined independently, but applicants below standard in mathematics and physics are advised to seek tuition until they are able to meet the laid down objectives. Failure to do so may make the aeronautical knowledge objectives difficult to achieve. 10.2 For mathematics the requirement is to solve problems requiring the use of: (a) basic arithmetic: (i) vulgar fractions (ix) decimal fractions (x) percentages (xi) averages (xii) squares (b) ratio and proportion: (i) direct and inverse proportion and (xiii) representative fractions (c) circular slide rule: (i) multiplication and division (xiv) conversion problems between the following units: • nautical miles, statute miles and kilometres • degrees Fahrenheit and degrees Celsius • pounds and kilograms • imperial gallons, US gallons and litres (xv) squares and square roots (d) basic trigonometry: (i) sine, cosine and tangent (xvi) simple problems involving solution of right-angled triangles. 10.3 For physics the requirements are: (a) solve problems relating to time, speed (velocity) and distance (b) define velocity, acceleration, weight, mass, force momentum, work, energy, power, static equilibrium, density, specific gravity and pressure (c) solve graphically the wind triangle (d) solve problems relating to the principle of moments and centre of gravity (e) given the specific gravity and fuel quantity calculate fuel weight.				
11. Human Factors				
11.1 Basic Health		B		A
11.1.1 Know the effect and importance on pilot performance of the following factors: (a) diet, exercise (b) coronary risk factors - smoking, cholesterol, obesity, hereditary factors				

ITEM	STAGE/LICENCE			
	S	GFP	PPL	CPL
(c) upper respiratory tract infection eg, colds, hay fever, congestion of air passages and sinuses	B		A	
(d) food poisoning and other digestive problems				
(e) headaches and migraines				
(f) pregnancy: • when to stop flying • impact on cockpit ergonomics				
(g) injuries				
(h) ageing				
(i) alcohol and smoking	A			
(j) blood donations				
(k) dehydration				
(l) emotional • anxiety, depression, fear				
11.1.2 Know that a pilot is not to fly when on any medication unless a medical clearance from DAME has been obtained.	A			
11.1.3 Know the responsibilities of pilots with regard to being medically fit for flight		B	A	
11.2 Reserved				
11.3 Health and Fitness				
11.3.1 Know the:		C	B	A
(a) reasons for and frequency of physical examinations and that a CASA network of Designated Aviation Medical Examiners (DAMEs) exists				
(b) process of obtaining a medical examination				
(c) role of the CASA with regard to medical fitness and that only those conditions which present a flight safety hazard are disqualifying.				
11.3.2 Alcohol	C	B		A
(a) Explain how alcohol is absorbed and excreted				
(b) state and explain what a 'hangover' is				
(c) explain the effect a 'hangover' may have on flying performance				
(d) explain the relationship between a 'hangover' and level of blood alcohol in a person				
(e) explain the relationship between the level of blood alcohol and the recovery period from a 'hangover'				
(f) state the factors that affect the elimination of alcohol from the body and describe the effects of illicit drugs and alcohol on proficiency eg: • judgement, comprehension, attention to detail • the senses, co-ordination and reaction times.				
11.3.3 Drugs:	C	B		A
Explain that: Drug abuse is a behavioural problem and is independent of: • dependence (addiction) • frequent use.				

ITEM	STAGE/LICENCE			
	S	**GFP**	**PPL**	**CPL**
Define illicit or non-illicit psychoactive substances. Explain the adverse effects of illicit or non-illicit psychoactive substances. Explain the effects and duration of such effects on human performance related to perception, speed of processing information, and reaction time of such drugs as: • cannabis-based substances eg, marijuana, ganja • amphetamine-based substances eg, Ecstasy • opium-based substances eg, codeine, heroin. Have a broad knowledge of the undesirable effects of over-the-counter and prescription drugs. In particular, the side effects of: • aspirin, antihistamines, nasal decongestants • amphetamines, tranquillisers, sedatives, antibiotics.				
11.3.4 Blood Donations: (a) state the effect on flying after giving a blood donation (b) state the recommended period between giving blood and the next flight and know that this period can vary between individuals.	C	B		A
11.4 Hyperventilation 11.4.1 Know how to recognise and combat hyperventilation. 11.4.2 Know what hyperventilation is and its causes.	B			A
11.5 Atmospheric Pressure Changes 11.5.1 Trapped gases: (a) know the effect of changes in pressure on gases trapped in the body cavities (b) describe the effect on normal bodily function (c) state/list measures for prevention/treatment. 11.5.2 Know the effects of flying after a period of underwater diving and state the precautions to be taken if intending to fly after underwater diving.	B			A
11.6 Basic Knowledge of the Anatomy of the Ear (a) Know its function in receiving sound transmissions (b) explain the purpose of the Eustachian tube and effects of atmospheric/cabin pressure changes (c) state the effects of noise exposure on: • hearing loss: long/short term • speech intelligibility • fatigue (d) describe recommended methods of hearing protection.	 B B C	 C C C C C B	 B B B C A 	 A A A
11.7 Vision, Spatial Disorientation, Illusions 11.7.1 Have a knowledge of the anatomy of the eye and its function during the day and at night 11.7.2 Know factors which affect night vision and identify methods of "dark adaptation".		C C	B B	 A

ITEM		STAGE/LICENCE			
		S	GFP	PPL	CPL
11.7.3	Describe the limitations of the eye in discerning objects at night and the "off-centre" method of identifying objects at night.		C	B	A
11.7.4	Know the limitations of the eye with respect to:	B			A
	(a) the ability to discern objects during flight eg, • other aircraft, transmission lines etc.				
	(b) empty field myopia				
	(c) glare				
	(d) colour vision in aviation				
	(e) common visual problems, viz: • myopia, hyperopia, astigmatism, presbyopia.				
	(f) rotor flicker and its effects (helicopters only)				
11.7.5	Be aware of the importance of:		C	C	
	(a) seeking experienced professional advice for spectacles prescriptions				
	(b) selecting suitable sunglasses.				
11.7.6	Know of the factors which are conductive to mid-air collisions and describe/practice techniques for visual "scanning".	B		A	
11.7.7	Understand and define the term "disorientation".	C	B		A
11.7.8	Know the sensory systems involved in maintaining body equilibrium – ie, that:				
	• equilibrium is normally maintained by use of the eyes, inner ear and proprioceptive system ("seat of pants")	C	B	A	
11.7.9	Understand that these mechanisms were developed for use by land based mammals and do not provide reliable information under all conditions of flight.	C		B	A
11.7.10	Describe illusion(s) that may be associated with the factors listed below:		C	B	A
	(a) "leans"				
	(b) linear and angular accelerations:				
	(c) unperceived changes in the pitch roll yaw				
	(d) autokinetic illusions				
	(e) "graveyard spin" illusion.				
	(f) somatogravic illusion				
11.7.11	Know:				
	(a) that sensory illusions usually occur when external visual clues are poor or ambiguous and that they are predictable		C	B	
	(b) the importance of an artificial visual reference system and a pilot's ability to use the system		C	B	A
	(c) the factors that may make a person more susceptible to disorientation	C		B	
	(d) how to overcome sensory illusions.	C	B	A	

ITEM	STAGE/LICENCE			
	S	**GFP**	**PPL**	**CPL**
11.7.12 Know what illusions may result from the following flight factors (a) false horizontal clues eg: • sloping cloud formations and sloping terrain (b) depth perception eg: • flying over water, snow, desert and other featureless terrain • effect of fog: haze dust (c) optical characteristics of windscreens (d) landing illusions: • approach angles: steep shallow • width and slope of runway • slope of (approach) • terrain approaches over water (e) relative motion between objects.	C	B		A
11.8 Motion Sickness 11.8.1 State the basic cause of motion sickness 11.8.2 List factors which may aggravate motion sickness. 11.8.3 List methods of combating motion sickness in flight.	C	B		
11.9 Acceleration "g" Effects Know the effects of positive and negative accelerations on the human body including: (a) on the cardiovascular system (b) vision and (c) consciousness	C	B		
11.10 Toxic Hazards 11.10.1 Know the sources, symptoms, effects and treatment of carbon monoxide poisoning. 11.10.2 Know the effect of breathing air contaminated by fuel and other noxious or toxic aviation products.	B		A	
11.11 The Atmosphere and Associated Problems 11.11.1 State the chemical composition of the atmosphere and recall the variation of temperature and pressure with altitude. 11.11.2 Have a basic concept of the circulatory and respiratory systems in terms of the distribution of oxygen and the excretion of carbon dioxide. 11.11.3 Describe what is meant by the partial pressure of oxygen.	C		B	A

ITEM	STAGE/LICENCE			
	S	GFP	PPL	CPL
11.12 Hypoxia	C	B		A
11.12.1 (a) List the causes of hypoxia and recognise the symptoms of hypoxia particularly: • its effect on night vision • the dangers of behavioural changes eg, lack of self criticism, over-confidence and a false sense of security (b) know that symptoms are difficult to detect in healthy individuals and can develop much faster at higher altitudes - eg, 14, 000 ft. (c) list factors which may increase a person's susceptibility to hypoxia (d) state the approximate time of useful consciousness (Effective Performance Time: EPT) at 20,000, 25,000 and 30,000 feet and list factors which affect EPT (e) list methods of combating various forms of hypoxia.				
11.13 Human Factors Considerations:				
11.13.1 Know the concepts of information processing and decision making including: (a) how sensory information is used to form mental images (b) the influence of the following factors on the decision making process: • personality traits eg, introvert/extrovert • pride, peer pressure, employer pressure • the desire to get the task done • anxiety, over-confidence, boredom, complacency • types of memory - long/short term • memory limitations • aides memoire, rules of thumb • work load/overload • skill, experience, currency.	C			B
11.13.2 Discuss the general concepts behind decision making and the methods of enhancing decision making skills.	C			B
11.13.3 Concepts of Stress (a) Know the interaction between stress and arousal and the effects of short and long term stress on pilot performance and health (b) know the symptoms, causes and effects of environmental stress: • working in an excessively hot, cold, vibrating or noisy environment (c) know the symptoms and effects of domestic and work related stress (d) know the effects of stress on performance and (e) know the principles of stress management – eg: • cognitive/behavioural techniques • relaxation • time management.		C	B	

ITEM		STAGE/LICENCE			
		S	**GFP**	**PPL**	**CPL**
11.13.4	Concepts of Fatigue (a) identify causes of fatigue and describe its effect on pilot performance (b) differentiate between acute and chronic fatigue (c) discuss coping strategies – eg: • sleep management • relaxation • fitness and diet.		C	B	
11.13.5	Basic Ergonomics (a) discuss principles of control design and the design features of conventional and modern displays (b) discuss problems associated with: • poorly designed controls/positioning of controls • interpreting instrument presentations (c) know the following information regarding safety harnesses: • types, how to assess their maintenance • inertia reels, how to assess their maintenance.			C	
11.13.6	Basic Principles of Crew Co-ordination (a) discuss factors which: (i) influence verbal and non-verbal (ii) communication between flight deck (iii) crew viz: • barriers to communication • listening skills • assertion skills (iv) affect the decision making process viz: • communication attitude • personality • judgement • leadership style (b) discuss ideal leadership qualities (c) review aircraft accidents which resulted from poor crew co-ordination.			C	
11.14	**Principles of First Aid and Survival** The student should be aware of the first aid and survival information contained in ERSA and preferably be exposed to practical instruction in the terms of first aid given in this document.		C	B	

ITEM			STAGE/LICENCE		
		S	GFP	PPL	CPL
11.15	Threat and Error Management				
	Basic principles of TEM				
	(a) Explain the principles of TEM and detail a process to identify and manage threats and errors during single pilot operations.		C	A	
	(b) Define 'threats' and give examples of threats.		A		
	(c) Give an example of a committed error and how action could be taken to ensure safe flight.		C	B	A
	(d) Explain how the use of checklists and standard operating procedures can prevent errors.		B	A	
	(e) Give examples of how an undesired aircraft state can develop from an unmanaged threat or error.		B		
	(f) Explain what resources a pilot could identify and use to avoid or manage an undesired aircraft , state such as being lost or entering adverse weather.		C	A	
	(g) Explain the importance of ensuring that tasks are prioritised to manage an undesired aircraft state.		C	A	
	(h) Give examples of how establishing and maintaining interpersonal relationships can promote safe flight			B	

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