THAILAND CIVIL AVIATION REGULATION

Acceptable Means of Compliance and Guidance Material to TCAR PEL - Part FCL

Flight Crew Licensing

Subpart K and Appendix 1 to 9

(Preparatory Manual)

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RECORD OF REVISIONS

Revision No.	Date (DD MMM YYYY)	Subject	Updated By (Department Division)
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INTRODUCTION AND APPLICABILITY

In this publication the word 'should' is used to indicate that the Organisation, Owner or Operator has a degree of latitude in adhering to the requirement, particularly where the nature of the operation - or proposed operation - affects their ability to achieve the necessary degree of compliance with the requirement; provided that an acceptable level of safety is achieved.

If the Organisation's/owner's/operator's response is deemed to be inadequate by the Director General, a specific requirement or restriction may be applied as a condition of the appropriate instrument to be issued under Thailand Civil Aviation Regulations. This publication includes associated means of compliance and interpretative material wherever possible and, unless specifically stated otherwise, clarification will be based on this material or other relevant CAAT documentation.

These Acceptable Means of Compliance (AMCs) and Guidance Material (GM) to TCAR PEL Part FCL are broadly based upon or derived from the AMCs and GM corresponding to European Union Aircrew Regulation (EU) 1178/2011 up to and including EASA Executive Director decision "ED Decision 2020/005/R" as well as ED Decision 2021/002/R related to introduction of EBT.

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SUBPART K — EXAMINERS

AMCs and GM to SECTION 1 – Common requirements

GM1 FCL.1000 Examiner certificates

SPECIAL CONDITIONS

When new aircraft are introduced, requirements such as to hold a licence and rating equivalent to the one for which the skill test is being conducted, or to have adequate flight experience, may not be possible to comply with. In this case, to allow for the first ratings for these aircraft to be issued to applicants, the CAAT need the possibility to issue a specific certificate that does not have to comply with the requirements established in this Subpart.

The CAAT should only give these certificates to holders of other examiner certificates. As far as possible, preference should be given to persons with experience in similar types or classes of aircraft, for example, in aircraft having the same kind and number of engines or rotors and of the same order of mass or technology.

The certificate should be limited in validity to the time needed to qualify the first examiners for the new aircraft in accordance with this Subpart, but in any case it should not exceed 1 year.

GM2 FCL.1000 Examiner certificates

When examiners conduct a skill test, proficiency check or assessment of competence, in addition to a licence for the relevant aircraft category, they are required to hold the rating or certificate equivalent to the one for which they conduct the skill test, proficiency check or assessment of competence.

For example, a candidate who holds a CPL(A) may make a class rating proficiency check on an SE piston aeroplane with an examiner who holds a PPL(A) with an SE piston class rating and related examiner privileges.

GM1 FCL.1000(c);FCL.900(c) Instruction or examination outside the territory of Thailand

Instruction or examination outside the territory of the Thailand is possible within the scope of:

— ATOs that have their principal place of business outside the territory of the Thailand; or

— ATOs that have their principal place of business in Thailand and one or more additional training sites outside the territory of Thailand.

GM1 FCL.1005(b) Limitation of privileges in case of vested interests

Examples of a situation where the examiner should consider if their objectivity is affected are when the applicant is a relative or a friend of the examiner, or when they are linked by economic interests or political affiliations, etc.

AMC1 FCL.1010 Prerequisites for examiners

When evaluating the applicant's background, the CAAT should evaluate the personality and character of the applicant, and his/her cooperation with the CAAT.

The CAAT may also take into account whether the applicant has been convicted of any relevant criminal or other offenses, taking into account national law and principles of non-discrimination.

AMC1 FCL.1015 Examiner standardisation

GENERAL

(a) The CAAT may provide the course itself or through an arrangement with an ATO.

This arrangement should clearly state that the ATO is acting under the management system of the CAAT.

(b) The course should last:

(1) for the FE and FIE, at least 1 day, divided into theoretical and practical training;

(2) for other examiners, at least 3 days, divided into theoretical training (1 day) and practical training in an FFS conducting real or role played proficiency checks and skill tests or assessments of competence (at least 2 days).

(c) The CAAT, should determine any further training required before presenting the candidate for the examiner assessment of competence.

CONTENT

(d) The training should comprise:

(1) Theoretical training covering at least:

(i) the contents of AMC2 FCL.1015 and the FEM;

(i) FCL requirements and related AMCs and GM relevant to their duties;

(ii) operational requirements and related AMCs and GM relevant to their duties;

(iii) national requirements relevant to their examination duties;

(iv) fundamentals of human performance and limitations relevant to flight examination;

(v) fundamentals of evaluation relevant to applicant's performance;

(vi) the management system of ATOs;

(vii) MCC, human performance and limitations, if applicable.

(2) Examiners should also be briefed on the protection requirements for personal data, liability, accident insurance and fees, as applicable in the member state concerned.

(3) All items above are the core knowledge requirements for an examiner and are recommended as the core course material. This core course may be studied before recommended examiner training is commenced. The core course may utilise any suitable training format.

(4) Practical training consisting of at least:

(i) knowledge and management of the test for which the certificate is to be sought. These are described in the relevant modules in the FEM;

(ii) knowledge of the administrative procedures pertaining to that test or check.

(5) For an initial examiner certificate, practical training should include the examination of the test profile sought, consisting of the conduct of at least two test or check profiles in the role of examiner (these two tests or checks profiles can be performed in the same simulator session), including briefing, conduct of the skill test and proficiency check, assessment of the applicant to whom the test or check

is given, debriefing and recording or documentation under the supervision of an examiner of the appropriate category on the applicable type. This training is conducted in the aircraft if approval for testing or checking in the aircraft is required. If examiner privileges in FSTD's are required, practical instruction in the use of FSTD(S) for testing or checking should also be completed.

(6) If examiner privileges are to include the conduct of proficiency checks for the revalidation or renewal of an instrument rating, practical instruction should include the conduct of at least four instrument check profiles in the role of examiner, including briefing, conduct of the skill test and proficiency check, assessment of the applicant to whom the test or check is given, debriefing and recording or documentation under the supervision of an examiner of the appropriate category on the applicable type. This training is conducted in the aircraft if approval for testing or checking in the aircraft is required. If examiner privileges in both FSTD and aircraft are required, at least one of the instrument check profiles should be conducted in an FSTD.

(7) For extension of an examiner certificate to further types (as required for TRE), further practical training on the new type may be required, consisting of the conduct of at least one test or check profile in the role of examiner on the new type, including briefing, conduct of the skill test and proficiency check, assessment of the applicant to whom the test or check is given, debriefing and recording or documentation under the supervision of an examiner of the appropriate category on the applicable type. A further examiner check on the new type may be required, which may be supervised by an inspector of the CAAT or a suitably authorised senior examiner.

AMC2 FCL.1015 Examiner standardisation

STANDARDISATION ARRANGEMENTS FOR EXAMINERS

LIMITATIONS

(a) An examiner should allow an applicant adequate time to prepare for a test or check, normally not more than 1 hour.

(b) An examiner should plan a test or check flight so that all required exercises can be performed while allowing sufficient time for each of the exercises and with due regard to the weather conditions, traffic situation, ATC requirements and local procedures.

PURPOSE OF A TEST OR CHECK

(c) Determine through practical demonstration during a test or check that an applicant has acquired or maintained the required level of knowledge and skill or proficiency.

(d) Improve training and flight instruction in ATOs by feedback of information from examiners about items or sections of tests or checks that are most frequently failed.

(e) Assist in maintaining and, where possible, improving air safety standards by having examiners display good airmanship and flight discipline during tests or checks.

CONDUCT OF TEST OR CHECK

(f) An examiner will ensure that an applicant completes a test or check in accordance with Part-FCL requirements and is assessed against the required test or check standards.

(g) Each item within a test or check section should be completed and assessed separately. The test or check schedule, as briefed, should not normally be altered by an examiner. A failed item is not always a failed section,

for example type rating skill test where a failure of an item in a section does not fail the entire section, only the failed item is taken again.

(h) Marginal or questionable performance of a test or check item should not influence an examiner's assessment of any subsequent items.

(i) An examiner should verify the requirements and limitations of a test or check with an applicant during the pre-flight briefing.

(j) When a test or check is completed or discontinued, an examiner should debrief the applicant and give reasons for items or sections failed. In case of a failed or discontinued skill test and proficiency check, the examiner should provide appropriate advice to assist the applicant in re-tests or re-checks.

(k) Any comment on, or disagreement with, an examiner's test or check evaluation or assessment made during a debriefing will be recorded by the examiner on the test or check report, and will be signed by the examiner and countersigned by the applicant.

EXAMINER PREPARATION

(l) An examiner should supervise all aspects of the test or check flight preparation, including, where necessary, obtaining or assuring an ATC 'slot' time.

(m) An examiner will plan a test or check in accordance with the FCL requirements. Only the manoeuvres and procedures set out in the appropriate test or check form will be undertaken. The same examiner should not re-examine a failed applicant without the agreement of the applicant.

EXAMINER APPROACH

(n) An examiner should encourage a friendly and relaxed atmosphere to develop both before and during a test or check flight. A negative or hostile approach should not be used. During the test or check flight, the examiner should avoid negative comments or criticisms and all assessments should be reserved for the debriefing.

ASSESSMENT SYSTEM

(o) Although test or checks may specify flight test tolerances, an applicant should not be expected to achieve these at the expense of smoothness or stable flight. An examiner should make due allowance for unavoidable deviations due to turbulence, ATC instructions, etc. An examiner should terminate a test or check only when it is clear that the applicant has not been able to demonstrate the required level of knowledge, skill or proficiency and that a full re-test will be necessary or for safety reasons. An examiner will use one of the following terms for assessment:

(1) a 'pass', provided that the applicant demonstrates the required level of knowledge, skill or proficiency and, where applicable, remains within the flight test tolerances for the licence or rating;

(2) a 'fail' provided that any of the following apply:

(i) the flight test tolerances have been exceeded after the examiner has made due allowance for turbulence or ATC instructions;

(ii) the aim of the test or check is not completed;

(iii) the aim of exercise is completed but at the expense of safe flight, violation of a rule or regulation, poor airmanship or rough handling;

(iv) an acceptable level of knowledge is not demonstrated;

(v) an acceptable level of flight management is not demonstrated;

(vi) the intervention of the examiner or safety pilot is required in the interest of safety.

(3) a 'partial pass' in accordance with the criteria shown in the relevant skill test appendix of Part-FCL.

METHOD AND CONTENTS OF THE TEST OR CHECK

(p) Before undertaking a test or check an examiner will verify that the aircraft or FSTD intended to be used is suitable and appropriately equipped for the test or check.

(q) A test or check flight will be conducted in accordance with the AFM and, if applicable, the AOM.

(r) A test or check flight will be conducted within the limitations contained in the operations manual of an ATO or the operator for which the applicant is flying, as applicable.

(s) Contents:

(1) a test or check is comprised of:

(i) oral examination on the ground (where applicable);

(ii) pre-flight briefing;

(iii) in-flight exercises;

(iv) post-flight debriefing.

(2) oral examination on the ground should include:

(i) aircraft general knowledge and performance;

(i) planning and operational procedures;

(ii) other relevant items or sections of the test or check.

(3) pre-flight briefing should include:

(i) test or check sequence;

(ii) power setting, speeds and approach minima, if applicable;

(iii) safety considerations.

(4) in-flight exercises will include each relevant item or section of the test or check;

(5) post-flight debriefing should include:

(i) assessment or evaluation of the applicant;

(ii) documentation of the test or check with the applicant's FI present, if possible.

(t) A test or check is intended to simulate a practical flight. Thus, an examiner may set practical scenarios for an applicant while ensuring that the applicant is not confused and air safety is not compromised.

(u) When manoeuvres are to be flown by sole reference to instruments, the examiner should ensure that a suitable method of screening is used to simulate IMC.

(v) An examiner should maintain a flight log and assessment record during the test or check for reference during the post or flight debriefing.

(w) An examiner should be flexible to the possibility of changes arising to pre-flight briefings due to ATC instructions, or other circumstances affecting the test or check.

(x) Where changes arise to a planned test or check an examiner should be satisfied that the applicant understands and accepts the changes. Otherwise, the test or check flight should be terminated.

(y) Should an applicant choose not to continue a test or check for reasons considered inadequate by an examiner, the applicant will be assessed as having failed those items or sections not attempted. If the test or check is terminated for reasons considered adequate by the examiner, only these items or sections not completed will be tested during a subsequent test or check.

(z) An examiner may terminate a test or check at any stage, if it is considered that the applicant's competency requires a complete re-test or re-check.

GM1 FCL.1015 Examiner standardisation

(a) An examiner should plan per day not more than:

(1) three tests or checks relating to PPL, CPL, IR or class ratings;

(2) four tests or checks relating to LAPL, GPL or BPL;

(3) two tests or checks related to MPL or ATPL;

(4) two assessments of competence related to instructor certificates;

(5) four tests or checks relating to SP type ratings.

(b) An examiner should plan at least 2 hours for a LAPL, GPL or BPL, 3 hours for a PPL, or class rating test or checks, and at least 4 hours for instructor certificates, CPL, IR, MPL, ATPL or MP type rating tests or checks, including pre-flight briefing and preparation, conduct of the test, check or assessment of competence, de-briefing, evaluation of the applicant and documentation.

(c) For the conduct of the test, check or assessment of competence, without additional activities specified in point (b)When planning the duration of a test, check or assessment of competence, the following values may be used as guidance:

(1) 45 minutes for a LAPL(B) or BPL and SP class ratings VFR only;

(2) 60 minutes for extension of BPL commercial privileges;

(3) 90 minutes for LAPL(A) or (H), PPL(A) or (H), and CPL(A) or (H), including the navigation section;

(4) 60 minutes for PPL(As) and CPL(As);.

(5) 60 minutes for IR, instructor certificates, and SP type or class ratings; and

(6) 120 minutes for MPL, ATPL, and MP type ratings.

(d) For the LAPL(S) and SPL test or check flight the flight time must be sufficient to allow that all the items in each test or check section can be fully completed. If not all the items can be completed in one flight, additional flights have to be done.

AMC1 FCL.1020 Examiners assessment of competence

GENERAL

(a) The CAAT may nominate either one of its inspectors or a senior examiner to assess the competence of applicants for an examiner certificate.

DEFINITIONS

(b) Definitions:

(1) 'Inspector': the inspector of the CAAT conducting the examiner competence assessment;

(2) 'Examiner applicant': the person seeking certification as an examiner;

(3) 'Candidate': the person being tested or checked by the examiner applicant. This person may be a pilot for whom the test or check would be required, or the inspector of the CAAT who is conducting the examiner certification acceptance test.

CONDUCT OF THE ASSESSMENT

(c) An inspector of the CAAT or a senior examiner will observe all examiner applicants conducting a test on a 'candidate' in an aircraft for which examiner certificate is sought. Items from the related training course and test or check schedule will be selected by the inspector for examination of the 'candidate' by the examiner applicant. Having agreed with the inspector the content of the test, the examiner applicant will be expected to manage the entire test. This will include briefing, the conduct of the flight, assessment and debriefing of the 'candidate'. The inspector will discuss the assessment with the examiner applicant before the 'candidate' is debriefed and informed of the result.

BRIEFING THE 'CANDIDATE'

(d) The 'candidate' should be given time and facilities to prepare for the test flight. The briefing should cover the following:

(1) the objective of the flight;

(2) licensing checks, as necessary;

(3) freedom for the 'candidate' to ask questions;

(4) operating procedures to be followed (for example operators manual);

(5) weather assessment;

(6) operating capacity of 'candidate' and examiner;

(7) aims to be identified by 'candidate';

(8) simulated weather assumptions (for example icing and cloud base);

(9) use of screens (if applicable);

(10) contents of exercise to be performed;

(11) agreed speed and handling parameters (for example V-speeds, bank angle, approach minima);

(12) use of R/T;

(13) respective roles of 'candidate' and examiner (for example during emergency);

(14) administrative procedures (for example submission of flight plan).

(e) The examiner applicant should maintain the necessary level of communication with the 'candidate'. The following check details should be followed by the examiner applicant:

(1) involvement of examiner in a MP operating environment;

(2) the need to give the 'candidate' precise instructions;

(3) responsibility for safe conduct of the flight;

(4) intervention by examiner, when necessary;

(5) use of screens;

(6) liaison with ATC and the need for concise, easily understood intentions;

(7) prompting the 'candidate' about required sequence of events (for example following a go-around);

(8) keeping brief, factual and unobtrusive notes.

ASSESSMENT

(f) The examiner applicant should refer to the flight test tolerances given in the relevant skill test. Attention should be paid to the following points:

(1) questions from the 'candidate';

(2) give results of the test and any sections failed;

(3) give reasons for failure.

DEBRIEFING

(g) The examiner applicant should demonstrate to the inspector the ability to conduct a fair, unbiased debriefing of the 'candidate' based on identifiable factual items. A balance between friendliness and firmness should be evident. The following points should be discussed with the 'candidate', at the applicant's discretion:

(1) advise the candidate on how to avoid or correct mistakes;

(2) mention any other points of criticism noted;

(3) give any advice considered helpful.

RECORDING OR DOCUMENTATION

(h) The examiner applicant should demonstrate to the inspector the ability to complete the relevant records correctly. These records may be:

(1) the relevant test or check form;

(2) licence entry;

(3) notification of failure form;

(4) relevant company forms where the examiner has privileges of conducting operator proficiency checks.

DEMONSTRATION OF THEORETICAL KNOWLEDGE

(i) The examiner applicant should demonstrate to the inspector a satisfactory knowledge of the regulatory requirements associated with the function of an examiner.

AMC1 FCL.1025 Validity, revalidation and renewal of examiner certificates

EXAMINER REFRESHER COURSE

The examiner refresher course should follow the content of the examiner standardisation course, included in AMC1 FCL.1015, and take into account specific contents adequate to the category of examiner affected.

AMC1 FCL.1030 (b)(3) Conduct of skill tests, proficiency checks and assessments of competence

OBLIGATIONS FOR EXAMINERS APPLICATION AND REPORT FORMS

Common application and report forms can be found:

(a) For skill tests or proficiency checks for issue, revalidation or renewal of LAPL, BPL, GPL, PPL, CPL and IR in AMC1 to Appendix 7;

(b) For training, skill tests or proficiency checks for ATPL, MPL or class and type ratings, in AMC1 to Appendix 9;

(c) For EBT practical assessment, in AMC1 to Appendix 10;

(d) For assessments of competence for instructors, in AMC5 FCL.935.

GM1 FCL.1030(b)(3)(ii) Conduct of skill tests, proficiency checks and assessments of competence

REVALIDATION OF CLASS AND TYPE RATINGS — AEROPLANES — REQUIRED MANOEUVRES AND EXERCISES IN THE CONTEXT OF APPENDIX 10 (EBT PRACTICAL ASSESSMENT)

The confirmation that all the required manoeuvres and exercises have been completed means that during the period of validity of the type rating, the applicant has completed the operator's EBT programme applicable to that period.

Appendices

AMC1 to Appendix 3 Training courses for the issue of a CPL and an ATPL

GENERAL

(a) When ensuring that the applicant complies with the prerequisites for the course, in accordance with ORA.ATO.145, the ATO should check that the applicant has enough knowledge of mathematics, physics and English to facilitate the understanding of the theoretical knowledge instruction content of the course.

(b) Whenever reference is made to a certain amount of hours of training, this means a full hour. Time not directly assigned to training (such as breaks, etc.) is not to be counted towards the total amount of time that is required.

(c) The UPRT elements and components specified in AMC2 to Appendix 3; AMC1 to Appendix 5 point (a) should be integrated into the flying training phases or modules.

(d) The flight instruction syllabus should take into account the principles of TEM.

A. ATP integrated course: aeroplanes

(a) The ATP integrated course should last between 12 and 36 months. This period may be extended where additional flying training or ground instruction is provided by the ATO.

CREDITING

(b) Credit for previous experience given to an applicant who already holds a PPL should be entered into the applicant's training record. In the case of a student pilot who does not hold a pilot licence and with the approval of the CAAT, an ATO may designate certain dual exercises to be flown in a helicopter or a TMG up to a maximum of 20 hours.

THEORETICAL KNOWLEDGE

(c) The 750 hours of instruction, which also cover the Area 100 KSA, may include in suitable proportions:

(1) classroom work;

(2) lessons;

(3) tutorials;

(4) demonstrations, including those supported by demonstration equipment;

(5) exercises carried out as groups or individuals and based on pre-flight and en-route planning, communications, presentations and projects;

(6) exercises that use demonstration equipment or training devices;

(7) directed study including workbook exercises or assignments;

(8) aerodrome or aviation industry field trips;

(9) computer-based training and e-learning elements;

(10) progress tests, Area 100 KSA assessments and mental maths test(s); and

(11) other training methods, media and tools approved by the CAAT.

The 750 hours of instruction should be divided in such a way that in each subject the minimum hours are:

(1)	Air law	35 hours
(2)	Aircraft general knowledge	100 hours
(3)	Flight performance and planning	120 hours
(4)	Human performance and limitations	35 hours
(5)	Meteorology	60 hours
(6)	Navigation	90 hours
(7)	Operational procedures	25 hours
(8)	Principles of flight	55 hours
(9)	Communications	20 hours

Other subdivision of hours may be agreed upon between the CAAT and the ATO.

FLYING TRAINING

(d) The flying instruction is divided into six phases:

(1) Phase 1:

Exercises up to the first solo flight comprise a total of at least 10 hours dual flight instruction on an SE aeroplane including:

(iii) pre-flight operations, mass and balance determination, aeroplane inspection and servicing;

(iv) aerodrome and traffic pattern operations, collision avoidance and precautions;

(v) control of the aeroplane by external visual references;

(vi) normal take-offs and landings;

(vii) the basic UPRT exercises as specified in point (b) of AMC2 to Appendix 3; AMC1 to Appendix 5;

(viii) simulated engine failure.

(2) Phase 2:

Exercises up to the first solo cross-country flight comprise a total of at least 10 hours of dual flight instruction and at least 10 hours solo flight including:

(i) maximum performance (short field and obstacle clearance) take-offs and short-field landings;

(ii) flight by reference solely to instruments, including the completion of a 180 ° turn;

(iii) dual cross-country flying using external visual references, DR and radio navigation aids, diversion procedures;

(iv) aerodrome and traffic pattern operations at different aerodromes;

(v) crosswind take-offs and landings;

(vi) abnormal and emergency procedures and manoeuvres, including simulated aeroplane equipment malfunctions;

(vii) operations to, from and transiting controlled aerodromes, compliance with ATS procedures, R/T procedures and phraseology;

(viii) knowledge of meteorological briefing arrangements, evaluation of weather conditions for flight and use of AIS.

(3) Phase 3:

Exercises up to the VFR navigation progress test comprise a total of at least 5 hours of dual instruction and at least 40 hours as PIC.

The dual instruction and testing up to the VFR navigation progress test should comprise:

(i) repetition of exercises of phases 1 and 2;

(ii) VFR navigation progress test conducted by an FI not connected with the applicant's training;

(iii) dual night flight instruction .

(4) Phase 4:

Exercises up to the instrument rating skill test comprise:

(i) at least 55 hours instrument flight, which may contain up to 25 hours of instrument ground time in an FNPT I or up to 40 hours in an FNPT II or FFS which should be conducted by an FI or an authorised SFI;

(ii) 20 hours instrument time flown as SPIC;

(iii) pre-flight procedures for IFR flights, including the use of the flight manual and appropriate ATS documents in the preparation of an IFR flight plan;

(iv) procedures and manoeuvres for IFR operation under normal, abnormal and emergency conditions covering at least:

(A) transition from visual to instrument flight on take-off;
(B) SIDs and arrivals;
(C) en-route IFR procedures;
(D) holding procedures;
(E) instrument approaches to specified minima;
(F) missed approach procedures;
(G) landings from instrument approaches, including circling.

(v) in-flight manoeuvres and specific flight characteristics and the basic UPRT exercises as specified in Sections A, B, C and D of Table 2 in point (b) of AMC2 to Appendix 3; AMC1 to Appendix 5;

(vi) operation of an ME aeroplane in the exercises of (iv), including operation of the aeroplane solely by reference to instruments with one engine simulated inoperative, and engine shut-down and restart (the latter training should be conducted at a safe altitude unless carried out in an FSTD);

(vii) after completion of instrument training that is equivalent to the basic instrument flight module set out in AMC2 to Appendix 6, take-offs and landings as PIC at night.

(5) Phase 5: Advanced UPRT in accordance with point FCL.745.A;

(6) Phase 6:

(i) instruction and testing in MCC comprising the relevant training requirements;

(ii) if a type rating for single-pilot aeroplanes in multi-pilot operations, or MP multi-pilot aeroplanes is not required on completion of this part, the applicant should be issued with a certificate of course completion for MCC training.

B. ATP modular theoretical knowledge course: aeroplanes

(a) The aim of this course is to train pilots who have not received the theoretical knowledge instruction during an integrated course to the level of theoretical knowledge required for the ATPL.

(b) An approved course may contain in suitable proportions

(1) classroom work;

(2) lessons;

(3) tutorials;

(4) demonstrations, including those supported by demonstration equipment;

(5) exercises carried out as groups or individuals and based on pre-flight and en-route planning, communications, presentations and projects;

(6) exercises that use demonstration equipment or training devices;

(7) directed study including workbook exercises or assignments;

(8) aerodrome or aviation industry field trips;

(9) computer-based training and e-learning elements;

(10) progress tests, Area 100 KSA assessments and mental maths test(s); and

(11) other training methods, media and tools approved by the CAAT.

Approved distance-learning (correspondence) courses may also be offered as part of the course. The minimum amount of classroom instruction, as required by ORA.ATO.305, may include all of the above except item (b)(9).

(c) The ATP modular course should be completed within 18 months. This period may be extended where additional training is provided by the ATO. The flight instruction and skill test need to be completed within the period of validity of the pass in the theoretical examinations.

C. CPL/IR integrated course: aeroplanes

(a) The CPL/IR integrated course should last between 9 and 30 months. This period may be extended where additional flying training or ground instruction is provided by the ATO.

CREDITING

(b) Credit for previous experience given to an applicant who already holds a PPL should be entered into the applicant's training record. In the case of a student pilot who does not hold a pilot licence and with the approval of the CAAT, an ATO may designate certain dual exercises to be flown in a helicopter or a TMG up to a maximum of 20 hours.

THEORETICAL KNOWLEDGE

(c) The 500 hours of instruction, which also cover the Area 100 KSA, may include in suitable proportions

(1) classroom work;

(2) lessons;

(3) tutorials;

(4) demonstrations, including those supported by demonstration equipment;

(5) exercises carried out as groups or individuals and based on pre-flight and en-route planning, communications, presentations and projects;

(6) exercises that use demonstration equipment or training devices;

(7) directed study including workbook exercises or assignments;

(8) aerodrome or aviation industry field trips;

(9) computer-based training and e-learning elements;

(10) progress tests, Area 100 KSA assessments and mental maths test(s); and

(11) other training methods, media and tools approved by the CAAT.

The 500 hours of instruction should be divided in such a way that in each subject the minimum hours are:

(1)	Air law	25 hours
(2)	Aircraft general knowledge	75 hours
(3)	Flight performance and planning	80 hours
(4)	Human performance and limitations	20 hours
(5)	Meteorology	40 hours
(6)	Navigation	55 hours
(7)	Operational procedures	15hours
(8)	Principles of flight	35 hours
(9)	Communications	15 hours

Other subdivisions of hours may be agreed upon between the CAAT and the ATO.

FLYING TRAINING

(d) The flying instruction is divided into four phases:

(1) Phase 1:

Exercises up to the first solo flight comprise a total of at least 10 hours dual flight instruction on an SE aeroplane, including:

(i) pre-flight operations, mass and balance determination, aeroplane inspection and servicing;

(ii) aerodrome and traffic pattern operations, collision avoidance and precautions;

(iii) control of the aeroplane by external visual references;

(iv) normal take-offs and landings;

(v) the basic UPRT exercises as specified in point (b) of AMC2 to Appendix 3; AMC1 to Appendix 5;

(vi) simulated engine failure.

(2) Phase 2:

Exercises up to the first solo cross-country flight comprise a total of at least 10 hours of dual flight instruction and at least 10 hours solo flight including:

(i) maximum performance (short field and obstacle clearance) take-offs and short-field landings;

(ii) flight by reference solely to instruments, including the completion of a 180 ° turn;

(iii) dual cross-country flying using external visual references, DR and radio navigation aids, diversion procedures;

(iv) aerodrome and traffic pattern operations at different aerodromes;

(v) crosswind take-offs and landings;

(vi) abnormal and emergency operations and manoeuvres, including simulated aeroplane equipment malfunctions;

(vii) operations to, from and transiting controlled aerodromes, compliance with ATS procedures, R/T procedures and phraseology;

(viii) knowledge of meteorological briefing arrangements, evaluation of weather conditions for flight and use of AIS.

(3) Phase 3:

Exercises up to the VFR navigation progress test comprise a total of at least 5 hours of instruction and at least 40 hours as PIC.

The dual instruction and testing up to the VFR navigation progress test and the skill test should contain the following:

(i) repetition of exercises of phases 1 and 2;

(ii) VFR navigation progress test conducted by an FI not connected with the applicant's training;

(iii) dual night flight instruction

(4) Phase 4:

Exercises up to the instrument rating skill test comprise:

(i) at least 55 hours instrument time, which may contain up to 25 hours of instrument ground time in an FNPT I or up to 40 hours in an FNPT II or FFS which should be conducted by an FI or an authorised SFI;

(ii) 20 hours instrument time flown as SPIC;

(iii) pre-flight procedures for IFR flights, including the use of the flight manual and appropriate ATS documents in the preparation of an IFR flight plan;

(iv) procedures and manoeuvres for IFR operation under normal, abnormal and emergency conditions covering at least:

(A) transition from visual to instrument flight on take-off;
(B) SIDs and arrivals;
(C) en-route IFR procedures;
(D) holding procedures;

(E) instrument approaches to specified minima;
(F) missed approach procedures;
(G) landings from instrument approaches, including circling.

(v) in-flight manoeuvres and particular flight characteristics and the basic UPRT exercises as specified in Sections A, B, C and D of Table 2 in paragraph (b) of AMC2 to Appendix 3; AMC1 to Appendix 5;

(vi) operation of either an SE or an ME aeroplane in the exercises of (iv), including in the case of an ME aeroplane operation of the aeroplane solely by reference to instruments with one engine simulated inoperative and engine shut-down and restart. The latter exercise is to be conducted at a safe altitude unless carried out in an FSTD.

(vii) after completion of instrument training that is equivalent to the basic instrument flight module set out in AMC2 to Appendix 6, take-offs and landings as PIC at night.

D. CPL integrated course: aeroplanes

(a) The CPL integrated course should last between 9 and 24 months. This period may be extended where additional flying training or ground instruction is provided by the ATO.

CREDITING

(b) Credit for the hours flown should be entered into the applicant's training record. In the case of a student pilot who does not hold a pilot licence and with the approval of the CAAT, an ATO may designate certain dual exercises to be flown in a helicopter or a TMG up to a maximum of 20 hours.

THEORETICAL KNOWLEDGE

(c) The 350 hours of instruction, which also cover the Area 100 KSA, may include in suitable proportions:

(1) classroom work;
(2) lessons;
(3) tutorials;
(4) demonstrations, including those supported by demonstration equipment;
(5) exercises carried out as groups or individuals and based on pre-flight and en-route planning, communications, presentations and projects;
(6) exercises that use demonstration equipment or training devices;
(7) directed study including workbook exercises or assignments;
(8) aerodrome or aviation industry field trips;
(9) computer-based training and e-learning elements;
(10) progress tests, Area 100 KSA assessments and mental maths test(s); and
(11) other training methods, media and tools approved by the CAAT.

FLYING TRAINING

(d) The flying instruction is divided into four phases:

(1) Phase 1:

Exercises up to the first solo flight comprise a total of at least 10 hours dual flight instruction on an SE aeroplane, including:

(i) pre-flight operations, mass and balance determination, aeroplane inspection and servicing;

(ii) aerodrome and traffic pattern operations, collision avoidance and precautions;

(iii) control of the aeroplane by external visual references;

(iv) normal take-offs and landings;

(v) the basic UPRT exercises as specified in point (b) of AMC2 to Appendix 3; AMC1 to Appendix 5;

(vi) simulated engine failure.

(2) Phase 2:

Exercises up to the first solo cross-country flight comprise a total of at least 10 hours of dual flight instruction and at least 10 hours solo flight including:

(i) maximum performance (short field and obstacle clearance) take-offs and short-field landings;

(ii) flight by reference solely to instruments, including the completion of a 180 ° turn;

(iii) dual cross-country flying using external visual references, DR and radio navigation aids, diversion procedures;

(iv) aerodrome and traffic pattern operations at different aerodromes;

(v) crosswind take-offs and landings;

(vi) abnormal and emergency procedures and manoeuvres, including simulated aeroplane equipment malfunctions;

(vii) operations to, from and transiting controlled aerodromes, compliance with ATS procedures, R/T procedures and phraseology;

(viii) knowledge of meteorological briefing arrangements, evaluation of weather conditions for flight and use of AIS.

(3) Phase 3:

Exercises up to the VFR navigation progress test comprise a total of at least 30 hours instruction and at least 58 hours as PIC, including:

(i) at least 10 hours instrument time, which may contain 5 hours of instrument ground time in an FNPT or an FFS and should be conducted by an FI or an authorised SFI;

(ii) repetition of exercises of phases 1 and 2, which should include at least 5 hours in an aeroplane certificated for the carriage of at least four persons and have a variable pitch propeller or a single lever power control and retractable landing gear;

(iii) night flight time including, after completion of instrument training that is equivalent to the basic instrument flight module set out in AMC2 to Appendix 6, take-offs and landings as PIC.

(4) Phase 4:

The dual instruction and testing up to the CPL(A) skill test contain the following:

(i) up to 30 hours instruction which may be allocated to specialised aerial work training;

(ii) repetition of exercises in Phase 3, as required;

(iii) in-flight manoeuvres and particular flight characteristics including the basic UPRT exercises as specified in point (b) of AMC2 to Appendix 3; AMC1 to Appendix 5;

(iv) ME training.

If required, operation of an ME aeroplane including operation of the aeroplane with one engine simulated inoperative, and engine shutdown and restart (the latter exercise at a safe altitude unless carried out in an FSTD).

E. CPL modular course: aeroplanes

(a) The CPL modular course should be completed within 18 months. This period may be extended where additional training is provided by the ATO. The flight instruction and skill test need to be completed within the period of validity of the pass in the theoretical examinations.

CREDITING

Applicants with prior experience as PIC may be credited with an amount of hours to meet the requirement of 150 hours of flight time of Appendix 3, Part E, point (3)(a). The amount of credited hours should be decided by the ATO where the applicant takes the training course on the basis of a pre-entry flight test, but in any case, should have been completed only in one aircraft category other than aeroplane.

THEORETICAL KNOWLEDGE

(b) The 250 hours which also cover the Area 100 KSA, may include in suitable proportions

(1) classroom work;

(2) lessons;

(3) tutorials;

(4) demonstrations, including those supported by demonstration equipment;

(5) exercises carried out as groups or individuals and based on pre-flight and en-route planning, communications, presentations and projects;

(6) exercises that use demonstration equipment or training devices;

(7) directed study including workbook exercises or assignments;

(8) aerodromes or aviation industry field trips;

(9) computer-based training and e-learning elements;

(10) progress tests, Area 100 KSA assessments and mental maths test(s); and

(11) other training methods, media and tools approved by the CAAT.

Approved distance-learning (correspondence) courses may also be offered as part of the course. The minimum amount of classroom instruction, as required by ORA.ATO.305, may include all of the above except item (b)(9).

FLYING TRAINING

(c) The following flight time is suggested for the flying training: (all times are suggested time)

(1) visual flight training: suggested flight time

(i) Exercise 1:

pre-flight operations: mass and balance determination, aeroplane inspection and servicing.

(ii) Exercise 2: 0:45 hours

take-off, traffic patterns approach and landing, use of checklist, collision avoidance and checking procedures.

(iii) Exercise 3: 0:45 hours

traffic patterns: simulated engine failure during and after take-off.

(iv) Exercise 4: 1:00 hours

maximum performance (short field and obstacle clearance) take-offs and short-field landings.

(v) Exercise 5: 1:00 hours

crosswind take-offs, landings and go-arounds.

(vi) Exercise 6: 0:45 hours

Arresting divergence of the aeroplane from intended flight path, Preventing flight at airspeeds inappropriate for the (intended flight) conditions, High airspeed (including flight at relatively high airspeed), Steep turns Nose-low attitudes at various bank angles (including spiral dive).

(vii) Exercise 7: 0:45 hours

Arresting divergence of the aeroplane from intended flight path, Preventing flight at airspeeds inappropriate for the (intended flight) conditions, slow flight, nose-high attitudes at various bank angles, spin avoidance, stall events in the following configurations:

- take-off configuration,
- clean configuration, and
- landing configuration.

(viii) Exercise 8: 10:00 hours

cross-country flying using DR and radio navigation aids; flight planning by the applicant; filing of ATC flight plan; evaluation of weather briefing documentation, NOTAM, etc.; R/T procedures and phraseology; positioning by radio navigation aids; operation to, from and transiting controlled aerodromes, compliance with ATS procedures for VFR flights, simulated radio communication failure, weather deterioration, diversion procedures; simulated engine failure during cruise flight; selection of an emergency landing strip.

(2) instrument flight training:

(i) This module content is identical to that of the 10-hours basic instrument flight module as set out in AMC2 to Appendix 6. This module is focused on the basics of flying by sole reference to instruments, including limited panel and basic UPRT exercises as specified in Sections A, B and C of Table 2 in point (b) of AMC2 Appendix 3; AMC1 Appendix 5..

(ii) All exercises may be performed in an FNPT I or II or an FFS. If instrument flight training is in VMC, a suitable means of simulating IMC for the student should be used.

(iii) A BITD may be used for the following exercises: (9), (10), (11), (12), (14) and (16).

(iv) The use of the BITD is subject to the following:

(A) the training is complemented by exercises on an aeroplane;
(B) the record of the parameters of the flight is available;
(C) an FI(A) or IRI(A) conducts the instruction.

(v) Exercise 9: 0:30 hours

Basic instrument flying without

external visual cues; horizontal flight; power changes for acceleration or deceleration, maintaining straight and level flight; turns in level flight with 15 ° and 25 ° bank, left and right; roll-out onto predetermined headings.

(vi) Exercise 10: 0:45 hours

Repetition of exercise 9;

additionally climbing and descending, maintaining heading and speed, transition to horizontal flight; climbing and descending turns.

(vii) Exercise 11: 0:45 hours

Instrument pattern:

(1) start exercise, decelerate to approach speed, flaps into approach configuration;
(2) initiate standard turn (left or right);
(3) roll out on opposite heading, maintain new heading for 1 minute;
(4) standard turn, gear down, descend 500 ft/min;
(5) roll out on initial heading, maintain descent (500 ft/min) and new heading for 1 minute;
(6) transition to horizontal flight, 1.000 ft below initial flight level;
(7) initiate go-around;
(8) climb at best rate of climb speed.

(viii) Exercise 12: 0:45 hours

Repetition of exercise 9 and

steep turns with 45° bank; recovery from unusual attitudes.

(ix) Exercise 13 0:45 hours

Repetition of exercise 12

(x) Exercise 14 0:45 hours

radio navigation using VOR, NDB or, if available, VDF; interception of predetermined QDM and QDR.

(xi) Exercise 15: 0:45 hours

Repetition of exercise 9 and

recovery from nose-high attitudes at various bank angles,

recovery from nose-low attitudes at various bank angles

(xii) Exercise 16 0:45 hours

Repetition of exercise 9, turns and level change and
recovery from nose-high attitudes at various bank angles,
recovery from nose-low attitudes at various bank angles
with simulated failure of the artificial horizon or directional gyro.

(xiii) Exercise 17: 0:45 hours

Basic UPRT exercises as specified
in point (b) of AMC2 to Appendix 3; AMC1 to Appendix 5,
excluding those manoeuvres which have already been completed during exercises 15 and 16

(xiv) Exercise 18: 3:00 hours

Repetition of exercises (14), (16) and (17).

(3) ME training

If required, operation of an ME aeroplane in the exercises 1 through 17, including operation of the aeroplane with one engine simulated inoperative, and engine shutdown and restart. Before commencing training, the applicant should have complied with the type and class ratings requirements as appropriate to the aeroplane used for the test.

(4) Applicants who need to complete night training in accordance with point 10(b) of Section E of Appendix 3 to Part-FCL should perform take-offs and landings as PIC at night only after having completed the instrument flight training specified in point (2)(i) of 'FLYING TRAINING' of Section E of this AMC.

F. ATP/IR integrated course: helicopters

(a) The ATP/IR integrated course should be completed within between 12 and 36 months. This period may be extended where additional flying training or ground instruction is provided by the ATO.

CREDITING

(b) Credit for the hours flown should be entered into the applicant's training record. In case of a student pilot who does not hold a pilot licence and with the approval of the CAAT, an ATO may designate certain dual exercises to be flown in an aeroplane or a TMG up to a maximum of 20 hours.

THEORETICAL KNOWLEDGE

(c) The 750 hours of instruction which also cover the Area 100 KSA, may include in suitable proportion

(1) classroom work;

(2) lessons;

(3) tutorials;

(4) demonstrations, including those supported by demonstration equipment;

(5) exercises carried out as groups or individuals and based on pre-flight and en-route planning, communications, presentations and projects;

(6) exercises that use demonstration equipment or training devices;

(7) directed study including workbook exercises or assignments;

(8) aerodrome or aviation industry field trips;

(9) computer-based training and e-learning elements;

(10) progress tests, Area 100 KSA assessments and mental maths test(s); and

(11) other training methods, media and tools approved by the CAAT.

The 750 hours of instruction should be divided in such a way that in each subject the minimum hours are:

(1)	Air law	35 hours
(2)	Aircraft general knowledge	100 hours
(3)	Flight performance and planning	120 hours
(4)	Human performance and limitations	35 hours
(5)	Meteorology	60 hours
(6)	Navigation	90 hours
(7)	Operational procedures	25 hours
(8)	Principles of flight	55 hours
(9)	Communications	20 hours

Other subdivision of hours may be agreed upon between the CAAT and the ATO.

(d) The flight instruction is divided into four phases:

(1) phase 1:

Flight exercises up to the first solo flight comprise a total of not less than 12 hours dual flight instruction on a helicopter, including:

(1) pre-flight operations, mass and balance determination, helicopter inspection and servicing;
(2) aerodrome and traffic pattern operations, collision avoidance and procedures;
(3) control of the helicopter by external visual reference;
(4) take-offs, landings, hovering, look-out turns and normal transitions from and to the hover;
(5) emergency procedures, basic auto-rotations, simulated engine failure, ground resonance recovery if relevant to type.

(2) phase 2:

Flight exercises until general handling and day VFR navigation progress check, and basic instrument flying progress check. This phase comprises a total flight time of not less than 128 hours including 73 hours of dual flight instruction flight time and including at least 5 hours VFR conversion training on an ME helicopter, 15 hours of solo flight and 40 hours flown as student PIC. The instruction and testing contain the following:

(i) sideways and backwards flight, turns on the spot;

(ii) incipient vortex ring recovery;

(iii) advanced/touchdown auto-rotations, simulated engine-off landings, practice forced landings. Simulated equipment malfunctions and emergency procedures relating to malfunctions of engines, controls, electrical and hydraulic circuits;

(iv) steep turns;

(v) transitions, quick stops, out of wind manoeuvres, sloping ground landings and take-offs;

(vi) limited power and confined area operations, including low level operations to and from unprepared sites;

(vii) flight by sole reference to basic flight instruments, including completion of a 180 ° turn and recovery from unusual attitudes to simulate inadvertent entry into cloud;

(viii) cross-country flying by external visual reference, DR and radio navigation aids, diversion procedures;

(ix) aerodrome and traffic pattern operations at different aerodromes;

(x) operations to, from and transiting controlled aerodromes; compliance with ATS procedures, R/T procedures and phraseology;

(xi) application of meteorological briefing arrangements, evaluation of weather conditions for flight and use of AIS;

(xii) night flight, including take-offs and landings as PIC;

(xiii) general handling, day VFR navigation and basic instrument flying progress checks in accordance with Appendix 4 to Part-FCL, conducted by an FI not connected with the applicant's training.

(3) phase 3:

Flight exercises up to IR skill test. This part comprises a total of 40 hours dual instrument flight time, including 10 hours of an ME IFR certificated helicopter.

The instruction and testing should contain the following:

(i) pre-flight procedures for IFR flights, including the use of the flight manual and appropriate ATS documents in the preparation of an IFR flight plan;

(ii) procedures and manoeuvres for IFR operation under normal, abnormal and emergency conditions covering at least:

(A) transition from visual to instrument flight on take-off;

(B) SIDs and arrivals;

(C) en-route IFR procedures;

(D) holding procedures;

(E) instrument approaches to specified minima;

(F) missed approach procedure;

(G) landings from instrument approaches;

(H) in-flight manoeuvres and particular flight characteristics;

(I) instrument exercises with one engine simulated inoperative.

(4) phase 4:

Instruction in MCC should comprise the relevant training set out in FCL.735.H and AMC1 FCL,735.A, FCL.735.H and FCL.735.As.

If a type rating for MP helicopter is not required on completion of this part, the applicant should be provided with a certificate of course completion for MCC training.

G. ATP integrated course: helicopters

(a) The ATP integrated course should between 12 and 36 months. This period may be extended where additional flying training or ground instruction is provided by the ATO.

CREDITING

(b) Credit for the hours flown should be entered into the applicant's training record. In case of a student pilot who does not hold a pilot licence and with the approval of the CAAT, an ATO may designate certain dual exercises to be flown in an aeroplane or a TMG up to a maximum of 20 hours.

THEORETICAL KNOWLEDGE

(c) The 650 hours of instruction which also cover the Area 100 KSA, may include in suitable proportions

(1) classroom work;

(2) lessons;

(3) tutorials;

(4) demonstrations, including those supported by demonstration equipment;

(5) exercises carried out as groups or individuals and based on pre-flight and en-route planning, communications, presentations and projects;

(6) exercises that use demonstration equipment or training devices;

(7) directed study including workbook exercises or assignments;

(8) aerodrome or aviation industry field trips;

(9) computer-based training and e-learning elements;

(10) progress tests, Area 100 KSA assessments and mental maths test(s); and

(11) other training methods, media and tools approved by the CAAT.

The 650 hours of instruction should be divided in such a way that in each subject the minimum hours are:

(1)	Air law	30 hours
(2)	Aircraft general knowledge	90 hours
(3)	Flight performance and planning	90 hours
(4)	Human performance and limitations	30 hours
(5)	Meteorology	50 hours
(6)	Navigation	70 hours
(7)	Operational procedures	20 hours
(8)	Principles of flight	45 hours
(9)	Communications	15 hours

Other subdivision of hours may be agreed upon between the CAAT and the ATO.

(d) The flight instruction is divided into three phases:

(1) phase 1:

Flight exercises up to the first solo flight comprise a total of not less than 12 hours dual flight instruction on a helicopter, including:

(i) pre-flight operations, mass and balance determination, helicopter inspection and servicing;

(ii) aerodrome and traffic pattern operations, collision avoidance and procedures;

(iii) control of the helicopter by external visual reference;

(iv) take-offs, landings, hovering, look-out turns and normal transitions from and to the hover;

(v) emergency procedures, basic auto-rotations, simulated engine failure, ground resonance recovery if relevant to type.

(2) phase 2:

Flight exercises until general handling and day VFR navigation progress and basic instrument flying progress check conducted by an FI not connected with the applicant's training. This phase comprises a total flight time of not less than 128 hours, including 73 hours of dual instruction flight time and including at least 5 hours VFR conversion training on an ME helicopter, 15 hours of solo flight and 40 hours flown as student PIC. The instruction and testing contain the following:

(i) sideways and backwards flight, turns on the spot;

(ii) incipient vortex ring recovery;

(iii) touchdown or advanced auto-rotations, simulated engine-off landings, practice forced landings. Simulated equipment malfunctions and emergency procedures relating to malfunctions of engines, controls, electrical and hydraulic circuits;

(iv) steep turns;

(v) transitions, quick stops, out of wind manoeuvres, sloping ground landings and take-offs;

(vi) limited power and confined area operations, including low level operations to and from unprepared sites;

(vii) 10 hours flight by sole reference to basic flight instruments, including completion of a 180 ° turn and recovery from unusual attitudes to simulate inadvertent entry into cloud;

(viii) cross-country flying by external visual reference, DR and radio navigation aids, diversion procedures;

(ix) aerodrome and traffic pattern operations at different aerodromes;

(x) operations to, from and transiting controlled aerodromes, compliance with ATS procedures, R/T procedures and phraseology;

(xi) application of meteorological briefing arrangements, evaluation of weather conditions for flight and use of AIS;

(xii) night flight, including take-offs and landings as PIC;

(xiii) general handling, day VFR navigation and basic instrument flying progress checks in accordance with Appendix 4 to Part-FCL, conducted by an FI not connected with the applicant's training.

(3) phase 3:

Instruction in MCC comprises the relevant training set out in FCL.735.H and AMC1 FCL,735.A, FCL.735.H and FCL.735.As.

If a type rating for MP helicopter is not required on completion of this part, the applicant should be provided with a certificate of course completion for MCC training.

H. ATP modular theoretical knowledge course: helicopters

(a) The aim of this course is to train pilots who have not received the theoretical knowledge instruction during an integrated course to the level of theoretical knowledge required for the ATPL.

(b) An approved course which also covers the Area 100 KSA, may contain in suitable proportions:

(1) Classroom work;

(2) lessons;

(3) tutorials;

(4) demonstrations, including those supported by demonstration equipment;

(5) exercises carried out as groups or individuals and based on pre-flight and en-route planning, communications, presentations and projects;

(6) exercises that use demonstration equipment or training devices;

(7) directed study including workbook exercises or assignments;

(8) aerodrome or aviation industry field trips;

(9) computer-based training and e-learning elements;

(10) progress tests, Area 100 KSA assessments and mental maths test(s); and

(11) other training methods, media and tools approved by the CAAT.

Approved distance-learning (correspondence) courses may also be offered as part of the course. The minimum amount of classroom instruction, as required by ORA.ATO.305, may include all of the above except item (b)(9).

(c) The ATP modular course should last 18 months. This period may be extended where additional training is provided by the ATO. The flight instruction and skill test need to be completed within the period of validity of the pass in the theoretical examinations.

I. CPL/IR integrated course: helicopters

(a) The CPL/IR integrated course should last between 9 and 30 months. This period may be extended where additional flying training or ground instruction is provided by the ATO.

CREDITING

(b) Credit for the hours flown should be entered into the applicant's training record. In case of a student pilot who does not hold a pilot licence and with the approval of the CAAT, an ATO may designate certain dual exercises to be flown in an aeroplane or a TMG up to a maximum of 20 hours.

THEORETICAL KNOWLEDGE

(c) The 500 hours of instruction, which also cover the Area 100 KSA, may include in suitable proportions

(1) classroom work;

(2) lessons;

(3) tutorials;

(4) demonstrations, including those supported by demonstration equipment;

(5) exercises carried out as groups or individuals and based on pre-flight and en-route planning, communications, presentations and projects;

(6) exercises that use demonstration equipment or training devices;

(7) directed study including workbook exercises or assignments;

(8) aerodrome or aviation industry field trips;

(9) computer-based training and e-learning elements;

(10) progress tests, Area 100 KSA assessments and mental maths test(s); and

(11) other training methods, media and tools approved by the CAAT.

The 500 hours of instruction should be divided in such a way that in each subject the minimum hours are:

(1)	Air law	25 hours
(2)	Aircraft general knowledge	75 hours
(3)	Flight performance and planning	80 hours
(4)	Human performance and limitations	20 hours
(5)	Meteorology	40 hours
(6)	Navigation	55 hours
(7)	Operational procedures	15 hours
(8)	Principles of flight	35 hours
(9)	Communications	15 hours

Other subdivision of hours may be agreed upon between the CAAT and the ATO.

FLYING TRAINING

(d) The flight instruction is divided into three phases:

(1) phase 1:

Flight exercises up to the first solo flight. This part comprises a total of at least 12 hours dual flight instruction on a helicopter including:

(i) pre-flight operations: mass and balance determination, helicopter inspection and servicing;

(ii) aerodrome and traffic pattern operations, collision avoidance and procedures;

(iii) control of the helicopter by external visual reference;

(iv) take-offs, landings, hovering, look-out turns and normal transitions from and to the hover;

(v) emergency procedures, basic auto-rotation, simulated engine failure, ground resonance recovery if relevant to type.

(2) phase 2:

Flight exercises until general handling and day VFR navigation progress check conducted by an FI not connected with the applicant's training, and basic instrument progress check. This part comprises a total flight time of not less than 128 hours, including 73 hours of dual instruction flight time and including at least 5 hours VFR conversion training on an ME helicopter, 15 hours of solo flight and 40 hours flown as SPIC. The instruction and testing contain the following:

(i) sideways and backwards flight, turns on the spot;

(ii) incipient vortex ring recovery;

(iii) touchdown or advanced auto-rotation and simulated engine-off landings, practice forced landings. Simulated equipment malfunctions and emergency procedures relating to malfunctions of engines, controls, electrical and hydraulic circuits;

(iv) steep turns;

(v) transitions, quick stops, out of wind manoeuvres, sloping ground landings and take-offs;

(vi) limited power and confined area operations, including selection of and low level operations to and from unprepared sites;

(vii) flight by sole reference to basic flight instruments, including completion of 180 degree turn and recovery from unusual attitudes to simulate inadvertent entry into cloud;

(viii) cross-country flying by external visual reference, DR and radio navigation aids and diversion procedures;

(ix) aerodrome and traffic pattern operations at different aerodromes;

(x) operations to, from and transiting controlled aerodromes, compliance with ATS procedures, R/T procedures and phraseology;

(xi) application of meteorological briefing arrangements, evaluation of weather conditions for flight and use of AIS;

(xii) night flight, including take-offs and landings as PIC;

(xiii) general handling, day VFR navigation and basic instrument flying progress checks in accordance with Appendix 4 to Part-FCL, conducted by an FI not connected with the applicant's training.

(3) phase 3:

Flight exercises up to IR skill test. This part comprises a total of 40 hours dual instrument flight time, including 10 hours of an ME IFR certificated helicopter.

The instruction and testing should contain the following:

(i) pre-flight procedures for IFR flights, including the use of the flight manual and appropriate ATS documents in the preparation of an IFR flight plan;

(ii) procedures and manoeuvres for IFR operation under normal, abnormal and emergency conditions covering at least:

(A) transition from visual to instrument flight on take-off;

(B) SIDs and arrivals;

(C) en-route IFR procedures;

(D) holding procedures;

(E) instrument approaches to specified minima;

(F) missed approach procedure;

(G) landings from instrument approaches;

(H) in-flight manoeuvres and particular flight characteristics;

(I) instrument exercises with one engine simulated inoperative.

J. CPL integrated course: helicopters

(a) The CPL integrated course should last between 9 and 24 months. This period may be extended where additional flying training or ground instruction is provided by the ATO.

CREDITING

(b) Credit for the hours flown should be entered into the applicant's training record. In case of a student pilot who does not hold a pilot licence and with the approval of the CAAT, an ATO may designate certain dual exercises to be flown in an aeroplane or a TMG up to a maximum of 20 hours.

THEORETICAL KNOWLEDGE

(c) The 350 hours of instruction which also cover the Area 100 KSA, may include in suitable proportions

(1) classroom work;

(2) lessons;

(3) tutorials;

(4) demonstrations, including those supported by demonstration equipment;

(5) exercises carried out as groups or individuals and based on pre-flight and en-route planning, communications, presentations and projects;

(6) exercises that use demonstration equipment or training devices;

(7) directed study including workbook exercises or assignments;

(8) aerodrome or aviation industry field trips;

(9) computer-based training and e-learning elements;

(10) progress tests, Area 100 KSA assessments and mental maths test(s); and

(11) other training methods, media and tools approved by the CAAT.

The 350 hours of instruction should be divided in such a way that in each subject the minimum hours are:

(1)	Air law	15 hours
(2)	Aircraft general knowledge	40 hours
(3)	Flight performance and planning	35hours
(4)	Human performance and limitations	10 hours
(5)	Meteorology	30 hours
(6)	Navigation	35 hours
(7)	Operational procedures	10 hours

(8) Principles of flight 30 hours

(9) Communications 10 hours

Other subdivision of hours may be agreed upon between the CAAT and the ATO.

FLYING TRAINING

(d) The flight instruction is divided into two phases:

(1) Phase 1:

Flight exercises up to the first solo flight. This part comprises a total of not less than 12 hours dual flight instruction on a helicopter, including:

(i) pre-flight operations: mass and balance determination, helicopter inspection and servicing;

(ii) aerodrome and traffic pattern operations, collision avoidance and procedures;

(iii) control of the helicopter by external visual reference;

(iv) take-offs, landings, hovering, look-out turns and normal transitions from and to the hover;

(v) emergency procedures, basic auto-rotations, simulated engine failure, ground resonance recovery if relevant to type.

(2) Phase 2:

Flight exercises until general handling and day VFR navigation progress check conducted by an FI not connected with the applicant's training, and basic instrument progress check. This part comprises a total flight time of not less than 123 hours, including 73 hours of dual instruction flight time, 15 hours of solo flight and 35 hours flown as SPIC. The instruction and testing contain the following:

(i) sideways and backwards flight, turns on the spot;

(ii) incipient vortex ring recovery;

(iii) touchdown or advanced auto-rotations and simulated engine-off landings, practice forced landings. Simulated equipment malfunctions and emergency procedures relating to malfunctions of engines, controls, electrical and hydraulic circuits;

(iv) steep turns;

(v) transitions, quick stops, out of wind manoeuvres, sloping ground landings and take-offs;

(vi) limited power and confined area operations, including selection of and low level operations to and from unprepared sites;

(vii) flight by sole reference to basic flight instruments, including completion of a 180° turn and recovery from unusual attitudes to simulate inadvertent entry into cloud;

(viii) cross-country flying by external visual reference, DR and radio navigation aids, diversion procedures;

(ix) aerodrome and traffic pattern operations at different aerodromes;

(x) operations to, from and transiting controlled aerodromes, compliance with ATS procedures, R/T procedures and phraseology;

(xi) application of meteorological briefing arrangements, evaluation of weather conditions for flight and use of AIS;

(xii) night flight, including take-offs and landings as PIC;

(xiii) general handling, day VFR navigation and basic instrument flying progress checks in accordance with Appendix 4 to Part-FCL, conducted by an FI not connected with the applicant's training.

K. CPL modular course: helicopters

(a) The CPL modular course should be completed within 18 months. This period may be extended where additional training is provided by the ATO. The flight instruction and skill test need to be completed within the period of validity of the pass in the theoretical examinations.

CREDITING

Applicants with prior experience as PIC may be credited with an amount of hours to meet the requirement of 150 hours of flight time of Appendix 3, Part K, point (3)(a).

The amount of credited hours should be decided by the ATO where the applicant takes the training course on the basis of a pre-entry flight test, but in any case, should have been completed only in one aircraft category other than helicopter, and not be a combination of hours in more than two different aircraft categories.

THEORETICAL KNOWLEDGE

(b) The 250 hours of instruction which also covers the Area 100 KSA, may include in suitable proportions

(1) classroom work;

(2) lessons;

(3) tutorials;

(4) demonstrations, including those supported by demonstration equipment;

(5) exercises carried out as groups or individuals and based on pre-flight and en-route planning, communications, presentations and projects;

(6) exercises that use demonstration equipment or training devices;

(7) directed study including workbook exercises or assignments;

(8) aerodrome or aviation industry field trips;

(9) computer-based training and e-learning elements;

(10) progress tests, Area 100 KSA assessments and mental maths test(s); and

(11) other training methods, media and tools approved by the CAAT.

Approved distance-learning (correspondence) courses may also be offered as part of the course. The minimum amount of classroom instruction, as required by ORA.ATO.305, may include all of the above except item (b)(9).

FLYING TRAINING

(c) The flying instruction comprises the following items. The flight time allocated to each exercise is at the discretion of the FI, provided that at least 5 hours flight time is allocated to cross-country flying.

VISUAL INSTRUCTION

(d) Within the total of dual flight instruction time, the applicant may have completed during the visual phase up to 5 hours in a helicopter FFS or FTD 2, 3 or FNPT II, III.

(1) pre-flight operations: mass and balance calculations, helicopter inspection and servicing;

(2) level flight speed changes, climbing, descending, turns, basic auto-rotations, use of checklist, collision avoidance and checking procedures;

(3) take-offs and landings, traffic pattern, approach, simulated engine failures in the traffic pattern. Sideways and backwards flight and spot turns in the hover;

(4) recovery from incipient vortex ring condition;

(5) advanced auto-rotations covering the speed range from low speed to maximum range and manoeuvre in auto-rotations (180 °, 360 ° and 'S' turns) and simulated engine-off landings;

(6) selection of emergency landing areas, auto-rotations following simulated emergencies to given areas and steep turns at 30 ° and 45 ° bank;

(7) manoeuvres at low level and quick-stops;

(8) landings, take-offs and transitions to and from the hover when heading out of wind;

(9) landings and take-offs from sloping or uneven ground;

(10) landings and take-offs with limited power;

(11) low level operations into and out of confined landing sites;

(12) cross-country flying using dead reckoning and radio navigation aids, flight planning by the applicant, filing of ATC flight plan, evaluation of weather briefing documentation, NOTAM, etc., R/T procedures and phraseology, positioning by radio navigation aids; operation to, from and transiting controlled aerodromes, compliance with ATS procedures for VFR flights, simulated radio communication failure, weather deterioration, diversion procedures; location of an off airfield landing site and simulated approach.

BASIC INSTRUMENT INSTRUCTION

(e) A maximum of 5 hours of the following exercises may be performed in an FFS or FTD or FNPT. Flight training should be carried out in VMC using a suitable means of simulating IMC for the student.

(1) Exercise 1:

Instrument flying without external visual cues. Level flight performing speed changes, maintaining flight altitude (level, heading) turns in level flight at rate 1 and 30° bank, left and right; roll-out on predetermined headings;

(2) Exercise 2:

repetition of exercise 1; additionally, climbing and descending, maintaining heading and speed, transition to horizontal flight; climbing and descending turns;

(3) Exercise 3:

repetition of exercise 1; and recovery from unusual attitudes;

(4) Exercise 4:

radio navigation;

(5) Exercise 5:

repetition of exercise 1; and turns using standby magnetic compass and standby artificial horizon (if fitted).

AMC2 to Appendix 3 and AMC1 to Appendix 5

BASIC UPRT FOR AEROPLANE ATP INTEGRATED, CPL/IR INTEGRATED, CPL INTEGRATED AND CPL MODULAR COURSES AS WELL AS MPL COURSE PHASES 1 TO 3

(a) BASIC UPRT ELEMENTS AND COMPONENTS

In order for student pilots to develop the competencies to prevent and recover from aeroplane upsets, the basic UPRT elements and respective components in the following Table 1 should be integrated into the flying training modules and phases, such that all the elements are covered.

Table 1: Basic UPRT elements and components		Pre-flight briefing	Flying training
A.	**Aerodynamics**		
1.	General aerodynamic characteristics	.	.
2.	Aeroplane certification and limitations	.	.
4.	Aerodynamics (high and low altitude)	.	
5.	Aeroplane performance (high and low altitude)	.	
6.	AoA and stall awareness	.	.
7.	Aeroplane stability	.	.
8.	Control surface fundamentals	.	.
9.	Use of trim	.	.
10.	Icing and contamination effects	.	.
11.	Propeller slipstream (as applicable)	.	.
B.	**Causes of and contributing factors to upsets**		
1.	Environmental	.	
2.	Pilot-induced	.	
3.	Mechanical (aeroplane systems)	.	
C.	**Safety review of accidents and incidents relating to aeroplane upsets**		
1.	Safety review of accidents and incidents relating to aeroplane upsets	.	

Table 1: Basic UPRT elements and components		Pre-flight briefing	Flying training
D.	**G-load awareness and management**		
1.	Positive/negative/increasing/decreasing G-loads	.	.
2.	Lateral G awareness (sideslip)	.	.
3.	G-load management	.	.
E.	**Energy management**		
1.	Kinetic energy vs potential energy vs chemical energy (power)	.	.
F.	**Flight path management**		
1.	Relationship between pitch, power and performance	.	.
2.	Performance and effects of differing power plants	.	.
3.	Manual and automation inputs for guidance and control (if applicable)	.	.
4.	Class-specific characteristics of flight path management	.	.
5.	Management of go-arounds from various stages during the approach	.	.
6.	Automation management (if applicable)	.	.
7.	Proper use of rudder	.	.
G.	**Recognition**		
1.	Class-specific examples of physiological, visual and instrument clues during developing and developed upset	.	.
2.	Pitch/power/roll/yaw	.	.
3.	Effective scanning (effective monitoring)	.	.
4.	Stall protection systems and cues	.	.
5.	Criteria for identifying stalls and upsets	.	.
H.	**System malfunction** (including immediate handling and subsequent operational considerations, as applicable)		
1.	Flight control defects	.	.
2.	Engine failure (partial or full)	.	.
3.	Instrument failures	.	.
4.	Loss of reliable airspeed (training elements as per point (lb) of AMC2 ORA.ATO.125).	.	.

Table 1: Basic UPRT elements and components		Pre-flight briefing	Flying training
5.	Automation failures	.	.
6.	Stall protection system failures, including icing alerting systems	.	.

(b) MANOEUVRE-BASED UPRT EXERCISES

The following Table 2 contains manoeuvre-based basic UPRT exercises.

Table 2: Manoeuvre-based basic UPRT exercises		Pre-flight briefing	Flying training
A.	**Timely and appropriate intervention**		
1.	Arresting divergence of the aeroplane from intended flight path	.	.
2.	Preventing flight at airspeeds inappropriate for the (intended flight) condition	.	.
3.	Avoiding spins	.	.
B.	**Flight path management**		
1.	Steep turns	.	.
2.	Slow flight (including flight at critically low airspeed)	.	.
3.	High airspeed (including flight at relatively high airspeed)	.	.
C.	**Application of OEM recommendations (if applicable) during developing upsets**		
1.	Nose-high attitudes at various bank angles	.	.
2.	Nose-low attitudes at various bank angles (including spiral dive)	.	.
D.	**Stall events in the following configurations**		
1.	Take-off configuration	.	.
2.	Clean configuration	.	.
3.	Landing configuration	.	.

(c) INTEGRATION OF TEM, PILOT CORE COMPETENCIES, AND HUMAN FACTORS

Threat and Error Management (TEM), pilot competencies and human factors, as shown in the following Table 3 below, should be integrated into the flying training modules and phases as appropriate.

Table 3: Core elements and components of TEM, pilot competencies and human factors		**Pre-flight briefing**	**Flying training**
A.	**TEM**		
1.	TEM framework	•	•
2.	Recognition of threats and errors	•	•
3.	Management of threats and errors	•	•
4.	Countermeasures against threats and errors to prevent undesired aircraft states, including early intervention and, when necessary to prevent upsets, timely application of countermeasures to manage undesired aircraft states	•	•
B.	**Pilot Competencies, including CRM**		
1.	All elements listed in Table 1 of GM2 FCL.735.A	•	•
C.	**Human factors**		
1.	Instrument interpretation, active monitoring, checking	•	•
2.	Distraction, inattention, fixation, fatigue	•	•
3.	Human information processing, cognitive effects	•	•
4.	Perceptual illusions (visual or physiological) and spatial disorientation, effects of G-loads	•	•
5.	Stress, startle and surprise effect	•	•
6.	Intuitive and counter-intuitive behaviour	•	•

GM1 to Appendix 3 and to Appendix 5

BASIC UPRT EXERCISES

(a) GENERAL

The training objective of the basic UPRT exercises is for the student to achieve competence in applying prevention and recovery techniques. In order to meet the training objectives, some UPRT exercises will involve operation at altitudes, speeds and g-loadings that are not required for other parts of the training course. When designing training courses, ATOs should ensure that the aircraft used for these exercises will allow the training objectives to be achieved while maintaining a margin of safety to aircraft limitations in accordance with the training envelope, as determined by the ATO (see GM1 ORA.ATO.125 point (f)).

(b) UPRT WITH REFERENCE TO INSTRUMENTS

Basic UPRT exercises completed by reference to instruments (i.e. in simulated instrument meteorological conditions (IMC)) should involve only moderate excursions from the speeds and attitudes used in normal instrument flight. Exercises conducted in IMC should not be planned to involve 'unusual attitudes'.

(c) INSTRUCTORS DELIVERING BASIC UPRT

Instructors conducting basic UPRT training during the CPL or ATP course do not require any additional qualifications. It is the responsibility of the ATO to ensure that instructors are competent to deliver effective training on all parts of the course and also that they are competent to recover the aircraft in the event that a student erroneously conducts any UPRT exercise.

(d) APPLICATION OF OEM RECOMMENDATIONS DURING DEVELOPING UPSETS

Stall recovery training exercises as well as nose-high and nose-low prevention training exercises use the recovery strategies recommended by the OEMs contained in Tables 1, 2 and 3 below.

Note: As OEM procedures always take precedence over the general strategies as recommended by the OEMs, ATOs should consult the OEM on whether any approved specific procedures are available prior to using the templates.

Refer to revision 3 of the Airplane Upset Prevention and Recovery Training Aid (AUPRTA) for a detailed explanation and rationale of nose-high and nose-low recovery strategies as recommended by the OEMs.

Table 1: Stall event recovery template	
Pilot Flying (PF) Immediately do the following at first indication of a stall (aerodynamic buffeting, reduced roll stability and aileron effectiveness, visual or aural cues and warnings, reduced elevator (pitch) authority, inability to maintain altitude or arrest rate of descent, stick shaker activation (if installed)) during any flight phases except at lift-off.	
1. **AUTOPILOT — DISCONNECT (IF APPLICABLE)** (A large out-of-trim condition could be encountered when the autopilot is disconnected)	
2. **AUTOTHROTTLE — OFF (IF APPLICABLE)**	
3. **NOSE-DOWN PITCH CONTROL** apply until stall warning is eliminated **NOSE-DOWN PITCH TRIM** (as needed) (Reduce the AoA whilst accepting the resulting altitude loss.)	
4. **BANK — WINGS LEVEL**	
5. **POWER — ADJUST** (as needed) (Thrust reduction for aeroplanes with underwing-mounted engines may be needed)	
6. **SPEEDBRAKES/SPOILERS — RETRACT**	
7. When airspeed is sufficiently increasing — **RECOVER** to level flight (Avoid the secondary stall due to premature recovery or excessive G-loading)	

Table 2: Nose-high recovery strategy template	
Recognise and confirm the developing situation by announcing '**nose high**'	
Pilot Flying (PF)	
1. **AUTOPILOT — DISCONNECT (if applicable)** (A large out-of-trim condition could be encountered when the autopilot is disconnected)	
2. **AUTOTHROTTLE — OFF** (if applicable)	
3. **APPLY** as much nose-down control input as required to obtain a nose-down pitch rate	
4. **POWER — ADJUST** (if required)	
5. **ROLL — ADJUST** (if required) (Avoid exceeding 60-degree bank)	
6. When airspeed is sufficiently increasing — **RECOVER** to level flight (Avoid the secondary stall due to premature recovery or excessive G-loading)	
NOTE: (1) Recovery to level flight may require use of pitch trim. (2) WARNING: Excessive use of pitch trim or rudder may aggravate the upset situation or may result in high structural loads.	

Table 3: Nose-low recovery strategy template		
Recognise and confirm the developing situation by announcing '**nose low**' (If the autopilot or autothrottle is responding correctly, it may not be appropriate to decrease the level of automation while assessing if the divergence is being stopped)		
Pilot Flying (PF)		
1.	**AUTOPILOT — DISCONNECT (if applicable)** (A large out-of-trim condition could be encountered when the autopilot is disconnected)	
2.	**AUTOTHROTTLE — OFF** (if applicable)	
3.	**RECOVERY** from stall (if required)	
4.	**ROLL** in the shortest direction to wings level (It may be necessary to reduce the G-loading by applying forward control pressure to improve roll effectiveness)	
5.	**POWER** and **DRAG — ADJUST** (if required)	
6.	**RECOVER** to level flight (Avoid the secondary stall due to premature recovery or excessive G-loading)	
NOTE: (1) Recovery to level flight may require use of pitch trim. (2) WARNING: Excessive use of pitch trim or rudder may aggravate the upset situation or may result in high structural loads.		

ADDITIONNAL GUIDANCE

(e) Specific guidance on UPRT is available in the latest revision of ICAO Doc 10011 'Manual on Aeroplane Upset Prevention and Recovery Training'.

GM1 to Appendix 3 to Appendix 6 and to FCL.735.H

OVERVIEW OF FSTD TRAINING CREDITS FOR DUAL INSTRUCTION IN HELICOPTER FLYING TRAINING COURSES

		ATPL(H)/IR integrated			FSTD credits
	Dual	Solo	SPIC	Total	FFS; FTD; FNPT
Visual, including ME T/R training	75 hrs	15 hrs	40 hrs	130 hrs	30 hrs FFS C/D level or 25 hrs FTD 2, 3 or 20 hrs FNPT II/III
Basic instrument	10 hrs	-	-	10 hrs	20 hrs FFS or FTD 2, 3 or FNPT II/III or 10 hrs in at least an FNPT I
Instrument rating training	40 hrs	-		40 hrs	
MCC	15 hrs	-	-	15 hrs	15 hrs FFS or FTD 2, 3 (MCC) or FNPT II/III (MCC)
Total	140 hrs	55 hrs		195 hrs	Note 2

		ATPL(H)/VFR integrated			
	Dual	Solo	SPIC	Total	FFS; FTD; FNPT
Visual including ME T/R training	75 hrs	15 hrs	40 hrs	130 hrs	30 hrs FFS C/D level or 25 hrs FTD 2, 3 or 20 hrs FNPT II/III
Basic instrument	10 hrs	-	-	10 hrs	5 hrs in at least an FNPT I
MCC / VFR	10 hrs	-	-	10 hrs	10 hrs FFS or FTD 2, 3 (MCC) or FNPT II/III (MCC)
Total	95 hrs	55 hrs		150 hrs	Note 2

		CPL(H)/IR integrated			
	Dual	Solo	SPIC	Total	FFS; FTD; FNPT
Visual including ME T/R training	75 hrs	15 hrs	40hrs	130 hrs	30 hrs FFS C/D level or 25 hrs FTD 2, 3 or 20 hrs FNPT II/III
Basic instrument	10 hrs	-	-	10 hrs	20 hrs FFS or FTD 2, 3 or FNPT II/III or 10 hrs in at least an FNPT I
Instrument rating training	40 hrs	-		40 hrs	
Total	125 hrs	55 hrs		180 hrs	Note 2

		CPL(H) Integrated			
	Dual	Solo	SPIC	Total	FFS; FTD; FNPT
Visual	75 hrs	15 hrs	35 hrs	125 hrs	30 hrs FFS C/D level or 25 hrs FTD 2, 3 or 20 hrs FNPT II/III
Basic instrument	10 hrs	-	-	10 hrs	5 hrs in at least an FNPT I
Total	85 hrs	50 hrs		135 hrs	Note 2

		CPL(H) modular			
	Dual	Solo	SPIC	Total	FFS; FTD; FNPT
Visual	20 hrs	-	-	20 hrs	5 hrs FFS or FTD 2, 3 or FNPT II/III
Basic instrument	10 hrs	-	-	10 hrs	5 hrs in at least an FNPT I
Total	30 hrs	-	-	30 hrs	Note 2

		IR(H) modular			
	Dual	Solo	SPIC	Total	FFS; FTD; FNPT
SE	50 hrs	-	-	50 hrs	35 hrs FFS or FTD 2, 3 or FNPT II/III or 20 hrs FNPT I (H) or (A)
ME	55 hrs	-	-	55 hrs	40 hrs FFS; FTD 2, 3 FNPT II/III or 20 hrs FNPT I (H) or (A)

		MCC(H)			
	Dual	Solo	SPIC	Total	FFS; FTD; FNPT

MCC / IR	20 hrs	-	-	20 hrs	20 hrs FFS or FTD 2, 3 (MCC) or FNPT II/III (MCC)
MCC / VFR	15 hrs	-	-	15 hrs	15 hrs FFS or FTD 2, 3 (MCC) or FNPT II/III (MCC)
MCC / IR for MCC/VFR holders	5 hrs	-	-	5 hrs	5 hrs FFS or FTD 2, 3 (MCC) or FNPT II/III (MCC)

Note 1: In this matrix FSTD credits refer to helicopter FSTDs if not mentioned otherwise.

Note 2: Total credits for the FSTDs used in the course are not provided in the tables as the FSTDs may be used in various combinations. The FSTD credits provided in the tables for the separate phases of the course are the maximum FSTD credits available for each phase.

GM1 to Appendix 3 Example of a grading system for practical flight training during ATP, CPL and MPL courses grading system

An ATPL/CPL/MPL grading system may be developed by using the grading system in GM3 FCL.735.A.

GM1 to Appendix 5 Integrated MPL training course

GENERAL

(a) In broad terms, the MPL holder is expected to be able to complete the airline operators' conversion course with a high probability of success and within the time frame normally allowed for this phase. The standard is equivalent to what is currently expected from graduates of the ATP(A) integrated course who have completed type rating training.

(b) The general approach is to use the existing ATP(A) integrated training course as a reference and to implement progressively the MPL integrated training course and specifically the transfer from actual flight to simulated flight.

(c) This transfer should be organised in a way that is similar to the approach used for ETOPS. Successive evolutions of the training syllabus introduce progressively a higher level of simulated flight and a reduction of actual flight. Change from one version to the next should only take place after enough experience has been gained and once its results, including those of airline operator conversion courses, have been analysed and taken into account.

MPL TRAINING SCHEME

(d) The specific arrangement, pursuant to ORA.GEN.205, between an approved training organisation (ATO) and an operator for the multi-pilot licence (MPL) training should cover at least the following points:

(1) pre-entry requirements (including screening and selection);

(2) provision of the relevant documentation (operations manuals (OMs) and training manuals);

(3) design of the training programme;

(4) content of the operator conversion course;

(5) training effectiveness (e.g. continuous monitoring system, progress checks, etc.);

(6) provision of base training;

(7) graduate performance data feedback from the operator to the ATO;

(8) course evaluation and improvement; and

(9) alignment of the grading and assessment criteria.

The ATO and operator may use their OMs and training manuals to identify additional areas to be covered by the specific arrangement.

The following scheme should be applied:

MPL Training Scheme

Phases of training	Training items	Flight and simulated flight training media - Minimum level requirement -		Ground training media
Adapted competency model				
Phase 4 — advanced Type rating training covering the training content of Appendix 9 to Part-FCL within an airline-oriented environment	• TEM and CRM • Landing training • All weather • LOFT • Abnormal procedures • Normal procedures • Type-specific UPRT	Aeroplane: ME Multi-crew certified FSTD FS level D or C + ATC simulation	6 to 12 take-offs and landings as PF (in accordance with point 11 of Appendix 5) One go-around with all engines operating (refer to GM1 to Appendix 9 (d). PF / PM	• E-learning • Part-task trainer • Class-room
Phase 3 — intermediate Application of multi-crew operations in a high-performance ME turbine aeroplane	• TEM and CRM • LOFT • Abnormal procedures • Normal procedures • Multi-crew • Instrument flight • Non-type-specific UPRT	FSTD: *representing an ME turbine-powered aeroplane to be operated with a co-pilot and qualified to an equivalent standard to level B + ATC simulation*	PF / PM	
Phase 2 — basic Introduction of multi-crew operations and instrument flight	• TEM and CRM • PF / PM complement • IFR cross-country • Instrument flight • Night flight	Aeroplane: SE or ME FSTD: FNPT II + MCC	PF / PM	
Phase 1 — core flying skills Specific basic SP training	• TEM and CRM • VFR cross-country • Solo flight • Basic instrument flight • Principles of flight • Cockpit procedures • Upset recovery in an aeroplane • Night flight	Aeroplane: SE or ME FSTD: FNPT I / BITD	PF	

THEORETICAL KNOWLEDGE INSTRUCTION

(e) The 750 hours of instruction, which also cover the Area 100 KSA, may include in suitable proportions:

(1) classroom work;

(2) lessons;

(3) tutorials;

(4) demonstrations, including those supported by demonstration equipment;

(5) exercises carried out as groups or individuals and based on pre-flight and en-route planning, communications, presentations and projects;

(6) exercises that use demonstration equipment or training devices;

(7) directed study including workbook exercises or assignments;

(8) aerodrome or aviation industry field trips;

(9) computer-based training and e-learning elements;

(10) progress tests, Area 100 KSA assessments and mental maths test(s); and

(11) other training methods, media and tools approved by the CAAT.

COMPETENCY UNITS, COMPETENCY ELEMENTS AND PERFORMANCE CRITERIA

(f) Apply human performance principles, including principles of threat and error management:

(1) cooperation;

(2) leadership and managerial skills;

(3) situation awareness;

(4) decision making.

These behaviour categories are intended to help in the effective utilisation of all available resources to achieve safe and efficient operations.

These behaviour categories may be adapted and extended to incorporate issues like communication and use of automation if it is considered to be relevant to the development of the curriculum.

(g) Perform Aircraft Ground and Pre-Flight Operations

List of competency elements and performance criteria:

(1) demonstrate attitudes and behaviours appropriate to the safe conduct of flight, including recognising and managing potential threats and errors;

Duty Observation and assessment

Satisfactory (S)

Unsatisfactory (U)

(2) perform dispatch duties: (S) or (U)

(i) verifies technical condition of the a/c, including adequate use of MEL;

PF/PNF

(ii) checks technical bulletins and notices; PF/PNF

(iii) determines operational environment and pertinent weather; PF/PNF

(iv) determines impact of weather on aircraft performance; PF/PNF

(v) applies flight planning and load procedures; PF/PNF

(vi) determines fuel requirement; PF/PNF

(vii) files an ATS flight plan (if required) PF/PNF

(3) provide flight crew and cabin crew briefings; (S) or (U)

(i) briefed flight crew in all relevant matters; PF

(ii) briefed cabin crew in all relevant matters. PF

(4) perform pre-flight checks and cockpit preparation: (S) or (U)

(i) ensures the airworthiness of the aircraft; PF

(ii) performs the cockpit preparation and briefings; PF/PNF

(iii) performs FMS initialisation, data insertion and confirmation; PF/PNF

(iv) optimises and checks take-off performance and take-off data calculation. PF/PNF

(5) perform engine start: (S) or (U)

(i) asks for, receives acknowledges and checks ATC clearance; PNF

(ii) performs engine start procedure; PF/PNF

(iii) uses standard communication procedures with ground crew and ATC. PF/PNF

(6) perform taxi out: (S) or (U)

(i) receives, checks and adheres to taxi clearance; PNF

(ii) taxis the aircraft, including use of exterior lighting; PF

(iii) complies to taxi clearance; PF/PNF

(iv) maintains look-out for conflicting traffic and obstacles; PF/PNF

(v) operates thrust, brakes and steering; PF

(vi) conducts relevant briefings; PF

(vii) uses standard communication procedures with crew and ATC; PNF

(viii) completes standard operating procedures and checklists; PF/PNF

(ix) updates and confirms FMS data; PF/PNF

(x) manages changes in performance and departure route; PF/PNF

(xi) completes de or anti-ice procedures. PF/PNF

(7) manage abnormal and emergency situations: (S) or (U)

(i) identifies the abnormal condition; PF/PNF

(ii) interprets the abnormal condition; PF/PNF

(iii) performs the procedure for the abnormal condition. PF/PNF

(8) communicate with cabin crew, passengers and company: (S) or (U)

(i) communicates relevant information with cabin crew; PF

(ii) communicates relevant information with company; PF/PNF

(iii) makes passenger announcements when appropriate. PF/PNF

(h) Perform take-off

List of competency elements and performance criteria:

(1) demonstrate attitudes and behaviours appropriate to the safe conduct of including recognising flight, and managing potential

(2) perform pre threats and errors. -take-off and predeparture preparation: (S) or (U)

(i) checks and acknowledges line up clearance; PF/PNF

(ii) checks correct runway selection; PF/PNF

(iii) confirms validity of performance data; PF/PNF

(iv) checks approach sector and runway are clear; PF/PNF

(v) confirms all checklists and take-off preparations completed; PF/PNF

(vi) lines up the aircraft on centreline without losing distance; PF

(vii) checks weather on departure sector; PF/PNF

(viii) checks runway status and wind. PF/PNF

(3) perform take-off roll: (S) or (U)

(i) applies take-off thrust; PF

(ii) (checks engine parameters; PNF

(iii) checks air speed indicators; PF/PNF

(iv) stays on runway centreline. PF

(4) perform transition to instrument flight rules: (S) or (U)

(i) applies v1 procedures; PF/PNF

(ii) rotates at vr to initial pitch attitude; PF

(iii) establishes initial wings level attitude; PF

(iv) retracts landing gear; PNF

(v) maintains climb out speed. PF

(5) perform initial climb to flap retraction altitude: (S) or (U)

(i) sets climb power; PF

(ii) adjusts attitude for acceleration; PF

(iii) selects flaps according flap speed schedule; PF/PNF

(iv) observes speed restrictions; PF

(v) completes relevant checklists. PF/PNF

(6) perform rejected take-off: (S) or (U)

(i) recognised the requirement to abort the take-off; PF

(ii) applies the rejected take-off procedure; PF

(iii) assesses the need to evacuate the aircraft. PF/PNF

(7) perform navigation: (S) or (U)

(i) complies to departure clearance; PF

(ii) complies with published departure procedures, for example speeds; PF

(iii) monitors navigation accuracy; PF/PNF

(iv) communicates and coordinates with ATC. PNF

(8) manage abnormal and emergency situations: (S) or (U)

(i) identifies the abnormal condition; PF/PNF

(ii) interprets the abnormal condition; PF/PNF

(iii) performs the procedure for the abnormal condition. PF/PNF

(i) Perform climb

List of competency elements and performance criteria:

(1) demonstrate attitudes and behaviours appropriate to the safe conduct of flight, including recognising and managing potential threats and errors;

(2) perform SID or en-route navigation: (S) or (U)

(i) complies with departure clearance and procedures; PF

(ii) demonstrates terrain awareness; PF/PNF

(iii) monitors navigation accuracy; PF/PNF

(iv) adjusts flight to weather and traffic conditions; PF

(v) communicates and coordinates with ATC; PNF

(vi) observes minimum altitudes; PF/PNF

(vii) selects appropriate level of automation; PF

(viii) complies with altimeter setting procedures. PF/PNF

(3) complete climb procedures and checklists: (S) or (U)

(i) performs the after take-off items; PF/PNF

(ii) confirms and checks according checklists. PF/PNF

(4) modify climb speeds, rate of climb and cruise altitude: (S) or (U)

(i) recognises the need to change speed, Rate of climb or cruise altitude; PF

(ii) selects and maintains the appropriate climb speed or rate of climb; PF

(iii) selects optimum cruise flight level. PF/PNF

(5) perform systems operations and procedures: (S) or (U)

(i) monitors operation of all systems; PF/PNF

(ii) operates systems as required. PF/PNF

(6) manage abnormal and emergency situations: (S) or (U)

(i) identifies the abnormal condition; PF/PNF

(ii) interprets the abnormal condition; PF/PNF

(iii) performs the procedure for the abnormal condition. PF/PNF

(7) communicate with cabin crew, passengers and company: (S) or (U)

(i) communicates relevant information with cabin crew; PF

(ii) communicates relevant information with company; PF/PNF

(iii) makes passenger announcements when appropriate. PF

(j) Perform cruise

List of competency elements and performance criteria.

(1) demonstrate attitudes and behaviours appropriate to the safe conduct of flight, including recognising and managing potential threats and errors;

(2) monitor navigation accuracy: (S) or (U)

(i) demonstrates adequate area knowledge; PF/PNF

(ii) demonstrates adequate route knowledge; PF/PNF

(iii) navigates according to flight plan and clearance; PF

(iv) adjusts flight to weather and traffic conditions; PF

(v) communicates and coordinates with ATC; PNF

(vi) observes minimum altitudes; PF/PNF

(vii) uses all means of automation. PF

(3) monitor flight progress: (S) or (U)

(i) selects optimum speed; PF

(ii) selects optimum cruise flight level; PF

(iii) monitors and controls fuel status; PF/PNF

(iv) recognises the need for a possible diversion; PF/PNF

(v) creates a diversion contingency plan if required. PF/PNF

(4) perform descent and approach planning: (S) or (U)

(i) checks weather of destination and alternate airport; PF/PNF

(ii) checks runway in use and approach procedure; PF/PNF

(iii) sets the FMS accordingly; PNF

(iv) checks landing weight and landing distance required; PNF

(v) checks MEA, MGA and MSA; PF/PNF

(vi) identifies top of descent point. PF

(5) perform systems operations and procedures: (S) or (U)

(i) monitors operation of all systems; PF/PNF

(ii) operates systems as required. PNF

(6) manage abnormal and emergency situations: (S) or (U)

(i) identifies the abnormal condition; PF/PNF

(ii) interprets the abnormal condition; PF/PNF

(iii) performs the procedure for the abnormal condition. PF/PNF

(7) communicate with cabin crew, passengers and company: (S) or (U)

(i) communicates relevant information with cabin crew; PF

(ii) communicates relevant information with company; PF/PNF

(iii) makes passenger announcements when appropriate. PF

(k) Perform descent

List of competency elements and performance criteria:

(1) Demonstrate attitudes and behaviours appropriate to the safe conduct of flight, including recognising and managing potential threats and errors;

(2) initiate and manage descent: (S) or (U)

(i)	starts descent according to ATC clearance or optimum descent point;	PF
(ii)	selects optimum speed and descent rate;	PF
(iii)	adjusts speed to existing environmental conditions;	PF
(iv)	recognises the need to adjust the descent path;	PF
(v)	adjusts the flight path as required;	PF
(vi)	utilises all means of FMS descent information.	PF

(3) monitor and perform en route and descent navigation: (S) or (U)

(i)	complies with arrival clearance and procedures;	PF
(ii)	demonstrates terrain awareness;	PF/PNF
(iii)	monitors navigation accuracy;	PF/PNF
(iv)	adjusts flight to weather and traffic conditions;	PF
(v)	communicates and coordinates with ATC;	PNF
(vi)	observes minimum altitudes;	PF/PNF
(vii)	selects appropriate level or mode of automation;	PF
(viii)	complies with altimeter setting procedures.	PF/PNF

(4) re-planning and update of approach briefing: (S) or (U)

(i)	re-checks destination weather and runway in use;	PNF
(ii)	briefs or re-briefs about instrument approach and landing as required;	PF
(iii)	reprograms the FMS as required;	PNF
(iv)	re-checks fuel status.	PF/PNF

(5) perform holding: (S) or (U)

(i)	identifies holding requirement;	PF/PNF
(ii)	programs FMS for holding pattern;	PNF
(iii)	enters and monitors holding pattern;	PF
(iv)	assesses fuel requirements and determines max holding time;	PF/PNF
(v)	reviews the need for a diversion;	PF/PNF
(vi)	initiates diversion.	PF

(6) perform systems operations and procedures: (S) or (U)

(i)	monitors operation of all systems;	PF/PNF
(ii)	operates systems as required.	PF/PNF

(7) manage abnormal and emergency situations: (S) or (U)

(i) identifies the abnormal condition; PF/PNF

(ii) interprets the abnormal condition; PF/PNF

(iii) performs the procedure for the abnormal condition. PF/PNF

(8) communicate with cabin crew, passengers and company: (S) or (U)

(i) communicates relevant information with cabin crew; PF

(ii) communicates relevant information with company; PF/PNF

(iii) makes passenger announcements when appropriate; PF

(l) Perform approach

List of competency elements and performance criteria:

(1) demonstrate attitudes and behaviours appropriate to the safe conduct of flight, including recognising and managing potential threats and errors;

(2) perform approach in general: (S) or (U)

(i) executes approach according to procedures and situation; PF

(ii) selects appropriate level or mode of automation; PF

(iii) selects optimum approach path; PF

(iv) operates controls smooth and coordinated; PF

(v) performs speed reduction and flap extension; PF/PNF

(vi) performs relevant checklists; PF/PNF

(vii) initiates final descent; PF

(viii) achieves stabilised approach criteria; PF

(ix) ensures adherence to minima; PF/PNF

(x) initiates go-around if required; PF

(xi) masters transition to visual segment. PF

(3) perform precision approach: (S) or (U)

(i) performs ILS approach; PF

(ii) performs MLS approach. PF

(4) perform non-precision approach: (S) or (U)

(i) performs VOR approach; PF

(ii) performs NDB approach; PF

(iii) performs SRE approach; PF

(iv) performs GNSS approach; PF

(v) performs ILS loc approach; PF

(vi) performs ILS back beam approach. PF

(5) perform approach with visual reference to ground: (S) or (U)

(i) performs standard visual approach; PF

(ii) performs circling approach. PF

(6) monitor the flight progress: (S) or (U)

(i) insures navigation accuracy; PF/PNF

(ii) communicates with ATC and crew members; PNF

(iii) monitors fuel status. PF/PNF

(7) perform systems operations and procedures: (S) or (U)

(i) monitors operation of all systems; PF

(ii) operates systems as required. PF

(8) manage abnormal and emergency situations: (S) or (U)

(i) identifies the abnormal condition; PF/PNF

(ii) interprets the abnormal condition; PF/PNF

(iii) performs the procedure for the abnormal condition. PF/PNF

(9) perform missed approach and goaround: (S) or (U)

(i) initiates go-around procedure; PF

(ii) navigates according to missed approach procedure; PF

(iii) completes the relevant checklists; PF/PNF

(iv) initiates approach or diversion after the go-around; PF

(v) communicates with ATC and crew members. PNF

(10) communicate with cabin crew, passengers and company: (S) or (U)

(i) communicates relevant information with cabin crew; PF

(ii) communicates relevant information with company; PF/PNF

(iii) makes passenger announcements when appropriate; PF

(iv) initiates go-around procedure. PF

(m) Perform landing

List of competency elements and performance criteria:

(1) demonstrate attitudes and behaviours appropriate to the safe conduct of flight, including recognising and managing potential threats and errors;

(2) land the aircraft; (S) or (U)

(i) maintains a stabilised approach path during visual segment;

PF

(ii) recognises and acts on changing conditions for windshift or wind shear segment; PF

(iii) initiates flare; PF

(iv) controls thrust; PF

(v) achieves touchdown in touchdown zone on centreline; PF

(vi) lowers nose wheel; PF

(vii) maintains centreline; PF

(viii) performs after-touchdown procedures; PF

(ix) makes use of appropriate braking and reverse thrust; PF

(x) vacates runway with taxi speed. PF

(3) perform systems operations and procedures: (S) or (U)

(i) monitors operation of all systems; PF

(ii) operates systems as required. PF

(4) manage abnormal and emergency situations: (S) or (U)

(i) identifies the abnormal condition; PF/PNF

(ii) interprets the abnormal condition; PF/PNF

(iii) performs the procedure for the abnormal condition. PF/PNF

(n) Perform after landing and post flight operations

List of competency elements and performance criteria:

(1) demonstrate attitudes and behaviours appropriate to the safe conduct of flight, including recognising and managing potential threats and errors;

(2) perform taxiing and parking: (S) or (U)

(i) receives, checks and adheres to taxi clearance; PNF

(ii) taxies the aircraft including use of exterior lighting; PF

(iii) controls taxi speed; PF/PNF

(iv) maintains centreline; PF

(v) maintains look-out for conflicting traffic and obstacles; PF

(vi) identifies parking position; PF/PNF

(vii) complies with marshalling or stand guidance; PF/PNF

(viii) applies parking and engine shut down procedures; PF

(ix) completes with relevant checklists. PF/PNF

(3) perform aircraft post-flight operations: (S) or (U)

(i) communicates to ground personnel and crew; PF

(ii)	completes all required flight documentation;	PF/PNF
(iii)	ensures securing of the aircraft;	PF
(iv)	conducts the debriefings.	PF
(4)	perform systems operations and procedures:	(S) or (U)
(i)	monitors operation of all systems;	PF/PNF
(ii)	operates systems as required.	PF/PNF
(5)	manage abnormal and emergency situations:	(S) or (U)
(i)	identifies the abnormal condition;	PF/PNF
(ii)	interprets the abnormal condition;	PF/PNF
(iii)	performs the procedure for the abnormal condition.	PF/PNF
(6)	communicate with cabin crew, passengers and company:	(S) or (U)
(i)	communicates relevant information with cabin crew;	PF
(ii)	communicates relevant information with company;	PF/PNF
(iii)	makes passenger announcements when appropriate.	PF

PRINCIPLES OF THREAT AND ERROR MANAGEMENT

(o) One model that explains the principles of threat and error management is the TEM model.

(1) The components of the TEM model:

There are three basic components in the TEM model, from the perspective of flight crews: threats, errors and undesired aircraft states. The model proposes that threats anderrors are part of everyday aviation operations that must be managed by flight crews, since both threats and errors carry the potential to generate undesired aircraft states. Flight crews must also manage undesired aircraft states, since they carry the potential for unsafe outcomes. Undesired state management is an essential component of the TEM model, as important as threat and error management. Undesired aircraft state management largely represents the last opportunity to avoid an unsafe outcome and thus maintain safety margins in flight operations.

(2) Threats:

(i) Threats are defined as events or errors that occur beyond the influence of the flight crew, increase operational complexity, and which must be managed to maintain the margins of safety. During typical flight operations, flight crews have to manage various contextual complexities. Such complexities would include, for example, dealing with adverse meteorological conditions, airports surrounded by high mountains, congested airspace, aircraft malfunctions, errors committed by other people outside of the cockpit, such as air traffic controllers, flight attendants or maintenance workers, and so forth. The TEM model considers these complexities as threats because they all have the potential to negatively affect flight operations by reducing margins of safety;

(ii) Some threats can be anticipated, since they are expected or known to the flight crew. For example, flight crews can anticipate the consequences of a thunderstorm by briefing their response in advance, or prepare for a congested airport by making sure they keep a watchful eye on other aircraft as they execute the approach;

(iii) Some threats can occur unexpectedly, such as an in-flight aircraft malfunction that happens suddenly and without warning. In this case, flight crews must apply skills and knowledge acquired through training and operational experience;

(iv) Lastly, some threats may not be directly obvious to, or observable by, flight crews immersed in the operational context, and may need to be uncovered by safety analysis. These are considered latent threats. Examples of latent threats include equipment design issues, optical illusions, or shortened turnaround schedules;

(v) Regardless of whether threats are expected, unexpected, or latent, one measure of the effectiveness of a flight crew's ability to manage threats is whether threats are detected with the necessary anticipation to enable the flight crew to respond to them through deployment of appropriate countermeasures;

(vi) Threat management is a building block to error management and undesired aircraft state management. Although the threat-error linkage is not necessarily straightforward, and although it may not be always possible to establish a linear relationship, or one-to-one mapping between threats, errors and undesired states, archival data demonstrates that mismanaged threats are normally linked to flight crew errors, which in turn are often linked to undesired aircraft states. Threat management provides the most proactive option to maintain margins of safety in flight operations, by voiding safety-compromising situations at their roots. As threat managers, flight crews are the last line of defence to keep threats from impacting flight operations;

(vii) Table 1 presents examples of threats, grouped under two basic categories derived from the TEM Model. Environmental threats occur due to the environment in which flight operations take place. Some environmental threats can be planned for and some will arise spontaneously, but they all have to be managed by flight crews in real time. Organisational threats, on the other hand, can be controlled (for example removed or, at least, minimised) at source by aviation organisations. Organisational threats are usually latent in nature. Flight crews still remain the last line of defence, but there are earlier opportunities for these threats to be mitigated by aviation organisations themselves.

Environmental threats	Organisational threats
(A) weather: thunderstorms, turbulence, icing, wind shear, cross or tailwind, very low or high temperatures; (B) ATC: traffic congestion, ACAS RA/TA, ATC command, ATC error, ATC language difficulty, ATC non-standard phraseology, ATC runway change, ATIS communication or units of measurement (QFE/meters); (C) airport: contaminated or short runway; contaminated taxiway, lack of, confusing, faded signage, markings, birds, aids unserviceable, complex surface navigation procedures or airport constructions; (D) terrain: high ground, slope, lack of references or 'black hole'; (E) other: similar call-signs.	(A) operational pressure: delays, late arrivals or equipment changes; (B) aircraft: aircraft malfunction, automation event or anomaly, MEL/CDL; (C) cabin: flight attendant error, cabin event distraction, interruption, cabin door security; (D) maintenance: maintenance event or error; (E) ground: ground-handling event, de-icing or ground crew error; (F) dispatch: dispatch paperwork event or error; (G) documentation: manual error or chart error; (H) other: crew scheduling event.

Table 1. Examples of threats (list is not exhaustive)

(3) Errors:

(i) Errors are defined actions or inactions by the flight crew that lead to deviations from organisational or flight crew intentions or expectations. Unmanaged or mismanaged errors frequently lead to undesired aircraft states. Errors in the operational context thus tend to reduce the margins of safety and increase the probability of adverse events;

(ii) Errors can be spontaneous (for example without direct linkage to specific, obvious threats), linked to threats, or part of an error chain. Examples of errors would include the inability to maintain stabilised approach parameters, executing a wrong automation mode, failing to give a required callout, or misinterpreting an ATC clearance;

(iii) Regardless of the type of error, an error's effect on safety depends on whether the flight crew detects and responds to the error before it leads to an undesired aircraft state and to a potential unsafe outcome. This is why one of the objectives of TEM is to understand error management (for example detection and response), rather than to solely focus on error causality (for example causation and commission). From the safety perspective, operational errors that are timely detected and promptly responded to (for example properly managed), errors that do not lead to undesired aircraft states, do not reduce margins of safety in flight operations, and thus become operationally inconsequential. In addition to its safety value, proper error management represents an example of successful human performance, presenting both learning and training value;

(iv) Capturing how errors are managed is then as important, if not more, as capturing the prevalence of different types of error. It is of interest to capture if and when errors are detected and by whom, the response(s) upon detecting errors, and the outcome of errors. Some errors are quickly detected and resolved, thus becoming operationally inconsequential, while others go undetected or are mismanaged. A mismanaged error is defined as an error that is linked to or induces an additional error or undesired aircraft state;

(v) Table 2 presents examples of errors, grouped under three basic categories derived from the TEM model. In the TEM concept, errors have to be 'observable' and therefore, the TEM model uses the 'primary interaction' as the point of reference for defining the error categories;

(vi) The TEM model classifies errors based upon the primary interaction of the pilot or flight crew at the moment the error is committed. Thus, in order to be classified as aircraft handling error, the pilot or flight crew must be interacting with the aircraft (for example through its controls, automation or systems). In order to be classified as procedural error, the pilot or flight crew must be interacting with a procedure (for example checklists; SOPs; etc.). In order to be classified as communication error, the pilot or flight crew must be interacting with people (ATC, ground crew, other crewmembers, etc.);

(vii) Aircraft handling errors, procedural errors and communication errors may be unintentional or involve intentional non-compliance. Similarly, proficiency considerations (for example skill or knowledge deficiencies, training system deficiencies) may underlie all three categories of error. In order to keep the approach simple and avoid confusion, the TEM model does not consider intentional noncompliance and proficiency as separate categories of error, but rather as sub-sets of the three major categories of error.

Aircraft handling errors	(A)	manual handling, flight controls: vertical, lateral or speed deviations, incorrect flaps or speed brakes, thrust reverser or power settings;
	(B)	automation: incorrect altitude, speed, heading, auto throttle settings, incorrect mode executed or incorrect entries;
	(C)	systems, radio, instruments: incorrect packs, incorrect anti-icing, incorrect altimeter, incorrect fuel switches settings, incorrect speed bug or incorrect radio frequency dialed;
	(D)	ground navigation: attempting to turn down wrong taxiway or runway, taxi too fast, failure to hold short or missed taxiway or runway.
Procedural errors	(A)	SOPs: failure to cross-verify automation inputs;
	(B)	checklists: wrong challenge and response; items missed, checklist performed late or at the wrong time;
	(C)	callouts: omitted or incorrect callouts;
	(D)	briefings: omitted briefings; items missed;
	(E)	documentation: wrong weight and balance, fuel information, ATIS, or clearance information recorded, misinterpreted items on paperwork; incorrect logbook entries or incorrect application of MEL procedures.
Communication errors	(A)	crew to external: missed calls, misinterpretations of instructions, incorrect read- back, wrong clearance, taxiway, gate or runway communicated;
	(B)	pilot to pilot: within crew miscommunication or mis-interpretation.

Table 2. Examples of errors (list is not exhaustive)

(4) Undesired aircraft states:

(i) Undesired aircraft states are flight crew-induced aircraft position or speed deviations, misapplication of flight controls, or incorrect systems configuration, associated with a reduction in margins of safety. Undesired aircraft states that result from ineffective threat or error management may lead to compromising situations and reduce margins of safety in flight operations. Often considered at the cusp of becoming an incident or accident, undesired aircraft states must be managed by flight crews;

(ii) Examples of undesired aircraft states would include lining up for the incorrect runway during approach to landing, exceeding ATC speed restrictions during an approach, or landing long on a short runway requiring maximum braking. Events such as equipment malfunctions or ATC controller errors can also reduce margins of safety in flight operations, but these would be considered threats;

(iii) Undesired states can be managed effectively, restoring margins of safety, or flight crew response(s) can induce an additional error, incident, or accident;

(iv) Table 3 presents examples of undesired aircraft states, grouped under three basic categories derived from the TEM model;

Aircraft handling	(A) (B) (C) (D) (E) (F) (G) (H)	aircraft control (attitude); vertical, lateral or speed deviations; unnecessary weather penetration; unauthorised airspace penetration; operation outside aircraft limitations; unstable approach; continued landing after unstable approach; long, floated, firm or off-centreline landing.
Ground navigation	(A) (B)	proceeding towards wrong taxiway or runway; Wrong taxiway, ramp, gate or hold spot.
Incorrect aircraft configurations	(A) (B) (C) (D) (E)	incorrect systems configuration; incorrect flight controls configuration; incorrect automation configuration; incorrect engine configuration; incorrect weight and balance configuration.

Table 3. Examples of undesired aircraft states (list is not exhaustive)

(v) An important learning and training point for flight crews is the timely switching from error management to undesired aircraft state management. An example would be as follows: a flight crew selects a wrong approach in the FMC. The flight crew subsequently identifies the error during a cross-check prior to the FAF. However, instead of using a basic mode (for example heading) or manually flying the desired track, both flight crew members become involved in attempting to reprogram the correct approach prior to reaching the FAF. As a result, the aircraft 'stitches' through the localiser, descends late, and goes into an unstable approach. This would be an example of the flight crew getting 'locked in' to error management, rather than switching to undesired aircraft state management. The use of the TEM model assists in educating flight crews that, when the aircraft is in an undesired state, the basic task of the flight crew is undesired aircraft state management instead of error management. It also illustrates how easy it is to get locked in to the error management phase;

(vi) Also from a learning and training perspective, it is important to establish a clear differentiation between undesired aircraft states and outcomes. Undesired aircraft states are transitional states between a normal operational state (for example a stabilised approach) and an outcome. Outcomes, on the other hand, are end states, most notably, reportable occurrences (for example incidents and accidents). An example would be as follows: a stabilised approach (normal operational state) turns into an unstabilised approach (undesired aircraft state) that results in a runway excursion (outcome);

(vii) The training and remedial implications of this differentiation are of significance. While at the undesired aircraft state stage, the flight crew has the possibility, through appropriate TEM, of recovering the situation, returning to a normal operational state, thus restoring margins of safety. Once the undesired aircraft state becomes an outcome, recovery of the situation, return to a normal operational state, and restoration of margins of safety is not possible.

(5) Countermeasures:

(i) Flight crews must, as part of the normal discharge of their operational duties, employ countermeasures to keep threats, errors and undesired aircraft states from reducing margins of safety in flight operations. Examples of countermeasures would include checklists, briefings, call-outs and SOPs, as well as personal strategies and tactics. Flight crews dedicate significant

amounts of time and energies to the application of countermeasures to ensure margins of safety during flight operations. Empirical observations during training and checking suggest that as much as 70 % of flight crew activities may be countermeasures-related activities.

(ii) All countermeasures are necessarily flight crew actions. However, some countermeasures to threats, errors and undesired aircraft states that flight crews employ build upon 'hard' resources provided by the aviation system. These resources are already in place in the system before flight crews report for duty, and are therefore considered as systemic-based countermeasures. The following would be examples of 'hard' resources that flight crews employ as systemic-based countermeasures:

(A) ACAS;

(B) TAWS;

(C) SOPs;

(D) checklists;

(E) briefings;

(F) training;

(G) etc.

(iii) Other countermeasures are more directly related to the human contribution to the safety of flight operations. These are personal strategies and tactics, individual and team countermeasures that typically include canvassed skills, knowledge and attitudes developed by human performance training, most notably, by CRM training. There are basically three categories of individual and team countermeasures:

(A) planning countermeasures: essential for managing anticipated and unexpected threats;

(B) execution countermeasures: essential for error detection and error response;

(C) review countermeasures: essential for managing the changing conditions of a flight.

(iv) Enhanced TEM is the product of the combined use of systemic based and individual and team countermeasures. Table 4 presents detailed examples of individual and team countermeasures. Further guidance on countermeasures can be found in the sample assessment guides for terminal training objectives (PANS-TRG, Chapter 3, Attachment B) as well as in the ICAO manual, Line Operations Safety Audit (LOSA) (Doc 9803).

Planning countermeasures		
SOP briefing	The required briefing was interactive and operationally thorough	(A) Concise, not rushed, and met SOP requirements; (B) Bottom lines were established
Plans stated	Operational plans and decisions were communicated and acknowledged	Shared understanding about plans: 'Everybody on the same page'
Workload assignment	Roles and responsibilities were defined for normal and non-normal situations	Workload assignments were communicated and acknowledged
Contingency management	Crew members developed effective strategies to manage threats to safety	(A) Threats and their consequences were anticipated; (B) Used all available resources to manage threats
Execution countermeasures		
Monitor and cross-check	Crew members actively monitored and cross-checked systems and other crew members	Aircraft position, settings, and crew actions were verified
Workload management	Operational tasks were prioritised and properly managed to handle primary flight duties	(A) Avoided task fixation; (B) Did not allow work overload
Automation management	Automation was properly managed to balance situational and workload requirements	(A) Automation setup was briefed to other members (B) Effective recovery techniques from automation anomalies
Review countermeasures		
Evaluation and modification of plans	Existing plans were reviewed and modified when necessary	Crew decisions and actions were openly analysed to make sure the existing plan was the best plan
Inquiry	Crew members asked questions to investigate and/or clarify current plans of action	Crew members not afraid to express a lack of knowledge: 'Nothing taken for granted' attitude
Assertiveness	Crew members stated critical information or solutions with appropriate persistence	Crew members spoke up without hesitation

Table 4. Examples of individual and team countermeasures

GM2 to Appendix 5 Assessment of student competency during take-off and landing training

The required level of competency of a student pilot is assessed by observing the following:

(a) application of knowledge;

(b) application of regulations and procedures;

(c) communication;

(d) aeroplane flight path management – automation;

(e) aeroplane flight path management – manual control;

(f) leadership and teamwork;

(g) problem-solving and decision-making;

(h) situational awareness (SA) and information management; and

(i) workload management.

The competencies referred to in points (b) and (e) are particularly relevant during the training. This means that the focus is on observing the student pilot performing take-offs and landings in accordance with the standard operating procedures (SOPs) and recommended techniques of the original equipment manufacturer (OEM).

The competency elements and sub-elements stipulated in GM1 to Appendix 5 for take-off and landing provide additional guidance for instructors and student pilots.

Consistency and repeatability of all the competencies above is achieved if the student pilot is able to perform at least three successive take-offs and landings demonstrating the required observable behaviours.

The take-off and landing training in an aeroplane should include at least one go-around. Due consideration should be given to environmental conditions when evaluating competency.

AMC1 to Appendix 6 Modular training course for the IR

ALL MODULAR FLYING TRAINING COURSES FOR THE IR, EXCEPT COMPETENCYBASED MODULAR FLYING TRAINING COURSE

(a) The theoretical knowledge instruction may be given at an ATO conducting theoretical knowledge instruction only, in which case the head of training (HT) of that organisation should supervise that part of the course.

(b) The 150 hours of instruction, which include the application of threat and error management (TEM), may include in suitable proportions:

(1) classroom work;

(2) lessons;

(3) tutorials;

(4) demonstrations, including those supported by demonstration equipment;

(5) exercises carried out as groups or individuals and based on pre-flight and en-route planning, communications, presentations and projects;

(6) exercises that use demonstration equipment or training devices;

(7) directed study including workbook exercises or assignments;

(8) aerodrome or aviation industry field trips;

(9) computer-based training and e-learning elements;

(10) progress tests; and

(11) other training methods, media and tools approved by the CAAT.

Approved distance-learning (correspondence) courses may also be offered as part of the course. The minimum amount of classroom instruction, as required by ORA.ATO.305, may include all of the above except item (b)(9).

AMC2 to Appendix 6 Modular training course for the IR

SECTION A IR(A) - MODULAR FLYING TRAINING COURSE

Basic Instrument Flight Module Training Course

(a) This 10 hours module is focused on the basics of flying by sole reference to instruments, including limited panel and unusual attitude recovery.

(b) All exercises may be performed in an FNPT I or II or an FFS, for a maximum of 5 hours. If instrument flight training is in VMC, a suitable means of simulating IMC for the student should be used.

(c) A BITD may be used for the exercises 1, 2, 3, 4, 6, and 8.

(d) The use of the BITD is subject to the following:

(1) the training should be complemented by exercises on an aeroplane;

(2) the record of the parameters of the flight must be available;

(3) an FI(A) or IRI(A) should conduct the instruction.

EXERCISES

(e) Exercise 1:

(1) basic instrument flying without external visual cues; 0:30 hours

(2) horizontal flight; power changes for acceleration or deceleration;

(3) maintaining straight and level flight;

(4) turns in level flight with 15 ° and 25 ° bank, left and right;

(5) roll-out onto predetermined headings.

(f) Exercise 2:

(1) repetition of exercise 1; 0:45 hours

(2) additionally climbing, descending, maintaining heading and speed, transition to horizontal flight;

(3) climbing and descending turns.

(g) Exercise 3:

Instrument pattern: 0:45 hours

(1) start exercise, decelerate to approach speed, flaps into approach configuration;

(2) initiate standard turn (left or right);

(3) roll out on opposite heading, maintain new heading for 1 minute;

(4) standard turn, gear down, descend 500 ft/min;

(5) roll out on initial heading, maintain descent (500 ft/min) and new heading for 1 minute;

(6) transition to horizontal flight, 1000 ft below initial flight level;

(7) initiate go-around;

(8) climb at best rate of climb speed.

(h) Exercise 4:

Repetition of exercise 1 and 0:45 hours

steep turns with 45° bank;

recovery from unusual attitudes.

(i) Exercise 5:

Repetition of exercise 4. 0:45 hours

(j) Exercise 6:

(1) radio navigation using VOR, NDB 0:45 hours

or, if available, VDF;

(2) interception of predetermined QDM, QDR.

(k) Exercise 7:

Repetition of exercise 1 and 0:45 hours

recovery from unusual attitudes.

(l) Exercise 8:

(1) Repetition of exercise 1; 0:45 hours

(2) turns, level change and recovery from unusual attitudes with simulated failure of the artificial horizon or directional gyro.

(m) Exercise 9:

Recognition of, and recovery from, incipient and full stalls. 0:45 hours

(n) Exercise 10: Repetition of exercises 6, 8 and 9 3:30 hours

Certificate of Completion of Basic instrument Flight Module

CERTIFICATE OF COMPLETION OF BASIC INSTRUMENT FLIGHT MODULE				
Pilot's last name(s):		First name(s):		
Type of licence:		Number:		State:
Flight training hours performed on SE aeroplane:		OR	Flight training hours performed on ME aeroplane:	
Flight training hours performed in an FSTD (maximum 5 hours):				
	Signature of applicant:			

The satisfactory completion of basic instrument flight module according to requirements is certified below:

TRAINING			
Basic instrument flight module training received during period:			
from:	to:	at:	ATO
Location and date:		Signature of head of training:	
Type and number of licence and state of issue:		Name(s) in capital letters of authorised instructor:	

AMC3 to Appendix 6 Modular training courses for the IR

SECTION Aa IR(A) – COMPETENCY-BASED MODULAR FLYING TRAINING COURSE

(a) THEORETICAL KNOWLEDGE INSTRUCTION

(1) The theoretical knowledge instruction may be given at an ATO conducting theoretical knowledge instruction only, in which case the HT of that ATO should supervise that part of the course.

(2) The hours required for the theoretical knowledge instruction for the IR following the competency-based training route should be divided between the subjects and include the application of threat and error management (TEM) as based on the ATO's systems course design and agreed upon between the CAAT and the ATO.

An approved course, which includes the application of threat and error management, may contain in suitable proportions:

(i) classroom work;

(ii) lessons;

(iii) tutorials;

(iv) demonstrations, including those supported by demonstration equipment;

(v) exercises carried out as groups or individuals and based on pre-flight and en-route planning, communications, presentations and projects;

(vi) exercises that use demonstration equipment or training devices;

(vii) directed study including workbook exercises or assignments;

(viii) aerodrome or aviation industry field trips;

(ix) computer-based training and e-learning elements;

(x) progress tests, ; and

(xi) other training methods, media and tools approved by the CAAT.

Approved distance-learning (correspondence) courses may also be offered as part of the course. The minimum amount of classroom instruction, as required by ORA.ATO.305, may include all of the above except item (a)(2)(ix).'

(b) THEORETICAL KNOWLEDGE EXAMINATION

The applicant for the IR following the competency-based training route should pass an examination to demonstrate a level of theoretical knowledge appropriate to the privileges granted in the subjects further detailed in FCL.615(b). The number of questions per subject, the distribution of questions and the time allocated to each subject is detailed in CAAT procedures.

AMC4 to Appendix 6 Modular training courses for the IR

Reserved

AMC5 to Appendix 6 Modular training courses for the IR

SECTION Aa IR(A) – COMPETENCY-BASED MODULAR FLYING TRAINING COURSE (6)(a)(i); (6)(b)(i)

PRIOR EXPERIENCE OF FLIGHT TIME UNDER IFR AS PIC

A rating giving privileges to fly under IFR and in IMC referred to in (6)(a)(i)(B) and (6)(b)(i)(B) may be any of the following:

(a) a national instrument rating issued prior to the application of TCAR PEL Part FCL; or

(b) an instrument rating issued in compliance with the requirements of Annex 1 to the Chicago Convention by a third country.

The amount of credit given should not exceed the amount of hours completed as instrument flight time.

AMC6 to Appendix 6 Modular training courses for the IR

SECTION Aa IR(A) – COMPETENCY-BASED MODULAR FLYING TRAINING COURSE (6)(a)(ii); (6)(b)(ii)

PRIOR INSTRUMENT FLIGHT TIME UNDER INSTRUCTION

Prior instrument flight time under instruction on aeroplanes, as referred in (6)(a)(ii) and (6)(b)(ii), may be instrument flight time completed for the issue of:

(a) a national instrument rating prior to the application of TCAR PEL Part FCL; or

(b) an instrument rating in compliance with the requirements of Annex 1 to the Chicago Convention by a third country.

The amount of credit given should not exceed the amount of hours completed as instrument flight time.

AMC7 to Appendix 6 Modular training courses for the IR

Reserved

AMC8 to Appendix 6 Modular training courses for the IR

SECTION Aa IR(A) – COMPETENCY-BASED MODULAR FLYING TRAINING COURSE (8)

In order to be credited in full towards the multi-engine IR(A) training course requirements, the applicant should

(a) hold a multi-engine IR(A), issued in accordance with the requirements of Annex 1 to the Chicago Convention by a third country;

(b) have the minimum experience required in Appendix 6 Aa paragraph 8(c), of which at least 15 hours should be completed in a multi-engine aeroplane.

AMC9 to Appendix 6 Modular training courses for the IR

AIRSHIPS

Basic Instrument Flight Module Training Course

(a) This 10 hours module is focused on the basics of flying by sole reference to instruments, including limited panel and unusual attitude recovery.

(b) All exercises may be performed in an FNPT I or II or an FFS, for a maximum of 5 hours. If instrument flight training is in VMC, a suitable means of simulating IMC for the student should be used.

(c) A BITD may be used for the exercises 1, 2, 3, 4, 6 and 8.

(d) The use of the BITD is subject to the following:

(1) the training should be complemented by exercises on an airship;

(2) the record of the parameters of the flight must be available;

(3) an FI(As) or IRI(As) should conduct the instruction.

EXERCISES

(e) Exercise 1:

(1) basic instrument flying without external visual cues; 0:30 hours

(2) horizontal flight;

(3) maintaining straight and level flight;

(4) turns in level flight, left and right;

(5) rollout onto predetermined headings.

(f) Exercise 2:

(1) Repetition of exercise 1; additionally climbing and descending 0:45 hours

(2) maintaining heading and speed;

(3) transition to horizontal flight;

(4) climbing and descending turns.

(g) Exercise 3:

Instrument pattern: 0:45 hours

(1) start exercise, decelerate to approach speed, approach configuration;

(2) initiate standard turn (left or right);

(3) rollout on opposite heading, maintain new heading for 1 minute;

(4) standard turn, descend with given rate (for example 500 ft/min);

(5) rollout on initial heading, maintain descent (for example 500 ft/min) and new heading for 1 minute;

(6) transition to horizontal flight (for example 1000 ft below initial level);

(7) initiate go-around;

(8) climb at best rate of climb speed.

(h) Exercise 4:

(1) repetition of exercise 1; 0:45 hours

(2) recovery from unusual attitudes.

(i) Exercise 5

Repetition of exercise 4. 0:45 hours

(j) Exercise 6

(1) radio navigation using VOR, NDB 0:45 hours

or, if available, VDF;

interception of predetermined QDM, QDR.

(k) Exercise 7

(1) repetition of exercise 1; 0:45 hours

(2) recovery from unusual attitudes.

(l) Exercise 8

(1) repetition of exercise 1; 0:45 hours

(2) turns, level change and recovery from unusual attitudes with simulated failure of the artificial horizon or directional gyro.

(m) Exercise 9

Repetition of exercises (6) and (8). 4:15 hours

CERTIFICATE OF COMPLETION OF BASIC INSTRUMENT FLIGHT MODULE

CERTIFICATE OF COMPLETION OF BASIC INSTRUMENT FLIGHT MODULE			
Pilot's last name(s):		First name(s):	
Type of licence:		Number:	State:
Flight training hours performed on airship:			
Flight training hours performed in an FSTD (maximum 5 hours):			
	Signature of applicant:		

The satisfactory completion of basic instrument flight module according to requirements is certified below:

TRAINING			
Basic instrument flight module training received during period:			
from:	to:	at:	ATO
Location and date:		Signature of head of training:	
Type and number of licence and state of issue:		Name(s) in capital letters of authorised instructor:	

AMC10 to Appendix 6 Modular training courses for the IR

PBN Training

This AMC provide specific elements related to PBN in order to facilitate development of IR training courses.

Training shall be conducted with a flight crew composition at least compliant with the minimum flight crew composition for conducting these RNP APCH as mentioned by the training manual and operations manual of the ATO.

(a) Theoretical training

(1) Theoretical PBN training

The detailed theoretical knowledge syllabus is described at Appendix to AMC1 FCL.310; FCL.515(b); FCL.615(b) Theoretical knowledge examination.

Specifics elements concerning PBN can be found in Subject 062 Navigation-Radio navigation 062 07 00 00 Performance-based navigation (PBN) (up to 062 07 05 09)

(2) Theoretical knowledge training to RNAV

RNAV system operating principles depending on its version (Part Number, software version)

- RNAV systems operating principles;
- System limitations, if applicable, and their impact on the considered PBN operations :
  - its certified PBN capacity,
  - ARINC 424 path terminator (e.g : radius to fix segment),
  - the various supported features (holding pattern, parallel offset routes, ...).
- Verification of the validity of the navigation database;
- How to enter data in the RNAV system and how to cancel it or modify it;
- RNAV system integration in the cockpit:
  - connection to the Automatisms if applicable (flight director, autopilot),
  - flight mode annunciator,
  - interaction with other avionic systems.
- Identification of different navigation sensors (DME, VOR, IRU, GNSS) used by the RNAV system;
- Information and symbole display;
- Accuracy of course deviation indicator and its management depending on flight phase;
- Procedure for entering a flight plan;
- Procedure for checking the consistency of the selected procedure ;
- Flight plan modification, treatment of discontinuities, treatment of changes (runway, arrival, destination aerodrome, alternate aerodrome...);
- Warning, information or error messages generated by the system;
- Selecting and following a route, anticipating a turn, identification of the main waypoints;
- Management of holding pattern in automated or manual mode;
- 'Direct To' function;
- Different RNAV route/procedure interception mode;
- Treatment by the system of transition from RNAV towards conventional approaches (ILS, VOR...);
- Selecting different RNP APCH: (LNAV, LPV, LNAV/VNAV if applicable) ;
- Identification by the RNAV system of PBN procedures (SID RNAV, STAR RNAV, LNAV, LNAV/VNAV, LPV) and how they are announced.

(1) (b) Practical training:Ground practical training (RNAV system)

The ground practical training shall cover operating and setting a RNAV navigation system similar to the system on board of the aircraft and shall cover all functionalities supported by the navigation system likely to be used in conducting a PBN procedure.

For the purpose of this training, the equipment used may be presented or run on a computer system, on a simulation bench, on an FSTD - flight simulation training device or on an aircraft on the ground.

The duration of this training depends on the complexity of the RNAV system used and the recommendations of the manufacturer.

The minimum duration of training on a simple RNAV system (e.g. GNS 430W) shall be of 2 hours. This training shall comply with system manufacturer's recommendation when applicable (e.g: Garmin G1000).

if a pilot receives initial training in an ATO on a system different from the one he/she will use, it is necessary he/she be familiarised with his/her own RNAV system.

(2) FSTD training or flight instruction

This training shall be conducted:

- either on an aircraft of the same class or type as the one used in operations ;
- or on a simulation training device representative of the aircraft used in operations, or compliant with ORA.ATO.135.

In both cases, the RNAV equipment shall be comparable to the one used in operations.

- In the context of the approval of an instrument rating training programme including PBN operations, a sufficient number of RNP approaches shall be implemented in the training programme taking into account the different means of guidance of the aircraft and the characteristics of the instrument approach procedures that may impact the conduct of the flight.

The training shall include interruptions following the simulation of an abnormal situation (e.g. loss of RNAV capacity or RAIM warning if applicable

- In the context of a type rating course, the training shall include at least 4 RNP APCH approaches. It is not, however, a question of the indiscriminate compilation of the different types of approach procedures, but rather of establishing the training programme taking into account the different means of guidance of the aircraft and the characteristics of the instrument approach procedures that may impact the conduct of the flight.

Two of them shall include an interruption following the simulation of an abnormal situation (e.g. loss of RNAV capacity or RAIM warning if applicable)

GM1 to Appendix 6 Modular training courses for the IR

Aa. IR(A)(8)

The following elements may be used by the examiner for the applicant's verbal demonstration of knowledge:

(a) AIR LAW:

(1) explain the requirements for plus validity and privileges of instrument ratings;

(2) explain why a time check has to be completed before flight;

(3) describe the necessary action when an aircraft experiences a failure in communications;

(4) state the responsibility of the operator when unable to utilise the published departure procedures;

(5) explain when the omnidirectional method is used for departure;

(6) describe the solutions when omnidirectional procedures are not possible;

(7) justify the establishment of aircraft categories for the approach;

(8) state the minimum obstacle clearance provided by the minimum sector altitudes (MSAs) established for an aerodrome;

(9) describe the point of origin, shape, size, and subdivisions of the area used for MSAs;

(10) explain why a pilot should not descend below obstacle clearance altitude/height (OCA/H) without visual reference, which is established for precision approach procedures, non-precision approach procedures and visual (circling) procedures;

(11) translate the following acronyms into plain language: decision altitude (DA), decision height (DH), obstacle clearance altitude (OCA), obstacle clearance height (OCH), minimum decision altitude (MDA), minimum decision height (MDH), minimum obstacle clearance (MOC), decision altitude/height (DA/H), obstacle clearance altitude/height (OCA/H) and minimum decision altitude/height (MDA/H);

(12) explain the relationship between the following: DA, DH, OCA, OCH, MDA, MDH, MOC, DA/H, OCA/H and MDA/H;

(13) define the following terms: initial approach fix (IAF), intermediate fix (IF), final approach fix (FAF), missed approach point (MAPt) and turning point;

(14) state the accuracy of facilities providing track (omnidirectional radio range (VOR), instrument landing system (ILS), non-directional beacon (NDB));

(15) state the optimum descent gradient (preferred for a precision approach) in degrees and per cent;

(16) name the five standard segments of an instrument approach procedure and state the beginning and end for each of them;

(17) describe where an arrival (ARR) route normally ends;

(18) state whether or not omnidirectional or sector ARRs are possible to be made;

(19) explain the main task of the initial approach segment;

(20) describe the main task of the intermediate approach segment;

(21) state the main task of the final approach segment;

(22) name the two possible aims of a final approach;

(23) explain the term 'final approach point' in case of an ILS approach;

(24) state what happens if an ILS glide path (GP) becomes inoperative during approach;

(25) describe the main task of a missed approach procedure;

(26) define 'MAPt';

(27) state the pilot's reaction if upon reaching the MAPt, the required visual reference is not established;

(28) describe what a pilot is expected to do in the event that a missed approach is initiated prior to arriving at the MAPt (a missed approach, after an approach flown as CDFA, should be made when reaching the MAPt or DA/H, whichever occurs first);

(29) state whether the pilot is obliged to cross the MAPt at the A/H required by the procedure or whether they are allowed to cross the MAPt at an A/H greater than that required by the procedure;

(30) describe what is meant by 'visual manoeuvring (circling)';

(31) state the conditions to be fulfilled before descending below MDA/H in a visual manoeuvring (circling) approach;

(32) state how the pilot is expected to behave after initial visual contact during a visual manoeuvring (circling);

(33) describe what the pilot is expected to do if visual reference is lost while circling to land from an instrument approach;

(34) describe the shape and terminology associated with the holding pattern;

(35) state the bank angle and rate of turn to be used whilst flying in a holding pattern;

(36) explain why pilots in a holding pattern should attempt to maintain tracks and how this is achieved;

(37) describe where outbound timing begins in a holding pattern;

(38) state where the outbound leg in a holding pattern terminates if the outbound leg is based on distance-measuring equipment (DME);

(39) describe the three entry headings for entries into a holding pattern;

(40) define the terms 'parallel entry', 'offset entry', and 'direct entry';

(41) determine the correct entry procedure for a given holding pattern;

(42) state the still-air time for flying on the outbound entry heading with or without DME;

(43) define the following Q codes: 'QNH' and 'QFE';

(44) define 'flight level' (FL);

(45) state the intervals by which consecutive FLs should be separated;

(46) describe how FLs are numbered;

(47) define the term 'transition altitude';

(48) define the term 'transition level';

(49) state how the vertical position of the aircraft should be expressed at or below the transition altitude and transition level;

(50) define the term 'transition layer';

(51) state when the QNH altimeter setting should be made available to departing aircraft;

(52) state how a QNH altimeter setting should be made available to aircraft approaching a controlled aerodrome for landing;

(53) state where during the climb, the altimeter setting should be changed from QNH to 1013.2 hPa;

(54) describe when a pilot of an aircraft intending to land at an aerodrome should obtain the transition level;

(55) describe when a pilot of an aircraft intending to land at an aerodrome should obtain the actual QNH altimeter setting;

(56) state where the altimeter settings should be changed from 1013.2 hPa to QNH during descent for landing;

(57) state the modes and codes that the pilot should operate in the absence of any air traffic control (ATC) directions or regional air navigation agreements;

(58) state when the pilot should 'squawk ident';

(59) state the transponder mode and code to indicate: a state of emergency, a failure in communications, an unlawful interference;

(60) describe the consequences of an in-flight transponder failure;

(61) state the primary action of the pilot in the case of an unserviceable transponder before departure when no repair or replacement at that aerodrome is possible;

(62) understand the various rules and services that apply to the various classes of airspace;

(63) describe the aim of clearances issued by the ATC with regard to instrument flight rules (IFR), visual flight rules (VFR) or special VFR flights, and refer to the different airspaces;

(64) explain what is meant by the expression 'clearance limit';

(65) explain the meaning of the phrases 'cleared via flight planned route', 'cleared via (designation) departure' and 'cleared via (designation) ARR' in an ATC clearance;

(66) list which items of an ATC clearance should always be read back by the flight crew;

(67) justify the speed control by the ATC;

(68) explain how the change from IFR to VFR may be initiated by the pilot in command (PIC);

(69) define the following terms: 'transition level', 'transition layer', and 'transition altitude';

(70) indicate how the vertical position of an aircraft in the vicinity of an aerodrome should be expressed at or below the transition altitude, at or above the transition level, and while climbing or descending through the transition layer;

(71) list the six items that are normally included in a voice position report;

(72) name the item of a position report which must be forwarded to the ATC with the initial call after changing to a new frequency;

(73) understand the difference among the types of separation within the various classes of airspace and among the various types of flight;

(74) state who is responsible for the avoidance of collision with other aircraft when operating in visual meteorological conditions (VMC);

(75) explain the term 'expected approach time' and the procedures for its use;

(76) state the reasons which may probably lead to the decision to use another take-off or landing direction than the one into the wind;

(77) define the term 'radar vectoring';

(78) explain the procedures for the conduct of surveillance radar approaches (SRAs);

(79) state the mode and code of secondary surveillance radar (SSR) equipment that a pilot may operate in a (general) state of emergency, or (specifically) in case the aircraft is subject to unlawful interference;

(80) describe the expected action of the aircraft after receiving a broadcast from air traffic services (ATS) concerning the emergency descent of another aircraft;

(81) name the colours used for the various markings (runway (RWY), taxiway (TWY), aircraft stands, apron safety lines);

(82) describe the application and characteristics of RWY centre line markings and threshold markings;

(83) describe the wing bars of a precision approach path indicator (PAPI) and an abbreviated precision approach path indicator (A-PAPI); and

(84) interpret what the pilot sees during approach, using a PAPI, an APAPI, a T visual approach slope indicating system (TVASIS), and an abbreviated T visual approach slope indicator system (ATVASIS);

(b) FLIGHT PLANNING AND FLIGHT MONITORING:

(1) select the preferred airway(s) or route(s) considering:

(i) altitudes and FLs,

(ii) standard routes,

(iii) ATC restrictions,

(iv) the shortest distance,

(v) obstacles, and

(vi) any other relevant data;

(2) determine courses and distances from en route charts;

(3) determine bearings and distances of waypoints based on radio navigation aids on en route charts;

(4) define the following altitudes:

(i) minimum en route altitude (MEA),

(ii) minimum obstacle clearance altitude (MOCA),

(iii) minimum off-route altitude (MORA),

(iv) grid minimum off-route altitude (Grid MORA),

(v) maximum authorised altitude (MAA),

(vi) minimum crossing altitude (MCA), and

(vii) minimum holding altitude (MHA);

(5) extract the following altitudes from the chart(s):

(i) MEA,

(ii) MOCA,

(iii) MORA,

(iv) Grid MORA,

(v) MAA,

(vi) MCA, and

(vii) MHA;

(6) explain the reasons for studying standard instrument departure (SID) and standard ARR (STAR) charts;

(7) state the reasons why the SID and STAR charts show procedures only in a pictorial presentation style which is not to scale;

(8) interpret all data and information represented on SID and STAR charts, particularly:

(i) routings,

(ii) distances,

(iii) courses,

(iv) radials,

(v) altitudes/levels,

(vi) frequencies, and

(vii) restrictions;

(9) identify SIDs and STARs which may be relevant to a planned flight;

(10) state the reasons why it is imperative to be familiar with instrument approach procedures and appropriate data for departure, destination, and alternate airfields prior to departure;

(11) select instrument approach procedures appropriate for departure, destination, and alternate airfields;

(12) interpret all procedures, data and information represented on instrument approach charts, particularly:

(i) courses and radials,

(ii) distances,

(iii) altitudes, levels or heights,

(iv) restrictions,

(v) obstructions,

(vi) frequencies,

(vii) speeds and times,

(viii) DA/H and MDA/H,

(ix) visibility and runway visual ranges (RVRs), and

(x) approach light systems;

(13) find communications (COM) frequencies and call signs for the following:

(i) control agencies, service facilities, and flight information services (FISs),

(ii) weather information stations, and

(iii) automatic terminal information service (ATIS);

(14) find the frequency and/or identifiers of radio navigation aids;

(15) complete the navigation plan with the courses, distances, and frequencies taken from charts;

(16) find standard instrument departure and ARR routes to be flown or to be expected;

(17) determine the position of top of climb (TOC) and top of descent (TOD), considering appropriate data;

(18) determine variation and calculate magnetic/true courses;

(19) calculate true airspeed (TAS) according to given aircraft performance data, altitude, and outside air temperature (OAT);

(20) calculate wind correction angles (WCA)/drift and ground speeds (GSs);

(21) determine all relevant altitudes/levels, particularly MEA, MOCA, MORA, MAA, MCA, MRA, and MSA;

(22) calculate individual and accumulated times for each leg until destination and alternate airfields;

(23) convert between volume, mass, and density given in different units commonly used in aviation;

(24) determine relevant data from the flight manual, such as fuel capacity, fuel flow/consumption at different power/thrust settings, altitudes, and atmospheric conditions;

(25) calculate attainable flight time/range considering fuel flow/consumption and available amount of fuel;

(26) calculate the required fuel considering fuel flow/consumption and required time/range to be flown;

(27) calculate the required fuel for an IFR flight considering expected meteorological conditions and expected delays under defined conditions;

(28) find and analyse the latest state at the departure, destination, and alternate aerodromes, in particular with regard to:

(i) opening hours,

(ii) work in progress (WIP),

(iii) special procedures due to WIP,

(iv) obstructions, and

(v) changes of frequencies for COM, navigation aids, and facilities;

(29) find and analyse the latest en route state with regard to:

(i) airway(s) or route(s),

(ii) restricted, dangerous, and prohibited areas, and

(iii) changes of frequencies for COM, navigation aids, and facilities;

(30) state the reasons for a fixed format of an International Civil Aviation Organization (ICAO) air traffic services flight plan (ATS FPL);

(31) determine the correct entries to complete an FPL, as well as decode and interpret the entries in a completed FPL, particularly as regards the following:

(i) aircraft identification (Item 7),

(ii) flight rules and type of flight (Item 8),

(iii) number and type of aircraft and wake turbulence category (Item 9),

(iv) equipment (Item 10),

(v) departure aerodrome and time (Item 13),

(vi) route (Item 15),

(vii) destination aerodrome, total estimated elapsed time, and alternate aerodrome (Item 16),

(viii) other information (Item 18), and

(ix) supplementary information (Item 19);

(32) complete the FPL using information from the following:

(i) navigation plan,

(ii) fuel plan, and

(iii) operator's records on basic aircraft information;

(33) explain the requirements for the submission of an ATS FPL;

(34) explain the action to be taken in case of FPL changes;

(35) state the action to be taken in case of inadvertent changes to track, TAS, and time estimate, affecting the current FPL; and

(36) explain the procedures for closing an FPL;

(c) METEOROLOGY:

(1) describe qualitatively and quantitatively the temperature lapse rates of the troposphere (mean value of 0.65 °C/100 m or 2 °C/1 000 ft and actual values);

(2) explain the characteristics of inversions and of an isothermal layer;

(3) explain the cooling and warming of the air on the earth or sea surfaces;

(4) describe qualitatively the influence of the clouds on the cooling and warming of the earth or sea surfaces as well as of the air near those surfaces;

(5) explain the influence of the wind on the cooling and warming of the air near the earth or sea surfaces;

(6) define 'atmospheric pressure';

(7) list the units of measurement of atmospheric pressure used in aviation (hPa, in.);

(8) describe isobars on the surface weather charts;

(9) explain the pressure variation with height;

(10) describe qualitatively the variation of the barometric lapse rate (note: the average value for the barometric lapse rate near mean sea level is 27 ft (8 m) per 1 hPa, whereas at about 5 500 m above mean sea level (AMSL) is 50 ft (15 m) per 1 hPa;

(11) describe and interpret contour lines (isohypses) on a constant pressure chart;

(12) describe the relationship between pressure, temperature, and density;

(13) describe the vertical variation of the air density in the atmosphere;

(14) describe the effect of humidity changes on the air density;

(15) explain the use of standardised values for the international standard atmosphere (ISA);

(16) list the main values of ISA (mean sea level pressure, mean sea level temperature, a vertical temperature lapse rate up to 20 km, as well as height and temperature of the tropopause);

(17) calculate the standard temperature in Celsius degrees for a given FL;

(18) determine a standard temperature deviation based on the difference between the given OAT and the standard temperature;

(19) define the following terms and acronyms and explain how they are related to each other: H, A, pressure A, FL, pressure level, true A, true H, elevation, QNH, QFE, and standard altimeter setting;

(20) describe the following terms: transition A, transition level, transition layer, terrain clearance, and lowest usable FL;

(21) calculate the different readings on the altimeter when the pilot changes the altimeter setting;

(22) illustrate with a numbered example the changes of the altimeter setting and the associated changes in reading when the pilot climbs through the transition altitude or descends through the transition level;

(23) derive the reading of the altimeter of an aircraft on the ground when the pilot uses different settings;

(24) explain the influence of the air temperature on the distance between the ground and the level reading on the altimeter as well as between two FLs;

(25) explain the influence of pressure areas on the true altitude;

(26) determine the true A/H for a given A/H and a given ISA temperature deviation;

(27) describe why and how the wind changes direction and speed with H in the friction layer in the northern and southern hemisphere (rule of thumb);

(28) describe and explain the origin and formation of mountain waves;

(29) explain how mountain waves may be identified through their associated meteorological phenomena;

(30) describe turbulence and gustiness;

(31) list common types of turbulence (convective, mechanical, orographic, frontal, and clear-air turbulence);

(32) indicate the sources of atmospheric humidity;

(33) define 'dew point';

(34) define 'relative humidity';

(35) describe the relationship between temperature and dew point;

(36) estimate the relative humidity of the air based on the difference between dew point and temperature;

(37) explain the influence of relative humidity on the H of the cloud base;

(38) list cloud types typical for stable and unstable air conditions;

(39) identify by shape cirriform, cumuliform, and stratiform clouds;

(40) explain the influence of inversions on vertical movements in the atmosphere;

(41) name the factors contributing in general to the formation of fog and mist;

(42) name the factors contributing to the formation of haze;

(43) describe significant characteristics of orographic fog;

(44) summarise the conditions for the dissipation of orographic fog;

(45) list and describe the types of precipitation given in the aerodrome forecast (TAF) and aerodrome routine meteorological report (METAR) codes (drizzle, rain, snow, snow grains, ice pellets, hail, small hail, snow pellets, ice crystals, freezing drizzle, and freezing rain);

(46) assign typical precipitation types and intensities to different clouds;

(47) describe the boundaries between air masses (fronts);

(48) define 'front' and 'frontal surface' ('frontal zone');

(49) define 'warm front';

(50) describe the cloud, weather, ground visibility, and aviation hazards at a warm front depending on the stability of the warm air;

(51) explain the seasonal differences in the weather at warm fronts;

(52) describe the structure, slope, and dimensions of a warm front;

(53) define 'cold front';

(54) explain the seasonal differences in the weather at cold fronts;

(55) describe the structure, slope, and dimensions of a cold front;

(56) describe the cloud, weather, ground visibility, and aviation hazards in a warm sector;

(57) describe the cloud, weather, ground visibility, and aviation hazards behind the cold front;

(58) define the term 'occlusion';

(59) identify the typical flat pressure pattern on a surface weather chart;

(60) describe the weather associated with a flat pressure pattern;

(61) explain the general weather conditions under which ice accretion on airframe occurs;

(62) indicate in which circumstances ice may form on an aircraft on the ground: air temperature, humidity, precipitation;

(63) explain in which circumstances ice may form on an aircraft in flight: inside clouds, in precipitation, outside clouds, and in the absence of precipitation;

(64) describe the different factors influencing 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 aircraft, shape (thickness) of the airframe parts (wings, antennas, etc.);

(65) define 'clear ice';

(66) define 'rime ice';

(67) define 'hoar frost';

(68) state the ICAO qualifying terms for the intensity of icing;

(69) describe in general the hazards of icing;

(70) assess the dangers of the different types of ice accretion;

(71) state the ICAO qualifying terms for the intensity of turbulence;

(72) describe the effects of turbulence on an aircraft in flight;

(73) indicate the possibilities of avoiding turbulence

(iv) in the flight planning: weather briefing, choice of track, and altitude, and

(v) during flight: choice of appropriate track and altitude;

(74) define 'wind shear' (vertical and horizontal);

(75) describe the conditions in which wind shear forms and how it forms (e.g. thunderstorms, squall lines, fronts, inversions, land and sea breeze, friction layer, and relief);

(76) describe the effects of wind shear on flight;

(77) indicate the possibilities of avoiding wind shear in flight:

(i) in the flight planning, and

(ii) during flight;

(78) name the cloud types which indicate the development of thunderstorms;

(79) describe the different types of thunderstorms, their location, the conditions for and the process of their development, and list their properties (air mass thunderstorms, frontal thunderstorms, squall lines, supercell storms, orographic thunderstorms);

(80) assess the average duration of thunderstorms and their different stages;

(81) summarise the flight hazards of a fully developed thunderstorm;

(82) describe and assess 'St. Elmo's fire';

(83) describe the effect of lightning strike on aircraft and flight execution;

(84) describe practical examples of flight techniques used to avoid the hazards of thunderstorms;

(85) describe the influence of a mountainous terrain on cloud and precipitation;

(86) describe the effects of the foehn;

(87) describe the influence of a mountainous area on a frontal passage;

(88) indicate the turbulent zones (mountain waves, rotors) on a sketch of a mountain chain;

(89) describe the reduction of visibility caused by precipitation (drizzle, rain, and snow);

(90) describe the differences between ground visibility, flight visibility, slant visibility, and vertical visibility when an aircraft is above or within a layer of haze or fog;

(91) define 'ground visibility';

(92) list the units used for visibility (m, km);

(93) define 'RVR';

(94) list the units used for RVR (m);

(95) compare visibility and RVR;

(96) define 'ceiling';

(97) name the unit and the reference level used for information about the cloud base (ft);

(98) define 'vertical visibility';

(99) name the unit used for vertical visibility (ft);

(100) interpret ground-weather radar images;

(101) describe the basic principle of airborne weather radars as well as the type of information they provide;

(102) describe the limits and errors of airborne weather radar information;

(103) interpret typical airborne weather radar images;

(104) decode and interpret significant weather charts (low-, medium-, and high-level charts);

(105) describe the flight conditions at designated locations or along a defined flight route at a given FL, based on a significant weather chart;

(106) describe, decode (by using a code table), and interpret the following aviation weather messages (given in written or graphical format):

(i) METAR;

(ii) aerodrome special meteorological reports (SPECI);

(iii) trend forecast (TREND);

(iv) TAF;

(v) information concerning en route weather phenomena which may affect the safety of aircraft operations (SIGMET);

(vi) information concerning en route weather phenomena which may affect the safety of low-level aircraft operations (AIRMET);

(vii) area forecast for low-level flights (GAMET);

(viii) automatic terminal information service (ATIS);

(ix) meteorological information for aircraft in flight (VOLMET);

(x) special air-report, and

(xi) volcanic-ash advisory information;

(107) list in general the cases where a SIGMET and an AIRMET are issued; and

(108) describe, decode (by using a code table), and interpret the following messages: runway state message (as written in a METAR) and general aviation forecast (GAFOR).

AMC1 to Appendix 7 IR skill test

LAPL, BPL, GPL, PPL, CPL, IR SKILL TEST AND PROFICIENCY CHECK APPLICATION AND REPORT FORM

APPLICATION AND REPORT FORM **LAPL, BPL, GPL, PPL, CPL, IR SKILL TEST AND PROFICIENCY CHECK**		
Applicant's last name(s):		

Applicant's first name(s):		**LAPL: A ☐ H ☐ B ☐ G ☐**
Signature of applicant:		**BPL: ☐ GPL: ☐**
Type of licence*:		**PPL: A ☐ H ☐ As ☐**
Licence number*:		**CPL: A ☐ H ☐ As ☐**
State:		**IR: A ☐ H ☐ As ☐**

1	**Details of the flight**			
Group, class, type of aircraft:			**Registration:**	
Aerodrome or site:	**Take-off time:**		**Landing time:**	**Flight time:**
				Total flight time:
2	**Result of the test**			
Skill test details:				
Pass ☐	**Fail ☐**		**Partial pass ☐**	
3	**Remarks**			
Location and date:				
Examiner's certificate number *:			**Type and number of licence:**	

Signature of examiner:	**Name(s) in capital letters**:

* ***if applicable***

AMC1 to Appendix 9 Training, skill test and proficiency check for MPL, ATPL, type and class ratings, and proficiency check for IRs

APPLICATION AND REPORT FORM

If applicable, this form is also the certificate of completion of the type rating course for ZFTT.

APPLICATION AND REPORT FORM **ATPL, MPL, TYPE RATING, TRAINING, SKILL TEST AND PROFICIENCY CHECK** **AEROPLANES (A) AND HELICOPTERS (H)**			
Applicant's last name(s):	**Aircraft:**	**SE-SP: A ☐ H ☐**	**ME-SP: A ☐ H ☐**
Applicant's first name(s):		**SE-MP: A ☐ H ☐**	**ME-MP: A ☐ H ☐**
Signature of applicant:	**Operations:**	**SP ☐**	**MP ☐**
Type of licence held:	**Checklist:**	**Training record: ☐**	**Type rating: ☐**
Licence number:		**Skill test: ☐**	**Class rating: ☐**
		IR: ☐	
State of licence issue:		**Proficiency check: ☐**	**ATPL: ☐ MPL: ☐**

1	**Theoretical training for the issue of a type or class rating performed during period**	
From:	**To:**	**At:**
Mark obtained:	**% (Pass mark 75%):**	**Type and number of licence:**
Signature of HT:		**Name(s) in capital letters:**

2	**FSTD**	
FSTD (aircraft type):	**Three or more axes: Yes ☐ No ☐**	**Ready for service and used:**
FSTD manufacturer:	**Motion or system:**	**Visual aid: Yes ☐ No ☐**
FSTD operator:		**FSTD ID code:**
Total training time at the controls:		**Instrument approaches at aerodromes to a decision altitude or height of:**
Location, date and time:		**Type and number of licence:**
Type rating instructor ☐ Class rating instructor ☐ ..... instructor ☐		
Signature of instructor:		**Name(s) in capital letters:**

3	**Flight training: in the aircraft ☐ in the FSTD (for ZFTT) ☐**		
Type of aircraft:		**Registration:**	**Flight time at the controls:**
Take-offs:		**Landings:**	**Training aerodromes or sites (take-offs, approaches and landings):**
Take-off time:			**Landing time:**
Location and date:			**Type and number of licence held:**
Type rating instructor ☐		**Class rating instructor ☐**	
Signature of instructor:			**Name(s) in capital letters:**
4	**Skill test ☐ Proficiency check ☐**		
Skill test and proficiency check details:			
Aerodrome or site:			**Total flight time:**
Take-off time:			**Landing time:**
Pass ☐	**Fail ☐**		**Reason(s) why, if failed:**
Location and date:			**SIM or aircraft registration:**
Examiner's certificate number (if applicable):			**Type and number of licence:**
Signature of examiner:			**Name(s) in capital letters:**

AMC2 to Appendix 9 Training, skill test and proficiency check for MPL, ATPL, type and class ratings, and proficiency check for IRs

TRAINING, SKILL TEST AND PROFICIENCY CHECK: SP AEROPLANES

Section 3.B of the training and skill test and proficiency check content for SP aeroplanes included in Appendix 9.B should include training on a circling approach, after an IFR approach.

GM1 to Appendix 9 Training, skill test and proficiency check for MPL, ATPL, type and class ratings, and proficiency check for IRs

TYPE SPECIFIC UPRT AND GO-AROUND TRAINING IN FSTD

(a) General

(1) The upset recovery training exercises should be mainly manoeuvre-based but may include some scenario-based training elements. The manoeuvre-based training enables type rating applicants to

apply their handling skills and recovery strategy whilst leveraging CRM principles to return the aeroplane from an upset condition to a stabilised flight path.

(2) If training is conducted in an FSTD, it is important that applicants understand the limitations of the FSTD in replicating the physiological and psychological aspects of upset recovery exercises.

Note: In order to avoid negative training and negative transfer of training, the ATO should ensure that the selected upset recovery exercises take into consideration the limitations of the FFS.

(b) Stall event recovery in FSTD (Appendix 9, Section B(5) exercise 7.2.1; Section B(6) exercise 3.7.1)

(1) It is of utmost importance that stall event recovery training takes into account the capabilities of the FFS used. To deliver stall event recovery training, the FFS should be qualified against the relevant UPRT elements of CS-FSTD Issue 2. Stall event recovery training should include training up to the stall (approach-to-stall). Post-stall training may be delivered provided the device has been qualified against the relevant optional elements of CS-FSTD Issue 2 and the operator demonstrates that negative training or negative transfer of training is avoided. A 'stall event' is defined as an occurrence whereby the aeroplane experiences one or more conditions associated with an approach-to-stall or a post stall.

(2) Stall event recovery training should emphasise the requirement to reduce the AoA whilst accepting the resulting altitude loss. High-altitude stall event training should be included so that flight crew experience the aeroplane control response, the significant altitude loss during the recovery, and the increased time required to recover. The training should also emphasise the risk of triggering a secondary stall event during the recovery.

(3) Recovery from a stall event should always be conducted in accordance with the stall event recovery procedures of the OEMs.

Note: If an OEM-approved recovery procedure does not exist, ATOs should develop and train the aeroplane-specific stall recovery procedure based on the template in Table 1 below. Refer to Revision 3 of the Airplane Upset Prevention and Recovery Training Aid (AUPRTA) for a detailed explanation and rationale of the stall event recovery template as recommended by the OEMs.

Table 1: Recommended stall event recovery template		
Stall event recovery template		
Pilot Flying (PF) Immediately do the following at first indication of a stall (aerodynamic buffeting, reduced roll stability and aileron effectiveness, visual or aural cues and warnings, reduced elevator (pitch) authority, inability to maintain altitude or arrest rate of descent, stick shaker activation (if		**Pilot Monitoring (PM)**
1,	**AUTOPILOT — DISCONNECT**	
	(A large out-of-trim condition could be encountered when the autopilot is disconnected)	
2,	**AUTOTHRUST/AUTOTHROTTLE — OFF**	
3,	(**a**) **NOSE-DOWN PITCH CONTROL** apply until stall warning is eliminated (**b**) **NOSE-DOWN PITCH TRIM** (as needed) (Reduce the AoA whilst accepting the resulting altitude loss.)	**MONITOR** airspeed and attitude throughout the recovery and **ANNOUNCE** any continued divergence
4,	**BANK — WINGS LEVEL**	
5,	**THRUST — ADJUST** (as needed) (Thrust reduction for aeroplanes with underwing-mounted engines may be needed)	
6,	**SPEEDBRAKES/SPOILERS — RETRACT**	
7,	When airspeed is sufficiently increasing — **RECOVER** to level flight	
	(Avoid the secondary stall due to premature recovery or excessive G-loading)	

(c) Nose-high and nose-low recovery exercises (Appendix 9, Section B(5) exercise 7.2.2; B(6) exercise 3.7.2)

Nose-high and nose-low recovery exercises should be conducted in accordance with the strategies recommended by the OEMs contained in Tables 2 and 3 below.

Note: As the OEM procedures always take precedence over the recommendations, ATOs should consult the OEM on whether any approved type-specific recovery procedures are available prior to using the templates.

Refer to Revision 3 of the Airplane Upset Prevention and Recovery Training Aid (AUPRTA) for a detailed explanation and rationale of nose-high and nose-low recovery strategies as recommended by the OEMs.

Table 2 : recommended Nose-high recovery strategy template		
Either pilot — Recognise and confirm the developing situation by announcing '**nose high**'		
	PF	**PM**
1,	**AUTOPILOT — DISCONNECT** (A large out-of-trim condition could be encountered when the autopilot is disconnected)	
2,	**AUTOTHRUST/AUTOTHROTTLE — OFF**	
3,	**APPLY** as much nose-down control input as required to obtain a nose-down pitch rate	**MONITOR** airspeed and attitude throughout the recovery and **ANNOUNCE** any continued divergence
4,	**THRUST — ADJUST** (if required) (Thrust reduction for aeroplanes with underwing-mounted engines may be needed)	
5,	**ROLL — ADJUST** (if required) (Avoid exceeding 60-degree bank)	
6,	When airspeed is sufficiently increasing — **RECOVER** to level flight (Avoid the secondary stall due to premature recovery or excessive G-loading)	

NOTE:

(1) Recovery to level flight may require use of pitch trim.

(2) If necessary, consider reducing thrust in aeroplanes with underwing-mounted engines to aid in achieving nose-down pitch rate.

WARNING: Excessive use of pitch trim or rudder may aggravate the upset situation or may result in high structural loads.

Table 3: recommended Nose-low recovery strategy template		
Either pilot —Recognise and confirm the developing situation by announcing '**nose low**' (If the autopilot or autothrust/autothrottle is responding correctly, it may not be appropriate to decrease the level of automation while assessing if the divergence is being stopped)		
	PF	**PM**
1,	**AUTOPILOT — DISCONNECT** (A large out-of-trim condition could be encountered when the autopilot is disconnected)	**MONITOR** airspeed and attitude throughout the recovery and **ANNOUNCE** any continued divergence
2.	**AUTOTHRUST/AUTOTHROTTLE — OFF**	
3.	**RECOVERY** from stall if required	
4.	**ROLL** in the shortest direction to wings level (It may be necessary to reduce the G-loading by applying forward control pressure to improve roll effectiveness)	
5.	**THRUST** and **DRAG — ADJUST** (if required)	
6.	**RECOVER** to level flight (Avoid the secondary stall due to premature recovery or excessive G-loading.)	
NOTE: (1) Recovery to level flight may require use of pitch trim. (2) WARNING: Excessive use of pitch trim or rudder may aggravate the upset situation or may result in high structural loads.		

(d) Go-around with all engines operating from various stages during an instrument approach (Appendix 9, Section B(5) exercise 7.3; B(6) exercise 4.1.)

(1) The objective of the go-around exercises is to expose the student pilot to the physiological effects caused by a go-around. The instructor should ensure that student pilots understand the objective of the exercises and provide students with appropriate coping strategies, including TEM. Due consideration should be given to environmental conditions when evaluating the demonstration of task proficiency and related criteria.

(2) A go-around may be commenced at any time during an approach, including before the aeroplane is in the landing configuration. Historically, most go-around training has been conducted when the aeroplane is in the landing configuration prior to commencing the go-around. Students must be prepared to adapt the go-around manoeuvre if the go-around is commenced prior to the point where the aeroplane is fully configured for landing. Situation awareness in relation to flap and gear configuration, aeroplane speed and missed approach altitude is important.

(3) Unanticipated go-arounds may startle the students (e.g. unexpected ATC constraints, automation malfunction, adverse weather, etc.). Students may find themselves faced with a situation where they have to perform a large number of critical actions under a high workload (e.g. setting thrust, landing

gear retraction, flight path management). The instructor should explain that there is also a possibility of disorientation during a go-around because of the somatogravic effect produced by large longitudinal acceleration felt by the inner-ear as the aeroplane speed increases. This effect cannot be reproduced in an FSTD.

(4) It is vital that the correct pitch attitude is selected and maintained, while the aeroplane is kept in trim as it accelerates (depending on the aeroplane type). On some aeroplane types with under-slung engines the pitch response with all engines functioning may be amplified due to the relatively low gross weight towards the end of a flight and the high thrust available from modern aeroplane engines. It is particularly important that trim changes are anticipated on such aeroplanes.

(5) ATOs should develop scenarios for go-around training containing different take-off and approach stall situations that also involve surprise and startle effects and include:

(i) a go-around from the non-landing configuration;

(ii) a go-around at low gross weight using maximum go-around thrust;

(iii) a go-around from the outer marker or equivalent point;

(iv) a go-around below 500 ft using, as applicable/permitted, reduced go-around thrust;

(v) a go-around initiated above the published missed approach altitude; and

(vi) a normal go-around from the landing configuration using reduced go-around thrust (if available / type-specific).

(6) Training should also incorporate topics such as flight path management (manual and automatic), application of procedures, startle factors, communication, workload management and situation awareness. The objective of this training is to highlight:

(i) differences to procedures when the aircraft is in the non-landing configuration;

(ii) differences in handling characteristics at low gross weights and high thrust settings;

(iii) the threat associated with go-arounds close to the published missed approach altitudes;

(iv) startle and surprise associated with an unplanned go-around (ATC, blocked runway, etc.);

(v) the importance of effective communication between flight crew;

(vi) the requirement to be aware of the aircraft energy state during a go-around; and

(vii) the importance of engaging the autopilot or flight director in the correct modes during a go-around.

(7) Go-around training should not be limited to addressing the somatogravic effects caused by a go-around. Training should also cover topics such as flight path management (manual and automatic), application of procedures, startle factor, communication, workload management and situation awareness. Flight path management training should address:

(i) the handling differences of a lighter than normal aircraft which may differ to handling experienced during take-off when the aircraft is much heavier;

(ii) the different reaction of the aeroplane (pitch and vertical speed) comparing a go-around performed with reduced G/A thrust (if the function is available) and a go-around performed with full G/A thrust (a different weight).

(8) The importance of correct selection of TO/GA modes by the PF should also be emphasised (pushing TO/GA, selected the correct thrust lever detent, etc.)

(9) The importance of the PM role in the go-around manoeuvre should also be highlighted. The PM usually has higher workload as they need to reconfigure the aircraft, engage FMA modes, communicate with ATC and monitor the actions of the PF. This excessive workload for the PM may lead him or her to prioritise actions to the detriment of monitoring activities. The phenomenon of attentional tunnelling may also need to be addressed. This happens when one pilot, or both, focus exclusively on a problem at the expense of general monitoring of the flight parameters.

AMC1 to Appendix 10 Revalidation and renewal of type ratings, and revalidation and renewal of IRs when combined with the revalidation or renewal of type ratings – EBT practical assessment

APPLICATION AND REPORT FORM — ADMINISTRATIVE PROCEDURES RELATED TO TYPE RATINGS

(a) Minimum information provided in the form for Appendix 10.

Applicant's last name(s):		Applicant's first name(s):
Signature of applicant:		State of licence issue:
Type of licence held:		Licence number:
Type rating:		FSTD (aircraft type):
EBT module 1	Session 1.....Name of the instructor _____ Type and number of licence: _____ Location, date and time: _____ FSTD ID code: _____	
	Session 2.....Name of the instructor _____ Type and number of licence: _____ Location, date and time: _____ FSTD ID code: _____	
	Session X.....Name of the instructor _____ Type and number of licence: _____ Location, date and time: _____ FSTD ID code: _____	
	Completion of the module: _____ Date /signature (EBT manager)	
EBT module 2	Session 1.....Name of the instructor _____ Type and number of licence: _____ Location, date and time: _____ FSTD ID code: _____	
	Session 2.....Name of the instructor _____ Type and number of licence: _____ Location, date and time: _____ FSTD ID code: _____	
	Session X.....Name of the instructor _____ Type and number of licence: _____ Location, date and time: _____ FSTD ID code: _____	
	Completion of the module: _____ Date /signature (EBT manager)	
EBT module X	Session 1.....Name of the instructor _____ Type and number of licence: _____ Location, date and time: _____ FSTD ID code: _____	
	Session 2.....Name of the instructor _____ Type and number of licence: _____ Location, date and time: _____ FSTD ID code: _____	

	Session X……..Name of the instructor _____ Type and number of licence: _____ Location, date and time: _____ FSTD ID code: _____
	Completion of the module: _____ Date /signature (EBT manager)
Completion of the operator's EBT programme from____(date) to ____(date) _____ date / signature (EBT manager)	
Name(s) in capital letters: Type and number of licence: Examiner certificate number:	Signature of examiner (EBT manager) _____ Date of applicant's licence endorsement: _____
Delegation of signature for licence endorsement (instructor)	
Name: Position in the operator: Date:	Signature

(b) AOC declaration for revalidation and renewal under the EBT programme for the purpose of AMC1 ARA.GEN.315(a) point (d) and for the purpose of point 1(a) of Appendix 10.

I confirm all of the following:

The EBT manager holds a current type rating examiner certificate in the type rating filled in in Appendix 10 (copy to be attached)	Yes
The instructor(s) that conducted the training to the applicant has (have) been standardised	Yes
The EBT operator has performed a verification of the grading system at least once in the last 3 years.	Yes
The integrity of the applicant training data is ensured.	Yes

Signature of the training manager or EBT manager_____

(c) In order for the EBT manager to delegate their signature in accordance with point 4(c)(2) of Appendix 10 to another person to endorse the licence of the applicant, the following should apply:

(1) the person signing the licence should be nominated,

(2) the person signing the licence should hold or have held an instructor certificate,

(3) the approved procedure for delegation of signature should include procedures to prevent the person who received the delegation from signing the licence when the EBT programme applicable to the validity period has not been completed.

(d) The CAAT may customise the form above by requesting additional information or changing the order of the elements of the form.

GM1 to Appendix 10 Revalidation and renewal of type ratings, and revalidation and renewal of IRs when combined with the revalidation or renewal of type ratings – EBT practical assessment

REVALIDATION OF TYPE RATING — ADMINISTRATIVE PROCEDURES

(a) The operator may nominate several deputy EBT managers to ensure the availability of at least one examiner for each fleet, in the context of workload to manage the EBT programme, several locations of the training facilities, or bases, etc.

(b) For the first revalidation of type rating after the transition from mixed EBT, the examiner may use mixed EBT module(s) in addition to the other EBT module(s) as a means to revalidate the type rating.

(c) In accordance with the approved procedure in Appendix 10, 4.(c)(2), and as provided in AMC1 to Appendix 10 point (c), the EBT manager may nominate the EBT instructor who completed the EBT module as the person to whom the signature of the examiner is delegated. A stamp or electronic signature may exclusively be given from the EBT manager to the EBT instructor, in order to document the delegation in a transparent and secure manner. Following that process, EBT instructors on behalf of the EBT manager can endorse an applicant's licence.

(d) The EBT programme is included in the operations manual and, in accordance with ORO.FC.145 of TCAR OPS Part ORO, for CAT it is subject to prior approval including any changes, its syllabi and the use of individual FSTD.

GM2 to Appendix 10 Revalidation and renewal of type ratings, and revalidation and renewal of IRs when combined with the revalidation or renewal of type ratings – EBT practical assessment

EBT PRACTICAL ASSESSMENT — PROFICIENCY CHECK

EBT practical assessment (or **Practical assessment**) is defined in FCL.010. More information can be found in ICAO Doc 9868 'PANS-TRG'.

The demonstration of skills to revalidate or renew referred to in the definition of proficiency check in FCL.010 is equivalent to the EBT practical assessments conducted in the EBT programme and the final review of the examiner. In fact, one single EBT practical assessment demonstrates the necessary skills performed in legacy training; however, EBT goes one step further — to revalidate or renew, the pilot performs at least two demonstrations, corresponding to at least two EBT modules within the validity period of the type rating.