AMC1 ARTICLE 8(2) REMOTE PILOT COMPETENCE

INTRODUCTION

The following AMC and GM has been developed to support remote pilot training and progression for increasingly complex UAS operations.

The training has been designed to deliver the relevant RP competencies based on the required task performance, knowledge, skills, and attitudes for future remote pilots.

The training is **not** designed to cover all operational scenarios on all types of UAS as this would create significant complexity.

Operators continue to be responsible for UA specific training and remote pilot harmonisation proportional to the complexity of their individual organisation. Operators should carefully consider what UA or operation specific training is required for remote pilots prior to making an application for an Operational Authorisation.

DEFINITIONS

For the purposes of this AMC, the following definitions shall apply:

- **"Assessment of competence"** means the demonstration of skills, knowledge, and attitudes for the initial issue, revalidation, or renewal of a remote pilot certificate.
- **"Competency"** means a combination of skills, knowledge and attitudes required to perform a task to the prescribed standard.
- **"UA Category"** or **"Category of UA"** means a categorisation of unmanned aircraft according to its basic characteristics. For this AMC that could mean an aeroplane or rotorcraft.
- **"Type" or "UA Type"** means a categorisation of unmanned aircraft according to the specific manufacturer and model.
- **"Credit"** means the recognition of prior experience or qualifications.
- **"Flight instruction"** means imparting of aeronautical knowledge through a combination of ground schooling, simulated, and practical flight instruction.
- **"Live flight hours"** means practical flight undertaken in real world conditions and cannot be simulated.
- **"Simulated flight hours"** means flight undertaken in a CAA approved simulator.
- **"Flight Instructor" (FI)** means an individual who is authorised by an RAE to conduct flight instruction of remote pilots.
- **"Theoretical Knowledge Instructor" (TKI)** means an individual who is authorised by an RAE to conduct theoretical training of remote pilots.
- **"Flight Examiner (FE)** means an individual who is authorised by an RAE to conduct flight tests and evaluations of remote pilots.
- **"Air Risk Class" or (ARC)** is a classification of the risk of the air environment as defined in UK SORA.
- **"Certificate Currency"** means the minimum currency to maintain the privileges of the remote pilot competence certificate for the relevant UA category. Certificate currency shall be live flight hours only.
- **"Operator Currency"** means the minimum currency determined by the operator for the relevant UA type.

REMOTE PILOT FLIGHT LOGGING

Remote pilots must keep accurate flight logs in accordance with mandatory operator's procedures and UAS.SPEC.060. Remote pilot logs that are being presented for the purpose of training course entry requirements, crediting, revalidation, and routine flight operations shall:

(a) be accurate and recorded in accordance with UAS.SPEC.060,
(b) be auditable by an RAE and/or the CAA including:
    (1) being verifiable by means of a corresponding aircraft technical log entry held by the operator,
    (2) supported by all other relevant operational documentation relating to that flight.

It is **not** an operator's responsibility to provide the remote pilot with digital or paper flight records, although this is common practice. Remote pilots should keep their own remote pilot logbook as necessary.

The CAA takes falsification of RP logs extremely seriously. Falsifying RP logs is a serious offence and could result in the suspension or revocation of the RP's certificate of competence and criminal prosecution.

Additional amendments to the relevant regulation, AMC, and GM regarding both Operator and RP flight logs are set out at the end of this document.

REMOTE PILOT COMPETENCE STRUCTURE

To demonstrate RP competence a RP may hold one of the following certificates of competence in each UA category.

General VLOS Certificate (GVC) Multirotor and/or Fixed Wing

Level 1 Remote Pilot Certificate (RPC-L1) Rotorcraft (R) and/or Aeroplane (A)

Level 2 Remote Pilot Certificate (RPC-L2) Rotorcraft (R) and/or Aeroplane (A)

Level 3 Remote Pilot Certificate (RPC-L3) Rotorcraft (R) and/or Aeroplane (A)

Level 4 Remote Pilot Certificate (RPC-L4) Rotorcraft (R) and/or Aeroplane (A)

GENERAL VLOS CERTIFICATE (GVC)

GENERAL

Note – some sections of this text have been included to provide context during the consultation and will be removed when this policy is published.

We have developed a new remote pilot competence framework to support the Future of Flight policy program.

During the initial consultation for the new framework the CAA received strong feedback that the GVC should be retained and/or another entry level VLOS qualification should be introduced. This was fully accepted by the CAA and the new entry level VLOS certificate is set out in the Level 1 RPC below.

We will also continue to recognise the GVC as a valid level of VLOS competency. RAEs will also be able to continue to offer the GVC course for the foreseeable future. Holders of a valid GVC will also benefit from an exemption from the Level 1 RPC theoretical knowledge examination, provided that the RAE is satisfied this is appropriate. Further details can be found below.

The GVC combines elements of operator training, such as creating an operation manual, and elements of remote pilot training. The new RPC framework **focuses primarily on remote pilot competence** as is the case in manned aviation. This represents a fundamental shift in our approach to remote pilot training enabling a pathway for career remote pilots.

For this reason, we have decided not to continue with the 'bolt-on' system previously communicated. Furthermore, no other exemptions from the Level 1 RPC will be permitted regardless of prior experience.

The current GVC theoretical syllabus has been aligned with the requirements of the RPC L1.

COMMON REQUIREMENTS

Below are the common requirements for the issue of a General VLOS Certificate (GVC).

MINIMUM AGE

None

CONDITIONS

Applicants for the issue of a GVC shall have passed the theoretical examination and practical skills test at a CAA approved RAE.

TRAINING COURSE

(a) Applicants for a GVC shall complete a training course at a CAA approved RAE.
(b) The course shall include theoretical knowledge, operator knowledge, and practical skills test appropriate to the privileges of GVC applied for.

ENTRY TO TRAINING

The remote pilot shall have completed the following initial training prior to being accepted for further training:

(a) Open category online training material (AMC1UAS.OPEN.20(4)(b) & UAS.OPEN.040(3) & UAS.OPEN.0302(a)
(b) Open category online assessment, and have obtained a Flyer ID.

GVC FIXED WING & MULTIROTOR

THEORETICAL KNOWLEDGE TOPICS

In the tables of Appendix B, the applicable learning objectives (LOs) for each certificate are marked with an 'X'.

The LOs are intended to be used by an RAE when developing the theoretical knowledge elements of the appropriate course. It should be noted, however, that the LOs do not provide a ready-made ground training syllabus for individual RAEs and should not be seen by organisations as a substitute for thorough course design.

THEORETICAL KNOWLEDGE EXAMINATION

Applicants for the issue of a GVC shall demonstrate a level of knowledge appropriate to the privileges granted in the following subjects:

(a) Air law.
(b) Aircraft general knowledge.
(c) Human performance.
(d) Meteorology.
(e) Operational procedures.

SKILLS TEST GENERAL

(a) The RAE will define the pass/fail criteria for the practical flight test assessment. As a guide, the criteria should consist of a combination of:
  (1) 'Minor' errors – cumulative up to a maximum of 7, at which point the test is failed;
  (2) 'Major' errors – cumulative up to a maximum of 3, at which point the test is failed;
  (3) 'Safety' errors – any single safety error will result in an automatic failure.
(b) Further training may be required following any failed skill test. There is no limit to the number of skill tests that may be attempted.

GVC SKILLS TEST

GVC Skills test	
Section 1 - Pre-flight	
1.1	Mission planning to include; meteorological checks, airspace considerations, and site risk-assessment.
1.2	Aircraft pre-flight inspection and set-up.
Section 2 - In flight procedures	
2.1	Take-off procedures.
2.2	Flight under abnormal conditions.
Section 3 - Post flight actions	
3.1	Shut down and secure/make safe the UAS.
3.2	Post-flight inspection and recording of any relevant data relating to the general condition of the UAS

GVC PRIVILEGES AND CONDITIONS

(a) **Privileges.** The privileges of the holder of a GVC are to act as remote pilot in command or flight crew of a UA where:
  (1) the flight is being undertaken in the Specific category,
  (2) the flight is being conducted VLOS,
  (3) the operational authorisation under which the flight is being conducted states the GVC is the minimum remote pilot competence.
(b) **Conditions.** BVLOS flight is prohibited.

GVC EXPERIENCE REQUIREMENTS AND CREDITING

None

GVC VALIDITY, REVALIDATION, AND RENEWAL

(a) The GVC shall be valid for 5 years.

THE GENERAL VLOS CERTIFICATE

To qualify for the issue of a GVC, a RP must:

(a) Have completed the Open category online training material (AMC1 UAS.OPEN.20(4)(b) & UAS OPEN.040(3) & UAS.OPEN.030(a).
(b) Complete the Open category online assessment, and have obtained a Flyer ID.
(c) Complete the necessary theoretical knowledge training.
(d) Complete the necessary practical training to pass the practical flight test.
(e) Have an operations manual that can be provided for the practical flight test.
(f) Complete the theoretical knowledge examination.
(g) Complete the practical flying test.

The theoretical knowledge examination and the practical flying test shall take place at an RAE. On successful completion of the above elements, the RAE may issue the candidate with a General VLOS Certificate.

LEVEL 1 REMOTE PILOT CERTIFICATE (RPC-L1)

COMMON REQUIREMENTS

Below are the common requirements for the issue of an RPC-L1.

MINIMUM AGE

None

CONDITIONS

Applicants for the issue of an RPC-L1 shall have passed the theoretical examination and practical skills test at a CAA approved RAE.

TRAINING COURSE

(a) Applicants for an RPC-L1 shall complete a training course at a CAA approved RAE.
(b) The course shall include theoretical knowledge and flight instruction appropriate to the privileges of the RPC-L1 applied for.
(c) Theoretical knowledge instruction and flight instruction may be completed at an RAE different from the one where applicants have commenced their training.

ENTRY TO TRAINING

The RP shall have completed the following initial training prior to being accepted for further training:

(a) Open category online training material (AMC1 UAS.OPEN.20(4)(b) & UAS.OPEN.040(3) & UAS.OPEN.030(a)
(b) Open category online assessment, and have obtained a Flyer ID.

RPC-L1(A) AEROPLANE

GROUND INSTRUCTION

Ground instruction considering take-off and landing area selection, aircraft preparation, ground hazard analysis, route planning, avoidance of uninvolved people, and airspace.

FLIGHT INSTRUCTION

The RPC-L1(A) flight instruction syllabus considers the principles of safe UA operations including:

(a) Ability to apply operational procedures (normal, contingency, and emergency procedures, flight planning, pre-flight and post-flight inspections).
(b) Ability to manage aeronautical communication.
(c) Manage the unmanned aircraft flight path and automation.
(d) Leadership, teamwork, and self-management.
(e) Problem solving and decision-making.
(f) Situational awareness.
(g) Workload management.
(h) Coordination or handover, as applicable.

THEORETICAL KNOWLEDGE TOPICS

In the tables of Appendix B, the applicable learning objectives (LOs) for each certificate are marked with an ‘X’.

The LOs are intended to be used by an RAE when developing the theoretical knowledge elements of the appropriate course. It should be noted, however, that the LOs do not provide a ready-made ground training syllabus for individual RAEs and should not be seen by organisations as a substitute for thorough course design.

THEORETICAL KNOWLEDGE EXAMINATION

Applicants for the issue of an RPC-L1(A) shall demonstrate a level of knowledge appropriate to the privileges granted in the following subjects:

(a) Air law.
(b) Aircraft general knowledge.
(c) Human performance.
(d) Meteorology.
(e) Operational procedures.

SKILLS TEST GENERAL

(a) An applicant for a skills test for the RPC-L1(A) shall have received instruction on the same category and type of UAS to be used in the test.
(b) An applicant shall pass all the relevant sections of the skills test. If any item in a section is failed, that section is failed. Failure in more than one section will require the applicant to take the entire test again. An applicant failing only in one section shall only repeat the failed section. Failure in any section of the retest, including those sections that have been passed on a previous attempt, will require the applicant to take the entire test again. All relevant sections of the skills test shall be completed within 6 months. Failure to achieve a pass in all relevant sections of the test in two attempts will require further training.
(c) Further training may be required following any failed skills test. There is no limit to the number of skill tests that may be attempted.

CONDUCT OF THE TEST

(a) Should the applicant choose to terminate a skills test for reasons considered inadequate by the Flight Examiner (FE), the applicant shall retake the entire skill test. If the test is terminated for reasons considered adequate by the FE, only those sections not completed shall be tested in a further flight.

(b) At the discretion of the FE, any manoeuvre or procedure of the test may be repeated once by the applicant. The FE may stop the test at any stage if it is considered that the applicant's demonstration of flying skills requires a complete re-test.

(c) An applicant shall indicate to the FE the checks and duties carried out. Checks shall be completed in accordance with the checklist for the UA on which the test is being taken. During pre-flight preparation for the test, the applicant will configure the command unit (CU).

(d) The FE shall take no part in the operation of the UA except where intervention is necessary in the interest of safety.

CONTENT OF THE SKILL TEST FOR THE ISSUE OF AN RPC-L1(A)

(a) The UAS used for the skills test shall meet the requirements for training UAS as set out in the relevant CAA publication.

(b) The skills test shall comprise of a general handling examination in a range of flight modes including non-positioning mode lasting a minimum of 30 minutes.

(c) Use of checklists, situational awareness, control of the UA either manually or by use of the CU, and principles of risk management apply to all sections.

RPC-L1(A) SKILLS TEST

RPC-L1(A) Skills test	
Section 1 – Pre-Flight	
1.1	Conducts a pre-flight including flight planning, documentation, mass and balance consideration, flight briefing, NOTAMS
1.2	UA inspection and technical logbook
1.3	Take-off
1.4	Performance considerations
Section 2 - General Handling	
2.1	Control of the aeroplane by use of the transmitter/CU in both positioning and non-positioning flight modes including: 1) level flight, control of heading, altitude, and airspeed 2) climbing and descending turns 3) recoveries from unusual attitudes
Section 3 - Approach and Landing	
3.1	Approach procedures
3.2	Go-around landing area blocked
3.3	Normal Landing
3.4	Post flight actions
Section 4 - Abnormal and Emergency Procedures	
4.1	Simulated engine/motor failure
4.2	Equipment malfunctions
4.3	Forced landing
4.4	Oral questions

RPC-L1(A) PRIVILEGES AND CONDITIONS

(a) **Privileges.** The privileges of the holder of an RPC-L1(A) are to act as remote pilot in command or flight crew of a UA where:

(1) The flight is being undertaken in the Specific category.

(2) The primary means of lift of the UA is fixed wing(s).

(3) The flight is being conducted VLOS.

(4) The operational authorisation under which the flight is being conducted states the RPC-L1(A) is the minimum remote pilot competence.

(b) **Conditions.**

(1) The remote pilot maintains a minimum certificate currency of 2 hours of live flight within the last 90 days.

(2) The remote pilot holds a valid flyer ID.

(3) BVLOS flight is prohibited.

RPC-L1(A) EXPERIENCE REQUIREMENTS AND CREDITING

(a) Applicants for the RPC-L1(A) shall have completed at least 2 hours of flight instruction at a CAA approved RAE.

(b) Applicants for the RPC-L1(A) that hold a valid GVC shall be exempt from the theoretical assessment.

RPC-L1(A) VALIDITY, REVALIDATION, AND RENEWAL

(a) **Validity.** An RPC-L1(A) shall be valid for 5 years.

(b) **Revalidation.** An RPC-L1(A) shall be revalidated within 3 months immediately preceding its expiry date by completing a revalidation proficiency check at an RAE.

(c) The revalidation proficiency requirement should be determined by the RAE on a case-by-case basis.

(d) A remote pilot maybe exempted from a live revalidation check where all the following are true:

(1) The remote pilot has maintained at least minimum certificate currency for the complete duration of the certificate validation period.

(2) The remote pilot can demonstrate certificate currency has been maintained through a personal flight log.

(e) A remote pilot may be exempted from a live revalidation check where certificate currency has not been maintained in accordance with (d).

(f) When deciding if a remote pilot can be exempted, an RAE should consider:

(1) The experience of the applicant.

(2) The amount of time elapsed since the privileges of the RPC were last used.

(g) If deemed necessary by the RAE a revalidation proficiency check consisting of at least 1 hour of supervised flying covering general handling and emergency procedures will be required.

(h) If applicants choose to fulfil the revalidation requirements earlier than prescribed in point (b), the new validity period shall commence from the date of the proficiency check.

(i) Applicants who fail to pass the proficiency check before the expiry date of the RPC-L1(A) shall exercise the RPC-L1(A) privileges only if they have passed the RPC-L1(A) proficiency check.

(j) **Renewal**. If an RPC-L1(A) has expired, to renew their privileges, applicants shall comply with all the following:

(1) Complete a refresher training at an RAE, if deemed necessary by the RAE to reach the level of proficiency needed to pass an RPC-L1(A) proficiency check. The amount of refresher training needed should be determined by the RAE on a case-by-case basis, considering the following factors:
    (i) The experience of the applicant.
    (ii) The amount of time elapsed since the privileges of the RPC were last used.
    (iii) The complexity of the applicants experience.
(2) Pass an RPC-L1(A) proficiency check at an RAE.

RPC-L1(R) ROTORCRAFT

GROUND INSTRUCTION

Ground instruction considering take-off and landing area selection, UA preparation, ground hazard analysis, route planning, avoidance of uninvolved people, and airspace.

FLIGHT INSTRUCTION

The RPC-L1(A) flight instruction syllabus considers the principles safe UA operations including:

(a) Ability to apply operational procedures (normal, contingency, and emergency procedures, flight planning, pre-flight and post-flight inspections).
(b) Ability to manage aeronautical communication.
(c) Manage the unmanned aircraft flight path and automation.
(d) Leadership, teamwork, and self-management.
(e) Problem solving and decision-making.
(f) Situational awareness.
(g) Workload management.
(h) Coordination or handover, as applicable.

THEORETICAL KNOWLEDGE TOPICS

In the tables of Appendix B, the applicable learning objectives (LOs) for each certificate are marked with an ‘X’.

The LOs are intended to be used by an RAE when developing the theoretical knowledge elements of the appropriate course. It should be noted, however, that the LOs do not provide a ready-made ground training syllabus for individual RAEs and should not be seen by organisations as a substitute for thorough course design.

THEORETICAL KNOWLEDGE EXAMINATION

Applicants for the issue of an RPC-L1(R) shall demonstrate a level of knowledge appropriate to the privileges granted in the following subjects:

(a) Air law.
(b) Aircraft general knowledge.
(c) Human performance.
(d) Meteorology.
(e) Operational procedures.

SKILLS TEST GENERAL

(a) An applicant for a skill test for the RPC-L1(R) shall have received instruction on the same category and type of UAS to be used in the test.

(b) An applicant shall pass all the relevant sections of the skills test. If any item in a section is failed, that section is failed. Failure in more than one section will require the applicant to take the entire test again. An applicant failing only in one section shall only repeat the failed section. Failure in any section of the retest, including those sections that have been passed on a previous attempt, will require the applicant to take the entire test again. All relevant sections of the skills test shall be completed within 6 months. Failure to achieve a pass in all relevant sections of the test in two attempts will require further training.

(c) Further training may be required following any failed skills test. There is no limit to the number of skill tests that may be attempted.

CONDUCT OF THE TEST

(a) Should the applicant choose to terminate a skills test for reasons considered inadequate by the Flight Examiner (FE), the applicant shall retake the entire skills test. If the test is terminated for reasons considered adequate by the FE, only those sections not completed shall be tested in a further flight.

(b) At the discretion of the FE, any manoeuvre or procedure of the test may be repeated once by the applicant. The FE may stop the test at any stage if it is considered that the applicant's demonstration of flying skills requires a complete re-test.

(c) An applicant shall indicate to the FE the checks and duties carried out. Checks shall be completed in accordance with the checklist for the UA on which the test is being taken. During pre-flight preparation for the test, the applicant will configure the (CU).

(d) The FE shall take no part in the operation of the UA except where intervention is necessary in the interest of safety.

CONTENT OF THE SKILL TEST FOR THE ISSUE OF AN RPC-L1(R)

(a) The UAS used for the skills test shall meet the requirements for training UAS as set out in the relevant CAA publication.

(b) The skills test shall comprise of a general handling examination in a range of flight modes including non-positioning mode lasting a minimum of 30 minutes.

(c) Use of checklists, situational awareness, control of the UA either manually or by use of the CU, and principles of risk management apply to all sections.

RPC-L1(R) SKILLS TEST

RPC-L1(R) Skills test	
Section 1 – Pre-Flight	
1.1	Conducts a pre-flight, including flight planning, documentation, mass and balance consideration, flight briefing, NOTAMS
1.2	Rotorcraft inspection and technical logbook
1.3	Take-off
1.4	Performance considerations
Section 2 - General Handling	
2.1	Control of the rotorcraft by use of the transmitter/CU on both positioning and non-positioning flight modes including: 1) level flight, control of heading, altitude, and airspeed

	2) climbing and descending 3) recoveries from unusual attitudes
2.5	Hover manoeuvres
2.6	Autorotation (if equipped)
Section 3 - Approach and Landing	
3.1	Approach procedures
3.2	Go-around TOLA blocked
3.3	Normal Landing
3.4	Post flight actions
Section 4 - Abnormal and Emergency Procedures	
4.1	Simulated engine/motor failure
4.2	Equipment malfunctions
4.3	Forced landing
4.4	Oral questions

RPC-L1(R) PRIVILEGES AND CONDITIONS

(a) **Privileges**. The privileges of the holder of an RPC-L1(R) are to act as remote pilot in command or flight crew of a UA where:

(1) The flight is being undertaken in the Specific Category.

(2) The primary means of lift of the UA is rotating wing(s).

(3) The flight is being conducted VLOS

(4) The operational authorisation under which the flight is being conducted states the RPC-L1(R) is the minimum remote pilot competence.

(b) **Conditions.**

(1) The remote pilot maintains a minimum certificate currency of 2 hours of live flight within the last 90 days.

(2) The remote pilot holds a valid flyer ID.

(3) BVLOS flight is prohibited.

RPC-L1(R) EXPERIENCE REQUIREMENTS AND CREDITING

(a) Applicants for the RPC-L1(R) shall have completed a minimum of 2 hours of instruction at a CAA approved RAE.

(b) Applicants for the RPC-L1(R) that hold a valid GVC shall be exempt from the theoretical assessment.

RPC-L1(R) VALIDITY, REVALIDATION, AND RENEWAL

(a) **Validity.** An RPC-L1(R) shall be valid for 5 years.

(b) **Revalidation.** An RPC-L1(R) shall be revalidated within 3 months immediately preceding its expiry date by completing a revalidation proficiency check at an RAE.

(c) The revalidation proficiency requirement should be determined by the RAE on a case-by-case basis.

(d) A remote pilot maybe exempted from a live revalidation check where all the following are true:

(1) The remote pilot has maintained at least minimum certificate currency for the complete duration of the certificate validation period.

(2) The remote pilot can demonstrate certificate currency has been maintained through a personal flight log.

(e) A remote pilot may be exempted from a live revalidation check where certificate currency has not been maintained in accordance with (d).

(f) When deciding if a remote pilot can be exempted, an RAE should consider:

(1) The experience of the applicant.

(2) The amount of time elapsed since the privileges of the RPC were last used.

(g) If deemed necessary by the RAE a revalidation proficiency check consisting of at least 1 hour of supervised flying covering general handling and emergency procedures will be required.

(h) If applicants choose to fulfil the revalidation requirements earlier than prescribed in point (b), the new validity period shall commence from the date of the proficiency check.

(i) Applicants who fail to pass the proficiency check before the expiry date of the RPC-L1(R) shall exercise the RPC-L1(R) privileges only if they have passed the RPC-L1(R) proficiency check.

(j) **Renewal**. If an RPC-L1(R) has expired, to renew their privileges, applicants shall comply with all the following:

(1) Complete a refresher training at an RAE, if deemed necessary by the RAE to reach the level of proficiency needed to pass an RPC-L1(R) proficiency check. The amount of refresher training needed should be determined by the RAE on a case-by-case basis, considering the following factors:

(i) The experience of the applicant.

(ii) The amount of time elapsed since the privileges of the RPC were last used.

(iii) The complexity of the applicant’s experience.

(2) Pass an RPC-L1(R) proficiency check at an RAE.

LEVEL 2 REMOTE PILOT CERTIFICATE (RPC-L2)

COMMON REQUIREMENTS

Below are the common requirements for the issue of an RPC-L2.

MINIMUM AGE

None.

CONDITIONS

Applicants for the issue of an RPC-L2 shall have fulfilled the requirements of the relevant training course at a CAA approved RAE.

TRAINING COURSE

(a) Applicants for an RPC-L2 shall complete a training course at a CAA approved RAE.

(b) The course shall include theoretical knowledge and flight instruction appropriate to the privileges of the RPC-L2 applied for.

(c) Theoretical knowledge instruction and flight instruction may be completed at an RAE different from the one where applicants have commenced their training.

ENTRY TO TRAINING

Applicants for the RPC-L2 shall have completed the following initial training prior to being accepted for further training:

(a) Hold a valid RPC-L1 certificate for the same UA category.

(b) Have at least 50 logged flight hours on a UA of the same category conducted in the Specific category.

RPC-L2(A) AEROPLANE

GROUND INSTRUCTION

Ground instruction considering take-off and landing area selection, aircraft preparation, ground hazard analysis, route planning, avoidance of uninvolved people, and airspace.

FLIGHT INSTRUCTION

The RPC-L2(A) flight instruction syllabus considers the principle of safe UA operations including:

(a) Ability to apply operational procedures (normal, contingency, and emergency procedures, flight planning, pre-flight and post-flight inspections).
(b) Ability to manage aeronautical communication.
(c) Manage the unmanned aircraft flight path and automation.
(d) Leadership, teamwork, and self-management.
(e) Problem solving and decision-making.
(f) Situational awareness.
(g) Workload management.
(h) Coordination or handover, as applicable.

SYLLABUS OF FLIGHT INSTRUCTION

Details of the flight instruction syllabus can be found in Appendix A

THEORETICAL KNOWLEDGE TOPICS

In the tables of Appendix B, the applicable learning objectives (LOs) for each certificate are marked with an ‘X’.

The LOs are intended to be used by an RAE when developing the theoretical knowledge elements of the appropriate course. It should be noted, however, that the LOs do not provide a ready-made ground training syllabus for individual RAEs and should not be seen by organisations as a substitute for thorough course design.

THEORETICAL KNOWLEDGE EXAMINATION

Applicants for the issue of an RPC-L2(A) shall demonstrate a level of knowledge appropriate to the privileges granted in the following subjects:

(a) BVLOS operational procedures.

SKILLS TEST GENERAL

(a) An applicant for a skill test for the RPC-L2(A) shall have received instruction on the same category and type of UAS to be used in the test.
(b) An applicant shall pass all the relevant sections of the skills test. If any item in a section is failed, that section is failed. Failure in more than one section will require the applicant to take the entire test again. An applicant failing only in one section shall only repeat the failed section. Failure in any section of the retest, including those sections that have been passed on a previous attempt, will require the applicant to take the entire test again. All relevant sections of the skills test shall be completed within 6 months. Failure to achieve a pass in all relevant sections of the test in two attempts will require further training.

(c) Further training may be required following any failed skills test. There is no limit to the number of skills tests that may be attempted.

CONDUCT OF THE TEST

(a) Should the applicant choose to terminate a skills test for reasons considered inadequate by the Flight Examiner (FE), the applicant shall retake the entire skills test. If the test is terminated for reasons considered adequate by the FE, only those sections not completed shall be tested in a further flight.

(b) At the discretion of the FE, any manoeuvre or procedure of the test may be repeated once by the applicant. The FE may stop the test at any stage if it is considered that the applicant's demonstration of flying skills requires a complete re-test.

(c) An applicant shall indicate to the FE the checks and duties carried out. Checks shall be completed in accordance with the checklist for the UA on which the test is being taken. During pre-flight preparation for the test, the applicant will configure the (CU).

(d) The FE shall take no part in the operation of the UA except where intervention is necessary in the interest of safety.

CONTENT OF THE SKILLS TEST FOR THE ISSUE OF AN RPC-L2(A)

(a) The UAS used for the skills test shall meet the requirements for training UAS as set out in the relevant CAA publication.

(b) The skills test shall comprise of at least two BVLOS flights conducted under ARC-a conditions lasting at least 30mins flight time in total.

(c) Use of checklists, situational awareness, control of the UA either manually or by use of the CU, and principles of risk management apply to all sections.

RPC-L2(A) Skills Test	
Section 1 - Pre Flight Operations	
1.1	Conducts a pre-flight, including flight planning, documentation, mass and balance consideration, flight brief, NOTAMS
1.2	CU configuration
1.3	UA inspection and technical logbook
1.4	Take-off
1.5	Performance considerations
Section 2 - Infight procedures	
2.1	Control of the UA by the CU, flight path management, and range/endurance considerations
2.2	Monitoring of flight progress, fuel/energy usage, airspace, and ground risks
2.3	Altitude, speed, heading control
2.4	Monitoring navigation and communication system performance
2.5	CU management
Section 3 - Approach and Landing	
3.1	Approach procedures
3.3	Go-around TOLA blocked
3.4	Normal Landing
3.5	Post flight actions
Section 4 - Abnormal and Contingency Procedures	
4.1	Engine/motor failure
4.2	Equipment malfunctions

4.3	Tactical deconfliction procedures
4.4	Forced landing
4.5	Oral questions

RPC-L2(A) PRIVILEGES AND CONDITIONS

(a) **Privileges.** The privileges of the holder of an RPC-L2(A) are to act as remote pilot in command or flight crew of a UA where:
  (1) The flight is being undertaken in the Specific category.
  (2) The primary means of lift of the UA is fixed wing(s).
  (3) The maximum air risk class (ARC) of the flight is ARC-a.
  (4) The operational authorisation under which the flight is being conducted states the RPC-L2(A) is the minimum remote pilot competence.

(b) **Conditions**.
  (1) The remote pilot maintains a minimum certificate currency of 2 hours of live flight within the last 90 days.
  (2) The remote pilot holds a valid flyer ID.
  (3) No intentional traffic deconfliction permitted.

RPC-L2(A) EXPERIENCE REQUIREMENTS AND CREDITING

(a) Applicants for the RPC-L2(A) shall have completed at least 5 hours of flight instruction of which up to 2 hours may be completed using a CAA approved flight simulator device to facilitate emergency procedures training.

(b) Applicants for the RPC-L2(A) that hold a valid RPC-L2 in another category may be credited towards the requirements in (a)

(c) The amount of credit shall be decided by the RAE where the pilot undergoes the training course, but shall in any case not exceed 50% (2.5 hours) of the hours required in (a)

RPC-L2(A) VALIDITY, REVALIDATION AND RENEWAL

(a) **Validity.** An RPC-L2(A) shall be valid for 3 years.

(b) **Revalidation.** An RPC-L2(A) shall be revalidated within 3 months immediately preceding its expiry date by completing a revalidation proficiency check at an RAE.

(c) The revalidation proficiency requirement should be determined by the RAE on a case-by-case basis.

(d) A remote pilot maybe exempted from a live revalidation check where all the following are true:
  (1) The remote pilot has maintained at least minimum certificate currency for the complete duration of the certificate validation period.
  (2) The remote pilot can demonstrate certificate currency has been maintained through a personal flight log.

(e) A remote pilot may be exempted from a live revalidation check where certificate currency has not been maintained in accordance with (d).

(f) When deciding if a remote pilot can be exempted, an RAE should consider:
  (1) The experience of the applicant.
  (2) The amount of time elapsed since the privileges of the RPC were last used.

(g) If deemed necessary by the RAE a revalidation proficiency check consisting of at least 1 hour of supervised flying covering general handling and emergency procedures will be required.

(h) If applicants choose to fulfil the revalidation requirements earlier than prescribed in point (b), the new validity period shall commence from the date of the proficiency check.

(i) Applicants who fail to pass the proficiency check before the expiry date of the RPC-L2(A) shall exercise the RPC-L2(A) privileges only if they have passed the RPC-L2(A) proficiency check.

(j) **Renewal**. if an RPC-L2(A) has expired, to renew their privileges, applicants shall comply with all the following:

(1) Complete a refresher training at an RAE, if deemed necessary by the RAE to reach the level of proficiency needed to pass an RPC-L2(A) proficiency check. The amount of refresher training needed should be determined by the RAE on a case-by-case basis, considering the following factors:

(i) The experience of the applicant.

(ii) The amount of time elapsed since the privileges of the RPC were last used.

(iii) The complexity of the applicant's experience.

(2) Pass an RPC-L2(A) proficiency check at an RAE.

RPC-L2(R) ROTORCRAFT

GROUND INSTRUCTION

Ground instruction considering take-off and landing area selection, aircraft preparation, ground hazard analysis, route planning, avoidance of uninvolved people, and airspace.

FLIGHT INSTRUCTION

The RPC-L2(R) flight instruction syllabus considers the principle of safe UA operations including:

(a) Ability to apply operational procedures (normal, contingency, and emergency procedures, flight planning, pre-flight and post-flight inspections):
(b) Ability to manage aeronautical communication,
(c) Manage the unmanned aircraft flight path and automation,
(d) Leadership, teamwork, and self-management,
(e) Problem solving and decision-making,
(f) Situational awareness,
(g) Workload management,
(h) Coordination or handover, as applicable.

SYLLABUS OF FLIGHT INSTRUCTION

Details of the flight instruction syllabus can be found in Appendix A.

THEORETICAL KNOWLEDGE TOPICS

In the tables of Appendix B, the applicable learning objectives (LOs) for each certificate are marked with an 'X'.

The LOs are intended to be used by an RAE when developing the theoretical knowledge elements of the appropriate course. It should be noted, however, that the LOs do not provide a ready-made ground training syllabus for individual RAEs and should not be seen by organisations as a substitute for thorough course design.

THEORETICAL KNOWLEDGE EXAMINATION

Applicants for the issue of an RPC-L2(R) shall demonstrate a level of knowledge appropriate to the privileges granted in the following subjects:

(a) BVLOS operational procedures

SKILLS TEST GENERAL

(a) An applicant for a skills test for the RPC-L2(R) shall have received instruction on the same category and type of UAS to be used in the test.

(b) An applicant shall pass all the relevant sections of the skills test. If any item in a section is failed, that section is failed. Failure in more than one section will require the applicant to take the entire test again. An applicant failing only in one section shall only repeat the failed section. Failure in any section of the retest, including those sections that have been passed on a previous attempt, will require the applicant to take the entire test again. All relevant sections of the skills test shall be completed within 6 months. Failure to achieve a pass in all relevant sections of the test in two attempts will require further training.

(c) Further training may be required following any failed skills test. There is no limit to the number of skills tests that may be attempted.

CONDUCT OF THE TEST

(a) Should the applicant choose to terminate a skills test for reasons considered inadequate by the Flight Examiner (FE), the applicant shall retake the entire skills test. If the test is terminated for reasons considered adequate by the FE, only those sections not completed shall be tested in a further flight.

(b) At the discretion of the FE, any manoeuvre or procedure of the test may be repeated once by the applicant. The FE may stop the test at any stage if it is considered that the applicant's demonstration of flying skills requires a complete re-test.

(c) An applicant shall indicate to the FE the checks and duties carried out. Checks shall be completed in accordance with the checklist for the UA on which the test is being taken. During pre-flight preparation for the test, the applicant will configure the (CU).

(d) The FE shall take no part in the operation of the UA except where intervention is necessary in the interest of safety.

CONTENT OF THE SKILLS TEST FOR THE ISSUE OF AN RPC-L2(R)

(a) The UAS used for the skills test shall meet the requirements for training UAS as set out in the relevant CAA publication.

(b) The skills test shall comprise of at least two BVLOS flights conducted under ARC-a conditions lasting at least 30mins flight time in total.

(c) Use of checklists, situational awareness, control of the UA either manually or by use of the CU, and principles of risk management apply to all sections.

RPC-L2(R) Skills Test	
Section 1 – Pre-Flight Operations	
1.1	Conducts a pre-flight, including flight planning, documentation, mass and balance consideration, flight brief, NOTAMS

1.2	CU Configuration
1.3	UA inspection and technical logbook
1.4	Take-off
1.5	Performance considerations
Section 2 - Infight procedures	
2.1	Control of the UA by the CU, flight path management, and range/endurance considerations
2.2	Monitoring of flight progress, fuel/energy usage, airspace, and ground risks
2.3	Altitude, speed, heading control
2.4	Monitoring navigation and communication system performance
2.5	CU management
Section 3 - Approach and Landing	
3.1	Approach procedures
3.3	Go-around TOLA blocked
3.4	Normal Landing
3.5	Post flight actions
Section 4 - Abnormal and Contingency Procedures	
4.1	Engine/motor failure
4.2	Equipment malfunctions
4.3	Tactical deconfliction procedures
4.4	Forced landing
4.5	Oral questions

RPC-L2(R) PRIVILEGES AND CONDITIONS

(a) **Privileges.** The privileges of the holders of an RPC-L2(R) are to act as remote pilot in command or flight crew of a UA where:
- (1) the flight is being undertaken in the Specific Category
- (2) the primary means of lift of the UA is rotating wing(s)
- (3) the maximum air risk class (ARC) of the flight is ARC-a
- (4) the operational authorisation under which the flight is being conducted states the RPC-L2(R) is the minimum remote pilot competence.

(b) **Conditions.**
- (1) The remote pilot maintains a minimum certificate currency of 2 hours of live flight within the last 90 days.
- (2) The remote pilot holds a valid flyer ID.
- (3) No intentional traffic deconfliction.

RPC-L2(R) EXPERIENCE REQUIREMENTS AND CREDITING

(a) Applicants for the RPC-L2(R) shall have completed at least 5 hours of flight instruction of which up to 2 hours may be completed using a CAA approved flight simulator device to facilitate emergency procedures training.

(b) Applicants for the RPC-L2(R) that hold valid RPC-L2 in another category may be credited towards the requirements in (a)

(c) The amount of credit shall be decided by the RAE where the pilot undergoes the training course, but shall in any case not exceed 50% (2.5 hours) of the hours required in (a)

RPC-L2(R) VALIDITY, REVALIDATION AND RENEWAL

(a) **Validity.** An RPC-L2(R) shall be valid for 3 years.

(b) **Revalidation.** An RPC-L2(R) shall be revalidated within 3 months immediately preceding its expiry date by completing a revalidation proficiency check at an RAE.

(c) The revalidation proficiency requirement should be determined by the RAE on a case-by-case basis.

(d) A remote pilot maybe exempted from a live revalidation check where all the following are true:

(1) The remote pilot has maintained at least minimum certificate currency for the complete duration of the certificate validation period.

(2) The remote pilot can demonstrate certificate currency has been maintained through a personal flight log.

(e) A remote pilot may be exempted from a live revalidation check where certificate currency has not been maintained in accordance with (d).

(f) When deciding if a remote pilot can be exempted, an RAE should consider:

(1) The experience of the applicant.

(2) The amount of time elapsed since the privileges of the RPC were last used.

(g) If deemed necessary by the RAE a revalidation proficiency check consisting of a at least 1 hour of supervised flying covering general handling and emergency procedures will be required.

(h) If applicants choose to fulfil the revalidation requirements earlier than prescribed in point (b), the new validity period shall commence from the date of the proficiency check.

(i) Applicants who fail to pass the proficiency check before the expiry date of the RPC-L2(R) shall exercise the RPC-L2(R) privileges only if they have passed the RPC-L2(R) proficiency check.

(j) **Renewal**. If an RPC-L2(R) has expired, to renew their privileges, applicants shall comply with all the following:

(1) Complete a refresher training at an RAE, if deemed necessary by the RAE to reach the level of proficiency needed to pass an RPC-L2(R) proficiency check. The amount of refresher training needed should be determined by the RAE on a case-by-case basis, considering the following factors:

(i) The experience of the applicant.

(ii) The amount of time elapsed since the privileges of the RPC were last used.

(iii) The complexity of the applicant’s experience.

(2) Pass an RPC-L2(R) proficiency check at an RAE.

LEVEL 3 REMOTE PILOT CERTIFICATE (RPC-L3)

GENERAL

COMMON REQUIREMENTS

Below are the common requirements for the issue of an RPC-L3.

MINIMUM AGE

The minimum age for applicants for the RPC-L3 is 18.

CONDITIONS

Applicants for the issue of an RPC-L3 shall have fulfilled the requirements of the relevant training course at a CAA approved RAE.

TRAINING COURSE

Applicants for an RPC-L3 shall complete a training course at a CAA approved RAE.

The course shall include a theoretical knowledge assessment and flight instruction appropriate to the privileges of the RPC-L3.

ENTRY TO TRAINING

Applicants for the RPC-L3 shall have completed the following initial training prior to being accepted for further training:

(a) Hold a valid RPC-L2 certificate.

(b) Have logged at least 50 hours of BVLOS flight as RP in command in the Specific category on the application UA category.

(c) Hold at least a valid LAPL medical certificate.

REQUIRED LANGUAGE PROFICIENCY

Reserved for future policy.

RPC-L3(A) AEROPLANE

GROUND INSTRUCTION

Ground instruction considering take-off and landing area selection, aircraft preparation, ground hazard analysis, route planning, avoidance of uninvolved people, and airspace.

FLIGHT INSTRUCTION

The RPC-L3(A) flight instruction syllabus considers the principles of safe UA operations including:

(a) Ability to apply operational procedures (normal, contingency, and emergency procedures, flight planning, pre-flight and post-flight inspections).
(b) Ability to manage aeronautical communication.
(c) Manage the unmanned aircraft flight path and automation.
(d) Leadership, teamwork, and self-management.
(e) Problem solving and decision-making.
(f) Situational awareness.
(g) Workload management.
(h) Coordination or handover, as applicable.

SYLLABUS OF FLIGHT INSTRUCTION

Details of the flight instruction syllabus can be found in Appendix A. The syllabus details are intended to be used by an RAE when developing the RPC-L3 flight training elements of the appropriate course. It should be noted, however, that they do not provide a ready-made flight training syllabus for individual RAEs and should not be seen by organisations as a substitute for thorough course design.

The RPC-L3(A) flight instruction syllabus should consider the principles of threat and error management and be competency-based training throughout.

THEORETICAL KNOWLEDGE TOPICS

In the tables of Appendix B, the applicable learning objectives (LOs) for each certificate are marked with an ‘X’. The LOs define the subject knowledge and applied knowledge, skills,

and attitudes that a student remote pilot should have assimilated during the theoretical knowledge course.

The LOs are intended to be used by an RAE when developing the RPC-L3 theoretical knowledge elements of the appropriate course. It should be noted, however, that the LOs do not provide a ready-made ground training syllabus for individual RAEs and should not be seen by organisations as a substitute for thorough course design.

THEORETICAL KNOWLEDGE EXAMINATION

Applicants for the issue of an RPC-L3(A) shall demonstrate a level of knowledge appropriate to the privileges granted in the following subjects:

(a) Air law,
(b) Aircraft general knowledge
(c) Human performance and limitations
(d) Meteorology
(e) Operational procedures

SKILLS TEST GENERAL

(a) An applicant for a skills test for the RPC-L3(A) shall have received instruction on the same category and type of UAS to be used in the test.
(b) An applicant shall pass all the relevant sections of the skills test. If any item in a section is failed, that section is failed. Failure in more than one section will require the applicant to take the entire test again. An applicant failing only in one section shall only repeat the failed section. Failure in any section of the retest, including those sections that have been passed on a previous attempt, will require the applicant to take the entire test again. All relevant sections of the skill test shall be completed within 6 months. Failure to achieve a pass in all relevant sections of the test in two attempts will require further training.
(c) Further training may be required following any failed skills test. There is no limit to the number of skills tests that may be attempted.

CONDUCT OF THE TEST

(a) Should the applicant choose to terminate a skill test for reasons considered inadequate by the Flight Examiner (FE), the applicant shall retake the entire skill test. If the test is terminated for reasons considered adequate by the FE, only those sections not completed shall be tested in a further flight.
(b) At the discretion of the FE, any manoeuvre or procedure of the test may be repeated once by the applicant. The FE may stop the test at any stage if it is considered that the applicant’s demonstration of flying skills requires a complete re-test.
(c) An applicant shall indicate to the FE the checks and duties carried out. Checks shall be completed in accordance with the checklist for the UA on which the test is being taken. During pre-flight preparation for the test, the applicant will configure the (CU).
(d) The FE shall take no part in the operation of the UA except where intervention is necessary in the interest of safety.

CONTENT OF THE SKILLS TEST FOR THE ISSUE OF AN RPC-L3(A)

(a) The UAS used for the skills test shall meet the requirements for training UAS as set out in the relevant CAA publication.

(b) The skills test shall comprise of 3 elements to be completed at the end of each phase of training:
  (1) General handling BVLOS flight conducted in at least arc-b lasting at least 45 minutes returning to the departure location.
  (2) Cross country flight conducted in at least ARC-b including landing at a location different to the departure location where:
    (ii) The outbound leg is at least 10 nautical miles.
    (iii) The return leg is at least 10 nautical miles.
    (iiii) The remote pilot will be responsible for all aspects of the operation including the remote recovery and repositioning of the aircraft at the destination location.
  (3) Emergency procedures assessment lasting at least 45 minutes conducted in a simulator.
(c) Use of checklists, situational awareness, control of the UA either manually or by use of the CU, and principles of risk management apply to all sections.

RPC-L3(A) PRIVILEGES AND CONDITIONS

(a) **Privileges.** The privileges of the holders of an RPC-L3(A) are to act as remote pilot in command or flight crew of a UA where:
  (1) The flight is being undertaken in the Specific category.
  (2) The primary means of lift of the UA is fixed wing(s).
  (3) The maximum air risk class (ARC) of the flight is ARC-c.
  (4) The operational authorisation under which the flight is being conducted states the RPC-L3(A) is the minimum remote pilot competence.
(b) **Conditions.**
  (1) The remote pilot maintains a minimum certificate currency of 2 hours of live flight within the last 90 days.
  (2) The remote pilot holds a valid flyer ID.
  (3) BVLOS flight into Class A airspace prohibited.
  (4) IFR traffic integration prohibited.
  (5) ARC-d airspace prohibited.

RPC-L3(A) EXPERIENCE REQUIREMENTS AND CREDITING

Experience Requirements. Applicants for the RPC-L3(A) shall have completed at least 55 hours of instruction which shall include:

(a) 35 hours of beyond visual line of sight dual flight simulator instruction.
(b) 15 hours of beyond visual line of sight dual practical flight instruction.
(c) 5 hours of supervised practical flight as RP in command.
(d) 75 hours of logged live BVLOS flight in total as RP in command.

Crediting. Applicants for the RPC-L3(A) with equivalent prior experience as a remote pilot, or experience as a manned aeroplane pilot may be credited towards the requirements in (a). The amount of credit shall be decided by the RAE where the pilot undergoes the training course, based on a pre-entry flight test, but shall in any case:

(a) Not exceed 20% of the hours required in (a).
(b) Not include the requirements in (b), (c), or (d).

Crediting. Applicants for the RPC-L3(A) that hold a valid RPC-L3 in another category may be credited towards the requirements in (a) subject to completion of a suitable bridging course at a CAA approved RAE.

Crediting. Applicants for the RPC-L3(A) who hold a valid ATPL or CPL theory certificate in the appropriate category may be credited towards the requirements in Appendix A subject to completion of a suitable theoretical bridging course and examination at a CAA approved RAE.

RPC-L3(A) VALIDITY, REVALIDATION AND RENEWAL

(a) **Validity.** An RPC-L3(A) shall be valid for 3 years.

(b) **Revalidation.** An RPC-L3(A) shall be revalidated within 3 months immediately preceding its expiry date by completing a revalidation proficiency check at an RAE.

(c) The revalidation proficiency requirement should be determined by the RAE on a case-by-case basis.

(d) A remote pilot maybe exempted from a live revalidation check where all the following are true:

(1) The remote pilot has maintained at least minimum certificate currency for the complete duration of the certificate validation period.

(2) The remote pilot can demonstrate certificate currency has been maintained through a personal flight log.

(e) A remote pilot may be exempted from a live revalidation check where certificate currency has not been maintained in accordance with (d).

(f) When deciding if a remote pilot can be exempted, an RAE should consider:

(1) The experience of the applicant.

(2) The amount of time elapsed since the privileges of the RPC were last used.

(g) If deemed necessary by the RAE a revalidation proficiency check consisting of at least 1 hour of supervised flying covering general handling and emergency procedures will be required.

(h) If applicants choose to fulfil the revalidation requirements earlier than prescribed in point (b), the new validity period shall commence from the date of the proficiency check.

(i) Applicants who fail to pass the proficiency check before the expiry date of the RPC-L3(A) shall exercise the RPC-L3(A) privileges only if they have passed the RPC-L3(A) proficiency check.

(j) **Renewal**. If an RPC-L3(A) has expired, to renew their privileges, applicants shall comply with all the following:

(1) Complete a refresher training at an RAE, if deemed necessary by the RAE to reach the level of proficiency needed to pass an RPC-L3(A) proficiency check. The amount of refresher training needed should be determined by the RAE on a case-by-case basis, considering the following factors:

(i) The experience of the applicant.

(ii) The amount of time elapsed since the privileges of the RPC were last used.

(iii) The complexity of the applicant’s experience.

(2) Pass an RPC-L3(A) proficiency check at an RAE.

RPC-L3(R) ROTORCRAFT

GROUND INSTRUCTION

Ground instruction considering take-off and landing area selection, aircraft preparation, ground hazard analysis, route planning, avoidance of uninvolved people, and airspace.

FLIGHT INSTRUCTION

The RPC-L3(R) flight instruction syllabus considers the principles of safe UA operations including:

(a) Ability to apply operational procedures (normal, contingency, and emergency procedures, flight planning, pre-flight and post-flight inspections).
(b) Ability to manage aeronautical communication.
(c) Manage the unmanned aircraft flight path and automation.
(d) Leadership, teamwork, and self-management.
(e) Problem solving and decision-making.
(f) Situational awareness.
(g) Workload management.
(h) Coordination or handover, as applicable.

SYLLABUS OF FLIGHT INSTRUCTION

Details of the flight instruction syllabus can be found in Appendix A. The syllabus details are intended to be used by an RAE when developing the RPC-L3 flight training elements of the appropriate course. It should be noted, however, that they do not provide a ready-made flight training syllabus for individual RAEs and should not be seen by organisations as a substitute for thorough course design.

The RPC-L3(R) flight instruction syllabus should consider the principles of threat and error management and competency-based training throughout.

THEORETICAL KNOWLEDGE TOPICS

In the tables of Appendix B, the applicable learning objectives (LOs) for each certificate are marked with an ‘X’.

The LOs are intended to be used by an RAE when developing the RPC-L3 theoretical knowledge elements of the appropriate course. It should be noted, however, that the LOs do not provide a ready-made ground training syllabus for individual RAEs and should not be seen by organisations as a substitute for thorough course design.

THEORETICAL KNOWLEDGE EXAMINATION

Applicants for the issue of an RPC-L3(R) shall demonstrate a level of knowledge appropriate to the privileges granted in the following subjects:

(a) Air law.
(b) Aircraft general knowledge.
(c) Human performance and limitations.
(d) Meteorology.
(e) Operational procedures.

SKILLS TEST GENERAL

(a) An applicant for a skill test for the RPC-L3(R) shall have received instruction on the same category and type of UAS to be used in the test.
(b) An applicant shall pass all the relevant sections of the skills test. If any item in a section is failed, that section is failed. Failure in more than one section will require the applicant to take the entire test again. An applicant failing only in one section shall only repeat the failed section. Failure in any section of the retest, including those sections that have been passed on a previous attempt, will require the applicant to take the entire test again. All relevant sections of the skills test shall

be completed within 6 months. Failure to achieve a pass in all relevant sections of the test in two attempts will require further training.

(c) Further training may be required following any failed skills test. There is no limit to the number of skills tests that may be attempted.

CONDUCT OF THE TEST

(a) Should the applicant choose to terminate a skills test for reasons considered inadequate by the Flight Examiner (FE), the applicant shall retake the entire skills test. If the test is terminated for reasons considered adequate by the FE, only those sections not completed shall be tested in a further flight.

(b) At the discretion of the FE, any manoeuvre or procedure of the test may be repeated once by the applicant. The FE may stop the test at any stage if it is considered that the applicant's demonstration of flying skills requires a complete re-test.

(c) An applicant shall indicate to the FE the checks and duties carried out. Checks shall be completed in accordance with the checklist for the UA on which the test is being taken. During pre-flight preparation for the test, the applicant will configure the (CU).

(d) The FE shall take no part in the operation of the UA except where intervention is necessary in the interests of safety.

CONTENT OF THE SKILLS TEST FOR THE ISSUE OF AN RPC-L3(R)

(a) The UAS used for the skills test shall meet the requirements for training UAS as set out in the relevant CAA publication.

(b) The skills test shall comprise of 3 elements to be completed at the end of each phase of training:

(1) General handling BVLOS flight conducted in at least arc-b lasting at least 45 minutes returning to the departure location.

(2) Cross country flight conducted in at least ARC-b including landing at a location different to the departure location where:

(ii) The outbound leg is at least 10 nautical miles.

(iii) The return leg is at least 10 nautical miles.

(iiii) The remote pilot will be responsible for all aspects of the operation including the remote recovery and repositioning of the aircraft at the destination location.

(3) Emergency procedures assessment lasting at least 45 minutes conducted in a simulator.

(c) Use of checklists, situational awareness, control of the UA either manually or by use of the CU, and principles of risk management apply to all sections.

RPC-L3(R) PRIVILEGES AND CONDITIONS

(a) **Privileges.** The privileges of the holder of an RPC-L3(R) are to act as remote pilot in command or flight crew of a UA where:

(1) The flight is being undertaken in the Specific Category.

(2) The primary means of lift of the UA is rotating wings(s).

(3) The maximum air risk class (ARC) of the flight is ARC-c.

(4) The operational authorisation under which the flight is being conducted states the RPC-L3(R) is the minimum remote pilot competence.

(b) **Conditions**.

(1) The remote pilot maintains a minimum certificate currency of 2 hours of live flight within the last 90 days.

(2) The remote pilot holds a valid Flyer ID.
(3) BVLOS flight into Class A airspace prohibited.
(4) IFR traffic integration prohibited.
(5) ARC-d airspace prohibited.

RPC-L3(R) EXPERIENCE REQUIREMENTS AND CREDITING

Experience Requirements. Applicants for the RPC-L3(R) shall have completed at least 55 hours of instruction which shall include:

35 hours of beyond visual line of sight dual flight simulator instruction.
15 hours of beyond visual line of sight dual practical flight instruction.
5 hours of supervised practical flight as RP in command.
75 hours of logged live BVLOS flight in total as RP in command.

Crediting. Applicants for the RPC-L3(R) with equivalent prior experience as a remote pilot, or experience as a manned rotary pilot in may be credited towards the requirements in (a). The amount of credit shall be decided by the RAE where the pilot undergoes the training course, based on a pre-entry flight test, but shall in any case:

(a) Not exceed 20% of the hours required in (a).
(b) Not include the requirements in (b), (c), or (d).

Crediting. Applicants for the RPC-L3(R) that hold a valid RPC-L3 in another category may be credited towards the requirements in (a) subject to completion of a suitable bridging course at a CAA approved RAE.

Crediting. Applicants for the RPC-L3(R) who hold a valid ATPL or CPL theory certificate in the appropriate category may be credited towards the requirements in Appendix A subject to completion of a suitable bridging course and examination at a CAA approved RAE.

RPC-L3(R) VALIDITY, REVALIDATION AND RENEWAL

(a) **Validity.** An RPC-L3(R) shall be valid for 3 years.
(b) **Revalidation.** An RPC-L3(R) shall be revalidated within 3 months immediately preceding its expiry date by completing a revalidation proficiency check at an RAE.
(c) The revalidation proficiency requirement should be determined by the RAE on a case-by-case basis.
(d) A remote pilot maybe exempted from a live revalidation check where all the following are true:
    (1) The remote pilot has maintained at least minimum certificate currency for the complete duration of the certificate validation period.
    (2) The remote pilot can demonstrate certificate currency has been maintained through a personal flight log.
(e) A remote pilot may be exempted from a live revalidation check where certificate currency has not been maintained in accordance with (d).
(f) When deciding if a remote pilot can be exempted, an RAE should consider:
    (1) The experience of the applicant.
    (2) The amount of time elapsed since the privileges of the RPC were last used.
(g) If deemed necessary by the RAE a revalidation proficiency check consisting of at least 1 hour of supervised flying covering general handling and emergency procedures will be required.

(h) If applicants choose to fulfil the revalidation requirements earlier than prescribed in point (b), the new validity period shall commence from the date of the proficiency check.

(i) Applicants who fail to pass the proficiency check before the expiry date of the RPC-L3(R) shall exercise the RPC-L3(R) privileges only if they have passed the RPC-L3(R) proficiency check.

(j) **Renewal**. If an RPC-L3(R) has expired, to renew their privileges, applicants shall comply with all the following:

(1) Complete a refresher training at an RAE, if deemed necessary by the RAE to reach the level of proficiency needed to pass an RPC-L3(R) proficiency check. The amount of refresher training needed should be determined by the RAE on a case-by-case basis, considering the following factors:

(i) The experience of the applicant.

(ii) The amount of time elapsed since the privileges of the RPC were last used.

(iii) The complexity of the applicant's experience

(2) Pass an RPC-L3(R) proficiency check at an RAE.

LEVEL 4 REMOTE PILOT CERTIFICATE (RPC-L4)

GENERAL

The level 4 RPC considers the **future possibility** of full IFR integration between UAS and manned aircraft in the Specific category. The UAS technical assurance, operator procedures, and flight crew training requirements to perform these types of operations could be very high. Several other national and international policies need to be adopted prior to the commencement of these types of operations. Therefore, the following should be considered a **framework** for further development.

COMMON REQUIREMENTS

Below are the common requirements for the issue of an RPC-L4.

MINIMUM AGE

The minimum age for applicants for the RPC-L4 is 18.

CONDITIONS

Applicants for the issue of an RPC-L4 shall have fulfilled the requirements of the relevant training course at a CAA approved RAE.

TRAINING COURSE

Applicants for an RPC-L4 shall complete a training course at a CAA approved RAE.

The course shall include a theoretical knowledge assessment and flight instruction appropriate to the privileges of the RPC-L4.

ENTRY TO TRAINING

Applicants for the RPC-L4 shall have completed the following initial training prior to being accepted for further training:

(a) Hold a valid RPC-L3 certificate.

(b) Have logged at least 75 hours of BVLOS flight as RP in command in the Specific category on the application UA category.

(c) Hold at least a valid LAPL medical certificate.

REQUIRED LANGUAGE PROFICIENCY

Reserved for future policy.

RPC-L4(A) AEROPLANE

GROUND INSTRUCTION

Ground instruction considering take-off and landing area selection, aircraft preparation, ground hazard analysis, route planning, avoidance of uninvolved people, and airspace.

FLIGHT INSTRUCTION

The RPC-L4(A) flight instruction syllabus considers the principles of safe UA operations including:

(a) Ability to apply operational procedures (normal, contingency, and emergency procedures, flight planning, pre-flight and post-flight inspections).
(b) Ability to manage aeronautical communication.
(c) Manage the unmanned aircraft flight path and automation.
(d) Leadership, teamwork, and self-management.
(e) Problem solving and decision-making.
(f) Situational awareness.
(g) Workload management.
(h) Coordination or handover, as applicable.

SYLLABUS OF FLIGHT INSTRUCTION

Details of the flight instruction syllabus can be found in Appendix A. The syllabus details are intended to be used by an RAE when developing the RPC-L4 flight training elements of the appropriate course. It should be noted, however, that they do not provide a ready-made flight training syllabus for individual RAEs and should not be seen by organisations as a substitute for thorough course design.

The RPC-L4(A) flight instruction syllabus should consider the principles of threat and error management and competency-based training throughout.

THEORETICAL KNOWLEDGE TOPICS

In the tables of Appendix B, the applicable learning objectives (LOs) for each certificate are marked with an ‘X’.

The LOs are intended to be used by an RAE when developing the RPC-L4 theoretical knowledge elements of the appropriate course. It should be noted, however, that the LOs do not provide a ready-made ground training syllabus for individual RAEs and should not be seen by organisations as a substitute for thorough course design.

THEORETICAL KNOWLEDGE EXAMINATION

Applicants for the issue of an RPC-L4(A) shall demonstrate a level of knowledge appropriate to the privileges granted in the following subjects:

(a) International Air Law
(b) IFR Navigation
(c) IFR Operational procedures

SKILLS TEST GENERAL

(a) An applicant for a skill test for the RPC-L4(A) shall have received instruction on the same category and type of UAS to be used in the test.

(b) An applicant shall pass all the relevant sections of the skill test. If any item in a section is failed, that section is failed. Failure in more than one section will require the applicant to take the entire test again. An applicant failing only in one section shall only repeat the failed section. Failure in any section of the retest, including those sections that have been passed on a previous attempt, will require the applicant to take the entire test again. All relevant sections of the skill test shall be completed within 6 months. Failure to achieve a pass in all relevant sections of the test in two attempts will require further training.

(c) Further training may be required following any failed skill test. There is no limit to the number of skill tests that may be attempted.

CONDUCT OF THE TEST

(a) Should the applicant choose to terminate a skill test for reasons considered inadequate by the Flight Examiner (FE), the applicant shall retake the entire skill test. If the test is terminated for reasons considered adequate by the FE, only those sections not completed shall be tested in a further flight.

(b) At the discretion of the FE, any manoeuvre or procedure of the test may be repeated once by the applicant. The FE may stop the test at any stage if it is considered that the applicant's demonstration of flying skills requires a complete re-test.

(c) An applicant shall indicate to the FE the checks and duties carried out. Checks shall be completed in accordance with the checklist for the aircraft on which the test is being taken. During pre-flight preparation for the test, the applicant will configure the (CU).

(d) The FE shall take no part in the operation of the aircraft except where intervention is necessary in the interests of safety.

CONTENT OF THE SKILL TEST FOR THE ISSUE OF AN RPC-L4(A)

(a) The UAS used for the skills test shall meet the requirements for training UAS as set out in the relevant CAA publication.

(b) The skills test shall comprise of a practical flight test conducted in ARC-d airspace.

(c) Use of checklists, situational awareness, control of the aeroplane, and principles of risk management apply to all sections.

RPC-L4(A) PRIVILEGES AND CONDITIONS

(a) **Privileges.** The privileges of the holders of an RPC-L4(A) are to act as remote pilot in command or flight crew of a UA where:

(1) The flight is being undertaken in the Specific category.

(2) The primary means of lift of the UA is fixed wing(s).

(3) The maximum air risk class (ARC) of the flight is ARC-d.

(4) The operational authorisation under which the flight is being conducted states the RPC-L4(A) is the minimum remote pilot competence.

(b) **Conditions.**

(1) The remote pilot maintains a minimum certificate currency of 2 hours of live flight within the last 90 days.
(2) The remote pilot holds a valid flyer ID.

RPC-L4(A) EXPERIENCE REQUIREMENTS AND CREDITING

Experience Requirements. Applicants for the RPC-L4(A) shall have completed at least 28 hours of instruction which shall include:

(a) 14 hours of beyond visual line of sight dual flight simulator instruction,
(b) 14 hours of beyond visual line of sight dual practical flight instruction,
(c) 100 hours of logged live BVLOS flight in total as RP in command.

Crediting. Applicants for the RPC-L4(A) that hold valid RPC-L4 in another category may be credited towards the requirements in (a) subject to completion of a suitable bridging course at a CAA approved RAE.

RPC-L4(A) VALIDITY, REVALIDATION AND RENEWAL

(a) **Validity.** An RPC-L4(A)shall be valid for 1 year.
(b) **Revalidation.** An RPC-L4(A) shall be revalidated within 3 months immediately preceding its expiry date by completing a revalidation proficiency check at an RAE.
(c) The revalidation proficiency requirement should be determined by the RAE on a case-by-case basis.
(d) A remote pilot maybe exempted from a live revalidation check where all the following are true:
    (1) The remote pilot has maintained at least minimum certificate currency for the complete duration of the certificate validation period.
    (2) The remote pilot can demonstrate certificate currency has been maintained through a personal flight log.
(e) A remote pilot may be exempted from a live revalidation check where certificate currency has not been maintained in accordance with (d).
(f) When deciding if a remote pilot can be exempted, an RAE should consider:
    (1) The experience of the applicant.
    (2) The amount of time elapsed since the privileges of the RPC were last used.
(g) If deemed necessary by the RAE a revalidation proficiency check consisting of at least 1 hour of supervised flying covering general handling and emergency procedures will be required.
(h) If applicants choose to fulfil the revalidation requirements earlier than prescribed in point (b), the new validity period shall commence from the date of the proficiency check.
(i) Applicants who fail to pass the proficiency check before the expiry date of the RPC-L4(A)shall exercise the RPC-L4(A)privileges only if they have passed the RPC-L4(A)proficiency check.
(j) **Renewal**. If an RPC-L4(A)has expired, to renew their privileges, applicants shall comply with all the following:
    (1) Complete a refresher training at an RAE, if deemed necessary by the RAE to reach the level of proficiency needed to pass an RPC-L4(A)proficiency check. The amount of refresher training needed should be determined by the RAE on a case-by-case basis, considering the following factors:
        (i) The experience of the applicant.
        (ii) The amount of time elapsed since the privileges of the RPC were last used.

(iii) The complexity of the applicants experience

(2) Pass an RPC-L4(A)proficiency check at an RAE.

RPC-L4(R) ROTORCRAFT

GROUND INSTRUCTION

Ground instruction considering take-off and landing area selection, aircraft preparation, ground hazard analysis, route planning, avoidance of uninvolved people, and airspace.

FLIGHT INSTRUCTION

The RPC-L4(R) flight instruction syllabus considers the principles safe UA operations including:

(a) Ability to apply operational procedures (normal, contingency, and emergency procedures, flight planning, pre-flight and post-flight inspections).
(b) Ability to manage aeronautical communication.
(c) Manage the unmanned aircraft flight path and automation.
(d) Leadership, teamwork, and self-management.
(e) Problem solving and decision-making.
(f) Situational awareness.
(g) Workload management.
(h) Coordination or handover, as applicable.

SYLLABUS OF FLIGHT INSTRUCTION

Details of the flight instruction syllabus can be found in Appendix A. The syllabus details are intended to be used by an RAE when developing the RPC-L4 flight training elements of the appropriate course. It should be noted, however, that they do not provide a ready-made flight training syllabus for individual RAEs and should not be seen by organisations as a substitute for thorough course design.

The RPC-L4(R) flight instruction syllabus should consider the principles of threat and error management and competency-based training throughout.

THEORETICAL KNOWLEDGE TOPICS

In the tables of Appendix B, the applicable learning objectives (LOs) for each certificate are marked with an ‘X’.

The LOs are intended to be used by an RAE when developing the RPC-L4 theoretical knowledge elements of the appropriate course. It should be noted, however, that the LOs do not provide a ready-made ground training syllabus for individual RAEs and should not be seen by organisations as a substitute for thorough course design.

THEORETICAL KNOWLEDGE EXAMINATION

Applicants for the issue of an RPC-L4(R) shall demonstrate a level of knowledge appropriate to the privileges granted in the following subjects:

(a) International Air Law
(b) IFR Navigation
(c) IFR Operational procedures

SKILLS TEST GENERAL

(a) An applicant for a skill test for the RPC-L4(R) shall have received instruction on the same category and type of UAS to be used in the test.

(b) An applicant shall pass all the relevant sections of the skill test. If any item in a section is failed, that section is failed. Failure in more than one section will require the applicant to take the entire test again. An applicant failing only in one section shall only repeat the failed section. Failure in any section of the retest, including those sections that have been passed on a previous attempt, will require the applicant to take the entire test again. All relevant sections of the skill test shall be completed within 6 months. Failure to achieve a pass in all relevant sections of the test in two attempts will require further training.

(c) Further training may be required following any failed skill test. There is no limit to the number of skill tests that may be attempted.

CONDUCT OF THE TEST

(a) Should the applicant choose to terminate a skill test for reasons considered inadequate by the Flight Examiner (FE), the applicant shall retake the entire skill test. If the test is terminated for reasons considered adequate by the FE, only those sections not completed shall be tested in a further flight.

(b) At the discretion of the FE, any manoeuvre or procedure of the test may be repeated once by the applicant. The FE may stop the test at any stage if it is considered that the applicant's demonstration of flying skills requires a complete re-test.

(c) An applicant shall indicate to the FE the checks and duties carried out. Checks shall be completed in accordance with the checklist for the UA on which the test is being taken. During pre-flight preparation for the test, the applicant will configure the (CU).

(d) The FE shall take no part in the operation of the UA except where intervention is necessary in the interests of safety.

CONTENT OF THE SKILLS TEST FOR THE ISSUE OF AN RPC-L4(R)

(a) The UAS used for the skills test shall meet the requirements for training UAS as set out in the relevant CAA publication.

(b) The skills test shall comprise of a practical flight test lasting at least 1 hour conducted in ARC-d conditions departing from and returning to a licenced aerodrome.

(c) Use of checklists, situational awareness, control of the aeroplane, and principles of risk management apply to all sections.

RPC-L4(R) PRIVILEGES AND CONDITIONS

(a) **Privileges.** The privileges of the holders of an RPC-L4(A) are to act as remote pilot in command or flight crew of a UA where:

(1) The flight is being undertaken in the Specific Category.

(2) The primary means of lift of the UA is rotating wing(s).

(3) The maximum air risk class (ARC) of the flight is ARC-d.

(4) The operational authorisation under which the flight is being conducted states the RPC-L4(R) is the minimum remote pilot competence.

(b) **Conditions.**

(1) The remote pilot maintains a minimum certificate currency of 2 hours of live flight within the last 90 days.
(2) The remote pilot holds a valid flyer ID.

RPC-L4(R) EXPERIENCE REQUIREMENTS AND CREDITING

Experience Requirements. Applicants for the RPC-L4(R) shall have completed at least 28 hours of instruction which shall include:

(a) 14 hours of beyond visual line of sight dual flight simulator instruction,
(b) 14 hours of beyond visual line of sight dual practical flight instruction,
(c) 100 hours of logged live BVLOS flight in total as RP in command.

Crediting. Applicants for the RPC-L4(R) that hold valid RPC-L4 in another category may be credited towards the requirements in (a) subject to completion of a suitable bridging course at a CAA approved RAE.

RPC-L4(R) VALIDITY, REVALIDATION AND RENEWAL

(a) **Validity.** An RPC-L4(R)shall be valid for 1 year.
(b) **Revalidation.** An RPC-L4(R)shall be revalidated within 3 months immediately preceding its expiry date by completing a revalidation proficiency check at an RAE.
(c) The revalidation proficiency requirement should be determined by the RAE on a case-by-case basis.
(d) A remote pilot maybe exempted from a live revalidation check where all the following are true:
  (1) The remote pilot has maintained at least minimum certificate currency for the complete duration of the certificate validation period.
  (2) The remote pilot can demonstrate certificate currency has been maintained through a personal flight log.
(e) A remote pilot may not be exempted from a live revalidation check where certificate currency has not been maintained in accordance with (d).
(f) Where a revalidation check is required, an RAE should consider:
  (1) The experience of the applicant
  (2) The amount of time elapsed since the privileges of the RPC were last used.
  (3) If deemed necessary by the RAE a proficiency check consisting of at least 1 hour of supervised flying covering general handling and emergency procedures will be required.
(g) If applicants choose to fulfil the revalidation requirements earlier than prescribed in point (b), the new validity period shall commence from the date of the proficiency check.
(h) Applicants who fail to pass the proficiency check before the expiry date of the RPC-L4(R)shall exercise the RPC-L4(R)privileges only if they have passed the RPC-L4(R)proficiency check.
(i) **Renewal**. if an RPC-L4(R)has expired, to renew their privileges, applicants shall comply with all the following:
  (1) Complete a refresher training at an RAE, if deemed necessary by the RAE to reach the level of proficiency needed to pass an RPC-L4(R)proficiency check. The amount of refresher training needed should be determined by the RAE on a case-by-case basis, considering the following factors:
    (i) The experience of the applicant.
    (ii) The amount of time elapsed since the privileges of the RPC were last used.

(iii) The complexity of the applicants experience.

(2) Pass an RPC-L4(R)proficiency check at an RAE.

APPENDIX A – FLIGHT INSTRUCTION

The LOs in this appendix are intended to be used by an RAE when developing the simulated and practical training events of the appropriate course. It should be noted, however, that the LOs do not provide a ready-made flight training syllabus for individual RAEs and should not be seen by organisations as a substitute for thorough course design.

FLIGHT INSTRUCTION – RPC-L1

To be defined by the RAE through course design.

FLIGHT INSTRUCTION – RPC-L2

Ref	ARC	Learning Objectives (LO)	Sim	Live
FAM-1	**All**	**CU Familiarisation**		
		Introduce the UAS Command Unit		X
		Introduce flight planning		X
GH-S1	**All**	**Start Up Procedures**		
		Practice CU set-up		X
		Consolidate performance planning		X
		Introduce automation handling		X
		Introduce flight briefing		X
		Introduce pre-start / start procedures		X
		Introduce shutdown		X
GH-1	**All**	**Aircraft Preparation**		
		Introduce walk around		X
		Introduce refuelling		X
GH-S2	**All**	**Flight preparation procedures**		
		Consolidate Flight Planning		X
		Consolidate Flight Briefing		X
		Consolidate CU setup procedures		X
		Consolidate Startup procedures		X
		Consolidate emergency procedures		X
		Introduce pre-take off procedures		X
GH-S3	**A**	**Introduce Take-off**		
		Introduce take-off procedures		X
		Introduce basic automation management		X
GH-L2	**A**	**Consolidate Start-up, Taxi, Take-off**		
		Consolidate GH-S1, GH-S2, and GH-S3		X
		Observe landing and shutdown		X
		Introduce C2 link emergencies		X
GH-S4	**A**	**Introduce landing**		
		TOAL site approaches		X
		Landing procedures		X
AM-1	**A**	**Automation Management**		
		Basic automation handling		X
		Introduce high/low speed flight awareness		X
		Introduce climbs and descents		X
EP-S1	**A**	**Emergency Procedures**		
		Introduce basic EP management	X	
		Introduce startup emergencies	X	

Ref	ARC	Learning Objectives (LO)	Sim	Live
		Introduce engine emergency procedures	X	
		Introduce C2 link emergencies	X	
		Automation and sensor Failures	X	
		Introduce automation / FCA / Pitot Static failures	X	
		Introduce low visibility operations	X	

1370

1371 **FLIGHT INSTRUCTION – RPC-L3**

Ref	ARC	Learning Objectives	Sim	Live
FAM-1	**All**	**CU familiarisation**		
		Introduce the UAS Command Unit (CU)	X	
		Introduce flight planning	X	
		Introduce performance planning	X	
GH-S1	**All**	**Start-up procedures**		
		Practice CU set-up	X	
		Consolidate performance planning	X	
		Introduce automation handling	X	
		Introduce flight briefing	X	
		Introduce pre-start & start procedures	X	
		Introduce shutdown procedures	X	
EP-1	**All**	**Emergency procedures**		
		Introduce basic EP management	X	
		Introduce startup emergencies	X	
GH-L1	**All**	**Aircraft Preparation**		
		Introduce walk around		X
		Introduce refuelling		X
GH-S2	**All**	**Taxi and positioning procedures**		
		Consolidate Flight Planning	X	
		Consolidate Flight Briefing	X	
		Consolidate CU setup procedures	X	
		Consolidate startup procedures	X	
		Consolidate emergency procedures	X	
		Introduce pre-take off procedures	X	
GH-S3	**C**	**Introduce Take-off and departure**		
		Consolidate taxi and positioning	X	
		Introduce take-off procedures	X	
		Introduce departure procedures	X	
		Introduce basic automation management	X	
EP-2	**C**	**Consolidate Emergency Procedures**		
		Consolidate EP-1	X	
		Introduce engine emergency procedures	X	
GH-L2	**C**	**Consolidate Start-up, Taxi, Take-off**		
		Consolidate GH-S1, GH-S2, and GH-S3		X
		Observe landing and shutdown		X
EP-S3	**C**	**Consolidate Emergency Procedures**		
		Consolidate EP-1 and EP-2	X	
		Introduce C2 link emergencies	X	

Ref	ARC	Learning Objectives	Sim	Live
GH-S4	**C**	**Introduce landing**		
		Introduce circuits to land	X	
		Straight-in approaches	X	
		Circuits with visual traffic	X	
GH-S5	**C**	**Consolidate circuits to land**		
		Introduce airfield recovery	X	
		Consolidate circuits to land	X	
GH-L3	**C**	**Consolidate circuits**		
		Consolidate Circuits - dual		X
GH-L4	**C**	**Consolidate circuits**		
		Solo circuits		X
GH-S6	**C**	**Consolidate automation management**		
		Basic automation handling	X	
		Introduce high/low speed flight awareness	X	
		Consolidate engine failure	X	
		Introduce climbs and descents	X	
GH-L5	**C**	**Introduce general handling**		
		General handling exercises		X
GH-L6	**C**	**General Handling**		
		Consolidate handling		X
EP-S4	**C**	**Consolidate Emergency Procedures**		
		Automation and sensor Failures	X	
		Introduce automation / FCA / Pitot Static failures	X	
		Introduce low visibility operations	X	
GH-S7	**C**	**Introduce threat management**		
		Consolidate automation management	X	
		Introduce threat management - weather	X	
		Introduce IMC flight	X	
		Consolidate recovery	X	
GH-S8	**C**	**Introduce traffic avoidance**		
		Introduction to DAA systems	X	
		Introduction to airspace transits	X	
EP-S5	**C**	**Consolidate Emergency Procedures**		
		Consolidate EP-S3 and EP-S4	X	
		Introduce electrical system failures	X	
GH-S9	**C**	**Consolidate Traffic avoidance**		
		Consolidate traffic avoidance	X	
		Consolidate departure	X	
ST-L1	**C**	**Phase 1 GH Skills Test**		
		Skills test evaluation		X
GH-L7	**C**	**Consolidate departure and transit**		
		Solo departure, transit, and GH		X
GH-L8	**C**	**Introduce remote departure procedures**		
		Consolidate departure and transit		X
		Introduce departure remote aerodrome		X
GH-L9	**C**	**Consolidate remote departure procedures**		

Ref	ARC	Learning Objectives	Sim	Live
		Departure, transit, and land at remote aerodrome		X
		Departure remote aerodrome and return to base		X
ST-L2	**C**	**Phase 2 Cross Country Skills Test**		
		Cross Country Skills Test		X
ST-EP	**C**	**Phase 4 Emergency Procedures Assessment**		
		Emergency Procedures Assessment	X	

1372

1373 **FLIGHT INSTRUCTION – RPC-L4**

Ref	ARC	Learning Objectives	Sim	Live
IFR-S1	**D**	**Introduce IFR departure and transit**		
		Introduce IFR workflow	X	
		Introduce ANSP coordination	X	
IFR-S2	**D**	**Standard instrument departures and arrivals**		
		Consolidate IFR workflow	X	
		Introduce SIDs and STARs	X	
IFR-S3	**D**	**Enroute IFR procedures**		
		Introduce en-route holding	X	
		Consolidate SIDs and STARs	X	
IFR-S4	**D**	**Holding procedures**		
		Introduce terminal aera holds	X	
IFR-S5	**D**	**Instrument approaches to specified minima**		
		Consolidate IFR-S2, IFR-S3, and IFR-S4	X	
IFR-S6	**D**	**Missed approach procedures**		
		Go around procedures		
IFR-L1	**D**	**IFR Departure**		
		IFR Departure – Dual		X
		IFR Exercises		X
IFR-L2	**D**	**IFR Instrument Departure**		
		SID exercises		X
IFR-L3	**D**	**IFR Holds**		
		Holds and IFR exercises		X
IFR-L4	**D**	**IFR Exercises**		
		Holds into approaches		X
IFR-L5	**D**	**IFR Exercises dual**		
		Dual departure, hold and recovery		X
IFR-L6	**D**	**IFR Exercises solo**		
		Solo departure, hold, and recovery		X
IFR-ST	**D**	**IFR Skills test**		

1374

1375

1376

1377

APPENDIX B – THEORICAL KNOWLEDGE TOPICS

AIR LAW

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
LAW.SPEC.00.00	**Air Law**									
LAW.SPEC.01.00	**UK UAS Regulations**									
LAW.SPEC.01.01	Demonstrate an understanding of the UK Regulation (EU) 2019/947	X	X	X						
LAW.SPEC.01.02	Demonstrate an understanding of the Acceptable Means of Compliance to UK Regulation (EU) 2019/947	X	X	X						
LAW.SPEC.01.03	Demonstrate an understanding of other relevant CAA supporting documents and polices	X	X	X						
LAW.SPEC.01.04	Describe the requirements of article 8 in relation to remote pilot competence **Source: UK Regulation (EU) 2019/947 Art 8.**						X	X		
LAW.SPEC.01.05	State the privileges of each of the remote pilot competence certificates in the Specific category **Source: UK Regulation (EU) 2019/947 Art 8.**						X	X		
LAW.SPEC.01.06	Describe the responsibilities of a remote pilot in accordance with UAS.SPEC.050 **Source: UAS.SPEC.050**						X	X		
LAW.SPEC.01.07	Describe the responsibilities of a UAS operator in accordance with UAS.SPEC.060 **Source: UAS.SPEC.060**						X	X		
LAW.SPEC.01.08	Explain key differences between these responsibilities						X	X		
LAW.SPEC.02.00	**UK National UAS Regulations - The Air Navigation Order**									
LAW.SPEC.02.01	Demonstrate awareness of the UK Air Navigation Order including residual articles relevant to UAS operations	X	X	X						
LAW.SPEC.02.02	Describe the relationship between the ANO and UK Regulation (EU) 2019/947						X	X		
LAW.SPEC.02.03	Describe how article 23 of the ANO limits the scope of the order in relation to UAS operations						X	X		
LAW.SPEC.02.04	Describe the residual articles of the ANO that remain in scope of the order						X	X		
LAW.SPEC.03.00	**The issue of an Operational Authorisation**									

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
LAW.SPEC.03.01	Demonstrate an understanding of an Operational Authorisation (OA) and how it describes the privileges and conditions it sets out	X	X	X						
LAW.SPEC.04.00	**The Convention on International Civil Aviation (Chicago) — ICAO Doc 7300/9**									
LAW.SPEC.04.01	Explain the circumstances that led to the establishment of the Convention on International Civil Aviation, Chicago, 7 December 1944. **Source: ICAO Doc 7300/9 Preamble**						X	X		
LAW.SPEC.05.00	**The Standard European Rules of the Air (SERA)**									
LAW.SPEC.05.01	Reserved - Rights of Way								X	X
LAW.SPEC.06.00	**Flightworthiness of UAS**									
LAW.SPEC.06.01	For use after the implementation of the UK SAIL mark for flightworthiness						X	X		

1381

1382 **OPERATIONAL PROCEDURES**

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
OPS.SPEC.00.00	**OPERATIONAL PROCEDURES**									
OPS.SPEC.01.00	**Visual Line of Sight Procedures**									
OPS.SPEC.01.01	Describe specific airspace classifications and types	X	X	X						
OPS.SPEC.01.02	Describe the UK airspace reservations such as: (a) Danger Areas (b) Restricted Areas (c) Prohibited areas	X	X	X						
OPS.SPEC.01.03	Demonstrate an understanding of official sources of information that support UAS operations	X	X	X						
OPS.SPEC.01.04	Extract information from relevant aeronautical information sources	X	X	X						
OPS.SPEC.01.05	Interpret information from aeronautical information sources for their applicability to UAS operations	X	X	X						
OPS.SPEC.02.00	**Beyond Visual Line of Sight Procedures**									
OPS.SPEC.02.01	Demonstrate an understanding of coordination procedures with air traffic control (ATC) for BVLOS flights.				X	X				

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1A	L1R	L2A	L2R	L3A	L3R	L4A	L4R
OPS.SPEC.03.00	**BVLOS Flight Planning**									
OPS.SPEC.03.01	Describe the regulatory boundaries of BVLOS flight operations in terms of UK SORA (GRC, ARC, and Total SAIL)				X	X				
OPS.SPEC.04.00	**BVLOS Route Selection**									
OPS.SPEC.04.01	Describe the process of route optimisation considering factors such as terrain, obstacles, and populated areas.				X	X				
OPS.SPEC.05.00	**Waypoint Planning**									
OPS.SPEC.05.01	Describe the process to determine the position of waypoints along the chosen route.				X	X				
OPS.SPEC.05.02	Explain the need for precision navigation, obstacle avoidance, and compliance with airspace restrictions.				X	X				

1383

1384

1385 **UA GENERAL KNOWLEDGE**

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1A	L1R	L2A	L2R	L3A	L3R	L4A	L4R
AGK.SPEC.00.00	**UA GENERAL KNOWLEDGE**									
AGK.SPEC.01.00	**SAIL Certification**									
AGK.SPEC.01.01	Reserved for future									
AGK.SPEC.02.00	**Stress, strain and loads**									
AGK.SPEC.02.01	Explain how stress and strain are always present in a UA structure both when parked and during manoeuvring.						X	X		
AGK.SPEC.02.02	Describe the following types of loads that an unmanned aircraft may be subjected to, when they occur, and how a remote pilot may affect their magnitude: (a) static loads (b) dynamic loads (c) cyclic loads						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
AGK.SPEC.02.03	Describe the areas typically prone to stress that should be given particular attention during a pre-flight inspection and highlight the limited visual cues of any deformation that may be evident.						X	X		
AGK.SPEC.03.00	**Fatigue and corrosion**									
AGK.SPEC.03.01	Describe the effects of corrosion and how it can be visually identified by a remote pilot during the pre-flight inspection.						X	X		
AGK.SPEC.03.02	Describe the operating environments where the risk of corrosion is increased and how to minimise the effects of the environmental factors.						X	X		
AGK.SPEC.03.03	Explain fatigue, how it affects the useful life of an unmanned aircraft, and the effect of the following factors on the development of fatigue: (a) corrosion (b) number of cycles (c) type of flight manoeuvres (d) stress level						X	X		
AGK.SPEC.04.00	**UA Maintenance**									
AGK.SPEC.04.01	Reserved for future									
AGK.SPEC.05.00	**Airframe**									
AGK.SPEC.05.01	Describe the following attachment methods used for unmanned aircraft parts and components: (a) riveting (b) welding (c) bolting (d) pinning (e) adhesives (bonding (f) screwing						X	X		
AGK.SPEC.05.02	Explain how the development of a faulty attachment between unmanned aircraft parts or components can be detected by a remote pilot during the pre-flight inspection.						X	X		
AGK.SPEC.05.00	**Composite and other materials**									
AGK.SPEC.05.01	Explain the principle of a composite material, and give examples of typical non-metallic materials used on unmanned aircraft: (a) carbon (b) glass fibre						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
	(c) Kevlar aramid									
AGK.SPEC.05.02	State the advantages and disadvantages of composite materials compared with metal alloys by considering the following: (a) strength-to-weight ratio (b) capability to tailor the strength to the direction of the load (c) stiffness (d) electrical conductivity (lightning) (e) resistance to fatigue and corrosion (f) resistance to cost (g) discovering damage during a pre-flight inspection.						X	X		
AGK.SPEC.05.03	State that several types of materials are used on unmanned aircraft and that they are chosen based on type of structure or component and the required/desired material properties.						X	X		
AGK.SPEC.06.00	**Aeroplane: wings, tail surfaces, and control surfaces**									
AGK.SPEC.06.01	Describe the different types of UA design and explain their advantages and disadvantages						X	X		
AGK.SPEC.07.00	**Structural components**									
AGK.SPEC.07.01	Describe the function of a wing spar and other critical structural components						X	X		
AGK.SPEC.08.00	**Loads, stresses and aeroelastic vibrations (flutter)**									
	Describe the vertical and horizontal loads on the ground and during normal flight.						X	X		
AGK.SPEC.09.00	**Rotorcraft structural aspects of flight controls**									
AGK.SPEC.09.01	List the functions of flight controls.						X	X		
AGK.SPEC.09.02	Explain why vertical and horizontal stabilisers may have different shapes and alignments.						X	X		
AGK.SPEC.10.00	**Structural components, and materials**									
AGK.SPEC.10.01	Describe the fatigue life and methods of checking for serviceability of the components and materials of flight and control surfaces.						X	X		
AGK.SPEC.11.00	**Loads, stresses, and aeroelastic vibrations**									
AGK.SPEC.11.01	Describe the dangers and stresses regarding safety and serviceability in flight when the manufacturer’s design envelope is exceeded.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
AGK.SPEC.11.02	Explain that blade tracking is important both to minimise vibration and to help ensure uniformity of flow through the disc.						X	X		
AGK.SPEC.11.03	Describe the early indications and vibrations which are likely to be experienced when the main-rotor blades and tail rotor are out of balance or tracking, including the possible early indications due to possible fatigue and overload.						X	X		
AGK.SPEC.11.04	Explain how a vibration harmonic can be set up in other components which can lead to their early failure.						X	X		
AGK.SPEC.11.05	State the three planes of vibration measurement, i.e. vertical, lateral, fore and aft.						X	X		
AGK.SPEC.12.00	**Brakes**									
AGK.SPEC.12.01	Describe the basic operating principle of a disc brake.						X	X		
AGK.SPEC.12.02	Explain the limitation of brake energy and describe the operational consequences.						X	X		
AGK.SPEC.12.03	Explain how brakes are actuated: hydraulically, electrically, or mechanically						X	X		
AGK.SPEC.12.04	Describe the function of a parking brake.						X	X		
AGK.SPEC.13.00	**Flight Controls**									
AGK.SPEC.13.01	Define a ‘primary flight control’ in the context of a UA.	X	X	X						
AGK.SPEC.13.02	List the following primary flight control surfaces elevator, aileron, roll spoilers, flaperon and rudder.	X	X	X						
AGK.SPEC.13.03	List the various means of control surface actuation	X	X	X						
AGK.SPEC.14.00	**Rotorcraft flight controls**									
AGK.SPEC.14.01	Describe the following four axes of control operation, their operating principle, and their associated cockpit controls: (a) collective control (b) cyclic fore and aft (pitch axis) (c) cyclic lateral (roll axis) (d) yaw	X	X	X						
AGK.SPEC.14.02	Describe the swash plate or azimuth star control system including the following: (a) swash plate inputs (b) the function of the non-rotating swash plate (c) the function of the rotating swash plate						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
	(d) how swash plate tilt is achieved (e) swash plate pitch axis (f) swash plate roll axis (g) balancing of pitch/roll/collective inputs to the swash plate to equalise torsional loads on the blades									
AGK.SPEC.14.03	Describe how flight control is achieved in multirotor UA	X	X	X						
AGK.SPEC.14.04	Describe how transition between vertical and horizontal flight is achieved in VTOL UA	X	X	X						
AGK.SPEC.15.00	**Piston engines**									
AGK.SPEC.15.01	State the types of fuel used by a piston engine and their associated limitations: (a) diesel (b) JET-A1 (for high-compression engines) (c) AVGAS						X	X		
AGK.SPEC.15.02	State the main characteristics of these fuels and give typical values regarding their flash points, freezing points and density.						X	X		
AGK.SPEC.16.00	**Design, operation, system components, indications**									
AGK.SPEC.16.01	State the tasks of the fuel system.						X	X		
AGK.SPEC.16.02	Name the following main components of a fuel system, and state their location and their function: (a) lines (b) pumps (c) pressure valves (d) filter/strainer (e) tanks (f) vent system (g) fuel-quantity sensor; fuel-temperature sensor						X	X		
AGK.SPEC.16.03	Describe a gravity fuel feed system and a pressure feed fuel system.						X	X		
AGK.SPEC.16.04	Describe the construction of the different types of fuel tanks and state their advantages and disadvantages: (a) drum tank (b) bladder tank (c) integral tank						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
AGK.SPEC.16.05	Define the term 'unusable fuel'.						X	X		
AGK.SPEC.16.06	List the following parameters that maybe monitored for the fuel system: (a) fuel quantity (low-level warning) (b) fuel temperature						X	X		
AGK.SPEC.17.00	**Turbine engines**									
AGK.SPEC.17.01	State the types of fuel used by a gas turbine engine: (a) JET-A; (b) JET-A1; (c) JET-B.						X	X		
AGK.SPEC.17.02	State the main characteristics of these fuels and give typical values regarding their flash points, freezing points and density.						X	X		
AGK.SPEC.17.03	State the existence of additives for freezing.						X	X		
AGK.SPEC.18.00	**Design, operation, system components, indications**									
AGK.SPEC.18.01	Explain the function of the fuel system: (a) lines (b) pumps (c) pressure valves (d) filter/strainer (e) tanks (f) vent system (g) fuel-quantity sensor; fuel-temperature sensor						X	X		
AGK.SPEC.19.00	**Electrics**									
AGK.SPEC.19.01	Explain static electricity and describe the flying conditions where unmanned aircraft are most susceptible to build-up of static electricity.						X	X		
AGK.SPEC.19.02	Describe a static discharger and explain the following: (a) its purpose (b) typical locations (c) remote pilot's role of observing it during pre-flight inspection						X	X		
AGK.SPEC.19.03	Explain why an unmanned aircraft must first be grounded before refuelling/defueling.						X	X		
AGK.SPEC.19.04	Explain the reason for electrical bonding.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
AGK.SPEC.20.00	**Direct current (DC)**									
AGK.SPEC.20.01	Explain the term direct current (DC), and state that current can only flow in a closed circuit.	X	X	X						
AGK.SPEC.20.02	Explain the basic principles of conductivity and give examples of conductors, semiconductors, and insulators.	X	X	X						
AGK.SPEC.20.03	Describe the difference in use of the following mechanical switches and explain the difference in observing their state (e.g. ON/OFF), and why some switches are guarded: (a) toggle switch (b) rocker switch (c) pushbutton switch (d) rotary switch						X	X		
AGK.SPEC.20.04	Define voltage and current and state their unit of measurement.	X	X	X						
AGK.SPEC.20.05	Explain Ohm's law in qualitative terms.	X	X	X						
AGK.SPEC.20.06	Explain the effect on total resistance when resistors are connected in series or in parallel.						X	X		
AGK.SPEC.20.07	State that resistances can have a positive or a negative temperature coefficient (PTC/NTC) and state their use.						X	X		
AGK.SPEC.20.08	Define electrical power and state the unit of measurement.	X	X	X						
AGK.SPEC.21.00	**Alternating current (AC)**									
AGK.SPEC.21.01	Explain the term 'alternating current' (AC) and compare its use to DC regarding complexity.						X	X		
AGK.SPEC.21.02	Define the term 'phase', and explain the basic principle of single- phase and three-phase AC.						X	X		
AGK.SPEC.21.03	State that unmanned aircraft can use single-phase or three-phase AC.						X	X		
AGK.SPEC.21.04	Define frequency and state the unit of measurement.						X	X		
AGK.SPEC.21.05	Define 'phase shift' in qualitative terms.						X	X		
AGK.SPEC.22.00	**Electromagnetism**									
AGK.SPEC.22.01	State that an electrical current produces a magnetic field.						X	X		
AGK.SPEC.22.02	Describe how the strength of the magnetic field changes with the magnitude of the current.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
AGK.SPEC.22.03	Explain the purpose and the working principle of a solenoid.						X	X		
AGK.SPEC.22.04	Explain the purpose and the working principle of a relay.						X	X		
AGK.SPEC.22.05	Explain the principle of electromagnetic induction and how two electrical components or systems may affect each other through this principle.						X	X		
AGK.SPEC.23.00	**Circuit protection**									
AGK.SPEC.23.01	Explain the working principle of a fuse and a circuit breaker.	X	X	X						
AGK.SPEC.23.02	Explain how a fuse is rated.	X	X	X			X	X		
AGK.SPEC.23.04	Describe how circuit breakers may be used to reset unmanned aircraft systems/computers in the event of system failure.						X	X		
AGK.SPEC.23.05	Explain a short circuit in practical terms using Ohm's Law, power and energy expressions highlighting the risk of fire due to power transfer and extreme energy dissipation.						X	X		
AGK.SPEC.23.06	Explain the risk of fire resulting from excessive heat in a circuit subjected to overcurrent.	X	X	X						
AGK.SPEC.23.07	Explain that overcurrent situations may be transient.									
AGK.SPEC.23.08	Explain the hazards of the use of incorrect fuse rating when replacing blown fuses.	X	X	X						
AGK.SPEC.24.00	**Semiconductors and logic circuits (Reserved)**									
AGK.SPEC.25.00	**Batteries**									
AGK.SPEC.25.01	State the functions of an unmanned aircraft battery.	X	X	X						
AGK.SPEC.25.02	Name the types of rechargeable batteries used in unmanned aircraft: (a) lithium-ion (b) lithium-polymer	X	X	X						
AGK.SPEC.25.03	Compare the different battery types with respect to: (a) load behaviour (b) charging characteristics (c) risk of thermal runaway	X	X	X						
AGK.SPEC.25.04	Explain the term 'cell voltage' and describe how a battery may consist of several cells that combined provide the desirable voltage and capacity.	X	X	X						
AGK.SPEC.25.05	Explain the difference between battery voltage and charging voltage.	X	X	X						
AGK.SPEC.25.06	Define the term 'capacity of batteries' and state the unit of measurement used.	X	X	X						

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
AGK.SPEC.25.07	State the effect of temperature on battery capacity and performance.	X	X	X						
AGK.SPEC.25.08	State that in the case of loss of all generated power (battery power only) the remaining electrical power is time-limited.	X	X	X						
AGK.SPEC.25.09	Describe how to contain a battery thermal runaway highlighting how one cell can affect the neighbouring cells.	X	X	X						
AGK.SPEC.26.00	**DC generation**									
AGK.SPEC.26.01	Describe the basic working principle of a simple DC generator or DC alternator.						X	X		
AGK.SPEC.26.02	Explain the principle of voltage control and why it is required.						X	X		
AGK.SPEC.26.03	Describe the basic operating principle of a starter generator and state its purpose.						X	X		
AGK.SPEC.27.00	**DC distribution**									
AGK.SPEC.27.01	Describe a simple DC electrical system of an unmanned aircraft	X	X	X						
AGK.SPEC.27.02	Give examples of DC consumers.	X	X	X						
AGK.SPEC.28.00	**Electrical motors**									
AGK.SPEC.28.01	State that the purpose of an electrical motor is to convert electrical energy into mechanical energy.	X	X	X						
AGK.SPEC.28.02	Describe how electrical motors are rated for use in unmanned aircraft	X	X	X						
AGK.SPEC.28.03	State that because of the similarity in design, a generator and an electrical motor may be combined into a starter generator.						X	X		
AGK.SPEC.29.00	**Operating principle**									
AGK.SPEC.29.01	Describe how the torque of an electrical motor is determined by the supplied voltage and current, and the resulting magnetic fields within the motor.						X	X		
AGK.SPEC.30.00	**Components**									
AGK.SPEC.30.01	Name the following components of an electrical motor: rotor (rotating part of an electrical motor); stator (stationary part of an electrical motor).	X	X	X						
AGK.SPEC.31.00	**Piston Engines**									
AGK.SPEC.31.01	Define the following terms and expressions: (a) rpm (b) torque						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
	(c) manifold absolute pressure (MAP) (d) power output (e) specific fuel consumption (f) compression ratio, clearance volume, swept (displaced) volume, total volume									
AGK.SPEC.32.00	**Piston Engine: design, operation, components**									
AGK.SPEC.32.01	Describe the basic operating principle of a piston engine: (a) crankcase (b) crankshaft (c) connecting rod (d) piston (e) piston pin (f) piston rings (g) cylinder (h) cylinder head (i) valves (j) valve springs (k) push rod (l) camshaft (m) rocker arm (n) camshaft gear (o) bearings						X	X		
AGK.SPEC.32.02	Name and identify the various types of engine design with regard to cylinder arrangement and their advantages/disadvantages'						X	X		
AGK.SPEC.32.03	Describe the differences between petrol and diesel engines with respect to: (a) means of ignition (b) maximum compression ratio (c) regulating air or mixture supply to the cylinder (d) pollution from the exhaust						X	X		
AGK.SPEC.33.00	**Fuel**									
AGK.SPEC.33.01	Name the type of fuel used for petrol engines including its colour (AVGAS); (a) 100 (green) (b) 100LL (blue)						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
AGK.SPEC.33.02	Name the type of fuel normally used for aviation diesel engines (JET-A1).						X	X		
AGK.SPEC.33.03	Define the term ‘octane rating’.						X	X		
AGK.SPEC.33.04	Define the term ‘detonation’ and describe the causes and effects of detonation for both petrol and diesel engines.						X	X		
AGK.SPEC.33.05	Define the term ‘pre-ignition’ and describe the causes and effects of pre-ignition for both petrol and diesel engines.						X	X		
AGK.SPEC.33.06	Identify the conditions and power settings that promote detonation for petrol engines.						X	X		
AGK.SPEC.33.07	Describe how detonation in petrol engines is recognised.						X	X		
AGK.SPEC.33.08	Describe the method and occasions for checking the fuel for water content.						X	X		
AGK.SPEC.33.09	State the typical value of fuel density for aviation gasoline and diesel fuel.						X	X		
AGK.SPEC.33.10	Explain volatility, viscosity and vapour locking in petrol and diesel fuels.						X	X		
AGK.SPEC.34.00	**Engine fuel pumps**									
AGK.SPEC.34.01	Describe common fuel pumps used in unmanned aircraft						X	X		
AGK.SPEC.35.00	**Carburettor/injection system**									
AGK.SPEC.35.01	State the purpose of a carburettor.						X	X		
AGK.SPEC.35.02	Explain the advantages and difference in operation of an injection system compared with a carburettor system.						X	X		
AGK.SPEC.36.00	**Icing**									
AGK.SPEC.36.01	Describe the causes and effects of carburettor icing						X	X		
AGK.SPEC.36.02	Name the meteorological conditions under which carburettor icing may occur.						X	X		
AGK.SPEC.36.03	Describe the indications of the presence of carburettor icing for a rotorcraft.						X	X		
AGK.SPEC.36.04	Describe the indications that will occur upon selection of carburettor heat depending on whether ice is present or not.						X	X		
AGK.SPEC.36.05	Explain the reason for the use of alternate air on fuel injection systems and describe its operating principle.						X	X		
AGK.SPEC.36.06	State the meteorological conditions under which induction system icing may occur.						X	X		
AGK.SPEC.37.00	**Cooling systems**									
AGK.SPEC.37.01	Specify the reasons for cooling a piston engine.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
AGK.SPEC.37.02	Describe the design features to enhance cylinder air cooling for aeroplanes.						X	X		
AGK.SPEC.37.03	Describe the design features to enhance cylinder air cooling for rotorcraft						X	X		
AGK.SPEC.37.04	Compare the differences between liquid- and air-cooling systems.						X	X		
AGK.SPEC.38.00	**Lubrication systems**									
AGK.SPEC.39.01	Describe the term 'viscosity' including the effect of temperature.						X	X		
AGK.SPEC.39.02	Describe the viscosity grade numbering system used in aviation.						X	X		
AGK.SPEC.39.03	Design, operation, indications, and warnings						X	X		
AGK.SPEC.39.04	State the functions of a piston-engine lubrication system.						X	X		
AGK.SPEC.39.05	Describe the working principle of a dry-sump lubrication system and describe the functions of the following components: (a) oil tank (b) check valve (non-return valve). (c) pressure pump and pressure-relief valve. (d) scavenge pump (e) filters (f) oil cooler (g) oil cooler bypass valve (h) pressure and temperature sensors (i) lines						X	X		
AGK.SPEC.39.06	Describe a wet-sump lubrication system.						X	X		
AGK.SPEC.39.07	State the differences between a wet- and a dry-sump lubrication system and their advantages and disadvantages.						X	X		
AGK.SPEC.39.08	List the following factors that influence oil consumption: (a) oil grade (b) cylinder and piston wear; condition of piston rings						X	X		
AGK.SPEC.39.09	Describe the interaction between oil pressure, oil temperature and oil quantity.						X	X		
AGK.SPEC.40.00	**Ignition circuits**									
AGK.SPEC.40.01	Describe the working principle of a magneto-ignition system and the functions of the following components: (a) magneto (b) contact-breaker points						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
	(c) capacitor (condenser) (d) coils or windings (e) ignition switches (f) distributor (g) spark plug (h) high-tension (HT) cable									
AGK.SPEC.40.02	State why piston engines maybe equipped with two electrically independent ignition systems.						X	X		
AGK.SPEC.40.03	Explain how combustion is initiated in diesel engines.						X	X		
AGK.SPEC.41.00	**Fuel and air mixture**									
AGK.SPEC.42.01	Define the term mixture.						X	X		
AGK.SPEC.42.02	State the typical fuel-to-air ratio values or range of values for the above mixtures.						X	X		
AGK.SPEC.42.03	Describe the advantages and disadvantages of weak and rich mixtures.						X	X		
AGK.SPEC.42.04	Describe the relation between engine-specific fuel consumption and mixture ratio.						X	X		
AGK.SPEC.43.00	**Aeroplane: propellers**									
AGK.SPEC.43.01	Describe the operating principle of a fixed pitch propeller system	X	X							
AGK.SPEC.44.00	**Performance and engine handling**									
AGK.SPEC.44.01	Describe the effect on power output of a petrol and diesel engine taking into consideration the following parameters: (a) ambient pressure, exhaust back pressure (b) temperature (c) density altitude (d) humidity						X	X		
AGK.SPEC.45.00	**Engine handling**									
AGK.SPEC.45.01	Define the following terms: (a) take-off power (b) maximum continuous power						X	X		
AGK.SPEC.45.02	Describe the start problems associated with extreme cold weather.						X	X		
AGK.SPEC.46.00	**TURBINE ENGINES**									
AGK.SPEC.46.01	Describe how thrust is produced by a basic gas turbine engine.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
AGK.SPEC.46.02	Describe how thrust is produced by a basic electric ducted fan (EDF) engine.						X	X		
AGK.SPEC.46.03	Describe the simple form of the thrust formula for a basic, straight jet engine and perform simple calculations (including pressure thrust).						X	X		
AGK.SPEC.47.00	**Design, types and components of turbine engines**									
AGK.SPEC.47.01	List the main components of a basic gas turbine engine: (a) inlet (b) compressor (c) combustion chamber (d) turbine (e) outlet						X	X		
AGK.SPEC.47.02	List the different types of gas turbine engines: (a) straight jet (b) turboprop						X	X		
AGK.SPEC.47.03	State that a gas turbine engine can have one or more spools.						X	X		
AGK.SPEC.47.04	Describe how thrust is produced by turbojet engines.						X	X		
AGK.SPEC.47.05	Describe how power is produced by turboprop engines.						X	X		
AGK.SPEC.48.00	**Aeroplane: air intake**									
AGK.SPEC.48.01	State the functions of the engine air inlet/air intake.						X	X		
AGK.SPEC.49.02	Describe the reasons for, and the dangers of, the following operational problems concerning the engine air inlet: (a) airflow separation (b) inlet icing (c) inlet damage (d) foreign object damage (FOD) (e) heavy in-flight turbulence						X	X		
AGK.SPEC.50.00	**Compressor and diffuser**									
AGK.SPEC.50.01	State the purpose of the compressor.						X	X		
AGK.SPEC.50.02	Describe the working principle of a centrifugal and an axial flow compressor.						X	X		
AGK.SPEC.50.03	Name the following main components of a single stage and describe their function for a centrifugal compressor: (a) impeller						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
	(b) diffuser									
AGK.SPEC.50.04	Name the following main components of a single stage and describe their function for an axial compressor: (a) rotor vanes (b) stator vanes						X	X		
AGK.SPEC.50.05	Describe the gas-parameter changes in a compressor stage.						X	X		
AGK.SPEC.50.06	Define the term 'pressure ratio' and state a typical value for one stage of a centrifugal and an axial flow compressor and for the complete compressor.						X	X		
AGK.SPEC.50.07	State the advantages and disadvantages of increasing the number of stages in a centrifugal compressor.						X	X		
AGK.SPEC.50.08	Explain the difference in sensitivity for FOD of a centrifugal compressor compared with an axial flow type.						X	X		
AGK.SPEC.50.09	Explain the convergent air annulus through an axial flow compressor.						X	X		
AGK.SPEC.50.10	Describe the reason for twisting the compressor blades.						X	X		
AGK.SPEC.50.11	State the tasks of inlet guide vanes (IGVs).						X	X		
AGK.SPEC.50.12	State the advantages of increasing the number of spools.						X	X		
AGK.SPEC.50.13	Explain the implications of tip losses and describe the design features to minimise the problem.						X	X		
AGK.SPEC.50.14	Explain the problems of blade bending and flapping and describe the design features to minimise the problem.						X	X		
AGK.SPEC.50.15	Explain the following terms: (a) compressor stall (b) engine surge						X	X		
AGK.SPEC.50.16	State the conditions that are possible causes of stall and surge.						X	X		
AGK.SPEC.50.17	Describe the indications of stall and surge.						X	X		
AGK.SPEC.50.18	Describe the design features used to minimise the occurrence of stall and surge.						X	X		
AGK.SPEC.50.19	Describe a compressor map (surge envelope) with rpm lines, stall limit, steady state line and acceleration line.						X	X		
AGK.SPEC.50.20	Describe the function of the diffuser.						X	X		
AGK.SPEC.51.00	**Combustion chamber**									
AGK.SPEC.51.01	Define the purpose of the combustion chamber.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
AGK.SPEC.51.02	List the requirements for combustion.						X	X		
AGK.SPEC.51.03	Describe the working principle of a combustion chamber.						X	X		
AGK.SPEC.51.04	Explain the reason for reducing the airflow axial velocity at the combustion chamber inlet (snout).						X	X		
AGK.SPEC.51.05	State the function of the swirl vanes (swirler).						X	X		
AGK.SPEC.51.06	State the function of the drain valves.						X	X		
AGK.SPEC.51.07	Define the terms ‘primary airflow’ and ‘secondary airflow’ and explain their purpose.						X	X		
AGK.SPEC.51.08	Explain the following two mixture ratios: (a) primary airflow to fuel (b) total airflow (within the combustion chamber) to fuel						X	X		
AGK.SPEC.51.09	Describe the gas-parameter changes in the combustion chamber.						X	X		
AGK.SPEC.51.10	State a typical maximum value of the outlet temperature of the combustion chamber.						X	X		
AGK.SPEC.51.11	Describe the following types of combustion chambers and state the differences between them: (a) can type (b) can-annular, cannular or turbo-annular (c) annular (d) reverse-flow annular						X	X		
AGK.SPEC.52.00	**Turbine**									
AGK.SPEC.52.01	Explain the purpose of a turbine in different types of gas turbine engines.						X	X		
AGK.SPEC.52.02	Describe the principles of operation of impulse, reaction, and impulse-reaction axial flow turbines.						X	X		
AGK.SPEC.52.03	Name the main components of a turbine stage and their function.						X	X		
AGK.SPEC.52.04	Describe the working principle of a turbine.						X	X		
AGK.SPEC.52.05	Describe the gas-parameter changes in a turbine stage.						X	X		
AGK.SPEC.52.06	Describe the function and the working principle of active clearance control.						X	X		
AGK.SPEC.52.07	Describe the implications of tip losses and the means to minimise them.						X	X		
AGK.SPEC.52.08	Explain why the available engine thrust is limited by the turbine inlet temperature.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
AGK.SPEC.52.09	Explain the divergent gas-flow annulus through an axial-flow turbine.						X	X		
AGK.SPEC.52.10	Explain the high mechanical thermal stress in the turbine blades and wheels/discs.						X	X		
AGK.SPEC.53.00	**Aeroplane: exhaust**									
AGK.SPEC.53.01	Name the following main components of the exhaust unit and their function: (a) jet pipe (b) propelling nozzle (c) exhaust cone						X	X		
AGK.SPEC.53.02	Describe the working principle of the exhaust unit.						X	X		
AGK.SPEC.53.03	Describe the gas-parameter changes in the exhaust unit.						X	X		
AGK.SPEC.53.04	Define the term ‘choked exhaust nozzle’ (not applicable to turboprops).						X	X		
AGK.SPEC.53.05	Explain how jet exhaust noise can be reduced.						X	X		
AGK.SPEC.54.00	**Rotorcraft: air intake**									
AGK.SPEC.54.01	Name and explain the main task of the engine air intake.						X	X		
AGK.SPEC.54.02	Describe the use of a convergent air-intake ducting on rotorcrafts.						X	X		
AGK.SPEC.54.03	Describe the reasons for and the dangers of the following operational problems concerning engine air intake: (a) airflow separations (b) intake icing (c) intake damage (d) FOD						X	X		
AGK.SPEC.54.04	Describe the conditions and circumstances during ground operations when FOD is most likely to occur.						X	X		
AGK.SPEC.54.05	Describe and explain the principles of air intake filter systems that can be fitted to some rotorcrafts for operations in icing and sand conditions.						X	X		
AGK.SPEC.54.06	Describe the function of the heated pads on some rotorcraft air intakes.						X	X		
AGK.SPEC.55.00	**Rotorcraft: exhaust**									
AGK.SPEC.55.01	Describe the working principle of the exhaust unit.						X	X		
AGK.SPEC.55.02	Describe the gas-parameter changes in the exhaust unit.						X	X		
AGK.SPEC.56.00	**Additional components and systems**									

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
AGK.SPEC.56.01	Name the main components of the engine fuel system and state their function: (a) filters (b) pump (c) fuel manifold (d) fuel nozzles (e) fuel control system						X	X		
AGK.SPEC.56.02	State the tasks of the fuel control unit.						X	X		
AGK.SPEC.56.03	List the possible input parameters to a fuel control unit to achieve a given thrust/power setting.						X	X		
AGK.SPEC.57.00	**Engine control system**									
AGK.SPEC.57.01	State the tasks of the engine control system.						X	X		
AGK.SPEC.58.00	**Engine lubrication**									
AGK.SPEC.58.01	State the tasks of an engine lubrication system.						X	X		
AGK.SPEC.58.02	Name the following main components of a lubrication system and state their function: (a) oil tank (b) oil pump (c) oil filters (d) oil sumps (e) chip detectors (f) coolers						X	X		
AGK.SPEC.59.00	**Engine ignition**									
AGK.SPEC.59.01	State the task of the ignition system.						X	X		
AGK.SPEC.59.02	Name the following main components of the ignition system and state their function.						X	X		
AGK.SPEC.60.00	**Engine starter**									
AGK.SPEC.60.01	Name the main components of the starting system and state their function.						X	X		
AGK.SPEC.60.02	Explain the principle of a turbine engine start.						X	X		
AGK.SPEC.60.03	Define ‘self-sustaining rpm’.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
AGK.SPEC.61.00	**Rotorcraft specifics on design, operation and components for additional components and systems such as lubrication system, ignition circuit, starter, accessory gearbox**									
AGK.SPEC.61.01	State the task of the lubrication system.						X	X		
AGK.SPEC.61.02	List and describe the common rotorcraft lubrication systems.						X	X		
AGK.SPEC.61.03	Name the following main components of a rotorcraft lubrication system.						X	X		
AGK.SPEC.62.00	**Engine operation and monitoring**									
AGK.SPEC.62.01	Explain spool-up time.						X	X		
AGK.SPEC.62.02	State the parameters that can be used for setting and monitoring the thrust/power.						X	X		
AGK.SPEC.62.03	Explain how the exhaust gas temperature is used to monitor turbine stress.						X	X		
AGK.SPEC.62.04	Describe the possible effects on engine components when EGT limits are exceeded.						X	X		
AGK.SPEC.62.05	Explain why engine-limit exceedances must be reported.						X	X		
AGK.SPEC.62.06	Explain the term ‘engine seizure’.						X	X		
AGK.SPEC.62.07	State the possible causes of engine seizure and explain their preventative measures.						X	X		
AGK.SPEC.62.08	Explain oil-filter clogging (blockage) and the implications for the lubrication system.						X	X		
AGK.SPEC.62.09	Give examples of monitoring instruments of an engine.						X	X		
AGK.SPEC.62.10	Describe how to identify and assess engine damage based on instrument indications.						X	X		
AGK.SPEC.63.00	**Relight envelope**									
AGK.SPEC.63.01	Explain the relight envelope.						X	X		
AGK.SPEC.64.00	**ROTORCRAFT: ROTOR HEADS**									
AGK.SPEC.64.01	Describe the following rotor-head system.						X	X		
AGK.SPEC.64.02	Describe in basic terms the following configuration of rotor systems and their advantages and disadvantages.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
AGK.SPEC.64.03	Explain how flapping, dragging and feathering is achieved in each rotor-head system.						X	X		
AGK.SPEC.65.00	**Structural components and materials, stresses, structural limitations**									
AGK.SPEC.65.01	Identify from a diagram the main structural components of the main types of rotor-head systems.						X	X		
AGK.SPEC.66.00	**Design and construction**									
AGK.SPEC.66.01	Describe the material technology used in rotor-head design, including construction, using the following materials or mixture of materials: (a) composites (b) fibreglass (c) alloys (d) elastomer						X	X		
AGK.SPEC.67.00	**Adjustment**									
	Describe and explain the methods of adjustment which are possible on various rotorcraft rotor-head assemblies.						X	X		
AGK.SPEC.68.00	**Tail rotor types**									
AGK.SPEC.68.01	Describe common tail-rotor systems used on UA						X	X		
AGK.SPEC.68.02	Identify from a diagram the main structural components of common tail-rotor systems used on UA.						X	X		
AGK.SPEC.68.03	Explain pitch-input mechanisms.									
AGK.SPEC.68.04	Explain the relationship between tail-rotor thrust and engine power.						X	X		
AGK.SPEC.68.05	Describe how the vertical fin on some types reduces the power demand of the tail rotor.						X	X		
AGK.SPEC.69.00	**Design and construction**									
AGK.SPEC.69.01	List and describe the various tail-rotor designs and construction methods used on rotorcrafts currently in service.						X	X		
AGK.SPEC.70.00	**ROTORCRAFT: TRANSMISSION**									
AGK.SPEC.70.01	Describe the following main principles of rotorcraft transmission systems used in UA.						X	X		
AGK.SPEC.71.00	**Rotor brake**									
AGK.SPEC.71.01	Describe the main function of the disc type of rotor brake.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
AGK.SPEC.71.02	Describe the different options for the location of the rotor brake.						X	X		
AGK.SPEC.72.00	**Driveshaft and associated installation**									
AGK.SPEC.72.01	Describe how power is transmitted from the engine to the main- rotor gearbox.						X	X		
AGK.SPEC.72.02	Describe the material and construction of the driveshaft.						X	X		
AGK.SPEC.72.03	Explain the need for alignment between the engine and the main- rotor gearbox.						X	X		
AGK.SPEC.72.04	Identify how temporary misalignment occurs between driving and driven components.						X	X		
AGK.SPEC.72.05	Explain the relationship between driveshaft speed and torque.						X	X		
AGK.SPEC.72.06	Describe the methods with which power is delivered to the tailrotor.						X	X		
AGK.SPEC.73.00	**Intermediate and tail gearbox**									
AGK.SPEC.73.01	Explain and describe the various arrangements when the drive changes direction and the need for an intermediate or tail gearbox.						X	X		
AGK.SPEC.74.00	**Clutches**									
AGK.SPEC.74.01	Explain the purpose of a clutch.						X	X		
AGK.SPEC.74.02	Describe and explain the operation of a: (a) centrifugal clutch (b) actuated clutch						X	X		
AGK.SPEC.74.03	List the typical components of the various clutches.						X	X		
AGK.SPEC.75.00	**ROTORCRAFT: BLADES**									
AGK.SPEC.75.01	Describe the different types of blade construction and the need for torsional stiffness.						X	X		
AGK.SPEC.75.02	Describe the fully articulated rotor with hinges and feathering hinges.						X	X		
AGK.SPEC.76.00	**Structural components and materials**									
AGK.SPEC.76.01	List the materials used in the construction of main-rotor blades.						X	X		
AGK.SPEC.76.02	List the main structural components of a main-rotor blade and their function.						X	X		
AGK.SPEC.76.03	Describe the drag hinge of the fully articulated rotor and the lag flexure in the hingeless rotor.						X	X		
AGK.SPEC.77.00	**Forces and stresses**									
AGK.SPEC.77.01	Describe main-rotor blade-loading on the ground and in flight.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
AGK.SPEC.77.02	Describe where the most common stress areas are on rotor blades.						X	X		
AGK.SPEC.78.00	**Structural limitations**									
AGK.SPEC.78.01	Explain the structural limitations in terms of bending and rotor rpm.						X	X		
AGK.SPEC.79.00	**Adjustment**									
AGK.SPEC.79.01	Explain the use of trim tabs.						X	X		
AGK.SPEC.80.00	**Tip shape**									
AGK.SPEC.80.01	Describe the various blade-tip shapes used by different manufacturers and compare their advantages and disadvantages.						X	X		
AGK.SPEC.81.00	**Lateral vibrations**									
AGK.SPEC.81.01	Explain blade imbalances, causes, and effects.						X	X		
AGK.SPEC.82.00	**Tail-rotor design and blade design**									
AGK.SPEC.82.01	Describe the most common design of tail-rotor blade construction.						X	X		
AGK.SPEC.82.02	Describe the dangers to ground personnel and to the rotor blades, and how to minimise these dangers.						X	X		
AGK.SPEC.83.00	**Stresses, vibrations and balancing**									
AGK.SPEC.83.01	Describe the tail-rotor blade-loading on the ground and in flight.						X	X		
AGK.SPEC.83.02	Explain the sources of vibration of the tail rotor and the resulting high frequencies.						X	X		
AGK.SPEC.83.03	Explain balancing and tracking of the tail rotor.						X	X		
AGK.SPEC.84.00	**Structural limitations**									
AGK.SPEC.84.01	Describe the structural limitations of the tail-rotor blades.						X	X		
AGK.SPEC.84.02	Describe the method of checking the strike indicators placed on the tip of some tail-rotor blades.						X	X		
AGK.SPEC.85.00	**Adjustment**									
AGK.SPEC.85.01	Describe the adjustment of yaw pedals in the cockpit to obtain full-control authority of the tail rotor.						X	X		

1386

1387

1388 HUMAN PERFORMANCE AND LIMITATIONS

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
HPL.SPEC.00.00	**HUMAN PERFORMANCE AND LIMITATIONS**									
HPL.SPEC.01.00	**HUMAN FACTORS: BASIC CONCEPTS**									
HPL.SPEC.01.01	State that competence is based on knowledge, skills and attitudes of the individual remote pilot.	X	X	X						
HPL.SPEC.02.00	**Flight Safety Concepts**									
HPL.SPEC.02.01	Explain the three components of the TEM model.						X	X		
HPL.SPEC.02.02	Explain and give examples of latent threats						X	X		
HPL.SPEC.02.03	Explain and give examples of environmental threats.						X	X		
HPL.SPEC.02.04	Explain and give examples of organisational threats.						X	X		
HPL.SPEC.02.05	Explain and give a definition of ‘error’ according to the TEM model of ICAO Doc 9683 (Part II, Chapter 2).						X	X		
HPL.SPEC.02.06	Give examples of different countermeasures which may be used to manage threats, errors, and undesired unmanned aircraft states.						X	X		
HPL.SPEC.02.07	Explain and give examples of procedural error, communication errors, and unmanned aircraft handling errors.						X	X		
HPL.SPEC.02.08	Explain and give examples of ‘undesired unmanned aircraft states’.						X	X		
HPL.SPEC.02.09	State the components of the SHELL model.						X	X		
HPL.SPEC.02.10	State the relevance of the SHELL model to the work in the flightdeck						X	X		
HPL.SPEC.03.00	**Safety culture and safety management**									
HPL.SPEC.03.01	Distinguish between ‘open cultures’ and ‘closed cultures’.						X	X		
HPL.SPEC.03.02	Illustrate how safety culture is reflected in national culture.						X	X		
HPL.SPEC.03.03	Discuss the established expression ‘safety first’ in a commercial entity.						X	X		
HPL.SPEC.03.04	Explain James Reason’s ‘Swiss Cheese Model’						X	X		
HPL.SPEC.03.05	State the important factors that promote a good safety culture.						X	X		
HPL.SPEC.03.06	Distinguish between ‘just culture’ and ‘non-punitive culture’.						X	X		
HPL.SPEC.03.07	Name the five components which form safety culture (according to James Reason: informed culture, reporting culture, learning culture, just culture, flexible culture).						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
HPL.SPEC.03.08	Name the basic concepts of safety management system (SMS) (including hazard identification and risk management) and its relationship with safety culture.						X	X		
HPL.SPEC.04.00	**The sensory system**									
HPL.SPEC.04.01	List the different senses	X	X	X						
HPL.SPEC.05.00	**Central, peripheral and autonomic nervous system**									
HPL.SPEC.05.01	Define the term ‘sensory threshold’.						X	X		
HPL.SPEC.05.02	Define the term ‘sensitivity’, especially in the context of vision.						X	X		
HPL.SPEC.05.03	Give examples of sensory adaptation.						X	X		
HPL.SPEC.05.04	Define the term ‘habituation’ and state its implication for flight safety.						X	X		
HPL.SPEC.06.00	**Vision - Function**									
HPL.SPEC.06.01	Name the most important parts of the eye and the pathway to the visual cortex.						X	X		
HPL.SPEC.06.02	State the basic functions of the parts of the eye.	X	X	X						
HPL.SPEC.06.03	Define ‘accommodation’.						X	X		
HPL.SPEC.06.04	Distinguish between the functions of the rod and cone cells.						X	X		
HPL.SPEC.06.05	Describe the distribution of rod and cone cells in the retina and explain their relevance to vision.						X	X		
HPL.SPEC.06.06	Explain the terms ‘visual acuity’, ‘visual field’, ‘central vision’, ‘peripheral vision’ and ‘the fovea’, and explain their function in the process of vision.						X	X		
HPL.SPEC.06.07	List the factors that may degrade visual acuity and the importance of ‘lookout’.						X	X		
HPL.SPEC.06.08	State the limitations of night vision and the different scanning techniques at both night and day	X	X	X						
HPL.SPEC.06.09	State the time necessary for the eye to adapt both to bright light and the dark.						X	X		
HPL.SPEC.06.10	Reserved									
HPL.SPEC.06.11	Explain the nature of colour blindness.						X	X		
HPL.SPEC.06.12	Distinguish between monocular and binocular vision.	X	X	X						
HPL.SPEC.06.13	Explain the basis of depth perception.	X	X	X						
HPL.SPEC.06.14	List the possible monocular cues for depth perception.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
HPL.SPEC.06.15	Explain long-sightedness, short-sightedness, and astigmatism.						X	X		
HPL.SPEC.06.16	List the causes of and the precautions that may be taken to reduce the probability of vision loss due to: (a) presbyopia (b) cataract (c) glaucoma						X	X		
HPL.SPEC.06.17	State the possible problems associated with contact lenses.						X	X		
HPL.SPEC.06.18	Explain the significance of the 'blind spot' on the retina in detecting other traffic in flight.	X	X	X						
HPL.SPEC.07.00	**Hearing**									
HPL.SPEC.07.01	Descriptive and functional anatomy	X	X	X						
HPL.SPEC.07.02	State the basic parts and functions of the outer, the middle and the inner ear.	X	X	X						
HPL.SPEC.07.03	Differentiate between the functions of the vestibular apparatus and the cochlea in the inner ear.						X	X		
HPL.SPEC.07.04	Define the main causes of the following hearing defects/loss: conductive deafness noise-induced hearing loss presbycusis						X	X		
HPL.SPEC.07.05	Summarise the effects of environmental noise on hearing.						X	X		
HPL.SPEC.07.06	State the decibel level of received noise that will cause NIHL.						X	X		
HPL.SPEC.07.07	Identify the potential occupational risks that may cause hearing loss.						X	X		
HPL.SPEC.07.08	List the main sources of hearing loss in the unmanned flying environment.						X	X		
HPL.SPEC.07.09	List the precautions that may be taken to reduce the probability of onset of hearing loss.						X	X		
HPL.SPEC.08.00	**Integration of sensory inputs**									
HPL.SPEC.08.01	Define the term 'illusion'	X	X	X						
HPL.SPEC.08.02	Give examples of visual illusions based on shape constancy, size constancy, aerial perspective, atmospheric perspective, the absence of focal or ambient cues, autokinesis, vectional false horizons, field myopia, and surface planes.	X	X	X						
HPL.SPEC.09.00	**Body rhythm and sleep**									

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
HPL.SPEC.09.01	Name some internal body rhythms and their relevance to sleep. Explain that the most important of which is body temperature.						X	X		
HPL.SPEC.09.02	Explain the term ‘circadian rhythm’.						X	X		
HPL.SPEC.09.03	State the approximate duration of a ‘free-running’ rhythm.						X	X		
HPL.SPEC.09.04	Explain the significance of the ‘internal clock’ in regulating the normal circadian rhythm.						X	X		
HPL.SPEC.09.05	State the effect of the circadian rhythm of body temperature on an individual’s performance standard and on an individual’s sleep patterns.						X	X		
HPL.SPEC.09.06	List and describe the stages of a sleep cycle.						X	X		
HPL.SPEC.09.07	Differentiate between rapid eye movement (REM) and nonREM sleep						X	X		
HPL.SPEC.09.08	Explain the function of sleep and describe the effects of insufficient sleep on performance						X	X		
HPL.SPEC.09.09	Explain the simple calculations for the sleep/wake credit/debit situation.						X	X		
HPL.SPEC.09.10	Explain how sleep debit can become cumulative.						X	X		
HPL.SPEC.09.11	Describe the main effects of lack of sleep on an individual’s performance.	X	X	X			R	R		
HPL.SPEC.10.00	**Intoxication**									
HPL.SPEC.10.01	State the harmful effects of tobacco on: — the respiratory system; — the cardiovascular system;						X	X		
HPL.SPEC.10.02	Indicate the level of caffeine dosage at which performance is degraded						X	X		
HPL.SPEC.10.03	Besides coffee, indicate other beverages containing caffeine						X	X		
HPL.SPEC.10.04	State the maximum acceptable limit of alcohol for flight crew according to the applicable regulations.	X	X	X			R	R		
HPL.SPEC.10.05	State the effects of alcohol consumption on: — the ability to reason; — inhibitions and self-control; — vision; — the sense of balance and sensory illusions; — sleep patterns;	X	X	X			R	R		
HPL.SPEC.10.06	State the effects alcohol may have if consumed together with other drugs	X	X	X						
HPL.SPEC.10.07	List the signs and symptoms of alcoholism.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
HPL.SPEC.10.08	List the factors that may be associated with the development of alcoholism						X	X		
HPL.SPEC.10.09	Define the ‘unit’ of alcohol and state the approximate elimination rate from the blood						X	X		
HPL.SPEC.10.10	State the maximum daily and weekly intake of units of alcohol which may be consumed without causing damage to the organs and systems of the human body.						X	X		
HPL.SPEC.10.11	Discuss the actions that might be taken if a crew member is suspected of being an alcoholic.						X	X		
HPL.SPEC.10.12	State the dangers associated with the use of non-prescription drugs.	X	X	X			R	R		
HPL.SPEC.10.13	State the side effects of common non-prescription drugs used to treat colds, flu, hay fever and other allergies, especially medicines containing antihistamine preparations.	X	X	X			R	R		
HPL.SPEC.10.14	Interpret the rules relevant to using (prescription or non-prescription) drugs that the remote pilot has not used before.	X	X	X						
HPL.SPEC.10.15	Interpret the general rule that ‘if a remote pilot is so unwell that they require any medication, then they should consider themselves unfit to fly’	X	X	X						
HPL.SPEC.10.16	List those materials present in an unmanned aircraft which may, when uncontained, cause severe health problems.						X	X		
HPL.SPEC.10.17	List those unmanned aircraft component parts which if burnt may give off toxic fumes.						X	X		
HPL.SPEC.11.00	**Incapacitation**									
HPL.SPEC.11.01	State that incapacitation is most dangerous when its onset is insidious.	X	X	X			R	R		
HPL.SPEC.11.02	List the major causes of remote pilot incapacitation.	X	X	X			R	R		
HPL.SPEC.11.03	State the importance of crew to be able to recognise and promptly react upon incapacitation of other crew members, should it occur in flight.						X	X		
HPL.SPEC.11.04	Explain methods and procedures to cope with incapacitation in flight.	X	X	X			R	R		
HPL.SPEC.12.00	**Human Information Processing (HIP)**									
HPL.SPEC.12.01	Differentiate between ‘attention’ and ‘vigilance’	X	X	X			R	R		
HPL.SPEC.12.02	Differentiate between ‘selective’ and ‘divided’ attention						X	X		
HPL.SPEC.12.03	Define ‘hypovigilance’						X	X		
HPL.SPEC.12.04	Identify the factors that may affect the state of vigilance.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
HPL.SPEC.12.05	List the factors that may forestall hypovigilance during flight.						X	X		
HPL.SPEC.12.06	Indicate the signs of reduced vigilance.						X	X		
HPL.SPEC.12.07	List the factors that affect a person's level of attention.	X	X	X						
HPL.SPEC.13.00	**Perception**									
HPL.SPEC.13.01	Name the basis of the perceptual process.	X	X	X						
HPL.SPEC.13.02	Describe the mechanism of perception ('bottom-up'/'topdown' process).						X	X		
HPL.SPEC.13.03	Illustrate why perception is subjective and state the relevant factors that influence interpretation of perceived information						X	X		
HPL.SPEC.13.04	Describe some basic perceptual illusions.						X	X		
HPL.SPEC.13.05	Illustrate some basic perceptual concepts.						X	X		
HPL.SPEC.13.06	Give examples where perception plays a decisive role in flight safety.						X	X		
HPL.SPEC.13.07	Stress how persuasive and believable mistaken perception can manifest itself both for an individual and a group.						X	X		
HPL.SPEC.14.00	**Memory**									
HPL.SPEC.14.01	Explain the link between the types of memory (to include sensory, working/short-term and long-term memory).						X	X		
HPL.SPEC.14.02	Describe the differences between the types of memory in terms of capacity and retention time.						X	X		
HPL.SPEC.14.03	Justify the importance of sensory-store memories in processing information.						X	X		
HPL.SPEC.14.04	State the average maximum number of separate items that may be held in working memory (5 ± 2).						X	X		
HPL.SPEC.14.05	Stress how interruption can affect short-term/working memory						X	X		
HPL.SPEC.14.06	Give examples of items that are important for pilots to hold in working memory during flight.						X	X		
HPL.SPEC.14.07	Describe how the capacity of the working-memory store may be increased.						X	X		
HPL.SPEC.14.08	State the subdivisions of long-term memory and give examples of their content.						X	X		
HPL.SPEC.14.09	Explain that skills are kept primarily in the long-term memory.						X	X		
HPL.SPEC.14.10	Describe amnesia and how it affects memory.						X	X		
HPL.SPEC.14.11	Name the common problems with both the long- and short-term memories and the best methods to try to counteract them.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
HPL.SPEC.15.00	**Learning principles and techniques**									
HPL.SPEC.15.01	Explain and distinguish between the following basic forms of learning: — classic and operant conditioning (behaviouristic approach); learning by insight (cognitive approach); — learning by imitating (modelling).						X	X		
HPL.SPEC.15.02	Recognise pilot-related examples as behaviouristic, cognitive or modelling forms of learning.						X	X		
HPL.SPEC.15.03	State the factors that are necessary for and promote the quality of learning: — intrinsic motivation; — good mental health; — rehearsals for improvement of memory; — consciousness; — vigilance; — application in practical exercises.						X	X		
HPL.SPEC.15.04	Explain ways to facilitate the memorisation of information with the following learning techniques: — mnemonics; — mental training.						X	X		
HPL.SPEC.15.05	Describe the advantage of planning and anticipation of future actions: — define the term ‘skills’; — state the three phases of learning a skill (Anderson: cognitive, associative and autonomous phase).						X	X		
HPL.SPEC.15.06	Explain the term ‘motor programme’ or ‘mental schema’.						X	X		
HPL.SPEC.15.07	Describe the advantages and disadvantages of mental schemas.						X	X		
HPL.SPEC.15.08	Explain the Rasmussen model which describes the guidance of a pilot’s behaviour in different situations.						X	X		
HPL.SPEC.15.09	State the possible problems or risks associated with skill-, ruleand knowledge-based behaviour.						X	X		
HPL.SPEC.15.10	Define ‘motivation’.						X	X		
HPL.SPEC.15.11	Explain the relationship between motivation and learning.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
HPL.SPEC.15.12	Explain the problems of over-motivation, especially in the context of the extreme need to achieve.						X	X		
HPL.SPEC.16.00	**Human error and reliability**									
HPL.SPEC.16.01	Name and explain the factors that influence human reliability	X	X	X						
HPL.SPEC.16.02	Define the term ‘situation awareness’.	X	X	X	R	R				
HPL.SPEC.16.03	List the cues that indicate loss of situation awareness and name the steps to regain it.						X	X		
HPL.SPEC.16.04	List the factors that influence one’s situation awareness both positively and negatively, and stress the importance of situation awareness in the context of flight safety						X	X		
HPL.SPEC.16.05	Define the term ‘mental model’ in relation to a surrounding complex situation.						X	X		
HPL.SPEC.16.06	Describe the advantages/disadvantages of mental models						X	X		
HPL.SPEC.16.07	Explain the relationship between personal ‘mental models’ and the creation of cognitive illusions.						X	X		
HPL.SPEC.16.08	Explain the concept of the ‘error chain’.						X	X		
HPL.SPEC.16.09	Differentiate between an isolated error and an error chain.						X	X		
HPL.SPEC.16.10	Distinguish between the main forms/types of errors (i.e. slips, faults, omissions and violations).						X	X		
HPL.SPEC.16.11	Discuss the above errors and their relevance in flight.						X	X		
HPL.SPEC.16.12	Distinguish between an active and a latent error and give examples.						X	X		
HPL.SPEC.16.13	Distinguish between internal and external factors in error generation.						X	X		
HPL.SPEC.16.14	Identify possible sources of internal error generation.						X	X		
HPL.SPEC.16.15	Define and discuss the two errors associated with motor programmes (action slip and environmental capture).						X	X		
HPL.SPEC.16.16	List the three main sources of external error generation in the flight crew compartment.						X	X		
HPL.SPEC.16.17	Give examples to illustrate the following factors in external error generation in the flight crew compartment: — ergonomics; — economics; — social environment.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
HPL.SPEC.16.18	Name the major goals in the design of human-centred human– machine interfaces.						X	X		
HPL.SPEC.16.19	Define the term ‘error tolerance’.						X	X		
HPL.SPEC.16.20	List and describe the strategies that are used to reduce human error.						X	X		
HPL.SPEC.16.21	Describe the advantage of planning and the anticipation of future actions.						X	X		
HPL.SPEC.17.00	**Decision-making**									
HPL.SPEC.17.01	Define the terms ‘deciding’ and ‘decision-making’.						X	X		
HPL.SPEC.17.02	Describe the major factors on which decision-making should be based during the course of a flight.						X	X		
HPL.SPEC.17.03	Describe the main human attributes with regard to decision making.						X	X		
HPL.SPEC.17.04	Discuss the nature of bias and its influence on the decision making process.						X	X		
HPL.SPEC.17.05	Describe the main error sources and limits in an individual’s decision-making mechanism.						X	X		
HPL.SPEC.17.06	State the factors upon which an individual’s risk assessment is based.	X								
HPL.SPEC.17.07	Explain the relationship between risk assessment, commitment, and pressure of time in decision-making strategies.	X								
HPL.SPEC.17.08	Explain the risks associated with dispersion or channelised attention during the application of procedures requiring a high workload within a short time frame (e.g. a go-around).						X	X		
HPL.SPEC.17.09	Describe the positive and negative influences exerted by other group members on an individual’s decision-making process (risk shift).	X								
HPL.SPEC.17.10	Explain the general idea behind the creation of a model for decision-making based upon: — definition of the aim; — collection of information; — risk assessment; — development of options; — evaluation of options; — decision; — implementation; — consequences; — review and feedback.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
HPL.SPEC.18.00	**Avoiding and managing errors: cockpit management**									
	Safety awareness									
HPL.SPEC.18.01	Justify the need for being aware of not only one's own performance but that of others before and during a flight and the possible consequences or risks.						X	X		
HPL.SPEC.19.00	***Coordination (multi-crew concepts)***									
HPL.SPEC.19.01	Name the objectives of the multi-crew concept.						X	X		
HPL.SPEC.19.02	State and explain the elements of multi-crew concepts.						X	X		
HPL.SPEC.19.03	Describe the concepts of 'standard operating procedures' (SOPs), checklists and crew briefings.	X	X	X	R	R	R	R		
HPL.SPEC.19.04	Describe the purpose of and procedure for crew briefings.	X	X	X						
HPL.SPEC.19.05	Describe the purpose of and procedure for checklists.	X	X	X						
HPL.SPEC.19.06	Describe the function of communication in a coordinated team.	X	X	X						
HPL.SPEC.19.07	Explain the advantages of SOPs.	X	X	X						
HPL.SPEC.19.08	Explain how SOPs contribute to avoiding, reducing and managing threats and errors.						X	X		
HPL.SPEC.19.09	Explain potential threats of SOPs						X	X		
HPL.SPEC.20.00	***Cooperation***									
HPL.SPEC.20.01	Distinguish between cooperation and coaction.						X	X		
HPL.SPEC.20.02	Define the term 'group'.						X	X		
HPL.SPEC.20.03	Illustrate the influence of interdependence in a group.						X	X		
HPL.SPEC.20.04	List the advantages and disadvantages of teamwork.						X	X		
HPL.SPEC.20.05	Explain the term 'synergy'.						X	X		
HPL.SPEC.20.06	Define the term 'cohesion'.						X	X		
HPL.SPEC.20.07	Define the term 'groupthink'.						X	X		
HPL.SPEC.20.08	State the essential conditions for good teamwork.						X	X		
HPL.SPEC.20.09	Explain the function of role and norm in a group.						X	X		
HPL.SPEC.20.10	Name the different role patterns which occur in a group situation.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
HPL.SPEC.20.11	Explain how behaviour can be affected by the following factors: — persuasion; — conformity; — compliance; — obedience.						X	X		
HPL.SPEC.20.12	Distinguish between status and role.						X	X		
HPL.SPEC.20.13	Stress the inherent dangers of a situation where there is a mix of role and status within the flight crew compartment.						X	X		
HPL.SPEC.20.14	Explain the terms ‘leadership’ and ‘followership’.						X	X		
HPL.SPEC.20.15	Describe the trans-flightdeck authority gradient and its affiliated leadership styles (i.e. autocratic, laissez-faire and synergistic).						X	X		
HPL.SPEC.20.16	Name the most important attributes of a positive leadership style.						X	X		
HPL.SPEC.21.00	***Communication***									
HPL.SPEC.21.01	Define the term ‘communication’.						X	X		
HPL.SPEC.21.02	List the most basic components of interpersonal communication.						X	X		
HPL.SPEC.21.03	Explain the advantages of in-person two-way communication as opposed to one-way communication.						X	X		
HPL.SPEC.21.04	Name the importance of non-verbal communication.						X	X		
HPL.SPEC.21.05	Describe the general aspects of non-verbal communication.						X	X		
HPL.SPEC.21.06	Describe the advantages/disadvantages of implicit and explicit communication.						X	X		
HPL.SPEC.21.07	Describe the advantages and possible problems of using ‘social’ and ‘professional’ language in high- and low-workload situations.						X	X		
HPL.SPEC.21.08	Name and explain the major obstacles to effective communication.						X	X		
HPL.SPEC.21.09	Explain the difference between intrapersonal and interpersonal conflict.						X	X		
HPL.SPEC.21.10	Describe the escalation process in human conflict.						X	X		
HPL.SPEC.21.12	List the typical consequences of conflicts between crew members.						X	X		
HPL.SPEC.21.13	Explain the following terms as part of the communication practice with regard to preventing or resolving conflicts: — inquiry; — active listening; — advocacy;						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
	— feedback; — metacommunication; negotiation.									
HPL.SPEC.21.14	Describe the limitations of communication in situations of high workload in the flight crew compartment in view of listening, verbal, non-verbal and visual effects.						X	X		
HPL.SPEC.22.00	**Human behaviour**									
HPL.SPEC.22.01	***Personality, attitude, and behaviour***									
HPL.SPEC.22.02	Describe the factors that determine an individual's behaviour.						X	X		
HPL.SPEC.22.03	Define and distinguish between personality, attitude, and behaviour.						X	X		
HPL.SPEC.22.04	State the origin of personality and attitude.						X	X		
HPL.SPEC.22.05	State that with behaviour good and bad habits can be formed.						X	X		
HPL.SPEC.22.06	Explain how behaviour is generally a product of personality, attitude and the environment to which one was exposed at significant moments (childhood, schooling and training).						X	X		
HPL.SPEC.22.07	State that personality differences and selfish attitude may have effects on flight crew performance.						X	X		
HPL.SPEC.23.00	***Individual differences in personality and motivation***									
HPL.SPEC.23.01	Describe the individual differences in personality by means of a common trait model (e.g. Eysenck's personality factors).						X	X		
HPL.SPEC.24.00	***Self-concept***									
HPL.SPEC.24.01	Define the term 'self-concept' and the role it plays in any change of personality.						X	X		
HPL.SPEC.24.02	Explain how a self-concept of under confidence may lead to an outward show of aggression and self- assertiveness.						X	X		
HPL.SPEC.25.00	***Self-discipline***									
	Define 'self-discipline' and justify its importance for flight safety.						X	X		
HPL.SPEC.26.00	***Identification of hazardous attitudes (error proneness)***									
HPL.SPEC.26.01	Explain dangerous attitudes in aviation: — anti-authority; — macho; — impulsivity;						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
	— invulnerability; — complacency; — resignation.									
HPL.SPEC.26.02	Describe the personality, attitude, and behaviour patterns of an ideal crew member.						X	X		
HPL.SPEC.26.03	Summarise how a person's attitude influences their work in a unmanned flightdeck						X	X		
HPL.SPEC.27.00	**Human overload and underload**									
	Arousal									
HPL.SPEC.27.01	Explain the term 'arousal'.						X	X		
HPL.SPEC.27.02	Describe the relationship between arousal and performance.						X	X		
HPL.SPEC.27.03	Explain the circumstances under which underload may occur and its possible dangers.						X	X		
HPL.SPEC.28.00	***Stress***									
HPL.SPEC.28.01	Explain the term 'stress' and why stress is a natural human reaction.	X	X	X						
HPL.SPEC.28.02	State that the physiological response to stress is generated by the 'fight or flight' response.						X	X		
HPL.SPEC.28.03	Describe the function of the autonomic nervous system (ANS) in stress response.						X	X		
HPL.SPEC.28.04	Explain the relationship between arousal and stress.						X	X		
HPL.SPEC.28.05	State the relationship between stress and performance.						X	X		
HPL.SPEC.28.06	State the basic categories of stressors.	X	X	X						
HPL.SPEC.28.07	List and discuss the major environmental sources of stress in the flight crew compartment.						X	X		
HPL.SPEC.28.08	Discuss the concept of 'break point' with regard to stress, overload and performance.						X	X		
HPL.SPEC.28.09	Name the principal causes of domestic stress.						X	X		
HPL.SPEC.28.10	State that the stress experienced as a result of particular demands varies among individuals.						X	X		
HPL.SPEC.28.11	Explain the factors that lead to differences in the levels of stress experienced by individuals.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
HPL.SPEC.28.12	List the factors that influence the tolerance of stressors.						X	X		
HPL.SPEC.28.13	State that stress is a result of perceived demands and perceived ability.						X	X		
HPL.SPEC.28.14	Explain the relationship between stress and anxiety.						X	X		
HPL.SPEC.28.15	Describe the effects of anxiety on human performance.						X	X		
HPL.SPEC.28.16	State the general effect of acute stress on people.						X	X		
HPL.SPEC.28.17	Describe the relationship between stress, arousal and vigilance.						X	X		
HPL.SPEC.28.18	State the general effect of chronic stress and the biological reaction by means of the three stages of the general adaptation syndrome (Selye): alarm, resistance, and exhaustion.						X	X		
HPL.SPEC.28.19	Explain the differences between psychological, psychosomatic, and somatic stress reactions.						X	X		
HPL.SPEC.28.20	Name the typical common physiological and psychological symptoms of human overload.						X	X		
HPL.SPEC.28.21	Describe the effects of stress on human behaviour.						X	X		
HPL.SPEC.28.22	Explain how stress is cumulative and how stress from one situation can be transferred to a different situation.						X	X		
HPL.SPEC.28.23	Explain how successful completion of a stressful task will reduce the amount of stress experienced when a similar situation arises in the future.						X	X		
HPL.SPEC.28.24	Describe the effect of human underload/overload on effectiveness in the flight crew compartment.						X	X		
HPL.SPEC.28.25	List sources and symptoms of human underload.						X	X		
HPL.SPEC.29.00	***Fatigue and stress management***									
HPL.SPEC.29.01	Explain the term ‘fatigue’ and differentiate between the two types of fatigue (short-term and chronic fatigue).	X	X	X			R	R		
HPL.SPEC.29.02	Name the causes of short-term and chronic fatigue.	X	X	X			R	R		
HPL.SPEC.29.03	Identify the symptoms and describe the effects of fatigue.	X	X	X			R	R		
HPL.SPEC.29.04	List the strategies that prevent or delay the onset of fatigue and hypovigilance.						X	X		
HPL.SPEC.29.05	List and describe strategies for coping with stress factors and stress reactions.						X	X		
HPL.SPEC.29.06	Distinguish between short-term and long-term methods of stress management.	X	X	X			R	R		
HPL.SPEC.29.07	Give examples of short-term methods of stress management.	X	X	X			X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
HPL.SPEC.29.08	Give examples of long-term methods of coping with stress.						X	X		
HPL.SPEC.29.09	Describe the fatique risk management system (FRMS) as follows: a data-driven means of continuously monitoring and managing fatigue-related safety risks, based upon scientific principles and knowledge as well as operational experience that aims to ensure relevant personnel are performing at adequate levels of alertness.						X	X		
HPL.SPEC.30.00	**Automation**									
	Advantages and disadvantages									
HPL.SPEC.30.01	Explain the fundamental restrictions of automated flight systems to be lack of creativity in unknown situations, and lack of personal motivation with regard to safety.						X	X		
HPL.SPEC.30.02	List the principal strengths and weaknesses of pilot versus automated flight systems to be creativity, decision-making, prioritisation of tasks, safety attitude versus precision, reliability.						X	X		
HPL.SPEC.31.00	***Automation complacency***									
HPL.SPEC.31.01	State the main weaknesses in the monitoring of automatic systems to be hypovigilance.						X	X		
HPL.SPEC.31.02	Explain some basic flight crew errors and terms that arise with the introduction of automation: - passive monitoring - blinkered concentration - confusion - flight mode awareness.						X	X		
HPL.SPEC.31.03	Explain how the method of call-outs counteracts ineffective monitoring of automatic systems.						X	X		
HPL.SPEC.31.04	Define ‘complacency’.						X	X		
HPL.SPEC.32.00	***Working concepts***									
HPL.SPEC.32.01	Explain that the potential disadvantages of automation on crew communication are loss of awareness of input errors, flight modes, failure detection, failure comprehension, status of the unmanned aircraft and unmanned aircraft position.						X	X		

1389

1390 **METEOROLOGY**

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
MET.SPEC.00.00	**Meteorology**									
MET.SPEC.01.00	**The Atmosphere**									
	Structure of the atmosphere									
MET.SPEC.01.01	Describe the vertical division of the atmosphere up to flight level (FL) 650, based on the temperature variation with height	X	X	X			R	R		
MET.SPEC.01.02	List the different layers and their main qualitative characteristics up to FL650						X	X		
MET.SPEC.02.00	**Air temperature**									
MET.SPEC.02.01	Define ‘air temperature’.	X	X	X						
MET.SPEC.02.02	List the units of measurement of air temperature used in aviation meteorology (Celsius, Fahrenheit, Kelvin). *(Refer to Subject 050 10 01 01)*	X	X	X						
MET.SPEC.03.00	***Vertical distribution of temperature***									
MET.SPEC.03.01	Describe the mean vertical distribution of temperature up to FL 650.						X	X		
MET.SPEC.03.02	Mention the general causes of the cooling of the air in the troposphere with increasing altitude.						X	X		
MET.SPEC.03.03	Calculate the temperature and temperature deviations (in relation to International Standard Atmosphere (ISA)) at specified levels.						X	X		
MET.SPEC.04.00	***Transfer of heat***									
MET.SPEC.04.01	Explain how local cooling or warming processes result in transfer of heat.						X	X		
MET.SPEC.04.02	Describe radiation.						X	X		
MET.SPEC.04.03	Describe solar radiation reaching the Earth.						X	X		
MET.SPEC.04.04	Describe the filtering effect of the atmosphere on solar radiation.						X	X		
MET.SPEC.04.05	Describe terrestrial radiation.						X	X		
MET.SPEC.04.06	Explain how terrestrial radiation is absorbed by some components of the atmosphere.						X	X		
MET.SPEC.04.07	Explain the effect of absorption and radiation in connection with clouds.						X	X		
MET.SPEC.04.08	Explain the process of conduction.						X	X		
MET.SPEC.04.09	Explain the role of conduction in the cooling and warming of the atmosphere.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
MET.SPEC.04.10	Explain the process of convection.						X	X		
MET.SPEC.04.11	Name the situations in which convection occurs.						X	X		
MET.SPEC.04.12	Explain the process of advection.						X	X		
MET.SPEC.04.13	Name the situations in which advection occurs.						X	X		
MET.SPEC.04.14	Describe the transfer of heat by turbulence.						X	X		
MET.SPEC.04.15	Describe the transfer of latent heat.						X	X		
MET.SPEC.05.00	***Temperature near the Earth's surface, insolation, surface effects, effect of clouds, effect of wind***									
MET.SPEC.05.01	Explain the cooling/warming of the surface of the Earth by radiation.						X	X		
MET.SPEC.05.02	Explain the cooling/warming of the air by molecular or turbulent heat transfer to/from the earth or sea surfaces.						X	X		
MET.SPEC.05.03	Describe qualitatively the influence of the clouds on the cooling and warming of the surface and the air near the surface.						X	X		
MET.SPEC.05.04	Explain the influence of the wind on the cooling and warming of the air near the surfaces.						X	X		
MET.SPEC.06.00	**Atmospheric pressure**									
	Barometric pressure, isobars									
MET.SPEC.06.01	Define 'atmospheric pressure'.						X	X		
MET.SPEC.06.02	List the units of measurement of the atmospheric pressure used in aviation (hPa, inches of mercury). *(Refer to Subject 050 10 01 01)*						X	X		
MET.SPEC.06.03	Describe the principle of the barometers (mercury barometer, aneroid barometer).						X	X		
MET.SPEC.06.04	Define isobars and identify them on surface weather charts.						X	X		
MET.SPEC.06.05	Define 'high', 'low', 'trough', 'ridge', 'col'.						X	X		
MET.SPEC.07.00	***Pressure variation with height, contours (isohypses)***									
MET.SPEC.07.01	Explain the pressure variation with height.						X	X		
MET.SPEC.07.02	Describe quantitatively the variation of the barometric lapse rate. *Remark: An approximation of the average value for the barometric lapse rate near mean sea level (MSL) is 30 ft (9 m) per 1 hPa.*						X	X		
	Reduction of pressure to QFF (MSL)									

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
MET.SPEC.07.04	Define 'QFF'.						X	X		
MET.SPEC.07.05	Explain the reduction of measured pressure (QFE) to QFF (MSL).						X	X		
MET.SPEC.07.06	Mention the use of QFF for surface weather charts.						X	X		
	Relationship between surface pressure centres and pressure centres aloft									
MET.SPEC.07.07	Illustrate with a vertical cross section of isobaric surfaces the relationship between surface pressure systems and upper-air pressure systems.						X	X		
MET.SPEC.08.00	**Air density**									
MET.SPEC.08.01	***Relationship between pressure, temperature and density***									
MET.SPEC.08.02	Describe the relationship between pressure, temperature and density.						X	X		
MET.SPEC.08.03	Describe the vertical variation of the air density in the atmosphere.						X	X		
MET.SPEC.09.00	**International Standard Atmosphere (ISA)**									
MET.SPEC.09.01	Explain the use of standardised values for the atmosphere.						X	X		
MET.SPEC.09.02	List the main values of the ISA MSL pressure, MSL temperature, the vertical temperature lapse rate up to FL 650, height and temperature of the tropopause.						X	X		
MET.SPEC.10.00	**Altimetry**									
	Terminology and definitions									
MET.SPEC.10.01	Define the following terms and explain how they are related to each other: height, altitude, pressure altitude, FL, pressure level, true altitude, true height, elevation, QNH, QFE, and standard altimeter setting.						X	X	X	X
MET.SPEC.10.02	Describe the terms 'transition altitude', 'transition level','transition layer', 'terrain clearance', 'lowest usable flight level'.						X	X	X	X
	Altimeter settings									
MET.SPEC.10.03	Name the altimeter settings associated to height, altitude, pressure altitude and FL.						X	X		
	Describe the altimeter-setting procedures.						X	X		
MET.SPEC.10.04	***Calculations***									
MET.SPEC.10.05	Calculate the different readings on the altimeter when a remote pilot uses different settings (QNH, 1013.25, QFE).						X	X		
MET.SPEC.10.06	Illustrate with a numbered example the changes of altimeter setting and the						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
	associated changes in reading when the pilot climbs through the transition altitude or descends through the transition level.									
MET.SPEC.10.07	Derive the reading of the altimeter of an unmanned aircraft on the ground when the pilot uses the different settings.						X	X		
MET.SPEC.10.08	Explain the influence of the air temperature on the distance between the ground and the level read on the altimeter and between two FLs.						X	X		
MET.SPEC.10.09	Explain the influence of pressure areas on true altitude.						X	X		
MET.SPEC.10.10	Determine the true altitude/height for a given altitude/height and a given ISA temperature deviation.						X	X		
MET.SPEC.10.11	Calculate the terrain clearance and the lowest usable FL for given atmospheric temperature and pressure conditions.						X	X		
MET.SPEC.10.12	State that the 4 %-rule can be used to calculate true altitude from indicated altitude, and also indicated altitude from true altitude (not precise but sufficient due to the approximation of the 4%-rule.) *Remark: The following rules should be considered for altimetry calculations:* *a) All calculations are based on rounded pressure values to the nearest lower hPa.* *b) The value for the barometric lapse rate between MSL and 700 hPa to be used is 30 ft/hPa as an acceptable approximation of the barometric lapse rate.* *c) To determine the true altitude/height, the following rule of thumb, called the '4 %-rule', shall be used: the altitude/height changes by 4 % for each 10 °C temperature deviation from ISA.* *d) If no further information is given, the deviation of the outside-air temperature from ISA is considered to be constantly the same given value in the whole layer.* *e) The elevation of the aerodrome has to be taken into account. The temperature correction has to be considered for the layer between the ground and the position of the unmanned aircraft.*						X	X		
	Effect of accelerated airflow due to topography									
MET.SPEC.10.13	Describe qualitatively how the effect of accelerated airflow due to topography (the Bernoulli effect) affects altimetry.						X	X		
MET.SPEC.11.00	**WIND**									

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
	Definition and measurement of wind									
	Definition and measurement									
MET.SPEC.11.01	Define 'wind' and 'surface wind'.	X	X	X						
MET.SPEC.11.02	State the units of wind directions	X	X	X						
MET.SPEC.11.03	Describe that the reported wind is an average wind derived from measurements with an anemometer at a height of 10 m over 2 min for local routine and special reports and ATS units, and over 10 min for aerodrome routine meteorological reports (METARs) and aerodrome special meteorological reports (SPECIs).						X	X		
MET.SPEC.12.00	***Primary cause of wind, pressure gradient, Coriolis force, gradient wind***									
MET.SPEC.12.01	Define the term 'horizontal pressure gradient'.						X	X		
MET.SPEC.12.02	Reserved for future									
MET.SPEC.13.00	**General global circulation**									
	General circulation around the globe									
MET.SPEC.13.01	Describe the general global circulation.						X	X		
MET.SPEC.14.00	**Local winds**									
MET.SPEC.14.01	Describe and explain anabatic and katabatic winds.	X	X							
MET.SEPC.14.02	Describe mountain and valley winds.	X	X							
MET.SPEC.14.03	Describe the Venturi effect, convergence in valleys and mountain areas.	X	X							
MET.SPEC.14.04	Describe land and sea breezes, and sea-breeze front.	X	X							
MET.SPEC.14.05	Describe that local, low-level jet streams can develop in the evening.						X	X		
MET.SPEC.15.00	**Mountain waves (standing waves, lee waves)**									
	Origin and characteristics									
MET.SPEC.15.01	Explain the origin and formation of mountain waves.						X	X		
MET.SPEC.15.02	State the conditions necessary for the formation of mountain waves.						X	X		
MET.SPEC.15.03	Describe the structure and properties of mountain waves.						X	X		
MET.SPEC.15.04	Explain how mountain waves may be identified by their associated meteorological phenomena.						X	X		
MET.SPEC.15.05	Describe that mountain wave effects can exceed the performance or structural capability of unmanned aircraft.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
MET.SPEC.15.06	Describe that mountain wave effects can propagate from low to high level, e.g. over Greenland and elsewhere.						X	X		
MET.SPEC.16.00	**Turbulence**									
	Description and types of turbulence									
MET.SPEC.16.01	Describe turbulence and gustiness.	X	X	X						
MET.SPEC.16.02	List the common types of turbulence (convective, mechanical, orographic, frontal, clear-air turbulence).	X	X	X						
MET.SPEC.17.00	***Formation and location of turbulence***									
	Explain the formation of convective turbulence, mechanical and orographic turbulence, and frontal turbulence.						X	X		
	State where turbulence will normally be found (rough-ground surfaces, relief, inversion layers, cumulonimbus (CB), thunderstorm (TS) zones, unstable layers).						X	X		
	Describe and indicate the areas of worst wind shear and CAT.						X	X		
MET.SPEC.18.00	**CLOUDS AND FOG**									
MET.SPEC.18.01	Explain cloud formation by adiabatic cooling, conduction, advection and radiation.						X	X		
MET.SPEC.18.02	Describe cloud formation based on the following lifting processes: unorganisedlifting in thin layers and turbulent mixing; forced lifting at fronts or over mountains; free convection.						X	X		
MET.SPEC.18.03	List cloud types typical for stable and unstable air conditions.						X	X		
MET.SPEC.18.04	Summarise the conditions for the dissipation of clouds.						X	X		
MET.SPEC.19.00	***Cloud types and cloud classification***									
MET.SPEC.19.01	Describe the different cloud types and their classification.	X	X	X						
MET.SPEC.20.00	***Flying conditions in each cloud type***									
MET.SPEC.20.01	Assess the 10 cloud types for icing and turbulence.						X	X		
MET.SPEC.21.00	**Fog, mist, haze**									
MET.SPEC.21.01	Define ‘fog’, ‘mist’ and ‘haze’ with reference to the WMO standards of visibility range.						X	X		
MET.SPEC.21.02	Explain briefly the formation of fog, mist and haze.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
MET.SPEC.21.03	Name the factors that generally contribute to the formation of fog and mist.						X	X		
MET.SPEC.21.04	Name the factors that contribute to the formation of haze.						X	X		
MET.SPEC.21.05	Describe freezing fog and ice fog.						X	X		
MET.SPEC.22.00	***Radiation fog***									
MET.SPEC.22.01	Explain the formation of radiation fog.						X	X		
MET.SPEC.22.02	Describe the significant characteristics of radiation fog, and its vertical extent.						X	X		
MET.SPEC.22.03	Summarise the conditions for the dissipation of radiation fog.						X	X		
MET.SPEC.23.00	***Advection fog***									
MET.SPEC.23.01	Explain the formation of advection fog.						X	X		
MET.SPEC.23.02	Describe the different possibilities of advection-fog formation (over land, sea and coastal regions).						X	X		
MET.SPEC.23.03	Describe the significant characteristics of advection fog.						X	X		
MET.SPEC.23.04	Summarise the conditions for the dissipation of advection fog.						X	X		
MET.SPEC.24.00	***Sea smoke***									
MET.SPEC.24.01	Explain the formation of sea smoke.						X	X		
MET.SPEC.24.02	Explain the conditions for the development of sea smoke.						X	X		
MET.SPEC.24.03	Summarise the conditions for the dissipation of sea smoke.						X	X		
MET.SPEC.24.04	Explain the formation of frontal fog.						X	X		
MET.SPEC.24.05	Describe the significant characteristics of frontal fog.						X	X		
MET.SPEC.24.06	Summarise the conditions for the dissipation of frontal fog.						X	X		
MET.SPEC.24.07	Summarise the features of orographic fog.						X	X		
MET.SPEC.24.08	Describe the significant characteristics of orographic fog.						X	X		
MET.SPEC.24.09	Summarise the conditions for the dissipation of orographic fog.						X	X		
MET.SPEC.25.00	**PRECIPITATION**									
	Process of development of precipitation									
MET.SPEC.25.01	Describe the two basic processes of forming precipitation (The Wegener–Bergeron–Findeisen process, Coalescence).						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
MET.SPEC.25.02	Summarise the outlines of the ice-crystal process (The Wegener– Bergeron–Findeisen process).						X	X		
MET.SPEC.25.03	Summarise the outlines of the coalescence process.						X	X		
MET.SPEC.25.04	Explain the development of snow, rain, drizzle and hail.						X	X		
MET.SPEC.26.00	**Types of precipitation**									
MET.SPEC.26.01	List and describe the types of precipitation given in the aerodrome forecast (TAF) and METAR codes (drizzle, rain, snow, snow grains, ice pellets, hail,small hail, snow pellets, ice crystals, freezing drizzle, freezing rain).						X	X		
MET.SPEC.26.01	State the ICAO/WMO approximate diameters for cloud, drizzle and rain drops.						X	X		
MET.SPEC.26.02	State that, because of their size, hail stones can cause significant damage to unmanned aircraft.						X	X		
MET.SPEC.26.03	Explain the mechanism for the formation of freezing precipitation.						X	X		
MET.SPEC.26.04	Describe the weather conditions that give rise to freezing precipitation.						X	X		
MET.SPEC.26.05	Distinguish between the types of precipitation generated in convective and stratiform clouds.						X	X		
MET.SPEC.26.07	Assign typical precipitation types and intensities to different cloud types.						X	X		
MET.SPEC.26.08	Explain the relationship between moisture content and visibility during different types of winter precipitation (e.g. large vs small snowflakes).						X	X		
MET.SPEC.27.00	**AIR MASSES AND FRONTS**									
	Air masses									
MET.SPEC.27.01	Define the term ‘air mass’.						X	X		
MET.SPEC.27.02	Describe the properties of the source regions.						X	X		
MET.SPEC.27.03	Summarise the classification of air masses by source regions.						X	X		
MET.SPEC.27.04	State the classifications of air masses by temperature and humidity at source.						X	X		
MET.SPEC.27.05	State the characteristic weather in each of the air masses.						X	X		
MET.SPEC.27.06	Name the three main air masses that affect Europe.						X	X		
MET.SPEC.27.07	Classify air masses on a surface weather chart.						X	X		
MET.SPEC.27.08	*Remark: Names and abbreviations of air masses used in examinations:* *— first letter: humidity* *— continental (c)*						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
	— *maritime (m)* — *second letter: type of air mass* — *arctic (A)* — *polar (P)* — *tropical (T)* — *equatorial (E)* — *third letter: temperature* — *cold (c)* — *warm (w)*									
MET.SPEC.28.00	***Modifications of air masses***									
MET.SPEC.28.01	List the environmental factors that affect the final properties of an air mass.						X	X		
MET.SPEC.28.02	Explain how maritime and continental tracks modify air masses.						X	X		
MET.SPEC.28.03	Explain the effect of passage over cold or warm surfaces.						X	X		
MET.SPEC.28.04	Explain how air-mass weather is affected by the season, the air- mass track and by orographic and thermal effects over land.						X	X		
MET.SPEC.28.05	Assess the tendencies of the stability of an air mass and describe the typical resulting air-mass weather including the hazards for aviation.						X	X		
MET.SPEC.29.00	**Fronts**									
MET.SPEC.29.01	Describe the boundaries between air masses (fronts).						X	X		
MET.SPEC.29.02	Define ‘front’ and ‘frontal zone’.						X	X		
MET.SPEC.29.03	Name the global frontal systems (polar front, arctic front).						X	X		
MET.SPEC.29.04	State the approximate seasonal latitudes and geographic positions of the polar front and the arctic front.						X	X		
MET.SPEC.30.00	***Warm front, associated clouds and weather***									
MET.SPEC.30.01	Define a ‘warm front’.						X	X		
MET.SPEC.30.02	Describe the cloud, weather, ground visibility and aviation hazards at a warm front depending on the stability of the warm air.						X	X		
MET.SPEC.30.03	Explain the seasonal differences in the weather at warm fronts.						X	X		
MET.SPEC.30.04	Describe the structure, slope and dimensions of a warm front.						X	X		
MET.SPEC.30.05	Sketch a cross section of a warm front showing weather, cloud and aviation hazards.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
MET.SPEC.31.00	***Cold front, associated clouds and weather***									
MET.SPEC.31.01	Define a 'cold front'.						X	X		
MET.SPEC.31.02	Describe the cloud, weather, ground visibility and aviation hazards at a cold front depending on the stability of the warm air.						X	X		
MET.SPEC.31.03	Explain the seasonal differences in the weather at cold fronts.						X	X		
MET.SPEC.31.04	Describe the structure, slope and dimensions of a cold front.						X	X		
MET.SPEC.31.05	Sketch a cross section of a cold front showing weather, cloud and aviation hazards.						X	X		
MET.SPEC.32.00	***Warm sector, associated clouds and weather***									
MET.SPEC.32.01	Describe fronts and air masses associated with the warm sector.						X	X		
MET.SPEC.32.02	Describe the cloud, weather, ground visibility and aviation hazards in a warm sector.						X	X		
MET.SPEC.32.03	Explain the seasonal differences in the weather in the warm sector.						X	X		
MET.SPEC.32.04	Sketch a cross section of a warm sector showing weather, cloud and aviation hazards.						X	X		
MET.SPEC.33.00	***Weather behind the cold front***									
MET.SPEC.33.01	Describe the cloud, weather, ground visibility and aviation hazards behind the cold front.						X	X		
MET.SPEC.33.02	Explain the seasonal differences in the weather behind the cold front.						X	X		
MET.SPEC.34.00	***Occlusions, associated clouds and weather***									
MET.SPEC.34.01	Define the term 'occlusion' and 'occluded front'.						X	X		
MET.SPEC.34.02	Describe the cloud, weather, ground visibility and aviation hazards in a cold occlusion.						X	X		
MET.SPEC.34.03	Describe the cloud, weather, ground visibility and aviation hazards in a warm occlusion.						X	X		
MET.SPEC.34.04	Explain the seasonal differences in the weather at occlusions.						X	X		
MET.SPEC.34.05	Sketch a cross section of occlusions showing weather, cloud and aviation hazards.						X	X		
MET.SPEC.34.06	On a sketch illustrate the development of an occlusion and the movement of the occlusion point.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
MET.SPEC.35.00	***Stationary front, associated clouds and weather***									
MET.SPEC.35.01	Define a 'stationary front'.						X	X		
MET.SPEC.35.02	Describe the cloud, weather, ground visibility and aviation hazards in avstationary front.						X	X		
MET.SPEC.36.00	***Movement of fronts and pressure systems, life cycle***									
MET.SPEC.36.01	Describe the movements of fronts and pressure systems and the life cycle of a mid-latitude depression.						X	X		
MET.SPEC.36.02	State the rules for predicting the direction and the speed of movement of fronts.						X	X		
MET.SPEC.36.03	State the difference in the speed of movement between cold and warm fronts.						X	X		
MET.SPEC.36.04	State the rules for predicting the direction and the speed of movement of frontal depressions.						X	X		
MET.SPEC.36.05	Describe, with a sketch if required, the genesis, development and life cycle of a frontal depression with associated cloud and rain belts.						X	X		
MET.SPEC.37.00	***Changes of meteorological elements at a frontal wave***									
MET.SPEC.37.01	Sketch a plan and a cross section of a frontal wave (warm front, warm sector, and cold front) and illustrate the changes of pressure, temperature, surface, wind and wind in the vertical axis.						X	X		
MET.SPEC.38.00	**PRESSURE SYSTEMS**									
	Location of the principal pressure areas									
MET.SPEC.38.01	Identify or indicate on a map the principal global high-pressure and low-pressure areas in January and July.						X	X		
MET.SPEC.38.02	Explain how these pressure areas are formed.						X	X		
MET.SPEC.38.03	Explain how the pressure areas move with the seasons.						X	X		
MET.SPEC.39.00	**FLIGHT HAZARDS**									
	Icing									
MET.SPEC.39.01	Summarise the general conditions under which ice accretion occurs on unmanned aircraft (temperatures of outside air; temperature of the airframe; presence of supercooled water in clouds, fog, rain and drizzle; possibility of sublimation).						X	X		
MET.SPEC.39.02	Explain the general weather conditions under which ice accretion occurs in a venturi carburettor.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
MET.SPEC.39.03	Explain the general weather conditions under which ice accretion occurs on airframe.						X	X		
MET.SPEC.39.04	Explain the formation of supercooled water in clouds, rain and drizzle.						X	X		
MET.SPEC.39.05	Explain qualitatively the relationship between the air temperature and the amount of supercooled water.						X	X		
MET.SPEC.39.06	Explain qualitatively the relationship between the type of cloud and the size and number of the droplets in cumuliform and stratiform clouds.						X	X		
MET.SPEC.39.07	Indicate in which circumstances ice can form on an unmanned aircraft on the ground: air temperature, humidity, precipitation.						X	X		
MET.SPEC.39.08	Explain in which circumstances ice can form on an unmanned aircraft in flight: inside clouds, in precipitation, and outside clouds and precipitation.						X	X		
MET.SPEC.39.09	Explain the influence of fuel temperature, radiative cooling of the unmanned aircraft surface and temperature of the unmanned aircraft surface (e.g. from previous flight) on ice formation.						X	X		
MET.SPEC.39.10	Describe the different factors that influence the intensity of icing: air temperature, amount of supercooled water in a cloud or in precipitation, amount of ice crystals in the air, speed of the unmanned aircraft, shape (thickness) of the airframe parts (wings, antennas,etc.).						X	X		
MET.SPEC.39.11	Explain the effects of topography on icing.						X	X		
MET.SPEC.39.12	Explain the higher concentration of water drops in stratiform orographic clouds.						X	X		
MET.SPEC.40.00	***Types of ice accretion***									
MET.SPEC.40.01	Define ‘clear ice’.						X	X		
MET.SPEC.40.02	Describe the conditions for the formation of clear ice.						X	X		
MET.SPEC.40.03	Explain the formation of the structure of clear ice with the release of latent heat during the freezing process.						X	X		
MET.SPEC.40.04	Describe the aspects of clear ice: appearance, weight, solidity.						X	X		
MET.SPEC.40.05	Define ‘rime ice’.						X	X		
MET.SPEC.40.06	Describe the conditions for the formation of rime ice.						X	X		
MET.SPEC.40.07	Describe the aspects of rime ice: appearance, weight, solidity.						X	X		
MET.SPEC.40.08	Define ‘mixed ice’.						X	X		
MET.SPEC.40.09	Describe the conditions for the formation of mixed ice.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
MET.SPEC.40.10	Describe the aspects of mixed ice: appearance, weight, solidity.						X	X		
MET.SPEC.40.11	Describe the possible process of ice formation in snow conditions.						X	X		
MET.SPEC.40.12	Define 'hoar frost'.						X	X		
MET.SPEC.40.13	Describe the conditions for the formation of hoar frost.						X	X		
MET.SPEC.40.14	Describe the aspects of hoar frost: appearance, solidity.						X	X		
MET.SPEC.41.00	***Hazards of ice accretion, avoidance***									
MET.SPEC.41.01	State the ICAO qualifying terms for the intensity of icing.						X	X		
MET.SPEC.41.02	Describe, in general, the hazards of icing.						X	X		
MET.SPEC.41.03	Assess the dangers of the different types of ice accretion.						X	X		
MET.SPEC.41.04	Describe the position of the dangerous zones of icing in fronts, in stratiform and cumuliform clouds, and in the different precipitation types.						X	X		
MET.SPEC.41.05	Indicate the possibilities of avoiding dangerous zones of icing: — in the flight planning: weather briefing, selection of track and altitude; — during flight: recognition of the dangerous zones, selection of appropriate track and altitude.						X	X		
MET.SPEC.42.00	***Ice crystal icing***									
MET.SPEC.42.01	Describe ice crystal icing.						X	X		
MET.SPEC.42.01	Describe the atmospheric processes leading to high ice crystal concentration. Define the variable ice water content (IWC).						X	X		
MET.SPEC.42.01	Identify weather situations and their relevant areas where high concentrations of ice crystals are likely to occur.						X	X		
MET.SPEC.42.01	Name, in general, the flight hazards associated with high concentrations of ice crystals.						X	X		
MET.SPEC.42.01	Explain how a pilot may possibly avoid areas with a high concentration of ice crystals.						X	X		
MET.SPEC.43.00	**Turbulence**									
MET.SPEC.43.01	Describe the effects of turbulence on an unmanned aircraft in flight.						X	X		
MET.SPEC.43.02	Indicate the possibilities of avoiding turbulence: — in the flight planning: weather briefing, selection of track and altitude; during flight: selection of appropriate track and altitude.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
MET.SPEC.43.03	Describe atmospheric turbulence and distinguish between turbulence, gustiness and wind shear.						X	X		
MET.SPEC.43.04	Describe that forecasts of turbulence are not very reliable and state that pilot reports of turbulence are very valuable as they help others to prepare for or avoid turbulence.						X	X		
MET.SPEC.44.00	**Wind shear**									
MET.SPEC.44.01	Define 'wind shear' (vertical and horizontal).						X	X		
MET.SPEC.44.02	Define 'low-level wind shear'.						X	X		
MET.SPEC.45.00	***Weather conditions for wind shear***									
MET.	Describe the conditions, where and how wind shear can form (e.g. thunderstorms, squall lines, fronts, inversions, land and sea breeze, friction layer, relief).						X	X		
MET.SPEC.46.00	***Effects on flight, avoidance***									
MET.SPEC.46.01	Describe the effects of wind shear on flight.									
MET.SPEC.46.02	Indicate the possibilities of avoiding wind shear in flight: — in the flight planning; — during flight.									
MET.SPEC.47.00	**Thunderstorms**									
MET.SPEC.47.01	Conditions for and process of development, forecast, location, type specification						X	X		
MET.SPEC.47.02	Name the cloud types which indicate the development of thunderstorms.	X	X	X						
MET.SPEC.47.03	Describe the different types of thunderstorms, their location, the conditions for and the process of development, and list their properties (air-mass thunderstorms, frontal thunderstorms, squalllines, supercell storms, orographic thunderstorms).							X		
MET.SPEC.48.00	***Structure of thunderstorms, life cycle***									
MET.SPEC.48.01	Assess the average duration of thunderstorms and their different stages.						X	X		
MET.SPEC.48.02	Describe a supercell storm: initial, supercell, tornado and dissipating stage.						X	X		
MET.SPEC.48.03	Summarise the flight hazards associated with a fully developed thunderstorm.						X	X		
MET.SPEC.48.04	Indicate on a sketch the most dangerous zones in and around a single-cell and a multi-cell thunderstorm.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
MET.SPEC.49.00	***Electrical discharges***									
MET.SPEC.49.01	Describe the basic outline of the electric field in the atmosphere.						X	X		
MET.SPEC.49.02	Describe types of lightning, i.e. ground stroke, intra-cloud lightning, cloud-to-cloud lightning, upward lightning.								X	X
MET.SPEC.49.03	Reserved									
MET.SPEC.49.04	Describe the development of lightning discharges.						X	X		
MET.SPEC.49.05	Describe the effect of lightning strike on unmanned aircraft and flight execution.						X	X		
MET.SPEC.50.00	***Development and effects of downbursts***									
MET.SPEC.50.01	Define the term ‘downburst’.						X	X		
MET.SPEC.50.02	Distinguish between macroburst and microburst.						X	X		
MET.SPEC.50.03	State the weather situations leading to the formation of downbursts.						X	X		
MET.SPEC.50.04	Describe the process of development of a downburst.						X	X		
MET.SPEC.50.05	Give the typical duration of a downburst.						X	X		
MET.SPEC.50.06	Describe the effects of downbursts.						X	X		
MET.SPEC.51.00	***Thunderstorm avoidance***									
MET.SPEC.51.01	Explain how the pilot can anticipate each type of thunderstorm: through pre-flight weather briefing, observation in flight, use of specific meteorological information, use of information given by ground weather radar and by airborne weather radar.						X	X		
MET.SPEC.51.02	Describe practical examples of flight techniques used to avoid the hazards of thunderstorms.						X	X		
MET.SPEC.52.00	**Tornadoes**									
MET.SPEC.52.01	Define ‘tornado’.						X	X		
MET.SPEC.52.02	Describe the formation of a tornado.						X	X		
MET.SPEC.52.03	Describe the typical features of a tornado such as appearance, season, time of day, stage of development, speed of movement, and wind speed.						X	X		
MET.SPEC.53.05	Compare the dimensions and properties of tornadoes and dust devils.						X	X		
MET.SPEC.54.00	**Inversions**									
MET.SPEC.54.01	Compare the flight hazards during take-off and approach associated with a						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
	strong inversion alone and with a strong inversion combined with marked wind shear.									
MET.SPEC.55.00	**Hazards in mountainous areas**									
MET.SPEC.55.01	Describe the influence of mountainous area on a frontal passage.						X	X		
MET.SPEC.55.02	Describe the vertical movements, wind shear and turbulence that are typical of mountain areas.						X	X		
MET.SPEC.55.03	Indicate on a sketch of a chain of mountains the turbulent zones (mountain waves, rotors).						X	X		
MET.SPEC.55.04	Explain the influence of relief on ice accretion.						X	X		
MET.SPEC.56.00	***Development and effect of valley inversions***									
MET.SPEC.56.01	Describe the formation of a valley inversion due to katabatic winds.						X	X		
MET.SPEC.56.02	Describe the valley inversion formed by warm winds aloft.						X	X		
MET.SPEC.56.03	Describe the effects of a valley inversion for an unmanned aircraft in flight.						X	X		
MET.SPEC.57.00	**METEOROLOGICAL INFORMATION**									
MET.SPEC.57.01	Demonstrate ability to obtain, interpret and apply meteorological reports and forecasts for operations	X	X	X						
MET.SPEC.57.02	Define ‘gusts’, as given in METARs.							X		
MET.SPEC.57.03	Distinguish wind given in METARs and wind given by the control tower for take-off and landing.						X	X		
MET.SPEC.57.04	Define visibilty						X	X		
MET.SPEC.57.05	Describe the meteorological measurement of visibility.						X	X		
MET.SPEC.57.06	Define ‘prevailing visibility’.						X	X		
MET.SPEC.57.07	Define ‘ground visibility’.						X	X		
MET.SPEC.57.08	List the units used for visibility (m, km, statute mile).						X	X		
MET.SPEC.57.09	Define ‘runway visual range’.						X	X		
MET.SPEC.57.11	Describe the meteorological measurement of runway visual range.						X	X		
MET.SPEC.57.12	Indicate where the transmissometers/forward-scatter meters are placed on the aerodrome.						X	X		
MET.SPEC.57.13	List the units used for runway visual range (m, ft).						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
MET.SPEC.57.14	List the different possibilities to transmit information to pilots about runway visual range.						X	X		
MET.SPEC.57.15	Compare ground visibility, prevailing visibility, and runway visual range.						X	X		
MET.SPEC.57.16	Indicate the means of observation of present weather.						X	X		
MET.SPEC.57.17	Indicate the means of observing clouds for the purpose of recording: type, amount, height of base (ceilometers), and top.						X	X		
MET.SPEC.57.18	State the clouds which are indicated in METAR, TAF and SIGMET.						X	X		
MET.SPEC.57.19	Define ‘oktas’.						X	X		
MET.SPEC.57.20	Define ‘cloud base’.						X	X		
MET.SPEC.57.21	Define ‘ceiling’.						X	X		
MET.SPEC.57.22	Name the unit and the reference level used for information about cloud base (ft).						X	X		
MET.SPEC.57.23	Define ‘vertical visibility’.						X	X		
MET.SPEC.57.24	Explain briefly how and when vertical visibility is measured.						X	X		
MET.SPEC.57.25	Name the units used for vertical visibility (ft, m).						X	X		
MET.SPEC.57.26	Indicate the means of observation of air temperature (thermometer).						X	X		
MET.SPEC.57.27	Name the units of relative humidity (%) and dew-point temperature (Celsius, Fahrenheit).						X	X		
MET.SPEC.58.00	**Satellite observations**									
MET.SPEC.58.01	Describe the basic outlines of satellite observations.						X	X		
MET.SPEC.58.02	Name the main uses of satellite pictures in aviation meteorology.						X	X		
MET.SPEC.58.03	Describe the different types of satellite imagery.						X	X		
MET.SPEC.58.04	Interpret qualitatively the satellite pictures to get useful information for flights: — location of clouds (distinguish between stratiform and cumuliform clouds).						X	X		
MET.SPEC.58.06	Interpret qualitatively the satellite pictures in order to get useful information for flights: — location of fronts.						X	X		
MET.SPEC.59.00	**Weather radar observations**									
MET.SPEC.59.01	Describe the basic principle and the type of information given by a ground weather radar.						X	X		

Syllabus Reference	Syllabus details and associated Learning Objectives	GVC	L1 A	L1 R	L2 A	L2 R	L3 A	L3 R	L4 A	L4 R
MET.SPEC.59.01	Interpret ground weather radar images.						X	X		
MET.SPEC.59.01	Describe the basic principle and the type of information given by airborne weather radar.						X	X		
MET.SPEC.59.01	Describe the limits and the errors of airborne weather radar information.						X	X		
MET.SPEC.59.01	Interpret typical airborne weather radar images.						X	X		
MET.SPEC.60.00	**Unmanned aircraft observations and reporting**									
MET.SPEC.60.01	Describe routine air-report and special air-report (ARS).						X	X		
MET.SPEC.60.02	State the obligation of a pilot to prepare air-reports.						X	X		
MET.SPEC.60.03	Name the weather phenomena to be stated in an ARS.						X	X		
MET.SPEC.61.00	**Weather charts**									
MET.SPEC.61.01	Decode and interpret significant weather charts (low, medium and high level).						X	X		
MET.SPEC.61.02	Describe from a significant weather chart the flight conditions at designated locations or along a defined flight route at a given FL.						X	X		
MET.SPEC.62.00	**Surface charts**									
MET.SPEC.62.01	Recognise the following weather systems on a surface weather chart (analysed and forecast): ridges, cols and troughs; fronts; frontal side, warm sector and rear side of mid-latitude frontal lows; high- and low-pressure areas.						X	X		
MET.SPEC.62.02	Determine from surface weather charts the wind direction and speed.						X	X		
MET.SPEC.63.00	**Information for flight planning**									
MET.SPEC.63.01	Describe, decode and interpret the following aviation weather messages (given in written or graphical format): METAR, aerodrome special meteorological report (SPECI), trend forecast (TREND), TAF, information concerning en-route weather phenomena which may affect the safety of unmanned aircraft operations (SIGMET), information concerning en-route weather phenomena which may affect the safety of low-level unmanned aircraft operations (AIRMET), area forecast for low-level flights (GAMET), ARS, volcanic ash advisory information.						X	X		
MET.SPEC.63.02	Describe the general meaning of MET REPORT and SPECIAL REPORT.						X	X		

1391

APPENDIX C – REMOTE PILOT COMPETENCE

APPLICATION OF KNOWLEDGE

Application of Knowledge (APK)	
Description: Demonstrates knowledge and understanding of relevant information, operating instruction, unmanned aircraft systems and the operating environment.	
Observable Behaviours	
1	Demonstrates practical and applicable knowledge of limitations and systems and their interactions
2	Demonstrates required knowledge of published operating instructions
3	Demonstrates knowledge of the physical environment, the air traffic environment including routings, weather, airports, and the operational infrastructure
4	Demonstrates appropriate knowledge of applicable legislation
5	Knows where to source required information
6	Demonstrates a positive interest in acquiring knowledge
7	Can apply knowledge effectively

APPLICATION OF PROCEDURES & COMPLIANCE WITH REGULATIONS

Application of Procedures & Compliance with Regulations (PCR)	
Description: Identifies and applies procedures in accordance with published operating instructions and applicable regulations, using the appropriate knowledge	
Observable Behaviours	
1	Identifies the source of operating instructions
2	Follows standard operating procedures (SOPs) unless a higher degree of safety dictates an appropriate deviation
3	Identifies and follows all operating instructions in a timely manner
4	Correctly operates the UAS and associated equipment
5	Complies with applicable regulations
6	Applies relevant procedural knowledge

SITUATIONAL AWARENESS

Situational Awareness (SIT)	
Description: Perceives and comprehends the operational situation of the moment and all of the relevant information available and anticipates what could happen that may affect the operation	
Observable Behaviours	
1	Identifies and assesses accurately the state of the UAS
2	Identifies and assesses accurately the UAS vertical and lateral position, and its anticipated flight path
3	Identifies and assesses accurately the general environment as it may affect the flight, including the air traffic neighbouring the UAS operation and the meteorological conditions that could impact the operation

4	Conducts the operation in accordance with the airspace configuration where the UAS operation is taking place
5	Keeps track of time and energy
6	Maintains awareness of the people involved in or affected by the operation and their capacity to perform as expected
7	Anticipates accurately what could happen, plans, and stays ahead of the situation
8	Develops effective contingency plans based upon potential threats
9	Recognizes and effectively responds to indications of reduced situational awareness

1398

1399 **COMMUNICATION**

Communication (COM)	
Description: Demonstrates effective verbal, written and nonverbal communications, in normal and abnormal situations	
Observable Behaviours	
1	Ensures the recipient is ready and able to receive the information
2	Selects appropriately what, when how and with whom to communicate
3	Conveys messages clearly, accurately, and concisely
4	Confirms that the recipient correctly understands important information
5	Listens actively and demonstrates understanding when receiving information
6	Asks relevant and effective questions – Adheres to standard radiotelephony phraseology and procedures
7	Accurately reads and interprets required documentation for the operation of UAS
8	Accurately reads, interprets, constructs and responds to datalink messages
9	Completes accurate reports as required by operating procedures
10	Correctly interprets non-verbal communication
11	Where applicable, uses eye contact, body movement and gestures that are consistent with and support verbal messages

1400 **RPA FLIGHT PATH MANAGEMENT AND AUTOMATION**

UA flight path management, automation (FPM)	
Description: Controls the RPA flight path through automation, including appropriate use of flight management system(s) and guidance	
Observable Behaviours	
1	Controls the RPA through automation with accuracy and smoothness as appropriate to the situation
2	Contains the RPA within the normal flight envelope
3	Maintains the desired flight path during flight using automation
4	Takes appropriate action in case of deviations from the desired RPA trajectory
5	Selects appropriate level and mode of automation in a timely manner considering phase of flight and workload
6	Effectively monitors automation, including engagement and automatic mode transitions
7	Controls the RPA safely in degraded automation using only the relationship between RPA attitude, speed and thrust if applicable

1401

1402

LEADERSHIP, TEAMWORK, AND SELF-MANAGEMENT

Leadership, teamwork, and self-management (LTS)	
Description: Demonstrates effective leadership, team working and self-management	
Observable Behaviours	
1	Understands and agrees with the crew's roles and objectives
2	Creates an atmosphere of open communication and encourages team participation
3	Uses initiative and gives directions when required
4	Admits mistakes and takes responsibility for own performance, detecting and resolving own errors
5	Anticipates and responds appropriately to other crew members' needs
6	Carries out instructions when directed
7	Communicates relevant concerns and intentions
8	Gives and receives feedback constructively
9	Confidently intervenes when important for safety
10	Demonstrates empathy and shows respect and tolerance for other people
11	Engages others in planning and allocates activities fairly and appropriately according to abilities
12	Addresses and resolves conflicts and disagreements in a constructive manner
13	Demonstrates self-control in all situations
14	Self-evaluates the effectiveness of actions

PROBLEM SOLVING AND DECISION MAKING

Problem solving and decision making (PDM)	
Description: Accurately identifies risks and resolves problems. Uses the appropriate decision-making processes.	
Observable Behaviours	
1	Seeks accurate and adequate information from appropriate sources
2	Identifies and verifies what and why things have gone wrong
3	Employs proper problem-solving strategies
4	Perseveres in working through problems without reducing safety
5	Uses appropriate and timely decision-making processes
6	Identifies and considers options effectively
7	Monitors, reviews and adapts decisions as required
8	Identifies and manages risks and threats to the safety of the UAS and people effectively
9	Changes behaviour and responds as needed to deal with the demands of the changing situation

WORKLOAD MANAGEMENT

Workload management (WLM)	
Description: Manages available resources efficiently to prioritize and perform tasks in a timely manner under all circumstances	
Observable Behaviours	
1	Plans, prioritizes, and schedules tasks effectively
2	Manages time efficiently when carrying out tasks
3	Offers and accepts assistance, delegates when necessary and asks for help early
4	Reviews, monitors, and crosschecks actions conscientiously
5	Verifies that tasks are completed to the expected outcome
6	Manages and recovers from interruptions, distractions, variations and failures effectively

ARTICLE 2 DEFINITIONS

For the purposes of this Regulation, the definitions in Regulation (EU) 2018/1139 apply.

The following definitions also apply:

(1) 'unmanned aircraft system' ('UAS') means an unmanned aircraft and the equipment to control it remotely;

(2) 'unmanned aircraft system operator' ('UAS operator') means any legal or natural person operating or intending to operate one or more UAS;

(3) 'assemblies of people' means gatherings where persons are unable to move away due to the density of the people present;

(4) 'UAS geographical zone' means a portion of airspace established by the Secretary of State that facilitates, restricts or excludes UAS operations in order to address risks pertaining to safety, privacy, protection of personal data, security or the environment, arising from UAS operations;

(5) 'robustness' means the property of mitigation measures resulting from combining the safety gain provided by the mitigation measures and the level of assurance and integrity that the safety gain has been achieved;

[...]

(7) 'visual line of sight operation' ('VLOS') means a type of UAS operation in which, the remote pilot is able to maintain continuous unaided visual contact with the unmanned aircraft, allowing the remote pilot to control the flight path of the unmanned aircraft in relation to other aircraft, people and obstacles for the purpose of avoiding collisions;

(8) 'beyond visual line of sight operation' ('BVLOS') means a type of UAS operation which is not conducted in VLOS;

(9) 'light UAS operator certificate' ('LUC') means a certificate issued to a UAS operator by the CAA as set out in part C of the Annex;

(10) 'model aircraft club or association' means an organisation legally established in the United Kingdom for the purpose of conducting leisure flights, air displays, sporting activities or competition activities using UAS;

(11) 'dangerous goods' means articles or substances, which are capable of posing a hazard to health, safety, property or the environment in the case of an incident or accident, that the unmanned aircraft is carrying as its payload, including in particular:

(a) explosives (mass explosion hazard, blast projection hazard, minor blast hazard, major fire hazard, blasting agents, extremely insensitive explosives);

(b) gases (flammable gas, non-flammable gas, poisonous gas, oxygen, inhalation hazard);

(c) flammable liquids (flammable liquids; combustible, fuel oil, gasoline);

(d) flammable solids (flammable solids, spontaneously combustible solids, dangerous when wet);

(e) oxidising agents and organic peroxides;

(f) toxic and infectious substances (poison, biohazard);

(g) radioactive substances;

(h) corrosive substances;

(12) ‘payload’ means instrument, mechanism, equipment, part, apparatus, appurtenance, or accessory, including communications equipment, that is installed in or attached to the aircraft and is not used or intended to be used in operating or controlling an aircraft in flight, and is not part of an airframe, engine, or propeller;

(13) ‘direct remote identification’ means a system that ensures the local broadcast of information about a unmanned aircraft in operation, including the marking of the unmanned aircraft, so that this information can be obtained without physical access to the unmanned aircraft;

(14) ‘follow-me mode’ means a mode of operation of a UAS where the unmanned aircraft constantly follows the remote pilot within a predetermined radius;

(15) ‘geo-awareness’ means a function that, based on the data provided by the CAA , detects a potential breach of airspace limitations and alerts the remote pilots so that they can take immediate and effective action to prevent that breach;

(16) ‘privately built UAS’ means a UAS assembled or manufactured for the builder’s own use, not including UAS assembled from sets of parts placed on the market as a single ready-to-assemble kit;

(17) ‘autonomous operation’ means an operation during which an unmanned aircraft operates without the remote pilot being able to intervene;

(18) ‘uninvolved persons’ means persons who are not participating in the UAS operation or who are not aware of the instructions and safety precautions given by the UAS operator;

(19) ‘making available on the market’ means any supply of a product for distribution, consumption or use on the [...] market in the course of a commercial activity, whether in exchange of payment or free of charge;

[...]

(21) ‘controlled ground area’ means the ground area where the UAS is operated and within which the UAS operator can ensure that only involved persons are present;

(22) ‘maximum take-off mass’ (‘MTOM’) means the maximum Unmanned Aircraft mass, including payload and fuel, as defined by the manufacturer or the builder, at which the Unmanned Aircraft can be operated;

(23) ‘unmanned sailplane’ means an unmanned aircraft that is supported in flight by the dynamic reaction of the air against its fixed lifting surfaces, the free flight of which does not depend on an engine. It may be equipped with an engine to be used in case of emergency;

(24) ‘unmanned aircraft observer’ means a person, positioned alongside the remote pilot, who, by unaided visual observation of the unmanned aircraft, assists the remote pilot in keeping the unmanned aircraft in VLOS and safely conducting the flight;

(25) ‘airspace observer’ means a person who assists the remote pilot by performing unaided visual scanning of the airspace in which the unmanned aircraft is operating for any potential hazard in the air;

(26) ‘command unit’ (‘CU’) means the equipment or system of equipment to control unmanned aircraft remotely as defined in point 32 of Article 3 of Regulation (EU) 2018/1139 which supports the control or the monitoring of the unmanned aircraft during any phase of flight, with the exception of any infrastructure supporting the command and control (C2) link service;

(27) ‘C2 link service’ means a communication service supplied by a third party, providing command and control between the unmanned aircraft and the CU;

[...]

(34) ‘night’ means the hours between the end of evening civil twilight and the beginning of morning civil twilight as defined in Implementing Regulation (EU) No 923/2012;

(35) 'CAA' means the Civil Aviation Authority.

(36) "UA Category" or "Category of UA" means a categorisation of unmanned aircraft according to specified basic characteristics for example aeroplane or rotorcraft.

(37) "Type" or "UA Type" means a categorisation of unmanned aircraft according to the specific manufacturer and model.

UAS.SPEC.050 RESPONSIBILITIES OF THE UAS OPERATOR

(1) The UAS operator shall comply with all of the following:

(a) establish procedures and limitations adapted to the type of the intended operation and the risk involved, including:

(i) operational procedures to ensure the safety of the operations;

(ii) procedures to ensure that security requirements applicable to the area of operations are complied with in the intended operation;

(iii) measures to protect against unlawful interference and unauthorised access;

(iv) procedures to ensure that all operations are in respect of Regulation (EU) 2016/679 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data. In particular it shall carry out a data protection impact assessment, when required by the Information Commissioner's Office in application of Article 35 of Regulation (EU) 2016/679;

(v) guidelines for its remote pilots to plan UAS operations in a manner that minimises nuisances, including noise and other emissions-related nuisances, to people and animals.

(b) designate a remote pilot for each flight or, in the case of autonomous operations, ensure that during all phases of the flight, responsibilities and tasks especially those defined in points (2) and (3) of point UAS.SPEC.060 are properly allocated in accordance with the procedures established pursuant to point (a);

(c) ensure that all operations effectively use and support the efficient use of radio spectrum in order to avoid harmful interference;

(d) ensure that before conducting operations, remote pilots comply with all of the following conditions:

(i) have the competency to perform their tasks in line with the applicable training identified by the operational authorisation or, if point UAS.SPEC.020 applies, by the conditions and limitations defined in the appropriate standard scenario listed in Appendix 1 or as defined by the LUC;

(ii) follow remote pilot training which shall be competency based and include the competencies set out in paragraph 2 of Article 8:

(iii) follow remote pilot training, as defined in the operational authorisation, for operations requiring such authorisation, it shall be conducted in cooperation with an entity designated by the CAA ;

[...]

(v) have been informed about the UAS operator's operations manual, if required by the risk assessment and procedures established in accordance with point (a);

(vi) obtain updated information relevant to the intended operation about any geographical zones designated in accordance with Article 15;

(e) ensure that personnel in charge of duties essential to the UAS operation, other than the remote pilot itself, comply with all of the following conditions:

(i) have completed the on-the-job-training developed by the operator;

(ii) have been informed about the UAS operator's operations manual, if required by the risk assessment, and about the procedures established in accordance with point (a);

(iii) have obtained updated information relevant to the intended operation about any geographical zones designated in accordance with Article 15;

(f) carry out each operation within the limitations, conditions, and mitigation measures [...] specified in the operational authorisation;

(g) keep and maintain an up-to-date record of:

(i) all the relevant qualifications and training courses completed by the remote pilot and the other personnel in charge of duties essential to the UAS operation and by the maintenance staff, for at least 3 years after those persons have ceased employment with the organisation or have changed their position in the organisation;

(ii) the maintenance activities conducted on the UAS for a minimum of 3 years;

(iii) the information on UAS operations, including any unusual technical or operational occurrences and other data as required [...] by the operational authorisation for a minimum of 3 years;

(iv) the UA technical log book.

(h) use UAS which, as a minimum, are designed in such a manner that a possible failure will not lead the UAS to fly outside the operation volume or to cause a fatality. In addition, Man Machine interfaces shall be such to minimise the risk of pilot error and shall not cause unreasonable fatigue;

(i) maintain the UAS in a suitable condition for safe operation by:

(i) as a minimum, defining maintenance instructions and employing an adequately trained and qualified maintenance staff; and

(ii) complying with point UAS.SPEC.100, if required;

(iii) using an unmanned aircraft which is designed to minimise noise and other emissions, taking into account the type of the intended operations and

geographical areas where the aircraft noise and other emissions are of concern.

(j) establish and keep an up-to-date list of the designated remote pilots for each flight;

(k) establish and keep an up-to-date list of the maintenance staff employed by the operator to carry out maintenance activities; and

(l) ensure that each individual unmanned aircraft is installed with:

(i) at least one green flashing light for the purpose of visibility of the unmanned aircraft at night, and

(ii) an active and up-to-date remote identification system.

AMC1 UAS.SPEC.050(1)(D)(I), (II) AND (III) RESPONSIBILITIES OF THE UAS OPERATOR

OPERATOR CURRENCY REQUIREMENTS

The UAS Operator shall:

(a) Establish procedures to ensure that remote pilots are current in accordance with the OM and certificate of remote pilot competence as applicable.

(b) Establish procedures to train remote pilots on the types of UA being operated including initial and refresher training.

(c) Establish procedures for remote pilots to regain operator currency including any additional training requirements.

(d) Identify the appropriate amount of recent flying experience to be considered current which in in any case will be at least 2 hours of total flight time conducted in the Specific category in the last 3 calendar months on the type of UA applicable to the OA.

Currency shall be verifiable for the purposes of oversight by a corresponding Operator technical log book entries and RP flight log book entries.

AMC1 UAS.SPEC.050(1)(G) RESPONSIBILITIES OF THE UAS OPERATOR

LOGGING OF INDIVIDUAL UA FLIGHT ACTIVITIES

Flights must be logged using a UA technical logbook for each aircraft which must be held electronically. An **example** UA technical logbook has been provided below.

Records must be stored for the lifetime of UA in a manner that ensures their protection from unauthorised access, damage, alteration, and theft.

The following minimum information shall be recorded by the operator for each flight:

(a) UA Category
(b) UA Type
(c) UA Serial or (ICAO) Registration No
(d) Primary Operator Name (Legal person or organisation)
(e) Primary Operator ID
(f) Next maintenance due (total flight hours)
(g) Current/previous total flight hours carried forward (hours)
(h) Time remaining until next maintenance (hours)
(i) Date of flight (dd/mm/yy)
(j) OA Number
(k) Operator Name (if primary record ‘self’ if third party complete in full)
(l) Operator ID (if primary record ‘self’ if third party complete in full)
(m) Take Off Location in one of the following formats:
    (1) Latitude and Longitude
    (2) ICAO aerodrome identifier
    (3) What3Words identifier
(n) Take Off Time (hh:mm)
(o) Landing Location in one of the following formats:
    (1) Latitude and Longitude
    (2) ICAO aerodrome identifier
    (3) What3Words identifier
(p) Landing Time (hh:mm)
(q) Total Flight Time (hh:mm)
(r) RPIC Name(s)
(s) RPIC Flyer ID(s)
(t) Incidents, observations, and maintenance
(u) Corrective actions
(v) Released by (Legal person releasing the UA into service)
(w) Date
(x) Signed (Legal person releasing the UA into service)

ADDITIONAL UA RECORD KEEPING

Operators should keep the following additional records where applicable:

(a) Battery usage record which shall include:
    (1) Serial number

(2) Usage report which shall record the battery(s) fitment on a per UA and per flight basis.

(b) Fuel usage record including date, amount, and grade added.

UA load record including type of load (payload, cargo, and DG), fuel, weight, and balance calculations.

AIRCRAFT IDENTIFICATION			AIRCRAFT OPERATOR		MAINTENANCE		
UA CATEGORY (a)	UA TYPE (b)	SERIAL/REGISTRATION (c)	NAME (d)	OPERATOR ID (e)	NEXT MAINTENANCE DUE (hrs) (f)	PREVIOUS TOTAL TIME (g)	REMAINING TIME (h)

1682

DATE (dd/mm/yy) (i)	OPERATOR DETAILS			TAKE OFF		LANDING		TOTAL TIME OF FLIGHT (q)	CREW	
	OA NUMBER (j)	OPERATOR (k)	OPERATOR ID (l)	LOCATION (m)	TIME (n)	LOCATION (o)	TIME (p)		RPIC NAME(s) (r)	RPIC FLYER ID (s)
					TOTAL THIS PAGE					
					TOTAL PREVIOUS PAGES					
					TOTAL TIME					

1683

INCIDENTS, OBSERVATIONS, ISSUES (t)	CORRECTIVE ACTION (u)	RELEASED BY (v)	DATE (w)	SIGNATURE (x)

1684

UAS.SPEC.060 RESPONSIBILITIES OF THE REMOTE PILOT

(1) The remote pilot shall:

(a) not perform duties under the influence of psychoactive substances or alcohol or when it is unfit to perform its tasks due to injury, fatigue, medication, sickness or other causes;

(b) have the appropriate remote pilot competency as defined in the operational authorisation [...] or as defined by the LUC and carry a proof of competency while operating the UAS.

(c) be familiar with manufacturer's instructions provided by the manufacturer of the UAS.

(d) keep a personal flying log

(2) Before starting an UAS operation, the remote pilot shall comply with all of the following:

(a) obtain updated information relevant to the intended operation about any geographical zones designated in accordance with Article 15;

(b) ensure that the operating environment is compatible with the authorised [...] limitations and conditions;

(c) ensure that the UAS is in a safe condition to complete the intended flight safely, and if applicable, check if the direct remote identification is active and up-to-date;

(d) ensure that the information about the operation has been made available to the relevant air traffic service (ATS) unit, other airspace users and relevant stakeholders, as required by the operational authorisation or by the conditions designated by the Secretary of State for the geographical zone of operation in accordance with Article 15.

(3) During the flight, the remote pilot shall:

(a) comply with the authorised [...] limitations and conditions;

(b) avoid any risk of collision with any manned aircraft and discontinue a flight when continuing it may pose a risk to other aircraft, people, animals, environment or property;

(c) comply with the operational limitations in geographical zones designated in accordance with Article 15;

(d) comply with the operator's procedures;

(e) not fly close to or inside areas where an emergency response effort is ongoing unless they have permission to do so from the responsible emergency response services.

AMC1 UAS.SPEC.060(1)(D) RESPONSIBILITIES OF THE REMOTE PILOT

RPs shall maintain a personal flying log of each flight, which shall be used to demonstrate experience and currency. An example personal flying log is provided below.

This RP flying log must contain as a minimum:

(a) Remote pilot's full name.
(b) Remote pilot's flyer ID.
(c) Remote pilot's address.
(d) Remote pilot's postcode.
(e) Remote pilot's certificates held.
(f) Date of the flight.
(g) The OA number under which the flight was conducted.
(h) The operator's name (the legal person or organisation responsible for the operation).
(i) Operator ID
(j) Take Off Location in one of the following formats:
    (1) Latitude and Longitude
    (2) ICAO aerodrome identifier
    (3) What3Words identifier
    (4) Street address
(k) Take Off Time (hh:mm)
(l) Landing Location in one of the following formats:
    (1) Latitude and Longitude
    (2) ICAO aerodrome identifier
    (3) What3Words identifier
    (4) Street address
(m) Landing Time (hh:mm)
(n) Aircraft category (aeroplane or rotorcraft)
(o) Aircraft type including make and model
(p) Aircraft identification (registration or serial number)
(q) Total flight time (rounded to the nearest whole minute)
(r) Name RPIC/s
(s) Operational Condition VLOS/BVOS
(t) Pilot function time RPIC/Dual/Sim/Instructor
(u) Privileges Exercised
(v) Remarks

RP NAME (a)	RP FLYER ID (b)	RP ADDRESS (c)	RP POSTCODE (d)	RPC CERT(S) HELD (e)

DATE (dd/mm/yy) (f)	OPERATOR DETAILS			TAKE OFF			LANDING			AIRCRAFT				TOTAL TIME OF FLIGHT (q)		NAME(S) PIC (r)
	OA NUMBER (g)	OPERATOR (h)	OPERATOR ID (i)	PLACE (j)	TIME (k)		PLACE (l)	TIME (m)		CATEGORY (n)		TYPE (o)	SERIAL NO (p)			
										A	R					
													TOTAL THIS PAGE			
													TOTAL PREVIOUS PAGES			
													TOTAL TIME			

OPERATIONAL CONDITION (s)				PILOT FUNCTION TIME (t)								PRIVILEGES EXERCISED (u)					REMARKS (v)
VLOS		BVLOS		RPIC		DUAL		SIM		INSTRUCTOR		GVC	L1	L2	L3	L4	
																	I certify that the entries in this log are true.
																	PILOT'S SIGNATURE

1765

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1768

AMC1 UAS.SPEC.060(2)(B) RESPONSIBILITIES OF THE REMOTE PILOT

OPERATING ENVIRONMENT

The RP must check any conditions that might affect the UAS operation, such as the locations of people, property, vehicles, public roads, obstacles, aerodromes, critical infrastructure, and any other elements that may pose a risk to the safety of the UAS operation.

Familiarisation with the environment and obstacles should be conducted through a survey of the area where the operation is intended to be performed.

It must be verified that the weather conditions at the time when the operation starts and those that are expected for the entire period of the operation are within limits defined in the manufacturer's manual, as well as with the OA or declaration, as applicable.

The RP must be familiar with the light conditions and make a reasonable effort to identify potential sources of electromagnetic energy, which may cause undesirable effects, such as EMI or physical damage to the operational equipment of the UAS.