Section -2

Acceptable Means Of Compliance (AMC)/ Interpretative And Explanatory Material (IEM)

1. General

1.1 This Section contains Acceptable Means of Compliance and Interpretative/ Explanatory Material that has been agreed for inclusion in JCAR-FCL 1.

1.2 Where a particular JCAR-FCL 1 paragraph does not have an Acceptable Means of Compliance or any Interpretative / Explanatory Material, it is considered that no supplementary material is required.

2. Presentation

2.1 The Acceptable Means of Compliance and Interpretative/Explanatory Material are presented in full page width on loose pages, each page being identified by the date of issue or the Change number under which it is amended or reissued.

2.2 Anumbering system has been used in which the Acceptable Means of Compliance or Interpretative/Explanatory Material uses the same number as the JCAR-FCL 1 paragraph to which it refers. The number is introduced by the letters AMC or IEM to distinguish the material from the JCAR-FCL1 itself.

2.3 The acronyms AMC and IEM also indicate the nature of the material and for this purpose the two types of material are defined as follows:

- Acceptable Means of Compliance (AMC) illustrate a means, or several alternative means, but not necessarily the only possible means by which a requirement can be met. It should however be noted that where a new AMC is developed, any such AMC (which may be additional to an existing AMC) will be amended into the document.

- Interpretative/Explanatory Material (IEM) helps to illustrate the meaning of a requirement.

2.4 New AMC or IEM material may, in the first place, be made available rapidly by being published as a Temporary Guidance Leaflet (TGL).

Note: Any person who considers that there may be alternative AMCs or IEMs to those published should submit details to CARC, for alternatives to be properly considered. Possible alternative AMCs or IEMs may not be used until published by the CARC as AMCs, IEMs or TGLs.

2.5 Explanatory Notes not forming part of the AMC or IEM text appear in a smaller typeface.

2.6 New amended and corrected text will be mareked with a vertical bar to the left.

AMC/IEM Subpart A— General Requirements

IEM JCAR-FCL 1.001
Abbreviations (Interpretative Material)

A	Airplane
A/C	Aircraft
AMC	Acceptable Means of Compliance
AMC	Aeromedical Centre
AME	Authorised Medical Examiner
AMS	Aeromedical Section
ATC	Air Traffic Control
ATP	Airline Transport Pilot
ATPL	Airline Transport Pilot Licence
CARC	Civil Aviation Regulator Commition
CEO	Chief exactive officer
CFI	Chief Flying Instructor
CGI	Chief Ground Instructor
CP	Co-pilot
CPL	Commercial Pilot Licence
CRE	Class Rating Examiner
CRI	Class Rating Instructor
CQB	Central Question Bank
FCL	Flight Crew Licensing
FE	Flight Examiner
F/E	Flight Engineer
FI	Flight Instructor
FIE	Flight Instructor Examiner
FNPT	Flight and Navigation Procedures Trainer
FS	Flight Simulator
FTD	Flight Training Device
FTO	Flying Training Organisation
H	Helicopter
HPA	High Performance Airplane
HT	Head of Training

ICAO	International Civil Aviation Organisation
IEM	Interpretative and Explanatory Material
IFR	Instrument Flight Rules
IMC	Instrument Meteorological Conditions
IR	Instrument Rating
IRE	Instrument Rating Examiner
IRI	Instrument Rating Instructor
JAA	Joint Aviation Authorities
JAR	Joint Aviation Requirements
JCAR	Jordan Civil Aviation Regulation
LOFT	Line Orientated Flight Training
MCC	Multi Crew Co-operation
ME	Multi-engine
MEL	Minimum Equipment List
MEP	Multi-engine Piston
MET	Multi-engine Turbo-prop
MPA	Multi-pilot Airplane
MPH	Multi-pilot Helicopter
nm	Nautical Miles
OML	Operational Multicrew Limitation
OSL	Operational Safety Pilot Limitation
OTD	Other Training Devices
PF	Pilot Flying
PIC	Pilot-In-Command
PICUS	Pilot-In-Command Under Supervision
PNF	Pilot Not Flying
PPL	Private Pilot Licence
RIT	Radiotelephony
SE	Single-engine
SEP	Single Engine Piston
SET	Single-engine Turbo-prop
SFE	Synthetic Flight Examiner

SFI	Synthetic Flight Instructor
SPA	Single-pilot Airplane
SPH	Single-pilot Helicopter
SPIC	Student Pilot-In-Command
STD	Synthetic Training Devices
TMG	Touring Motor Glider
TR	Type Rating
TRE	Type Rating Examiner
TRI	Type Rating Instructor
TRTO	Type Rating Training Organisation
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
ZFTT	Zero Flight Time Training

AMC JCAR FCL 1.005 & 1.015

Knowledge requirements for the issue of a JCAR FCL 1 licence on the basis of the JCAR part 61 licence,or for the validation of pilot licences of an ICAO contracting States (Acceptable Means of Compliance)

IEM JCAR-FCL 1.010
Language Proficiency Assessment Guide
(See AMC No.2 to JCAR-FCL 1.010)

1. The language proficiency assessment should be designed to reflect a range of tasks undertaken by pilots but with the specific focus on language rather than operational procedures.

2. The assessment should determine the applicant's ability to:
   - Communicate effectively using standard radiotelephony phraseology; and
   - Deliver and understand messages in plain language in both usual and unusual situations that necessitate departure from standard radiotelephony phraseology.

   Refer to the Manual on the Implementation of ICAO Language Proficiency Requirements' (ICAO Doc 9835), Appendix A Part III and Appendix B for further guidance.

3. The assessment may be subdivided into three elements, as follows:
   i. Listening - assessment of comprehension.
   ii. Speaking - assessment of pronunciation, fluency, structure and vocabulary.
   iii. Interaction.

4. The three elements mentioned above may be combined and they can be covered by using a wide variety of means/technologies.

5. Where appropriate, some or all of these elements may be achieved through the use of the radiotelephony testing arrangements.

6. When the elements of the testing are assessed separately, the final assessment should be consolidated in the language proficiency endorsement issued by CARC.

7. The assessment may be conducted during one of the several existing checking or training activities, such as licence issue or rating issue and revalidation, line training, operator line checks or proficiency checks.

AMC No. 1 to JCAR-FCL 1.010
Language Proficiency Rating Scale
(See JCAR-FCL 1.010(a)(4))

Level 6

Pronunciation	Pronunciation, stress, rhythm, and intonation, though possibly influenced by the first language or regional variation, almost never interfere with ease of understanding
Structuer	Both basic and complex grammatical structures and sentence patterns are consistently well controlled
Vocabulary	Vocabulary range and accuracy are sufficient to communicate effectively on a wide variety of familiar and unfamiliar topics. Vocabulary is idiomatic, nuanced and sensitive to register
Fluency	Able to speak at length with a natural, effortless flow. Varies speech flow for stylistic effect, e.g. to emphasize a point. Uses appropriate discourse markers and connectors spontaneously
Comprehension	Comprehension Is consistently accurate in nearly all contexts and includes comprehension of linguistic and cultural subtleties.
Interactions	Interacts with ease in nearly all situations. Is sensitive to verbal and non- verbal cues, and responds to them appropriately

Level 5

Pronunciation	Pronunciation, stress, rhythm, and intonation, though influenced by the first blanguage or regional variation, rarely interfere with ease of understanding
Structuer	Basic grammatical structures and sentence patterns are consistently well controlled. Complex structures are attempted but with errors which sometimes interfere with meaning
Vocabulary	Vocabulary range and accuracy are sufficient to communicate effectively on common, concrete, and work related topics. Paraphrases consistently and successfullyVocabulary is sometimes idiomatic
Fluency	Able to speak at length with relative ease on familiar topics, but may not vary speech flow as a stylistic device. Can make use of appropriate discourse markers or connectors.
Comprehension	Comprehension is accurate on common, concrete, and work related topics and mostly accurate when the speaker is confronted with a linguistic or situational complication or an unexpected turn of events. Is able to comprehend a rangeof speech varieties (dialect and/or accent) or registers
Interactions	Responses are immediate, appropriat, and informative. Manages the speaker / listener relationship effectively

Level 4

Pronunciation	Pronunciatio, stress,rhyth, and intonation are influenced by the first language or regional variation but only sometimes interfere with ease of understanding
Structuer	Basic grammatical structures and sentence patterns are used creatively and are usually well controlled. Errors may occur, particularly in unusual or unexpected circumstance, but rarely interfere with meaning
Vocabulary	Vocabulary range and accuracy are usually sufficient to communicate effectively on common, concrete, and work related topics. Can often paraphrase successfully when lacking vocabulary particularly in unusual or unexpected circumstances.
Fluency	Produces stretches of language at an appropriate tempo.There may be occasional loss of fluency on transition from rehearsed or formulaic speech to spontaneous interaction, but this does not prevet effective communication. Can make limited use of discourse markers and connectors. Fillers are not distracting
Comprehension	Comprehension is mostly accurate on common, concrete, and work related topics when the accent or variety used is sufficiently intelligible for an international community of users. When the speaker is confronted with a linguistic or situational complication or an unexpected turn of events , comprehension may be slower or require clarification strategies
Interactions	Responses are usually immediate, appropriate, and informative. Initiates and maintains exchanges even when dealing with an unexpected turn of events. Deals adequately with apparent misunder standings by checking,confirming, or clarifying.

Level 3

Pronunciation	Pronunciation, stress, rhythm, and intonation are influenced by the first language or regional variation and frequently interfere with ease of understanding
Structuer	Basic grammaticl structures and sentence patterns associated with predictable situations are not always well controlled. Errors frequently interfere withmeaning.
Vocabulary	Vocabulay range and accuracy are often sufficient to communicate effectively on common, concrete, and work related topics but range is limited and the word choice often inappropriate Is often unable to paraphrase successfully when lacking vocabulary
Fluency	Produces stretches of language, but phrasing and pausing are often inappropriate. Hesitations or slowness in language processing may prevent effective communication. Fillers are sometimes distracting
Comprehension	Comprehension is often accurate on common, concrete, and work related topics when the accent or variety used is sufficiently intelligible for an international community of users. May fall to understand a linguistic or situational complication or an unexpected turn of events
Interactions	Responses are sometimes immediat, appropriate, and informative. Can initiate and maintain exchanges with reasonable ease on familiar topics and in predictable situations. Generally inadequate when dealing with an unexpected turn Use of elevator to maintain level fligh

Level 2

Pronunciation	Pronunciation, stress, rhythm, and intonation are heavily influenced by the first language or regional variation and usually interfere with ease of understanding.
Structuer	Shows only limited control of few simple memorized grammatical structures and sentence patterns.
Vocabulary	Limited vocabulary range consisting only of isolated words and memorized phrases
Fluency	Can produce very short, isolated, memorized utterances with frequent pausing and a distracting use of filers to search for expressions and articulate less familiar words
Comprehension	Comprehension is limited to isolated, memorized phrases when they are carefully and slowly articulated.
Interactions	Response time is slow, and often inappropriate. Interaction is limited to simple routine exchanges.

Level 1

Pronunciation	Performs at a level below the Elementary level
Structuer	Performs at a level below the Elementary level
Vocabulary	Performs at a level below the Elementary level
Fluency	Performs at a level below the Elementary level
Comprehension	Performs at a level below the Elementary level
Interactions	Performs at a level below the Elementary level

Note:

- The Operational Level (Level 4) is the minimum required proficiency level for radiotelephony communication.
- Levels 1 through 3 describe Pre-elementary, Elementary and Pre-operational levels of language proficiency respectively, all of which describe a level below the language proficiency requirement.
- Levels 5 and 6 describe Extended and Expert levels at levels of proficiency more advanced than the minimum required standard.

AMC No. 2 to JCAR-FCL 1.010
Language Proficiency Assessment
(See Appendix 1 to JCAR-FCL 1.010)
(See AMC No. 1 to JCAR-FCL 1.010)
(See IEM JCAR-FCL 1.010)

GENERAL.

1. CARC may use its own resources in developing or conducting the language proficiency assessment, or may delegate this task to language assessment bodies.

2. The assessment should meet the basic requirements stated in paragraphs 7 to 10, and the persons nominated as language proficiency assessors should meet the criteria at paragraphs 11 to 13 of this AMC.

3. CARC should establish an appeal procedure for applicants.

4. Based on existing assessment methods CARC may decide that active holders of a ATPL issued in accordance with JCAR-FCL 1 requirements should graded level 4 as of the 1 January 2011.

LANGUAGE PROFICIENCY RE-EVALUATION.

5. The recommended Language Proficiency re-evaluation intervals referred to in Appendix 1 to JCAR-FCL 1.010 paragraph 3 should not exceed:

   a) 3 years if the Language Proficiency level demonstrated is Operational Level (level 4) of the ICAO Language Proficiency Rating; or

   b) 6 years if the Language Proficiency level demonstrated is Extended Level (level 5) of the ICAO Language Proficiency Rating.

   It is recommended that the holder of the licence receives a statement containing the level and validity of the language endorsements.

6. Formal re-evaluation is not required for applicants who demonstrate expert (level 6) language proficiency, e.g. native and very proficient non-native speakers with a dialect or accent intelligible to the international aeronautical community.

BASIC ASSESSMENT REQUIREMENT

7. The aim of the assessment is to determine the ability of an applicant for a pilot licence or a licence holder to speak and understand the language used for radiotelephony communications.

8. a) The assessment should determine the ability of the applicant to use:
   - Standard radiotelephony phraseology; and
   - Plain language, in situations when standardised phraseology cannot serve an intended transmission.

   b) The assessment should include:
   - Voice-only and/or face-to face situations.
   - Common, concrete and work-related topics for pilots.

   c) The applicants should demonstrate their linguistic ability in dealing with an unexpected turn of events, and in solving apparent misunderstandings.

   d) The assessment should determine the applicant's speaking and listening abilities. Indirect assessments, of grammatical knowledge, reading and writing, are not appropriate.

   For further guidance see IEM JCAR-FCL 1.010.

9. The assessment should determine the language skills of the applicant in the following areas:

   a) Pronunciation:
   - The extent to which the pronunciation, stress, rhythm and intonation are influenced by the applicant's first language or national variations; and
   - How much they interfere with ease of understanding.

   b) Structure:
   - The ability of the applicant to use both basic and complex grammatical structures; and
   - The extent to which the applicant's errors interfere with the meaning.

Vocabulary:
- The range and accuracy of the vocabulary used; and
- The ability of the applicant to paraphrase successfully when lacking vocabulary.

c) Fluency:
- Tempo.
- Hesitancy.
- Rehearsed versus spontaneous speech.
- Use of discourse markers and connectors.

d) Comprehension:
- On common, concrete and work-related topics; and
- When confronted with a linguistic or situational complication or an unexpected turn of events.

Note: The accent or variety of accents used in the test material should be sufficiently intelligible for an international community of users.

e) Interactions
- Quality of response.(immediate, appropriate, and informative)
- The ability to initiate and maintain exchanges:
  - On common, concrete and work-related topics; and
  - When dealing with an unexpected turn of events.
- The ability to deal with apparent misunderstandings by checking, confirming or clarifying.

Note: The assessment of the language skills in the areas mentioned above is conducted using the Rating Scale in the AMC No. 1 to JCAR-FCL 1.010.

10. When the assessment is not conducted in a face-to-face situation, it should use appropriate technologies for the assessment of the applicant's abilities in listening and speaking, and for enabling interactions (for example: simulated pilot/controller communication).

ASSESSORS

11. It is essential that the persons responsible for language proficiency assessment (assessors') are suitably trained and qualified. They should be either aviation specialists (i.e. current or former flight crew members or air traffic controllers), or language specialists with additional aviation-related training.

An alternative approach would be to form an assessment team consisting of an operational expert and a language expert (see ICAO Doc 9835 paragraph 6.5.5).

12. The assessors should be trained on the specific requirements of the assessment.

13. Assessors should not test applicants to whom they have given language training.

CRITERIA FOR THE ACCEPTABILITY OF LANGUAGE ASSESSMENT BODIES.

14. Alanguage assessment body offering services on behalf of CARC (see Appendix 1 to JCAR-FCL 1.010 paragraph 5) should meet the specifications at paragraphs 14 to 18.

15. In order to ensure an impartial assessment process, the language assessment should be independent of the language training.

16. In order to be accepted, the language assessment bodies should demonstrate:
    a) Appropriate management and staffing, and
    b) Quality System established and maintained to ensure compliance with, and adequacy of, assessment requirements, standards and procedures.

17. The Quality system established by a language assessment body should address the following:
    a) Management.
    b) Policy and strategy.
    c) Processes.
    d) The relevant provisions of ICAO/JCAR-FCL 1, standards and assessment procedures.
    e) Organisational structure.
    f) Responsibility for the development, establishment and management of the Quality System.
    g) Documentation.
    h) Quality Assurance Program.
    i) Human Resources and training (initial, recurrent).
    j) Assessment requirements.
    k) Customer satisfaction.

18. The assessment documentation and records should be kept for a period of time determined by CARC and made available to CARC, on request.

19. The assessment documentation should include at least the following:
    a) Assessment objectives.
    b) Assessment layout, time scale, technologies used, assessment samples, voice samples.
    c) Assessment criteria and standards (at least for the levels 4, 5 and 6 of the Rating Scale in the AMC No. 1 to JCAR-FCL 1.010).
    d) Documentation demonstrating the assessment validity, relevance and reliability.
    e) Assessment procedures and responsibilities
        - Preparation of individual assessment.
        - administration: location(s), identity check and invigilation , assessment discipline, confidentiality/security.
        - Reporting and documentation provided to CARC and / or to the applicant, including sample certificate.
        - Retention of documents and records.

Note: Refer to the Manual on the Implementation of ICAO Language Proficiency Requirements (ICAO Doc 9835) for further guidance.

IEM JCAR-FCL 1.025
Validity of Medical Certificates

This chapter is deleted

IEM JCAR-FCL 1.035
Carriage of Safety Pilots
(See JCAR-FCL 1.035)

INTRODUCTION

1. A safety pilot is a pilot who is qualified to act as PIC on the class/type of Airplane and carried on board the Airplane for the purpose of taking over control should the person acting as a PIC holding a specific medical certificate restriction become incapacitated.

2. The following information should be provided to assist persons acting as safety pilots:
   a) The background for establishing the role of a safety pilot;
   b) The logging of flight time whilst acting as a safety pilot;
   c) The types of medical condition which restrict a particular pilot from flying solo;
   d) The safety pilot's role and responsibilities; and
   e) Guidance material to assist the safety pilot in the conduct of this role.

3. Whenever a pilot licence holder with a safety pilot restriction renews or is issued with the related medical certificate, the holder should receive from CARC an information sheet. This sheet will give advice to pilots utilised by the licence holder in the capacity of safety pilot. An example of this information sheet is shown below.

INFORMATION SHEET

General Considerations.

4. The following are a few notes to help you in your role as a safety pilot. Your pilot has been assessed by the Medical Section of CARC as unfit for solo private flying, but fit to fly with a safety pilot. Although this may sound medically rather alarming, the standards for such pilots are still high, and he/she would undoubtedly be passed fit to lead a normal life' on the ground. The chances of any problem occurring during the flight are therefore remote. Nevertheless, as with any aspect of flight safety, remote possibilities should be assessed and, as far as possible, eliminated. This is the purpose of the safety pilot limitation.

5. Unless you have to take over the controls you are supernumerary and cannot log any flying time. You should be checked out and current on the aircraft. It must have dual controls and you must be licensed to fly in the proposed airspace and conditions.

6. You should have some idea of your pilot's medical condition and the problems that might occur during the flight. These could be due to a sudden or subtle incapacitation in a pilot who is otherwise functioning perfectly normally. Alternatively, there may be some fixed problem that is always present (such as poor vision in one eye or an amputated leg) which might cause difficulties in special circumstances.

7. When flying with a pilot who might suffer some form of incapacitation, you should particularly monitor the critical stages of the flight (such as take-off and approach). It may be useful to use some form of question and answer routine as is done during commercial flights. If your pilot does become incapacitated, the two priorities are to fly the Airplane and try to prevent him/her from compromising the controls. The greatest help in the latter situation is the continuous wearing of a fixed seat belt and shoulder harness (not an inertia reel). With a fixed disability it should be possible to anticipate when help may be needed (maximum braking for example) and to take appropriate action. Further points of consideration are as follows:

   a. You should check the medical certificate of your intended PIC to see if the medical restriction is tied to an Airplane with specially adapted controls, or to a specific type of Airplane. If so, ensure your PIC is in compliance in this respect.

   b. Before the flight, discuss with your PIC the circumstances under which you should intercede and take control of the Airplane. During this discussion, also establish whether the PIC wishes you to conduct any flight crew ancillary tasks. If so, these should be clearly specified to avoid confusion between the PIC and you during the flight. This is particularly important when events are moving quickly and the Airplane is near the surface, for example, during take-off or final approach to landing.

   c. Bear in mind that you are not just a passenger but may, at any time during the flight, be called upon to take over control. Therefore, you will need to remain alert to this possible situation at all times.

d. You should also keep in mind that accidents have occurred with two qualified pilots on board when both pilots thought the other was in control. A means of communication must be established between you and the PIC in order that both of you know who is in control of the Airplane at any given time. The spoken words I have control' from one pilot and the response words you have control' from the other pilot is simple and appropriate for this purpose.

e. In order to avoid distraction or confusion to the PIC during the flight, you should keep your hands and feet away from the controls unless safety circumstances arise which require you to take over control of the Airplane.

AMC JCAR-FCL 1.055
Quality System For FTOs/TRTOs
(See Appendix 1a and 2 to JCAR-FCL 1.055)
(See IEM No. 1to JCAR-FCL 1.055)

1. In accordance with Appendix 1a and 2 to JCAR-FCL 1.055, a FTO and a TRTO shall, as a condition for approval, establish and maintain a quality system. This AMC establishes the objectives of such a system, and offers a means of compliance as to which elements should be included and how the system can be integrated in the organisations.

2. The rationale for the requirements of quality systems is the need to establish a distinct assignment of roles between CARC and training organisations by creating an evident division between the regulatory and surveillance responsibility on the one hand, and responsibility of the training activities in itself on the other. Therefore the training organisations must establish a system whereby they can monitor their activities, be able to detect deviations from set rules and standards, take the necessary corrective actions and thus ensure compliance with CARC regulations and own requirements. A well established and functioning quality system will make it possible for the CARC to perform inspections and surveillance efficiently and with a reasonable amount of resources.

3. It is obvious and well recognised that the scope and complexity of a quality system should reflect the size and complexity of the training organisation and its training activities. The objectives and the same principles apply, however, to any training organisation, irrespective of size and complexity. Thus, in small and relatively small training organisations, the quality system may be quite simple and integrated in the basic organisation, where as larger organisations with more complex training activities will need to establish separate and independent quality organisations within the overall organisational set-up.

4. In determining size and complexity in this context the following guidelines apply:

   - Training organisations with 5 or less instructors employed are considered very small;

   - Training organisations employing between 6 and 20 instructors are considered small.

- In determining complexity, factors such as number of aircraft types used for training, range of training courses offered, geographical spread of training activities (e.g. the use of satellites), range of training arrangements with other training organisations, etc. will be considered.

5. In a quality system of any FTO or TRTO the following five elements should be clearly identifiable:
   a. Determination of the organisation's training policy and training and flight safety standards;
   b. Determination and establishment of assignment of responsibility, resources, organisation and operational processes, which will make allowance for policy and training and flight safety standards;
   c. Follow up system to ensure that policy, training and flight safety standards are complied with;
   d. Registration and documentation of deviations from policy, training and flight safety standards together with necessary analysis, evaluations and correction of such deviations;
   e. Evaluation of experiences and trends concerning policy, training and flight safety standards.

6. IEM No. 1 to JCAR-FCL 1.055 describes in more detail objectives, the different elements of a quality system and offers guidance as to the set-up of quality systems in larger and/or more complex training organisations. For very small and small organisations paragraph 23 of IEM No. 1 to JCAR-FCL1.055 applies.

7. The Quality System required in JCAR-FCL 1 and in other JCARs may be integrated.

AMC JCAR-FCL 1.055(a)
Approval of Modular Theoretical Knowledge Distance Learning Courses
(See JCAR-FCL 1.055(a))
(See Appendix 3 to JCAR-FCL 1.055)
(See Appendix 1 to JCAR-FCL 1.130 & 1.135)
(See Appendix 1 to JCAR–FCL 1.160 & 1.165(a)(4))
(See Appendix 1 to JCAR-FCL 1.205)
(See Appendix 1 to JCAR-FCL 1.251)
(See Appendix 1 to JCAR-FCL 1.285)
GENERAL
1. Modular theoretical knowledge training may be conducted to meet licensing requirements for the issue of airplane class/type rating. Approved distance learning courses may be offered as part of modular theoretical knowledge training at the discretion of CARC.
TRAINING ORGANISATION
2. A variety of methods are open to FTOs/TRTOs to present course material. It is, however, necessary for FTOs/TRTOs to maintain comprehensive records in order to ensure that students make satisfactory academic progress and meet the time constraints laid down in JCAR-FCL for the completion of modular courses.
3. The following are given as planning guidelines for FTOs/TRTOs developing the distance learning element
of modular courses:

a. An assumption that a student will study for at least 15 hours per week.

b. An indication throughout the course material of what constitutes a week's study.

c. A recommended course structure and order of teaching acceptable to CARC.

d. One progress test for each subject for every 15 hours of study, which should be submitted to the FTO/TRTO for assessment. Additional self-assessed progress tests should be completed at intervals of 5 to 10 study hours.

e. Appropriate contact times throughout the course when a student can have access to an instructor by telephone, fax, e- mail or Internet.

f. Measurement criteria to determine whether a student has satisfactorily completed the appropriate elements of the course to a standard that, in the judgment of the Head of Training, or CGI, will enable them to be entered for the JCAR-FCL theoretical examinations with a good prospect of success.

IEM No. I to JCAR-FCL 1.055
Quality System For FTOs/TRTOs
(See AMC JCAR-FCL 1.055)

INTRODUCTION

A basis for quality should be established by every FTO/TRTO and problem-solving techniques to run processes should be applied. Knowledge in how to measure, establish and ultimately achieve quality in training and education is considered to be essential.

The purpose of this IEM is to provide information and guidance to the training organisations on how to establish a Quality System that enables compliance with Appendix 1a to JCAR-FCL 1.055, item 3 and Appendix 2 to JCAR-FCL 1.055, item 3 (Quality Systems).

In order to show compliance with Appendix 1a to JCAR-FCL 1.055, item 3 and Appendix 2 to JCAR-FCL 1.055, item 3, an FTO/TRTO should establish its Quality System in accordance with the instructions and information contained in the succeeding paragraphs.

THE QUALITY SYSTEM OF THE FTO/TRT

1. Terminology

- *Accountable Manager*.

  A person acceptable to CARC who has Authority for ensuring that all training activities can be financed and carried out to the standards required by CARC, and additional requirements defined by the FTO/TRTO.

- *Quality*.

  The totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs.

- *Quality Assurance*.

  All those planned and systematic actions necessary to provide adequate confidence that all training activities satisfy given requirements, including the ones specified by the FTO/TRTO in relevant manuals.

- *Quality Manager*.

  The manager, acceptable to the CARC, responsible for the management of the Quality System, monitoring function and requesting corrective actions.

- *Quality Manual*.

  The document containing the relevant information pertaining to the operator's quality system and quality assurance program.

- *Quality Audit*.

  A systematic and independent examination to determine whether quality activities and related results comply with planned arrangements and whether these arrangements are implemented effectively and are suitable to achieve objectives.

2. **Quality Policy and Strategy.**

   It is of vital importance that the FTO/TRTO describes how the organisation formulates, deploys, reviews its policy and strategy and turns it into plans and actions. A formal written Quality Policy Statement should be established that is a commitment by the Head of Training as to what the Quality System is intended to achieve. The Quality Policy should reflect the achievement and continued compliance with relevant parts of JCAR-FCL 1 together with any additional standards specified by the FTO/TRTO.

   The Accountable Manager will have overall responsibility for the Quality System including the frequency, format and structure of the internal management evaluation activities.

3. **Purpose of a Quality System.**

   The implementation and employment of a Quality System will enable the FTO/TRTO to monitor compliance with relevant parts of JCAR-FCL 1, the Operations Manual, the Training Manual, and any other standards as established by that FTO/TRTO, or CARC, to ensure safe and efficient training.

4. **Quality Manager.**

4.1 The primary role of the Quality Manager is to verify, by monitoring activities in the field of training, that the standards required by CARC, and any additional requirements as established by the FTO/TRTO, are being carried out properly under the supervision of the Head of Training, the Chief Flying Instructor and the Chief Ground Instructor.

4.2 The Quality Manager should be responsible for ensuring that the Quality Assurance Program is properly implemented, maintained and continuously reviewed and improved. The Quality Manager should:
- Have direct access to the Head of Training;
- Have access to all parts of the FTO/TRTO's organisation.

4.3 In the case of small or very small FTO/TRTOs, the posts of the Head of Training and the Quality Manager may be combined. However, in this event, quality audits should be conducted by independent personnel. In the case of a training organisation offering integrated training the Quality Manager should not hold the position of Head of Training, Chief Flying Instructor and Chief Ground Instructor.

5. **Quality System.**

5.1 The Quality System of the FTO/TRTO should ensure compliance with and adequacy of training activities requirements, standards and procedures.

5.2 The FTO/TRTO should specify the basic structure of the Quality System applicable to all training activities conducted.

5.3 The Quality System should be structured according to the size of the FTO/TRTO and the complexity of the training to be monitored.

6. **Scope.**

A Quality System should address the following:

6.1 Leadership.
6.2 Policy and Strategy.
6.3 Processes.
6.4 The provisions of JCAR-FCL 1.
6.5 Additional standards and training procedures as stated by the FTO/TRTO
6.6 The organisational structure of the FTO/TRTO.

6.7 Responsibility for the development, establishment and management of the Quality System.
6.8 Documentation, including manuals, reports and records.
6.9 Quality Assurance Program.
6.10 The required financial, material, and human resources.
6.11 Training requirements.
6.12 Customer satisfaction.

7. **Feedback System**.

The quality system should include a feedback system to ensure that corrective actions are both identified and promptly addressed. The feedback system should also specify who is required to rectify discrepancies and non-compliance in each particular case, and the procedure to be followed if corrective action is not completed within an appropriate timescale.

8. **Documentation**.

Relevant documentation includes the relevant part(s) of the Training and Operations Manual, which may be included in a separate Quality Manual.

8.1 In addition relevant documentation should also include the following:
- Quality Policy;
- Terminology;
- Specified training standards;
- A description of the organisation;
- The allocation of duties and responsibilities;
- Training procedures to ensure regulatory compliance.

8.2 The Quality Assurance Program, reflecting:
- Schedule of the monitoring process;
- Audit procedures;
- Reporting procedures;
- Follow-up and corrective action procedures; Recording system;
- The training syllabus; and
- Document control.

9. **Quality Assurance Program**.

The Quality Assurance Program should include all planned and systematic actions necessary to provide confidence that all training are conducted in accordance with all applicable requirements, standards and procedures.

10. **Quality Inspection**.

The primary purpose of a quality inspection is to observe a particular event/action/document etc., in order to verify whether established training procedures and requirements are followed during the accomplishment of that event and whether the required standard is achieved.

Typical subject areas for quality inspections are:
- Actual flight and ground training;
- Maintenance;
- Technical Standards; and
- Training Standards.

11. **Audit**.

An audit is a systematic, and independent comparison of the way in which a training is being conducted against the way in which the published training procedures say it should be conducted.

Audits should include at least the following quality procedures and processes
- An explanation of the scope of the audit;
- Planning and preparation;
- Gathering and recording evidence; and
- Analysis of the evidence.

The various techniques that make up an effective audit are:
- Interviews or discussions with personnel;
- A review of published documents;
- The examination of an adequate sample of records;
- The witnessing of the activities which make up the training; and
- The preservation of documents and the recording of observations.

12. **Auditors**.

The FTO/TRTO should decide, depending on the complexity of the training, whether to make use of a dedicated audit team or a single auditor. In any event, the auditor or audit team should have relevant training and/or operational experience.

The responsibilities of the auditors should be clearly defined in the relevant documentation.

13. Auditors Independence

Auditors should not have any day-to-day involvement in the area of the operation or maintenance activity which is to be audited. An FTO/TRTO may, in addition to using the services of full-time dedicated personnel belonging to a separate quality department, undertake the monitoring of specific areas or activities by the use of part-time auditors.

An FTO/TRTO whose structure and size does not justify the establishment of full-time auditors, may undertake the audit function by the use of part-time personnel from within his own organisation or from an external source under the terms of an agreement acceptable to CARC.

In all cases the FTO/TRTO should develop suitable procedures to ensure that persons directly responsible for the activities to be audited are not selected as part of the auditing team. Where external auditors are used, it is essential that any external specialist is familiar with the type of training conducted by the FTO/TRTO.

The Quality Assurance Program of the FTO/TRTO should identify the persons within the company who have the experience, responsibility and Authority to:

- Perform quality inspections and audits as part of ongoing Quality Assurance;
- Identify and record any concerns or findings, and the evidence necessary to substantiate such concerns or findings;
- Initiate or recommend solutions to concerns or findings through designated reporting channels.
- Verify the implementation of solutions within specific timescales;
- Report directly to the Quality Manager.

14. Audit Scope

FTO/TRTOs are required to monitor compliance with the training and Operations Manuals they have designed to ensure safe and efficient training. In doing so they should as a minimum, and where appropriate, monitor:

(a) Organisation;
(b) Plans and objectives;
(c) Training Procedures;
(d) Flight Safety;
(e) Manuals, Logs, and Records;
(f) Flight and Duty Time Limitations,
(g) Rest Requirements, and Scheduling;
(h) Aircraft Maintenance/Operations interface;
(i) Maintenance Programs and Continued Airworthiness;
(j) Airworthiness Directives management;
(k) Maintenance Accomplishment.

15. Audit Scheduling.

A Quality Assurance Program should include a defined audit schedule and a periodic review cycle. The schedule should be flexible, and allow unscheduled audits when trends are identified. Follow-up audits should be scheduled when necessary to verify that corrective action was carried out and that it was effective.

An FTO/TRTO should establish a schedule of audits to be completed during a specific calendar period. All aspects of the training should be reviewed within a period of 12 months in accordance with the program unless an extension to the audit period is accepted as explained below.

An FTO/TRTO may increase the frequency of their audits at their discretion but should not decrease the frequency without the acceptance of CARC. It is considered unlikely that a period of greater than 24 months would be acceptable for any audit topic.

When an FTO/TRTO defines the audit schedule, significant changes to the management, organisation, training, or technologies should be considered, as well as changes to the regulatory requirements.

16. Monitoring and Corrective Action.

The aim of monitoring within the Quality System is primarily to investigate and judge its effectiveness and thereby to ensure that defined policy, training standards are continuously complied with.

Monitoring activity is based upon quality inspections, audits, corrective action and follow-up. The FTO/TRTO should establish and publish a quality procedure to monitor regulatory compliance on a continuing basis. This monitoring activity should be aimed at eliminating the causes of unsatisfactory performance.

Any non-compliance identified should be communicated to the manager responsible for taking corrective action or, if appropriate, the Accountable Manager. Such non-compliance should be recorded, for the purpose of further investigation, in order to determine the cause and to enable the recommendation of appropriate corrective action.

The Quality Assurance Program should include procedures to ensure that corrective actions are developed in response to findings. These quality procedures should monitor such actions to verify their effectiveness and that they have been completed. Organisational responsibility and accountability for the implementation of corrective action resides with the department cited in the report identifying the finding. The Accountable Manager will have the ultimate responsibility for ensuring, through the Quality Manager(s), that corrective action has re-established compliance with the standard required by CARC and any additional requirements established by the FTO/TRTO.

17. Corrective action.

Subsequent to the quality inspection/audit, the FTO/TRTO should establish:

(a) The seriousness of any findings and any need for immediate corrective action;
(b) The origin of the finding;
(c) What corrective actions are required to ensure that the non-compliance does not recur;
(d) A schedule for corrective action;
(e) The identification of individuals or departments responsible for implementing corrective action;

(f) Allocation of resources by the Accountable Manager where appropriate.

17.1 The Quality Manager should:

17.1.1 Verify that corrective action is taken by the manager responsible in response to any finding of non-compliance;

17.1.2 Verify that corrective action includes the elements outlined in paragraph 16 above;

17.1.3 Monitor the implementation and completion of corrective action;

17.1.4 Provide management with an independent assessment of corrective action, implementation and completion;

17.1.5 Evaluate the effectiveness of corrective action through the follow-up process.

18. **Management Evaluation.**

A management evaluation is a comprehensive, systematic documented review by the management of the quality system, training policies, and procedures, and should consider:

The results of quality inspections, audits and any other indicators; as well as the overall effectiveness of the management organisation in achieving stated objectives. A management evaluation should identify and correct trends, and prevent, where possible, future non-conformities. Conclusions and recommendations made as a result of an evaluation should be submitted in writing to the responsible manager for action. The responsible manager should be an individual who has the Authority to resolve issues and take action. The Accountable Manager should decide upon the frequency, format, and structure of internal management evaluation activities.

19. **Recording.**

Accurate, complete, and readily accessible records documenting the results of the Quality Assurance Program should be maintained by the FTO/TRTO. Records are essential data to enable an FTO/TRTO to analyse and determine the root causes of non-conformity, so that areas of non-compliance can be identified and subsequently addressed.

The following records should be retained for a period of 5 years:

- Audit Schedules;
- Quality inspection and Audit reports;
- Responses to findings;

- Corrective action reports;
- Follow-up and closure reports;
- Management Evaluation reports.

20. **Quality Assurance Responsibility for Sub-Contractors.**

An FTO/TRTO may decide to sub-contract out certain activities to external organisations subject to the approval of CARC.

The ultimate responsibility for the training provided by the subcontractor always remains with the FTO/TRTO. A written agreement should exist between the FTO/TRTO and the sub- contractor clearly defining the safety related services and quality to be provided. The sub-contractorMs safety related activities relevant to the agreement should be included in the FTO/TRTOMs Quality Assurance Program.

The FTO/TRTO should ensure that the sub-contractor has the necessary authorisation/approval when required, and commands the resources and competence to undertake the task. If the FTO/TRTO requires the sub-contractor to conduct activity which exceeds the sub-contractors authorisation/approval, the FTO/TRTO is responsible for ensuring that the sub-contractors quality assurance takes account of such additional requirements.

21. **Quality System Training.**

Correct and thorough training is essential to optimise quality in every organisation. In order to achieve significant outcomes of such training the FTO/TRTO should ensure that all staff understand the objectives as laid down in the Quality Manual.

Those responsible for managing the Quality System should receive training covering:

- An introduction to the concept of Quality System;
- Quality management;
- Concept of Quality Assurance;
- Quality manuals;
- Audit techniques;
- Reporting and recording; and
- The way in which the Quality System will function in the FTO/TRTO.

Time should be provided to train every individual involved in quality management and for briefing the remainder of the employees. The allocation of time and resources should be governed by the size and complexity of the operation concerned.

22. Sources of Training.

Quality management courses are available from the various National or International Standards Institutions, and an FTO/TRTO should consider whether to offer such courses to those likely to be involved in the management of Quality Systems. Organisations with sufficient appropriately qualified staff should consider whether to carry out in-house training.

23. Quality Systems for small/very small Organisations.

The requirement to establish and document a Quality System, and to employ a Quality Manager applies to all FTO/TRTOs.

Complex quality systems could be inappropriate for small or very small FTO/TRTOs and the clerical effort required to draw up manuals and quality procedures for a complex system may stretch their resources.It is therefore accepted that such FTO/TRTOs should tailor their quality systems to suit the size and complexity of their training and allocate resources accordingly.

For small and very small FTO/TRTOs it may be appropriate to develop a Quality Assurance Program that employs a checklist. The checklist should have a supporting schedule that requires completion of all checklist items within a specified timescale, together with a statement acknowledging completion of a periodic review by top management. An occasional independent overview of the checklist content and achievement of the Quality Assurance should be undertaken.

The small FTO/TRTO may decide to use internal or external auditors or a combination of the two. In these circumstances it would be acceptable for external specialists and or qualified organisations to perform the quality audits on behalf of the Quality Manager.

If the independent quality audit function is being conducted by external auditors, the audit schedule should be shown in the relevant documentation.

Whatever arrangements are made, the FTO/TRTO retains the ultimate responsibility for the quality system and especially the completion and follow-up of corrective actions.

IEM No. 2 to JCAR-FCL 1.055
Financial Evaluation of Flying Training Organisations (FTOs) / Type Rating Training Organisations (TRTOs)
(See Appendix 1a and 2 to JCAR-FCL 1.055)

OBJECTIVE.

1. The objective of this IEM is to set out the means of compliance for CARC to be satisfied that FTOs/TRTOs have sufficient funding available to conduct training to the approved standards of JCAR-FCL1. Paragraph 9 of Appendix 1 a to JCAR-FCL1.055 and paragraph 8 of Appendix 2 to JCAR-FCL 1.055 address the maintenance of acceptable flying training standards throughout the duration of a course. It is not intended to be a consumer protection provision. The grant and revalidation of an approval cannot therefore be construed as a guarantee of the underlying financial soundness of the organisation. It is an indication, on the basis of financial information provided, that the approved organisation can provide sufficient facilities and qualified staff such that flying training can be, or can continue to be, provided in accordance with relevant JCAR-FCL 1 training requirements and standards.

APPLICATION FOR APPROVAL OR REVALIDATION.

2. Any application for initial approval or revalidation is to be supported by a plan, covering the period of approval requested, which includes at least the following information:

(a) Training facilities and number of students.

Details, as appropriate, of:
- The number and types of training aircraft that will be used;
- The number of flight and ground instructors that will be employed;
- The number of classrooms and other types of training facilities (synthetic training devices, etc.) intended for use;
- The supporting infrastructure (staff offices, operations room, briefing rooms, rest rooms, hangars, etc.)
- Planned number of students (by month and course)

(b) Financial Details.

- Capital expenditure necessary to provide the planned facilities;
- Costs associated with running each of the courses for which approval is sought;
- Income forecasts for the period of approval;
- A forecast financial operating statement for the business for which approval is sought;
- Details of any other financial trading arrangement on which the viability of the approved organisation may be dependent.

3. The plan submitted in support of an application for initial approval or revalidation is to be accompanied by a Financial Statement from the applicant's bankers or auditors which certifies that the applicant has, or has recourse to, sufficient financial resources to meet the applicant's proposals as described in the plan to conduct JCAR-FCL 1 approved courses. An appropriately revised Financial Statement will be required whenever the applicants wish to expand their activities in addition to those described in the plan, in order to satisfy the requirements of JCAR-FCL 1.

ONGOING FINANCIAL MONITORING.

4. After approval has been granted, if CARC has reason to believe that the necessary standards of compliance with JCAR-FCL 1 are not being met or may not be met due to a lack or apparent lack of financial resources, the Commission may require the organisation to demonstrate in a written submission that sufficient funds can and will be made available to continue to meet the terms of approval, or such modifications to it as may have been agreed with CARC. Any such submission is to be accompanied by a further Financial Statement signed by the approved organisation's bankers or auditors.

5. CARC may also require a Financial Statement if it appears that operation of the approved course(s) is significantly at variance with the proposals contained in the business plan.

IEM No. 3 to JCAR-FCL 1.055
Training and Operations Manual for FTOs and TRTOs (if applicable)
(See Appendix 1a and 2 to JCAR-FCL 1.055)

TRAINING MANUAL

Training Manuals for use at an FTO or TRTO conducting approved integrated or modular flying training courses should include the following:

Part I — The Training Plan.

- The aim of the course (ATP(A) CPL/IR(A),CPL(A) as applicable**.**

  A statement of what the student is expected to do as a result of the training, the level of performance, and the training constraints to beobserved.

- Pre-entry requirements.

  Minimum age, educational requirements (including language), medical requirements. Any CARC requirements

- Credits for previous experience.

  To be obtained from CARC before training begins.

- Training Syllabi.

  The flying syllabus (single-engine), the flying syllabus (multi-engine) the synthetic flight training syllabus and the theoretical knowledge training syllabus.

- The time scale and scale, in weeks, for each syllabus.

  Arrangement of the course and the integration of syllabi time.

- Training programs**.**
  - The general arrangements of daily and weekly programs for flying, ground and synthetic flight training.
  - Bad weather constraints.
  - Program constraints in terms of maximum student training times, (flying, theoretical knowledge, synthetic) e.g. per day/week/month.
  - Restrictions in respect of duty periods for students.

- Duration of dual and solo flights at various stages.
- Maximum flying hours in any day/night; maximum number of training flights in any day/night.
- Minimum rest period between duty periods.

- Training records.
  - Rules for security of records and documents.
  - Attendance records.
  - The form of training records to be kept.
  - Persons responsible for checking records and students' log books.
  - The nature and frequency of record checks.
  - Standardisation of entries in training records.
  - Rules concerning log book entries.

- Safety training.
  - Individual responsibilities.
  - Essential exercises.
  - Emergency drills (frequency).
  - Dual checks (frequency at various stages).
  - Requirement before first solo day/night/navigation etc.

- Tests and examinations**.**
  - Flying.
    (a) Progress checks.
    (b) Skill tests.

  - Theoretical Knowledge.
    (a) Progress tests.
    (b) Theoretical knowledge examinations.

  - Authorisation for test.
  - Rules concerning refresher training before retest.
  - Test reports and records.
  - Procedures for examination paper preparation, type of question and assessment, standard required for Pass.
  - Procedure for question analysis and review and for raising replacement papers.
  - Examination resit procedures.

- Training effectiveness.
  - Individual responsibilities.

- General assessment.
- Liaison between departments.
- Identification of unsatisfactory progress (individual students).
- Actions to correct unsatisfactory progress.
- Procedure for changing instructors.
- Maximum number of instructor changes per student.
- Internal feedback system for detecting training deficiencies.
- Procedure for suspending a student from training.
- Discipline.
- Reporting and documentation.

- Standards and Level of performance at various stages.
  - Individual responsibilities.
  - Standardisation.
  - Standardisation requirements and procedures.
  - Application of test criteria.

Part 2 - Briefing and Air Exercises.

- Air exercise**.**

  A detailed statement of the content specification of all the air exercises to be taught, arranged in the sequence to be flown with main and sub titles. This should normally be the same as the air exercise specification for the flight instructor rating course.

- Air exercise reference list.

  An abbreviated list of the above exercises giving only main and subtitles for quick reference, and preferably in flip-card form to facilitate daily use by flight instructors.

- Course structure – Phase of training.

  A statement of how the course will be divided into phases, indication of how the above air exercises will be divided between the phases and how they will be arranged to ensure that they are completed in the most suitable learning sequence and that essential (emergency) exercises are repeated at the correct frequency. Also, the syllabus hours for each phase and for groups of exercises within each phase shall be stated and when progress tests are to be conducted, etc.

- Course structure integration of syllabi**.**

  The manner in which theoretical knowledge, synthetic flight training and flying training will be integrated so that as the flying training exercises are carried out students will be able to apply the knowledge gained from the associated theoretical knowledge instruction and synthetic flight training.

- Student progress**.**

  The requirement for student progress and include a brief but specific statement of what a student is expected to be able to do and the standard of proficiency he must achieve before progressing from one phase of air exercise training to the next. Include minimum experience requirements in terms of hours, satisfactory exercise completion, etc. as necessary before significant exercises, e.g. night flying.

- Instructional methods.

  The FTO requirements, particularly in respect of pre and post-flying briefing, adherence to syllabi and training specifications, authorisation of solo flights, etc.

- Progress tests .

  The instructions given to examining staff in respect of the conduct and documentation of all progress tests.

- Glossary of terms.

  Definition of significant terms as necessary.

- Appendices.
  - Progress test report forms.
  - Skill test report forms.
  - FTO certificates of experience, competence, etc. as required.

Part 3 - Synthetic Flight Training.

- Structure generally as for Part 2.

Part 4 - Theoretical knowledge instruction.

- Structure of the theoretical knowledge course**.**

  A statement of the structure of the course, including the general sequence of the topics to be taught in each subject, the time allocated to each topic, the break down per subject and an example of a course schedule.

- Lesson Plans**.**

  A description of each lesson or group of lessons including teaching materials, training aids, progress test organisation and inter-connection of topics with other subjects.

- Teaching materials.

  Specification of the training aids to be used (e.g. study materials, course manual references, exercises, self-study materials, demonstration equipment).

- Student progress.

  The requirement for student progress, including a brief but specific statement of the standard that must be achieved and the mechanism for achieving this, before application for theoretical knowledge examinations.

- Progress testing.

  The organisation of progress testing in each subject, including topics covered, evaluation methods and documentation.

- Review procedure.

  The procedure to be followed if the standard required at any stage of the course is not achieved, including an agreed action plan with remedial training if required.

OPERATIONS MANUAL.

Operations Manual for use at an FTO or TRTO conducting approved integrated or modular flying training courses include the following:

(a) General.
- A list and description of all volumes in the Operations Manual.
- Administration (function and management).
- Responsibilities (all management and administrative staff).
- Student discipline and disciplinary action.
- Approval / authorisation of flights.
- Preparation of flying program (restriction of numbers of Airplanes in poor weather).
- Command of Airplane.
- Responsibilities of pilot-in-command.
- Carriage of passengers.
- Airplane documentation.
- Retention of documents.
- Flight crew qualification records (licences and ratings).
- Revalidation (medical certificates and ratings).
- Flying duty period and flight time limitations (flying instructors).
- Flying duty period and flight time limitations (students).
- Rest periods (flying instructors).
- Rest periods (students).
- Pilots' log books.
- Flight planning (general).
- Safety (general) - equipment, radio listening watch, hazards, accidents and incidents (including reports), safety pilots etc.

(b) Technical.
- Airplane descriptive notes.
- Airplane handling (including checklists, limitations, Airplane maintenance and technical logs, in accordance with relevant JCARs, etc.).
- Emergency procedures.
- Radio and radio navigation aids.
- Allowable deficiencies (based on MMEL, if available).

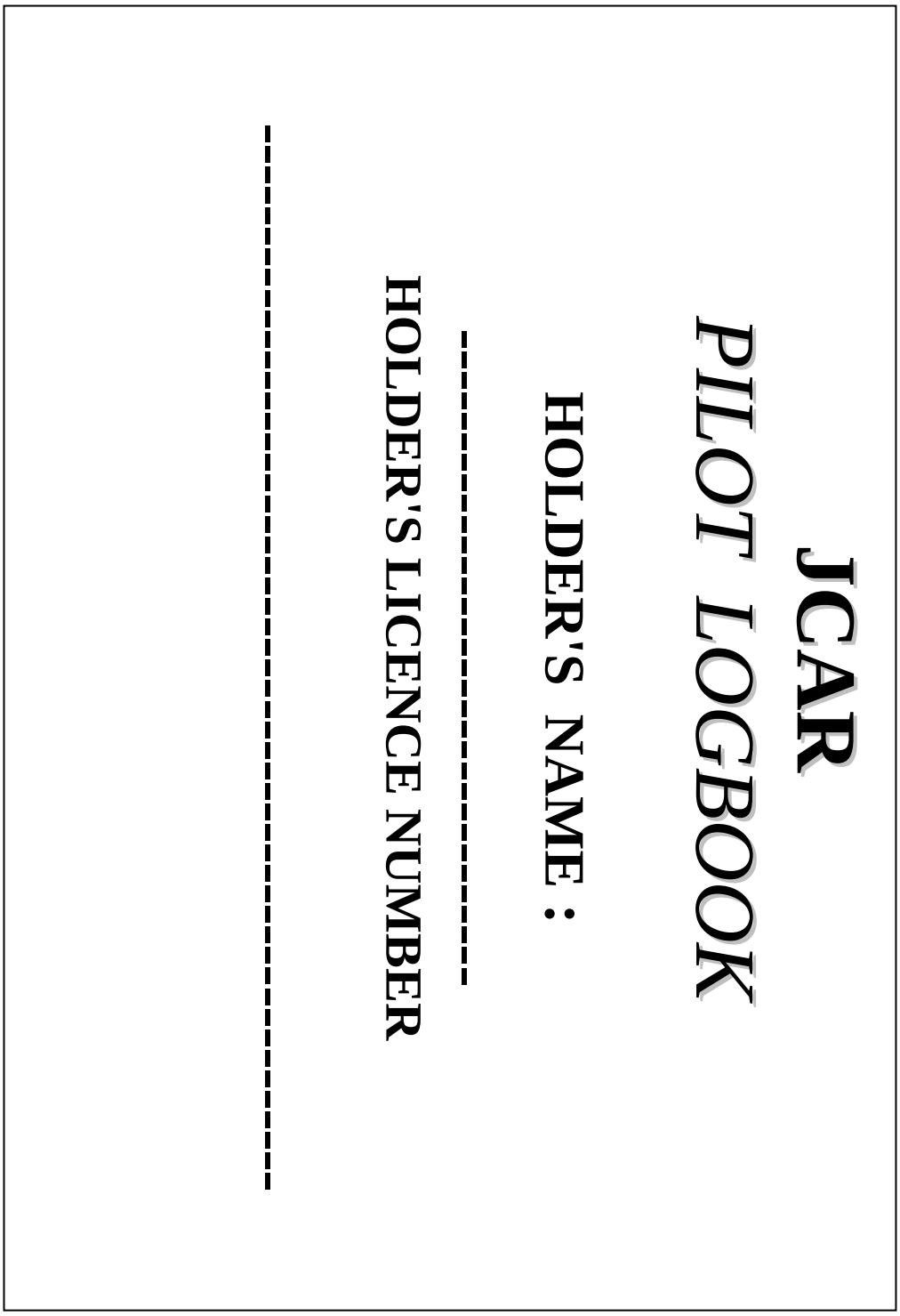
(c) Route.
- Performance (legislation, take-off, route, landing etc.).
- Flight planning (fuel, oil, minimum safe altitude, navigation equipment etc.).

- Loading (loadsheets, mass, balance, limitations).
- Weather minima (flying instructors).
- Weather minima (students - at various stages of training).
- Training routes/areas.

(d) Staff Training

- Appointments of persons responsible for standards/competence of flying staff.
- Initial training.
- Refresher training.
- Standardisation training.
- Proficiency checks.
- Upgrading training.
- FTO staff standards evaluation.

IEM JCAR-FCL 1.080
Recording of Flight Time



HOLDER'S ADDRESS	
…… …… …… … *(SPACE FOR ADDRESS CHANGE)*	…… …….. …… …… …… ……
…… …… …… …… ……	…… …….. …… …….. …… ……
…… …… …… …… ……	…… …….. …… …….. …… ……

1	2		3		4		5			6	7		
DATE (dd/mm/yy	DEPARTURE		ARRIVAL		AIRCRAFT		SINGLE PILOT TIME		MULTI PILOT TIME	TOTAL TIME OF FLIGHT	NAME8 PIC	LANDINGS	
	PLACE	*TIME*	*PLACE*	*TIME*	*MAKE, MODEL, VARIANT*	*REGESTRATION*	*SE*	*ME*				*DAY*	*NIGHT*
							TOTAL THIS PAGE						
							TOTAL FROM PREVIOUS PAGES						
							TOTAL TIME						

9		10				11			12
OPERATIONAL CONDITION TIMe		PILOT FUNCTION TIME				SYNTHETIC TRAINING DEVICE SESSION			REMARKS AND ENDORSEMENTS
NIGHT	*IFR*	*PILOT-IN-COMMAND*	*CO-PILOT*	DUAL	INSTRUCTOR	DATE (dd/mm/yy)	*TYPE*	*TOTAL TIME OF SESSION*	
TOTAL THIS									I certify that the entries in this log are true
TOTAL FROM PREVIOUS PAGES									--- Pilot's signature
TOTAL TIME									

Instruction For Use

1. JCAR–FCL 1.080 and JCAR–FCL 2.080 require holders of a flight crew licence to record details of all flights flown in a format acceptable to the CARC. This logbook enables pilot licence holders to record flying experience in a manner which will facilitate this process while providing a permanent record of the licence holders flying. Pilots who fly regularly Airplanes and helicopters or other aircraft types are recommended to maintain separate logbooks for each type of flying.

2. Flight crew logbook entries should be made as soon as practicable after any flight undertaken. All entries in the logbook shall be made in ink or indelible Pencil.

3. The particulars of every flight in the course of which the holder of a flight crew licence acts as a member of the operating crew of an aircraft are to be recorded in the appropriate columns using one line for each flight, provided that if an aircraft carries out a number of flights upon the same day returning on each occasion to the same place of departure and the interval between successive flights does not exceed thirty minutes, such series of flights may be recorded as a single entry.

4. Flight time is recorded from the time the aircraft first moves under its own power for the purpose of taking off until the time the aircraft finally comes to rest after landing (see JCAR–FCL 1.001).

5. When an aircraft carries two or more pilots as members of the operating crew, one of them shall, before the flight commences, be designated by the operator as the aircraft ‘commander’, in accordance with JCAR–OPS, who may delegate the conduct of the flight to another suitable qualified pilot. All flying carried out as ‘commander’ shall be entered in the log book as ‘pilot-in-command’. A pilot flying as ‘pilot-in-command under supervision’ or ‘student pilot-incommand’ shall enter flying times as ‘pilot-in-command’ but all such entries shall be certified by the commander or flight instructor in the ‘Remarks’ column of the logbook.

6. Notes on recording of flight time:

   (a) Column 1: enter date (d/m/y) on which the flight commences.

   (b) Column 2/3: enter place of departure and destination either in full or the internationally recognised three or four letter designator. All times should be UTC.

(c) Column 5: Indicate whether the operation was single or multi-pilot, and for single-pilot operation whether single or multi-engine.

(d) Column 6: total time of flight may be entered in hours and minutes or decimal notation as desired.

(e) Column 7: enter name of pilot-in-command or SELF as appropriate.

(f) Column 8: indicate number of landings as pilot flying by day and/or night.

(g) Column 9: enter flight time undertaken at night or under instrument flight rules if applicable.

(h) Column 10: Pilot function time:
- Enter flight time as pilot-in-command (PIC), student pilot-in-command (SPIC) and pilot-in-command under supervision (PICUS) as PIC.
- All time recorded as SPIC or PICUS must be countersigned by the aircraft commander/flight instructor in the Remarks (column 12).
- Instructor time should be recorded as appropriate and also entered as PIC.

(i) Column 11: Flight Simulator (FS) or Flight Navigation Procedures Trainer (FNPT):
- For FS enter type of aircraft and qualification number of the device. For other flight training devices enter either FNPT I or FNPT II as appropriate.

Total time of session includes all exercises carried out in the device, including pre- and after-flight checks.

Enter type of exercise performed in the Remarks (column 12), e.g. operator proficiency check, revalidation.

(j) Column 12: the Remarks column may be used to record details of the flight at the holder's discretion. The following entries, however, must be made:
- Instrument flight time undertaken as part of training for a licence or rating.
- Details of all skill tests and proficiency checks.

- Signature of PIC if the pilot is recording flight time as SPIC or PICUS.
- Signature of instructor if flight is part of a single-engine piston or touring motor glider class rating revalidation.

7. When each page is completed, accumulated flight times should be entered in the appropriate columns and certified by the pilot in the Remarks column.

AMC/IEM Subpart C – Private Pilot Licence

AMC JCAR-FCL 1.125
Syllabus of Theoretical Knowledge and Flight Instruction For the Private Pilot Licence (Airplane) – PPL(A)

(See JCAR-FCL 1.125)
(See Appendix 1 to JCAR-FCL 1.125)

SYLLABUS OF THEORETICAL KNOWLEDGE FOR THE PRIVATE PILOT LICENCE (AIRPLANE)

AIR LAW

Legislation

1 The Convention on International Civil Aviation.

2 The International Civil Aviation Organisation.

3 Articles of the Convention.
- Article 1 - Sovereignty.
- Article 2 - Territory.
- Article 5 - Flight over territory of Contracting States.
- Article 10 - Landing at customs airports.
- Article 11 - Applicability of air regulations.
- Article 12 - Rules of the air.
- Article 13 - Entry and clearance regulations of Contracting States.
- Article 16 - Search of aircraft.
- Article 22 - Facilitation of formalities.
- Article 23 - Customs and immigration procedures.
- Article 24 - Customs duty.
- Article 29 - Documents to be carried in aircraft.
- Article 30 - Use of aircraft radio equipment.
- Article 31 - Certificate of airworthiness.
- Article 32 - Licences of personnel.
- Article 33 - Recognition of certificates and licences.
- Article 34 - Journey log books.
- Article 35 - Cargo restrictions.
- Article 36 - Restrictions on use of photographic equipment.
- Article 37 - Adoption of international standards and procedures.
- Article 39 - Endorsement of certificates and licences.
- Article 40 - Validity of endorsed certificates and licence.

4 Annexes to the Convention ('ICAO Annexes').

Annex 7 - Aircraft nationality and registration marks.
- Definitions.
- Aircraft registration marks.
- Certificate of registration.
- Identification plate.

Annex 8 - Airworthiness of aircraft.
- Definitions.
- Certificate of airworthiness.
- Continuing airworthiness.
- Validity of certificate of airworthiness.
- Instruments and equipment.
- Aircraft limitations and information.

Rules of the air

Annex 2 - Rules of the air.
- Definitions.
- Applicability.
- General rules.
- Visual flight rules.
- Signals (Appendix 1).
- Interception of civil aircraft (Appendix 2).

Air traffic regulations and air traffic services

Annex 11 - Air traffic regulations and air traffic services.
- Definitions.
- Objectives of air traffic services.
- Classification of airspace.
- Flight information regions, control areas and control zones.
- Air traffic control services.
- Flight information services.
- Alerting service.
- Visual meteorological conditions.
- Instrument meteorological conditions.
- In-flight contingencies.

Annex 14 - Aerodrome data.

- Definitions.
- Conditions of the movement area and related facilities.
- Visual aids for navigation.
  - Indicators and signalling devices.
  - Markings.
  - Lights.
  - Signs.
  - Markers.
  - Signal area.
- Visual aids for denoting obstacles.
  - Marking of objects.
  - Lighting of objects.
- Visual aids for denoting restricted use of areas.
- Emergency and other services.
  - Fire and rescue service.
  - Apron management service.
- Aerodrome ground lights and surface marking colours.
  - Colours for aeronautical ground lights.
  - Colours for surface markings.

5 ICAO Document 4444 – Rules of the air and air traffic services.

General provisions.
- Definitions.
- ATS operating practices.
- Flight plan clearance and information.
- Control of air traffic flow.
- Altimeter setting procedures.
- Wake turbulence information.
- Meteorological information.
- Air reports (AIREP).

Area control service.
- Separation of controlled traffic in the various classes of airspace.
- Pilots, responsibility to maintain separation in VMC.

- Emergency and communications failure procedures by the pilot.
- Interception of civil aircraft.

Approach control service.
- Departing and arriving aircraft procedures in VMC.

Aerodrome control service.
- Function of aerodrome control towers.
- VFR operations.
- Traffic and circuit procedures.
- Information to aircraft.
- Control of aerodrome traffic.

Flight information and alerting service.
- Air traffic advisory service.
- Objectives and basic principles.

CARC Regulation

6. Jordan Civil Aviation Requlatory Requlations (JCAR).

JCAR FCL 1 Subpart A– General requirements.
- 1.025 – Validity of licences and ratings.
- 1.035 – Medical fitness.
- 1.040 – Decrease in medical fitness.
- 1.050 – Crediting of flight time.
- 1.065 – State of Licence issue.

JCAR FCL 1 Subpart B– Student pilot.
- 1.085 – Requirements.
- 1.090 – Minimum Age.
- 1.095 – Medical fitness.

JCAR FCL 1 Subpart C– Private pilot licence.
- 1.100 – Minimum Age.
- 1.105 – Medical fitness.
- 1.110 – Privileges and conditions.
- 1.115 – Ratings for special purposes.
- 1.120 – Experience and Crediting.
- 1.125 – Training course.
- 1.130 – Theoretical knowledge examination.
- 1.135 – Skill test.

JCAR FCL 1 Subpart E– Instrument rating.
- 1.175 – Circumstances in which an instrument rating is required.

JCAR FCL 1 Subpart F – Type and Class Ratings.

- 1.215 – Division of Class Ratings.
- 1.225 – Circumstances in which type or class ratings are required.
- 1.245 – Validity, revalidation and renewal.

JCAR FCL 1 Subpart H – Instructor ratings.

- 1.300 – Instruction – general.

AIRCRAFT GENERAL KNOWLEDGE

Airframe.

7. Airframe structure.
   - Components.
   - Fuselage, wings, tailplane, fin.
   - Primary flying controls.
   - Trim and flap/slat systems.
   - Landing gear.
     - Nose wheel, including steering.
     - Tyres, condition.
     - Braking systems and precautions in use.
     - Retraction systems.

8. Airframe loads.
   - Static strength.
     - Safety factor.
     - Control locks and use.
     - Ground/flight precautions.

Powerplant.

9. Engines – general**.**
   - Principles of the four stroke internal combustion engine.
   - Basic construction.
   - Causes of pre-ignition and detonation.
   - Power output as a function of RPM.

10. Engine cooling.
   - Air cooling.
   - Cowling design and cylinder baffles.
   - Design and use of cowl flaps.
   - Cylinder head temperature gauge.

11. Engine lubrication.
    - Function and methods of lubrication.
    - Lubrication systems.
    - Methods of oil circulation.
    - Oil pump and filter requirements.
    - Qualities and grades of oil.
    - Oil temperature and pressure control.
    - Oil cooling methods.
    - Recognition of oil system malfunctions.

12 Ignition systems.
    - Principles of magneto ignition.
    - Construction and function.
    - Purpose and principle of impulse coupling.
    - Serviceability checks, recognition of malfunctions.
    - Operational procedures to avoid spark plug fouling.

13 Carburation.
    - Principles of float type carburettor.
    - Construction and function.
    - Methods to maintain correct mixture ratio.
    - Operation of metering jets and accelerator pump.
    - Effect of altitude.
    - Manual mixture control.
        - Maintenance of correct mixture ratio.
        - Limitation on use at high power.
        - Avoidance of detonation.
    - Idle cut-off valve.
    - Operation and use of primary controls.
    - Air induction system.
    - Alternate induction systems.
    - Carburettor icing, use of hot air.
    - Injection systems, principles and operation.

14 Aero engine fuel.
    - Classification of fuels.
        - Grades and identification by colour.
        - Quality requirements.
    - Inspection for contamination.
    - Use of fuel strainers and drains.

15 Fuel systems.
- Fuel tanks and supply lines.
- Venting system.
- Mechanical and electrical pumps.
- Gravity feed.
- Tank selection.
- System management.

16 Propellers.
- Propeller nomenclature.
- Conversion of engine power to thrust.
- Design and construction of fixed pitch propeller.
- Forces acting on propeller blade.
- Variation of RPM with change of airspeed.
- Thrust efficiency with change of speed.
- Design and construction of variable pitch propeller.
- Constant speed unit operation.
- Effect of blade pitch changes.
- Windmilling effect.

17 Engine handling.
- Starting procedures and precautions.
- Recognition of malfunctions.
- Warming up, power and system checks.
- Oil temperature and pressure limitations.
- Cylinder head temperature limitations.
- Ignition and other system checks.
- Power limitations.
- Avoidance of rapid power changes.
- Use of mixture control.

Systems

18 Electrical system.
- Installation and operation of alternators/generators.
- Direct current supply.
- Batteries, capacity and charging.
- Voltmeters and ammeters.
- Circuit breakers and fuses.
- Electrically operated services and instruments.
- Recognition of malfunctions.
- Procedure in the event of malfunctions.

19 Vacuum system**.**
- Components.
- Pumps.
- Regulator and gauge.
- Filter system.
- Recognition of malfunction.
- Procedures in the event of malfunctions.

Instruments

20 Pitot/static system.
- Pitot tube, function.
- Pitot tube, principles and construction.
- Static source.
- Alternate static source.
- Position error.
- System drains.
- Heating element.
- Errors caused by blockage or leakage.

21 Airspeed indicator**.**
- Principles of operation and construction.
- Relationship between pitot and static pressure.
- Definitions of indicated, calibrated and true airspeed.
- Instrument errors.
- Airspeed indications, colour coding.
- Pilot's serviceability checks.

22 Altimeter.
- Principles of operation and construction.
- Function of the sub-scale.
- Effects of atmospheric density.
- Pressure altitude.
- True altitude.
- International standard atmosphere.
- Flight level.
- Presentation (three needle).
- Instrument errors.
- Pilot's service ability checks.

23 Vertical speed indicator**.**
- Principles of operation and construction.
- Function.
- Inherent lag.
- Instantaneous VSI.
- Presentation.
- Pilot's serviceability checks.

24 Gyroscopes.
- Principles.
- Rigidity.
- Precession.

25 Turn indicator**.**
- Rate gyro.
- Purpose and function.
- Effect of speed.
- Presentation.
- Turn co-ordinator.
- Limited rate of turn indications.
- Power source.
- Balance indicator.
  - Principle.
  - Presentation.
- Pilot's serviceability checks.

26 Attitude indicator**.**
- Earth gyro.
- Purpose and function.
- Presentations.
- Interpretation.
- Operating limitations.
- Power source.
- Pilot's serviceability checks.

27 Heading indicator.
- Directional gyro.
- Purpose and function.
- Presentation.
- Use with magnetic compass.
- Setting mechanism.

- Apparent drift.
- Operating limitations.
- Power source.
- Pilot's serviceability checks.

28 Magnetic compass**.**
- Construction and function.
- Earth's magnetic field.
- Variation and deviation.
- Turning, acceleration errors.
- Precautions when carrying magnetic items.
- Pilot's service ability checks.

29 Engine instruments**.**
- Principles, presentation and operational use of:
  - Oil temperature gauge.
  - Oil pressure gauge.
  - Cylinder head temperature gauge.
  - Exhaust gas meter.
  - Manifold pressure gauge.
  - Fuel pressure gauge.
  - Fuel flow gauge.
  - Fuel quantity gauge(s).
  - Tachometer.

30 Other instruments**.**
- principles, presentation and operational use of:
  - Vacuum gauge.
  - Voltmeter and ammeter.
  - Warning indicators.
  - Others relevant to Airplane type.

Airworthiness

31 Airworthiness**.**
- Certificate to be in force.
- Compliance with requirements.
  - Periodic maintenance inspections.
  - Compliance with flight manual (or equivalent), instructions, limitations, placards.
- Flight manual supplements.
- Provision and maintenance of documents.
  - Airplane, engine and propeller log books.

- Recording of defects.
- Permitted maintenance by pilots.

FLIGHT PERFORMANCE AND PLANNING

Mass and balance

32 Mass and balance.
- Limitations on maximum mass.
- Forward and aft limitations of centre of gravity, normal and utility operation.
- Mass and centre of gravity calculations – Airplane manual and balance sheet.

Performance

33 Take-off.
- Take-off run and distance available.
- Take-off and initial climb.
- Effects of mass, wind and density altitude.
- Effects of ground surface and gradient.
- Use of flaps.

34 Landing**.**
- Effect of mass, wind, density altitude and approach speed.
- Use of flaps.
- Ground surface and gradient.

35 In flight
- Relationship between power required and power available.
- Performance diagram.
- Maximum rate and maximum angle of climb.
- Range and endurance.
- Effects of configuration, mass, temperature and altitude.
- Reduction of performance during climbing turns.
- Gliding.
- Adverse effects.
  - Icing, rain.
  - Condition of the airframe.
  - Effect of flap.

HUMAN PERFORMANCE AND LIMITATIONS

Basic physiology

36 Concepts.
- Composition of the atmosphere.
- The gas laws.
- Respiration and blood circulation.

37 Effects of partial pressure**.**
- Effect of increasing altitude.
- Gas transfer.
- Hypoxia.
  - Symptoms.
  - Prevention.
- Cabin pressurisation.
- Effects of rapid decompression.
  - Time of useful consciousness.
  - The use of oxygen masks and rapid descent.
- Hyperventilation.
  - Symptoms.
  - Avoidance.
- Effects of accelerations.

38 Vision.
- Physiology of vision.
- Limitations of the visual system.
  - Vision defects.
  - Optical illusions.
  - Spatial disorientation.
  - Avoidance of disorientation.

39 Hearing.
- Physiology of hearing.
- Inner ear sensations.
- Effects of altitude change.
- Noise and hearing loss.
  - Protection of hearing.
- Spatial disorientation.
  - Conflicts between ears and eyes.
  - Prevention of disorientation.

40 Motion sickness**.**
- Causes.
- Symptoms.
- Prevention.

41 Flying and health.
- Medical requirements.
- Effect of common ailments and cures.
  - Colds.
  - Stomach upsets.
  - Drugs, medicines, and side effects.
  - Alcohol.
  - Fatigue.
- Personal fitness.
- Passenger care.
- Scuba diving – precautions before flying.

42 Toxic hazards.
- Dangerous goods.
- Carbon monoxide from heaters.

Basic psychology.

43 The information process**.**
- Concepts of sensation.
- Cognitive perception.
  - Expectancy.
  - Anticipation.
  - Habits.

44 The central decision channel.
- Mental workload, limitations.
- Information sources.
  - Stimuli and attention.
  - Verbal communication.
- Memory and its limitations.
- Causes of misinterpretation.

45 Stress**.**
- Causes and effects.
- Concepts of arousal.

- Effects on performance.
- Identifying and reducing stress.

46 Judgement and decision making**.**
- Concepts of pilots' judgement.
- Psychological attitudes.
  - Behavioural aspects.
- Risk assessment.
  - Development of situational awareness.

METEOROLOGY

47 The atmosphere**.**
- Composition and structure.
- Vertical divisions.

48 Pressure, density and temperature.
- Barometric pressure, isobars.
- Changes of pressure, density and temperature with altitude.
- Altimetry terminology.
- Solar and terrestrial energy radiation, temperature.
- Diurnal variation of temperature.
- Adiabatic process.
- Temperature lapse rate.
- Stability and instability.
- Effects of radiation, advection subsidence and convergence.

49 Humidity and precipitation**.**
- Water vapour in the atmosphere.
- Vapour pressure.
- Dew point and relative humidity.
- Condensation and vaporisation.
- Precipitation.

50 Pressure and wind.
- High and low pressure areas.
- Motion of the atmosphere, pressure gradient.
- Vertical and horizontal motion, convergence, divergence.
- Surface and geostrophic wind.
- Effect of wind gradient and windshear on take-off and landing.
- Relationship between isobars and wind, Buys Ballot's law.
- Turbulence and gustiness.
- Local winds, föhn, land and sea breezes.

51 Cloud formation.
- Cooling by advection, radiation and adiabatic expansion.
- Cloud types.
  - Convection clouds.
  - Orographic clouds.
  - Stratiform and cumulus clouds.
- Flying conditions in each cloud type.

52 Fog, mist and haze.
- Radiation, advection, frontal, freezing fog.
- Formation and dispersal.
- Reduction of visibility due to mist, snow, smoke, dust and sand.
- Assessment of probability of reduced visibility.
- Hazards in flight due to low visibility, horizontal and vertical.

53 Airmasses.
- Description of and factors affecting the properties of airmasses.
- Classification of airmasses, region of origin.
- Modification of airmasses during their movement.
- Development of low and high pressure systems.
- Weather associated with pressure systems.

54. Frontology.
- Formation of cold and warm fronts.
- Boundaries between airmasses.
- Development of a warm front.
- Associated clouds and weather.
- Weather in the warm sector.
- Development of a cold front.
- Associated clouds and weather.
- Occlusions.
- Associated clouds and weather.
- Stationary fronts.
- Associated clouds and weather.

55 Ice accretion.
- Conditions conducive to ice formation.
- Effects of hoar frost, rime ice, clear ice.
- Effects of icing on Airplane performance.
- Precautions and avoidance of icing conditions.
- Powerplant icing.

- Precautions, prevention and clearance of induction and carburettor icing.

56 Thunderstorms.
- Formation – airmass, frontal, orographic.
- Conditions required.
- Development process.
- Recognition of favourable conditions for formation.
- Hazards for Airplanes.
- Effects of lightning and severe turbulence.
- Avoidance of flight in the vicinity of thunderstorms.

57 Flight over mountainous areas.
- Hazards.
- Influence of terrain on atmospheric processes.
- Mountain waves, windshear, turbulence, vertical movement, rotor Effects, valley winds.

58 Climatology.
- General seasonal circulation in the troposphere over Europe.
- Local seasonal weather and winds.

59 Altimetry.
- Operational aspects of pressure settings.
- Pressure altitude, density altitude.
- Height, altitude, flight level.
- ICAO standard atmosphere.
- QNH, QFE, standard setting.
- Transition altitude, layer and level.

60 The meteorological organisation.
- Aerodrome meteorological offices.
- Aeronautical meteorological stations.
- Forecasting service.
- Meteorological services at aerodromes.
- Availability of periodic weather forecasts.

61 Weather analysis and forecasting.
- Weather charts, symbols, signs.
- Significant weather charts.
- Prognostic charts for general aviation.

62 Weather information for flight planning.
- Reports and forecasts for departure, en-route, destination and alternate(s).
- Interpretation of coded information METAR, TAF, GAFOR.
- Availability of ground reports for surface wind, windshear, visibility.

63 Meteorological broadcasts for aviation.
- VOLMET, ATIS, SIGMET.

NAVIGATION

64 Form of the earth.
- Axis, poles.
- Meridians of longitude.
- Parallels of latitude.
- Great circles, small circles, rhumb lines.
- Hemispheres, north/south, east/west.

65 Mapping
- Aeronautical maps and charts (topographical).
- Projections and their properties.
- Conformality.
- Equivalence.
- Scale.
- Great circles and rhumb lines.

66 Conformal orthomorphic projection (ICAO 1.500,000 chart).
- Main properties.
- Construction.
- Convergence of meridians.
- Presentation of meridians, parallels, great circles and rhumb lines.
- Scale, standard parallels.
- Depiction of height.

67 Direction.
- True north.
- Earth's magnetic field, variation – annual change.
- Magnetic north.
- Vertical and horizontal components.

- Isogonals, agonic lines.

68 Airplane magnetism.
- Magnetic influences within the Airplane.
- Compass deviation.
- Turning, acceleration errors.
- Avoiding magnetic interference with the compass.

69 Distances.
- Units.
- Measurement of distance in relation to map projection.

70 Charts in practical navigation.
- Plotting positions.
- Latitude and longitude.
- Bearing and distance.
- Use of navigation protractor.
- Measurement of tracks and distances.

71 Chart reference material/map reading.
- Map analysis.
- Topography.
- Relief.
- Cultural features.
  - Permanent features (e.g. line features, spot features, unique or special features).
  - Features subject to change (e.g. water).
- Preparation.
- Folding the map for use.
- Methods of map reading.
- Map orientation.
- Checkpoint features.
- Anticipation of check points.
  - With continuous visual contact.
  - Without continuous visual contact.
  - When uncertain of position.
- Aeronautical symbols.
- Aeronautical information.
- Conversion of units.

72 Principles of navigation.
- IAS, CAS and TAS.

- Track, true and magnetic.
- Wind velocity, heading and groundspeed.
- Triangle of velocities.
- Calculation of heading and groundspeed.
- Drift, wind correction angle.
- ETA.
- Dead reckoning, position, fix.

73 The navigation computer.

- Use of the circular slide rule to determine.
  - TAS, time and distance.
  - Conversion of units.
  - Fuel required.
  - Pressure, density and true altitude.
  - Time en-route and ETA.
  - Use of the computer to solve triangle of velocities.
  - Application of TAS and wind velocity to track.
  - Determination of heading and ground speed.
  - Drift and wind correction angle.

74 Time.

- Relationship between universal co-ordinated (standard) (UTC) time and local mean time (LMT).
- Definition of sunrise and sunset times.

75 Flight planning.

- Selection of charts.
- Route and aerodrome weather forecasts and reports.
- Assessing the weather situation.
- Plotting the route.
- Considerations of controlled/regulated airspace, airspace restrictions, danger areas, etc.
- Use of AIP and NOTAMS.
- ATC liaison procedures in controlled/regulated airspace.
- Fuel considerations.
- En-route safety altitude(s).
- Alternate aerodromes.
- Communications and radio/navaid frequencies.
- Compilation of flight log.
- Compilation of ATC flight plan.
- Selection of check points, time and distance marks.
- Mass and balance calculations.
- Mass and performance calculations.

76 Practical navigation.
- Compass headings, use of deviation card.
- Organisation of in-flight workload.
- Departure procedure, log entries, altimeter setting and establishing IAS.
- Maintenance of heading and altitude.
- Use of visual observations.
- Establishing position, checkpoints.
- Revisions to heading and ETA.
- Arrival procedures, ATC liaison.
- Completion of flight log and Airplane log entries

Radio navigation

77 Ground D/F.
- Application.
- Principles.
- Presentation and interpretation.
- Coverage.
- Errors and accuracy.
- Factors affecting range and accuracy.

78 ADF, including associated beacons (NDBs) and use of the RMI.
- Application.
- Principles.
- Presentation and interpretation.
- Coverage.
- Errors and accuracy.
- Factors affecting range and accuracy.

79 VOR/DME.
- Application.
- Principles.
- Presentation and interpretation.
- Coverage.
- Errors and accuracy.
- Factors affecting range and accuracy.

80 GPS.
- Application.
- Principles.

- Presentation and interpretation.
- Coverage.
- Errors and accuracy.
- Factors affecting reliability and accuracy.

81 Ground radar.
- Application.
- Principles.
- Presentation and interpretation.
- Coverage.
- Errors and accuracy.
- Factors affecting reliability and accuracy.

82 Secondary surveillance radar.
- Principles (transponders).
- Application.
- Presentation and interpretation.
- Modes and codes.

OPERATIONAL PROCEDURES

83 ICAO Annex 6, Part II – Operation of aircraft.
- Foreword.
- Definitions.
- General statement.
- Flight preparation and in-flight procedures.
- Performance and operating limitations.
- Instruments and equipment.
- Communications and navigation equipment.
- Maintenance.
- Flight crew.
- Lights to be displayed.

84 ICAO Annex 12 – Search and rescue.
- Definitions.
- Alerting phases.
- Procedures for pilot-in-command (para 5.8 and 5.9).
- Search and rescue signals (para 5.9 and Appendix A).

85 ICAO Annex 13 – Aircraft accident investigation.
- Definitions.
- CARC procedures.

86 Noise abatement.
- General procedures.
- Application to take-off and landing.

87 Contravention of aviation regulations.
- Offences.
- Penalties.

PRINCIPLES OF FLIGHT

88 The atmosphere.
- Composition and structure.
- ICAO standard atmosphere.
- Atmospheric pressure.

89 Airflow around a body, sub-sonic.
- Air resistance and air density.
- Boundary layer.
- Friction forces.
- Laminar and turbulent flow.
- Bernoulli's principle – venturi effect.

90 Airflow about a two dimensional aerofoil.
- Airflow around a flat plate.
- Airflow around a curved plate (aerofoil).
- Description of aerofoil cross section.
- Lift and drag.
- Cl and Cd and their relationship to angle of attack.

91 Three dimensional flow about an aerofoil.
- Aerofoil shapes and wing planforms.
- Induced drag.
  - Downwash angle, vortex drag, ground effect.
  - Aspect ratio.
- Parasite (profile) drag.
  - Form, skin friction and interference drag.
- Lift/drag ratio.

92 Distribution of the four forces.
- Balance and couples.
- Lift and mass.
- Thrust and drag.

- Methods of achieving balance.

93 Flying controls.
- The three planes.
  - Pitching about the lateral axis.
  - Rolling about the longitudinal axis.
  - Yawing about the normal axis.
- Effects of the elevators (stabilators), ailerons and rudder.
- Control in pitch, roll and yaw.
- Cross coupling, roll and yaw.
- Mass and aerodynamic balance of control surfaces.

94 Trimming controls.
- Basic trim tab, balance tab and anti-balance tab.
- Purpose and function.
- Method of operation.

95 Flaps and slats.
- Simple, split, slotted and Fowler flaps.
- Purpose and function.
- Operational use.
- Slats, leading edge.
- Purpose and function.
- Normal/automatic operation.

96 The stall**.**
- Stalling angle of attack.
- Disruption of smooth airflow.
- Reduction of lift, increase of drag.
- Movement of centre of pressure.
- Symptoms of development.
- Airplane characteristics at the stall.
- Factors affecting stall speed and Airplane behaviour at the stall.
- Stalling from level, climbing, descending and turning flight.
- Inherent and artificial stall warnings.
- Recovery from the stall.

97 Avoidance of spins.
- Wing tip stall.
- The development of roll.
- Recognition at the incipient stage.
- Immediate and positive stall recovery

98 Stability.
- Definitions of static and dynamic stability.
- Longitudinal stability.
- Centre of gravity effect on control in pitch.
- Lateral and directional stability.
- Interrelationship, lateral and directional stability.

99 Load factor and manoeuvre.
- Structural considerations.
- Manoeuvring and gust envelope.
- Limiting load factors, with and without flaps.
- Changes in load factor in turns and pull-ups.
- Manoeuvring speed limitations.
- In-flight precautions.

100 Stress loads on the ground.
- Side loads on the landing gear.
- Landing.
- Taxiing, precautions during turns.

COMMUNICATIONS

101 Radio telephony and communications.
- Use of AIP and frequency selection.
- Microphone technique.
- Phonetic alphabet.
- Station/Airplane callsigns/abbreviations.
- Transmission technique.
- Use of standard words and phrases.
- Listening out.
- Required ‘readback’ instructions.

102 Departure procedures.
- Radio checks.
- Taxi instructions.
- Holding on ground.
- Departure clearance.

103 En-route procedures.
- Frequency changing.
- Position, altitude/flight level reporting.
- Flight information service.
- Weather information.
- Weather reporting.
- Procedures to obtain bearings, headings, position.
- Procedural phraseology.
- Height/range coverage.
- Vertical situational awareness (avoidance of controlled flight into terrain).

104 Arrival and traffic pattern procedures.
- Arrival clearance.
- Calls and ATC instructions during the:
  - Circuit.
  - Approach and landing.
  - Vacating runway.

105 Communications failure.
- Action to be taken.
  - Alternate frequency..
  - Erviceability check, including microphone and headphones.
- In-flight procedures according to type of airspace.

106 Distress and urgency procedures.
- Distress (Mayday), definition and when to use.
- Frequencies to use.
- Contents of Mayday message.
- Urgency (Pan), definition and when to use.
- Frequencies to use.
- Relay of messages.
- Maintenance of silence when distress/urgency calls heard.
- Cancellation of distress/urgency.

General flight safety

107 Airplane.
- Seat adjustment and security.
- Harnesses and seat belts.
- Emergency equipment and its use.

- Fire extinguisher.
- Engine/cabin fires.
- De-icing systems.
- Survival equipment, life jackets, life rafts.

- Carbon monoxide poisoning.
- REfuelling precautions.
- Flammable goods/pressurised containers.

108 Operational.

- Wake turbulence.
- Aquaplaning.
- Windshear, take-off, approach and landing.
- Clearance to cross or enter runway (avoidance of runway incursions)
- Passenger briefings.
- Emergency exits.
- Evacuation from the Airplane.
  - Forced landings.
  - Gear-up landing.
  - Ditching.

SYLLABUS OF FLIGHT INSTRUCTION FOR THE PRIVATE PILOT LICENCE (AIRPLANE)

Exercise 1 - Familiarisation with the Airplane.

- Characteristics of the Airplane.
- Cockpit layout.
- Systems.
- Check lists, drills, controls Exercise 1 E Emergency drills.

Exercise 1E - Emergency drills.

- Action in the event of fire on the ground and in the air.
- Engine cabin and electrical system fire.
- Systems failure.
- Escape drills, location and use of emergency equipment and exits.

Exercise 2 – Preparation for and action after flight.

- Flight authorisation and Airplane acceptance.
- Serviceability documents.
- Equipment required, maps, etc.
- External checks.
- Internal checks.
- Harness, seat or rudder panel adjustments.

- Starting and warm up checks.
- Power checks.
- Running down system checks and switching off the engine.
- Parking, security and picketing (e.g. tie down).
- Completion of authorisation sheet and serviceability documents.

Exercise 3 - Air experience.

- Flight exercise.

Exercise 4 - Effects of controls.

- Primary effects when laterally level and when banked.
- Further effects of aileron and rudder.
- Effects of:
  - Airspeed.
  - Slipstream.
  - Power.
  - Trimming controls.
  - Flaps.
  - Other controls, as applicable.
- Operation of:
  - Mixture control.
  - Carburettor heat.
  - Cabin heating/ventilation.
- Airmanship.

Exercise 5 – Taxiing.

- Pre-taxi checks.
- Starting, control of speed and stopping.
- Engine handling.
- Control of direction and turning.
- Turning in confined spaces.
- Parking area procedure and precautions.
- Effects of wind and use of flying controls.
- Effects of ground surface.
- Freedom of rudder movement.
- Marshalling signals.
- Instrument checks.
- Air traffic control procedures.
- Airmanship.

Exercise 5 E– Emergencies.

- Brake and steering failure.

Exercise 6 - Straight and level.

- At normal cruising power, attaining and maintaining straight and level flight.
- Flight at critically high airspeeds.
- Demonstration of inherent stability.
- Control in pitch, including use of trim.
- Lateral level, direction and balance, trim.
- At selected airspeeds (use of power).
- During speed and configuration changes.
- Use of instruments for precision.
- Airmanship.

Exercise 7 – Climbing.

- Entry, maintaining the normal and max rate climb, levelling off.
- Levelling off at selected altitudes.
- En-route climb (cruise climb).
- Climbing with flap down.
- Recovery to normal climb.
- Maximum angle of climb.
- Use of instruments for precision.
- Airmanship.

Exercise 8 - Descending.

- Entry, maintaining and levelling off.
- Levelling off at selected altitudes.
- Glide, powered and cruise descent (including effect of power and airspeed).
- Side slipping (or suitable types).
- Use of instruments for precision flight.
- Airmanship.

Exercise 9 – Turning.

- Entry and maintaining medium level turns.
- Resuming straight flight.
- Faults in the turn – (in correct pitch, bank, balance).
- Climbing turns.
- Descending turns.
- Slipping turns (or suitable types).
- Turns onto selected headings, use of gyro heading indicator and compass.
- Use of instruments for precision.
- Airmanship.

Exercise 10 A - Slow flight.

NOTE: The objective is to improve the student's ability to recognise inadvertent flight at critically low speeds and provide practice in maintaining the Airplane in balance while returning to normal airspeed.

- Safety checks.
- Introduction to slow flight.
- Controlled flight down to critically slow airspeed.
- Application of full power with correct attitude and balance to achieve normal climb speed.
- Airmanship.

Exercise 10B - Stalling.

- Airmanship.
- Safety checks.
- Symptoms.
- Recognition.
- Clean stall and recovery without power and with power.
- Recovery when a wing drops.
- Approach to stall in the approach and in the landing configurations, with and without power, recovery at the incipient stage.

Exercise 11 - Spin avoidance.

- Airmanship.
- Safety checks.
- Stalling and recovery at the incipient spin stage (stall with excessive wing drop, about 45°).
- Instructor induced distractions during the stall.

NOTE 1: At least two hours of stall awareness and spin avoidance flight training shall be completed during the course.

NOTE 2: Consideration of manoeuvre limitations and the need to refer to the Airplane manual and mass and balance calculations.

Exercise 12 - Take-off and climb to downwind position.

- Pre-take-off checks.
- Into wind take-off.
- Safeguarding the nosewheel.
- Crosswind take-off.
- Drills during and after take-off.

- Short take-off and soft field procedure/techniques including. performance calculations.
- Noise abatement procedures.
- Airmanship.

Exercise 13 - Circuit, approach and landing.

- Circuit procedures, downwind, base leg.
- Powered approach and landing.
- Safeguarding the nosewheel.
- Effect of wind on approach and touchdown speeds, use of flaps.
- Crosswind approach and landing.
- Glide approach and landing.
- Short landing and soft field procedures/techniques.
- Flapless approach and landing.
- Wheel landing (tail wheel Airplanes).
- Missed approach/go around.
- Noise abatement procedures.
- Airmanship.

Exercise 12/13E – Emergencies.

- Abandoned take-off.
- Engine failure after take-off.
- Mislanding/go-around.
- Missed approach.

In the interests of safety it will be necessary for pilots trained on nosewheel Airplanes to undergo dual conversion training before flying tail wheel Airplanes, and vice-versa.

Exercise 14 - First solo.

- Instructor's briefing, observation of flight and de-briefing.

NOTE: During flights immediately following the solo circuit consolidation the following should be revised:

- Procedures for leaving and rejoining the circuit.
- The local area, restrictions, map reading.
- Use of radio aids for homing.
- Turns using magnetic compass, compass errors.
- Airmanship.

Exercise 15 - Advanced turning.

- Steep turns (45°), level and descending.
- Stalling in the turn and recovery.
- Recoveries from unusual attitudes, including spiral dives.
- Airmanship.

Exercise 16 - Forced landing without power.

- Forced landing procedure.
- Choice of landing area, provision for change of plan.
- Gliding distance.
- Descent plan.
- Key positions.
- Engine cooling.
- Engine failure checks.
- Use of radio.
- Base leg.
- Final approach.
- Landing.
- Actions after landing.
- Airmanship.

Exercise 17 - Precautionary landing.

- Full procedure away from aerodrome to break-off height.
- Occasions necessitating.
- In-flight conditions.
- Landing area selection.
  - Normal aerodrome.
  - Disused aerodrome.
  - Ordinary field.
- Circuit and approach.
- Actions after landing.
- Airmanship.

Exercise 18A - Navigation.

Flight planning.

- Weather forecast and actuals.
- Map selection and preparation.
  - Choice of route.
  - Controlled airspace.
  - Danger, prohibited and restricted areas.

  - Safety altitudes.
- Calculations.
  - Magnetic heading(s) and time(s) en-route.
  - Fuel consumption.
  - Mass and balance.
  - Mass and performance.
- Flight information.
  - NOTAMS etc.
  - Radio frequencies.
  - Selection of alternate aerodromes.
- Airplane documentation.
- Notification of the flight.
  - Pre-flight administrative procedures.
  - Flight plan form.

Departure.
- Organisation of cockpit workload.
- Departure procedures.
  - Altimeter settings.
  - ATC liaison in controlled/regulated airspace.
  - Setting heading procedure.
  - Noting of ETAs.
- Maintenance of altitude and heading.
- Revisions of ETA and heading.
- Log keeping.
- Use of radio.
- Use of navaids.
- Minimum weather conditions for continuation of flight.
- In-flight decisions.
- Transiting controlled/regulated airspace.
- Diversion procedures.
- Uncertainty of position procedure.
- Lost procedure.

Arrival Aerodrome joining procedure.
- ATC liaison in controlled/regulated airspace.
- Altimeter setting.
- Entering the traffic pattern.
- Circuit procedures.
- Parking.
- Security of Airplane.
- Refuelling.
- Closing of flight plan, if appropriate.

- Post-flight administrative procedures.

Exercise 18 B - Navigation problems at lower levels and in reduced visibility

- Actions prior to descending.
- Hazards (e.g. obstacles, and terrain).
- Difficulties of map reading.
- Effects of wind and turbulence.
- Vertical situational awareness (avoidance of controlled flight into terrain).
- Avoidance of noise sensitive areas.
- Joining the circuit.
- Bad weather circuit and landing.

Exercise 18 C - Radio navigation.

Use of VHF Omni Range.

- Availability, AIP, frequencies.
- Selection and identification.
- Omni bearing selector (OBS).
- To/from indications, orientation.
- Course deviation indicator (CDI).
- Determination of radial.
- Intercepting and maintaining a radial.
- VOR passage.
- Obtaining a fix from two VORs.

Use of automatic direction finding equipment (ADF) - Non-directional beacons (NDBs).

- Availability, AIP, frequencies.
- Selection and identification.
- Orientation relative to the beacon.
- Homing.

Use of VHF direction finding (VHF/DF)

- Availability, AIP, frequencies.
- R/T procedures and ATC liaison.
- Obtaining a QDM and homing.

Use of en-route/terminal radar

- Availability, AIP.
- Procedures and ATC liaison.
- Pilot’s responsibilities.

- Secondary surveillance radar.
  - Transponders.
  - Code selection.
  - Interrogation and reply.

Use of distance measuring equipment (DME)
- Station selection and identification.
- Modes of operation.
  - Distance, groundspeed, time to run.

Exercise 19 - Basic instrument flight
- Physiological sensations.
- Instrument appreciation.
  - Attitude instrument flight.
- Instrument limitations.
- Airmanship.
- Basic manoeuvres.
  - Straight and level at various airspeeds and configurations.
  - Climbing and descending.
  - Standard rate turns, climbing and descending, onto selected headings.
  - Recoveries from climbing and descending turns.

IEM JCAR-FCL 1.135
PPL(A) Skill Test Form
(See JCAR-FCL 1.135)

APPLICATION AND REPORT FORM for the PPL(A) skill test			
Applicant's last name:		First name:	

1	Details of the flight		
Type of aeroplane:		Departure aerodrome:	
Registration:		Destination aerodrome:	
Block time off:		Block time on:	
Total block time:		Take-off time:	
Landing time:			

2	Result of the test *delete as necessary		
Passed*		Failed *	Partial pass *

3	Remarks

Location and date:		Type and number of FE's licence:	
Signature of FE:		Name of FE, in capitals:	

AMC/IEM Subpart D - Commercial Pilot Licence

AMC JCAR-FCL 1.160 & 1.165(a)(1)
ATP(A) Integrated Course
(See JCAR-FCL1.160 & 165)
(See Appendix 1 to JCAR-FCL 1.470)
(See IEM JCAR-FCL 1.170)

THE FLYING INSTRUCTION IS DIVIDED INTO FIVE PHASES:

Phase 1.

1. Exercises up to the first solo flight comprise a total of at least 10 hours dual flight instruction on a single-engine Airplane including:
   a. Pre-flight operations, mass and balance determination, Airplane inspection and servicing;
   b. Aerodrome and traffic pattern operations, collision avoidance and precautions;
   c. Control of the Airplane by external visual references;
   d. Normal take-offs and landings;
   e. Flight at critically slow airspeeds, recognition of and recovery from incipient and full stalls, spin avoidance; and
   f. Unusual attitudes and simulated engine failure.

Phase 2.

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:
   a. Maximum performance (short field and obstacle clearance) take-offs, short-field landings;
   b. Flight by reference solely to instruments, including the completion of a 180° turn;
   c. Dual cross-country flying using external visual references, dead-reckoning and radio navigation aids, diversion procedures;
   d. Aerodrome and traffic pattern operations at different aerodromes;
   e. Crosswind take-offs and landings;
   f. Abnormal and emergency procedures and manoeuvres, including simulated Airplane equipment malfunctions;
   g. Operations to, from and transiting controlled aerodromes, compliance with air traffic services procedures, radio telephony procedures and phraseology; and

h. Knowledge of meteorological briefing arrangements, evaluation of weather conditions for flight and use of Aeronautical Information Services (AIS).

Phase 3.

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 pilot-in-command.

4. The dual instruction and testing up to the VFR navigation progress test shall comprise:
   a. Repetition of exercises of Phases 1 and 2.
   b. VFR flight at relatively critical high airspeeds, recognition of and recovery from spiral dives;
   c. VFR navigation progress test conducted by a flight instructor not connected with the applicant's training;

Phase 4.

5. Exercises up to the instrument rating skill test comprise:
   a. At least 55 hours instrument flight, which may contain up to 25 hours of instrument ground time in a FNPT I or up to 40 hours in an FNPT II or flight simulator which shall be conducted by a flight instructor and/or an authorised synthetic flight instructor; and
   b. 50 hours instrument time flown as SPIC;
   c. Night flight including take-offs and landings as pilot-in-command;
   d. Pre-flight procedures for IFR flights, including the use of the flight manual and appropriate air traffic services documents in the preparation of an IFR flight plan;
   e. Procedures and manoeuvres for IFR operation under normal, abnormal and emergency conditions covering at least;
      - Transition from visual to instrument flight on take-off.
      - Standard instrument departures and arrivals.
      - En route IFR procedures.
      - Holding procedures.
      - Instrument approaches to specified minima
      - Missed approach Procedures.
      - Landings from instrument approaches, including circling;
   f. In-flight manoeuvres and specific flight characteristics; and

g. Operation of a multi-engine Airplane in the exercises of 5(e), including operation of the Airplane solely by reference to instruments with one engine simulated inoperative, and engine shutdown and restart. (The latter training shall be at a safe altitude unless carried out in a synthetic training device).

Phase 5.

6. Instruction and testing in multi-crew co-operation (MCC) comprise the relevant training requirements set out in Appendix 1 to JCAR-FCL 1.261(d) and AMC JCAR-FCL 1.261(d).

7. If a type rating for multi-pilot Airplanes is not required on completion of this part, the applicant will be provided with a certificate of course completion for MCC training as set out in Appendix 1 to AMC JCAR-FCL 1.261(d).

AMC JCAR-FCL 1.160 & 1.165(a)(2)
CPL(A)/IR Integrated Course
(See JCAR-FCL 1.160 & 1.165)
(See Appendix 1 to JCAR FCL 1.470)
(See IEM JCAR-FCL 1.170)

THE FLYING INSTRUCTION IS DIVIDED INTO FOUR PHASES:

Phase 1.

1. Exercises up to the first solo flight comprise a total of at least 10 hours dual flight instruction on a single-engine Airplane including:
   a. Pre-flight operations, mass and balance determination, Airplane inspection and servicing;
   b. Aerodrome and traffic pattern operations, collision avoidance and precautions;
   c. Control of the Airplane by external visual references;
   d. Normal take-offs and landings;
   e. Flight at critically slow airspeeds, recognition of and recovery from incipient and full stalls, spin avoidance; and
   f. Unusual attitudes and simulated engine failure.

Phase 2.

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:
   a. Maximum performance (short field and obstacle clearance) take-offs, short-field landings;
   b. Flight by reference solely to instruments, including the completion of a 180° turn;
   c. Dual cross-country flying using external visual references, dead-reckoning and radio navigation aids, diversion procedures;
   d. Aerodrome and traffic pattern operations at different aerodromes;
   e. Crosswind take-offs and landings;
   f. Abnormal and emergency operations and manoeuvres, including simulated Airplane equipment malfunctions;
   g. Operations to, from and transiting controlled aerodromes, compliance with air traffic services procedures, radio telephony procedures and phraseology; and
   h. Knowledge of meteorological briefing arrangements, evaluation of weather conditions for flight and use of Aeronautical Information Services (AIS).

Phase 3.

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 pilot-in-command.

4. The dual instruction and testing up to the VFR navigation progress test and the skill test shall contain the following:
   a. Repetition of exercises of Phases 1 and 2;
   b. VFR flight at relatively critical high airspeeds, recognition of and recovery from spiral dives;
   c. VFR navigation progress test conducted by a flight instructor not connected with the applicant's training;

Phase 4.

5. Exercises up to the instrument rating skill test comprise:
   a. 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 flight simulator which shall be conducted by a flight instructor and/or an authorised synthetic flight instructor, and;
   b. 50 hours instrument time flown as SPIC;
   c. Night flight including take-offs and landings as pilot-in-command;
   d. Pre-flight procedures for IFR flights, including the use of the flight manual and appropriate air traffic services documents in the preparation of an IFR flight plan;
   e. Procedures and manoeuvres for IFR operation under normal, abnormal and emergency conditions covering at least:
      - Transition from visual to instrument flight on take-off.
      - Standard instrument departures and arrivals.
      - En route IFR procedures.
      - Holding procedures.
      - Instrument approaches to specified minima.
      - Missed approach procedures.
      - Landings from instrument approaches, including circling;
   f. In flight manoeuvres and particular flight characteristics; and
   g. Operation of either a single-engine or a multi-engine Airplane in the exercises of 5(e), including in the case of a multi-engine Airplane, operation of the Airplane solely by reference to instruments with one engine simulated inoperative and engine shut down and restart; (the latter exercise at a safe altitude unless carried out in a synthetic training device).

AMC JCAR FCL 1.160 & 1.165(a)(3)
CPL(A) Integrated Course
(See JCAR-FCL 1.160 & 1.165)
(See AMC JCAR-FCL 1.470 (b))
(See IEM JCAR-FCL 1.170)

THE FLYING INSTRUCTION IS DIVIDED INTO FOUR PHASES:

Phase 1.

1. Exercises up to the first solo flight comprise a total of at least 10 hours dual flight instruction on a single-engine Airplane including:
   a. Pre-flight operations, mass and balance determination, Airplane inspection and servicing;
   b. Aerodrome and traffic pattern operations, collision avoidance and precautions;
   c. Control of the Airplane by external visual references;
   d. Normal take-offs and landings;
   e. Flight at relatively slow airspeeds, recognition of and recovery from incipient and full stalls, spin avoidance; and
   f. Unusual attitudes and simulated engine failure.

Phase 2.

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:
   a. Maximum performance (short field and obstacle clearance) take-offs, short-field landings;
   b. Flight by reference solely to instruments, including the completion of a 180° turn;
   c. Dual cross-country flying using external visual references, dead-reckoning and radio navigation aids, diversion procedures;
   d. Aerodrome and traffic pattern operations at different aerodromes;
   e. Crosswind take-offs and landings;
   f. Abnormal and emergency procedures and manoeuvres, including simulated Airplane equipment malfunctions;
   g. Operations to, from and transiting controlled aerodromes, compliance with air traffic services procedures, radio telephony procedures and phraseology; and
   h. Knowledge of meteorological briefing arrangements, evaluation of weather conditions for flight and use of Aeronautical Information Services (AIS).

Phase 3.

3. Exercises up to the VFR navigation progress test comprise a total of at least 30 hours instruction and at least 58 hours as pilot-in-command, including:
   a. At least 10 hours instrument time, which may contain 5 hours of instrument ground time in a FNPT or a flight simulator and shall be conducted by a flight instructor and/or an authorised synthetic flight instructor.
   b. Repetition of exercises of Phases 1 and 2, which shall include at least five hours in an Airplane certificated for the carriage of at least four persons and have a variable pitch propeller and retractable landing gear;
   c. VFR flight at relatively critical high airspeeds, recognition of and recovery from spiral dives; and
   d. Night flight time including take-offs and landings as pilot-in-command.

Phase 4.

4. The dual instruction and testing up to the CPL(A) skill test contain the following:
   a. Up to 30 hours instruction which may be allocated to specialised aerial work training;
   b. Repetition of exercises in Phase 3, as required;
   c. In flight manoeuvres and particular flight characteristics; and
   d. Multi-engine training.If required, operation of a multi-engine Airplane including operation of the Airplane with one engine simulated inoperative, and engine shut down and restart (the latter exercise at a safe altitude unless carried out in a synthetic training device).

AMC JCAR-FCL 1.160 & 1.165(a)(4)
CPL(A) Modular Course

(See JCAR-FCL 1.160 & 1.165)
(See Appendix 1 to JCAR-FCL 1.470)
(See IEM JCAR-FCL 1.170)

Flight training:

Visual Flight Training

No.	Flight Training	Suggested Flight Time
1	Pre-flight operations; mass and balance determination, Airplane inspection and servicing	
2	Take-off, traffic pattern, approach and landing. Use of checklist; collision avoidance; checking procedures.	0:45
3	Traffic patterns: simulated engine failure during and after take-off.	0:45
4	Maximum performance (short field and obstacle clearance) take-offs; short-field landings.	1:00
5	Crosswind take-offs and landings; go-arounds.	1:00
6	Flight at relatively critical high airspeeds; recognition of and recovery from spiral dives.	0:45
7	Flight at critically slow airspeeds, spin avoidance, recognition of, and recovery from, incipient and full stalls.	0:45
8	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; radio telephony procedures and phraseology; positioning by radio navigation aids; operation to, from and transiting controlled aerodromes, compliance with air traffic services procedures for VFR flights, simulated radio communication failure, weather deterioration, diversion procedures; simulated engine failure during cruise flight; selection of an emergency landing strip.	10:00

Instrument flight training.

This module is identical to the 10 hour Basic Instrument Flight Module as set out in AMC JCAR-FCL 1.205. This module is focused on the basics of flying by sole reference to instruments, including limited panel and unusual attitudes.

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

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

The use of the BITD is subject to the following:

- The training shall be complemented by exercises on an Airplane;
- The record of the parameters of the flight must be available; and
- A FI(A) or IRI(A) shall conduct the instruction.

No.	Instrument Flight Training	Time
9	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	0:30
10	Repetition of exercise 9; additionally climbing and descending, maintaining heading and speed, transition to horizontal flight; climbing and descending turns	0:45
11	Instrument pattern; a. Start exercise, decelerate to approach speed, flaps into approach configuration; b. Initiate standard turn (left or right); c. Roll out on opposite heading, maintain new heading for 1 minute; d. Standard turn, gear down, descend 500 ft/min; e. Roll out on initial heading, maintain descent (500 ft/min) and new heading for 1 minute; f. Transition to horizontal flight, 1.000 ft below initial flight level; g. Initiate go-around; andClimb at best rate of climb speed	0:45
12	Repetition of exercise 9 and steep turns with 45° bank; recovery from unusual attitudes	0:45
13	Repetition of exercise 12	0:45
14	Radio navigation using VOR, NDB or, if available, VDF; interception of predetermined QDM, QDR	0:45
15	Repetition of exercise 9 and recovery from unusual attitudes	0:45
16	Repetition of exercise 9, turns and level change and recovery from unusual attitudes with simulated failure of the artificial horizon and/or directional gyro	
17	Recognition of, and recovery from, incipient and full stalls	0:45
18	Repetition of exercises 14, 16 and 17	3:30

Multi-engine training

If required, operation of a multi-engine Airplane in the exercises 1 through 18, including operation of the Airplane with one engine simulated inoperative, and engine shut down and restart. Before commencing training, the applicant shall have complied with JCAR-FCL 1.235 and 1.240 as appropriate to the Airplane used for the test.

IEM JCAR-FCL 1.170
CPL(A) Skill Test Form
(See JCAR-FCL 1.170)

APPLICATION AND REPORT FORM FOR THE CPL(A) SKILL TEST			
Applicant's last name:		First name:	
Licence held:		Number:	

1	Details of the flight		
Class/Type of aeroplane:		Departure aerodrome:	
Registration:		Destination aerodrome:	
Block time off:		Block time on:	
Total block time:		Take-off time:	
Landing time:			

2	Result of the test *delete as necessary		
Passed*		Failed *	Partial pass *

3	Remarks

Location and date:		Type and number of FE's licence:	
Signature of FE:		Name of FE, in capitals:	

AMC/IEM Subpart E - Instrument Rating

AMC JCAR-FCL 1.205
IR(A) - Modular Flying Training Course

(See JCAR-FCL 1.205)
(See Appendix 1 to JCAR-FCL 1.205)

Basic Instrument Flight Module Training Course.

This 10-hour module is focused on the basics of flying by sole reference to instruments, including limited panel and unusual attitudes.

All exercises may be performed in a FNPT I or II or a flight simulator, 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.

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

The use of the BITD is subject to the following:

- The training shall be complemented by exercises on an Airplane;
- The record of the parameters of the flight must be available; and
- A FI(A)or IRI(A) shall conduct the instruction.

No.	Instrument Flight Training	Time
1	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	0:30
2	Repetition of exercise 1; additionally climbing and descending, maintaining heading and speed, transition to horizontal flight; climbing and descending turns	0:45
3	Instrument pattern: (0:45) a. Start exercise, decelerate to approach speed, flaps into approach configuration; b. Initiate standard turn (left or right); c. Roll out on opposite heading, maintain new heading for 1 minute; d. Standard turn, gear down, descend 500 ft/min; e. Roll out on initial heading, maintain descent (500 ft/min) and new heading for 1 minute; f. Transition to horizontal flight, 1.000 ft below initial flight level; g. Initiate go-around; andClimb at best rate of climb speed	0:45
4	Repetition of exercise 1 and steep turns with 45° bank; recovery from unusual attitudes	0:45
5	Repetition of exercise	0:45
6	Radio navigation using VOR, NDB or, if available, VDF; interception of predetermined QDM, QDR	0:45
7	Repetition of exercise 1 and recovery from unusual attitudes	0:45
8	Repetition of exercise 1, turns, level change and recovery from unusual attitudes with simulated failure of the artificial horizon and/or directional gyro	0:45
9	Recognition of, and recovery from, incipient and full stalls	0:45
10	Repetition of exercises 6, 8 and 9	3:30

Appendix 1 to AMC JCAR-FCL 1.205
Certificate of Completion of Basic Instrument Flight Module
(See JCAR-FCL 1.205)

CERTIFICATE OF COMPLETION OF BASIC INSTRUMENT FLIGHT MODULE

Pilot's last name:			First names:	
Type of licence:			Number:	State:
Flight training hours performed on single-engine aeroplane:		OR	Flight training hours performed on multi-engine aeroplane:	
Flight training hours performed in a 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:	FTO
Location and date:		Signature of Head of Training:	
Type and number of licence and State of issue:		Name in capital letters of authorised instructor:	

IEM JCAR-FCL 1.210
IR(A) Skill Test and Proficiency Check Form
(See JCAR-FCL 1.185& 1.210)

APPLICATION AND REPORT FORM FOR THE IR(A) SKILL TEST			
Applicant's last name:		First name:	
Licence held:		Number:	

1	Details of the flight		
Class/Type of aeroplane:		Departure aerodrome:	
Registration:		Destination aerodrome:	
Block time off:		Block time on:	
Total block time:		Take-off time:	

2	Result of the test *delete as necessary		
Passed*		Failed *	Partial pass *

3	Remarks

Location and date:		Type and number of FE's licence:	
Signature of FE:		Name of FE, in capitals:	

AMC/IEM Subpart F - CLASS AND TYPE RATING

IEM JCAR-FCL 1.240(b)(1)

ATPL/Type Rating/Training/Skill Test and Proficiency Check Form on Multi-Engine Multi-Pilot Airplanes

(See JCAR-FCL 1.240)

APPLICATION AND REPORT FORM

Applicant last name:		First names:	
Type of licence:		Number:	
State:	Type rating as pilot-in-command/co-pilot*	Signature of applicant:	

Multi-engine Airplane:		Proficiency check:	
Training record:		Type rating:	
Skill test:		ATPL(A):	

Satisfactory completion of Type rating - training according to requirements is certified below:

1	Theoretical training for the issue of a type rating performed during period	
from:	To:	at:
mark obtained:	% (Pass mark 75%):	Type and number of licence:
Signature of instructor:		Name in capital letters:

2	Simulator (Airplane type):	Three or more axes:	YES	N0	Ready for service and used
Simulator manufacturer:		motion / system:			
Simulator operator:		Visual aid:	YES	N0*	
Total training time at the controls:					
Instrument approaches at aerodromes:					
to a decision altitude/height of:		Signature of type rating instructor / examiner*			
Type and No of licence:		Name in capital letters:			

3 Flight training:		
Type of Airplane:	Registration:	Flight time at the controls:
Take-offs:	Landings:	Training aerodromes/sites (take-offs, approaches and
Location and date:		Signature of type rating instructor/examiner*:
Type and No of licence:		Name in capital letters:

4	Skill test/Proficiency Check Remark: if the applicant failed the examiner shall indicate the reasons why	Passed	Failed	SIM/Aircraft Reg:	
Location and date				Type and number of licence	
Signature of authorised examiner*				Name in capital letters	

* delete as necessary

IEM JCAR-FCL 1.240(b)(2)
Class/Type Rating/Training/Skill Test and Proficiency Check Form on Single-Engine and Multi-Engine Single-Pilot Airplanes
(See JCAR-FCL 1.240)

APPLICATION AND REPORT FORM

Applicant's last name:		First name:	
Type of licence:		Number:	State:
Type of aeroplane:	Registration:	Signature of applicant:	

I hereby certify proper completion of the theoretical and practical instruction in accordance with the requirements:

1	**Single-engine / multi-engine / single-pilot Aeroplanes**		
Type rating:	+	Skill test:	+
Class rating:	+	Proficiency check:	+
Training record:	+		

2	**Flight training**:		
Flight time:		Take-offs:	Landings:
Training aerodromes (take-offs, approaches and landings):			
Location and date:			Signature of TRI/CRI*:
Type and No of licence:			Name in capital letters:

3	**Skill test**			
Aerodrome:		Take-off time:	Landing time:	
Skill test/Proficiency Check Remark: if the applicant failed the examiner shall indicate the reasons why		***Passed***	***Failed***	SIM/Aircraft Reg:
Location and date:			Type and number of licence:	
Signature of authorised examiner*:			Name in capital letters:	

** delete as necessary*

AMC JCAR-FCL 1.251
Additional Theoretical Knowledge For a Class or Type Rating For High Performance Single-Pilot Airplanes

(See Appendix 1 to JCAR-FCL 1.251)

1. A number of Airplanes certificated for single pilot operation have similar performances, systems and navigation capabilities to those more usually associated with multi-pilot types of Airplanes, and regularly operate within the same airspace. The level of knowledge required to operate safely in this environment is not part of, or not included to the necessary depth of knowledge in the training syllabi for the PPl, CPL or IR(A) but these licence holders may fly as pilot-in-command of such Airplanes. The additional theoretical knowledge required to operate such Airplanes safely is obtained by completion of an FTO or TRTO course covering the syllabus shown in Appendix 1 to JCAR-FCL 1.251. An applicant for the class or type rating who is the holder of an ICAO ATPL(A) or has demonstrated theoretical knowledge by passing all the required examinations at ATPL(A) level for JCAR-FCL is credited with the requirement of Appendix 1 to JCAR-FCL 1.251.

2. The course will utilise the learning objectives for theoretical knowledge instruction contained in the JCAR Administration and Guidance Material Part 5.

3. Demonstration of acquisition of this knowledge will be undertaken by passing an examination(s) set by the training provider and acceptable to CARC. Successfully passing this examination will result in the issue of a certificate indicating that the course and examination have been completed.

4. The certificate will represent a once only' qualification and will satisfy the requirement for the addition of all future high performance Airplanes to the holder's licence. The certificate will be valid indefinitely and must be submitted with the application of the first HPA type or class rating.

AMC JCAR-FCL 1.261(a)
Syllabus of Theoretical Knowledge Instruction For Class/Type Ratings For Single-Engine and Multi-Engine Airplanes
(See JCAR-FCL 1.261(a))
(See Appendix 1 to JCAR-FCL 1.261(a))

DETAILED LISTING

1. Airplane structure and equipment, normal operation of systems and malfunctions.

1.1 Dimensions.
minimum required runway width for 180^0 turn.

1.2 Engine including auxiliary power unit.

1.2.1 Type of engine/engines.

1.2.2 In general, function of the following systems or components:
- Engine.
- Auxiliary power unit.
- Oil system.
- Fuel system.
- Ignition system.
- Starting system.
- Fire warning and extinguishing system.
- Generators and generator drives.
- Power indication.
- Reverse thrust.
- Water injection.

On piston or turbine-propellor engines additonally:
- Propeller system.
- Feathering system.

1.2.3 Engine controls (including starter), engine instruments and indications in the cockpit, their function, interrelation and interpretation.

1.2.4 Engine operation, including APU, during engine start, start and engine malfunctions, procedures for normal operation in the correct sequence.

1.3 Fuel system.

1.3.1 Location of the fuel tanks, fuel pumps, fuel lines to the engines, tank capacities, valves and measuring.

1.3.2 Location of the following systems:
- Filtering.
- Heating.
- Fuelling and defuelling.
- Dumping.
- Venting.

1.3.3 In the cockpit .
- The monitors and indicators of the fuel system
- Quantity and flow indication, interpretation.

1.3.4 Procedures.
- Fuel procedures distribution into the various tanks
- Fuel supply,temperature control and fuel dumping.

1.4 Pressurisation and air conditioning**.**

1.4.1 Components of the system and protection devices.

1.4.2 Cockpit monitors and indicators.
- Interpretation with regard to the operational condition.

1.4.3 Normal operation of the system during start, cruise, approach and landing, air conditioning airflow and temperature control.

1.5 Ice and rain protection, windshield wipers and rain repellent.

1.5.1 Ice protected components of the Airplane including engines, heat sources, controls and indications.

1.5.2 Operation of the anti-icing/de-icing system during take-off, climb, cruise and descent, conditions requiring the use of the protection systems.

1.5.3 Controls and indications of the windshield wipers and rain repellent systems operation.

1.6 **Hydraulic system.**

1.6.1 Components of the hydraulic system(s), quantities and system pressure, hydraulically actuated components associated to the respective hydraulic system.

1.6.2 Controls, monitors and indicators in the cockpit, function and interrelation and interpretation of indications.

1.7 Landing gear.

1.7.1 Main components of the.

- Main landing gear.
- Nose gear.
- Gear steering.
- Wheel brake system, including anti-skid.

1.7.2 Gear retraction and extension (including changes in trim and drag caused by gear operation).

1.7.3 Required tyre pressure, or location of the relevant placard.

1.7.4 Controls and indicators including warning indicators in the cockpit in relation to the retraction/extension condition of the landing gear and brakes.

1.7.5 Components of the emergency extension system.

1.8 Flight controls and high lift devices.

1.8.1

- Aileron system.
- elevator system.
- Rudder system.
- Rim system.
- Spoiler system.
- Lift devices.
- Stall warning system.
- Take-off configuration warning system.

1.8.2 Flight control system from the cockpit controls to the flight control/surfaces.

1.8.3 Controls, monitors and indicators including warning indicators of the systems mentioned under 1.8.1, interrelation and dependencies.

1.9 Electrical power supply.

1.9.1 Number, power, voltage, frequency and location of the main power system (AC or DC), auxiliary power system location and external power system.

1.9.2 Location of the controls, monitors and indicators in the cockpit.

1.9.3 Flight instruments, communication and navigation systems, main and back-up power sources.

1.9.4 Location of vital circuit breakers.

1.9.5 Generator operation and monitoring procedures of the electrical power supply.

1.10 Flight instruments, communication, radar and navigation equipment, autoflight and flight recorde.

1.10.1 Visible antennae.

1.10.2 Controls and instruments of the following equipment in the cockpit during normal operation:

- Flight instruments.
- Flight management systems.
- Radar equipment, including radio altimeter.
- Communication and navigation systems.
- Autopilot.
- Flight recorder, voice recorder.
- Ground proximity warning system.
- Collision avoidance system.
- Warning systems.

1.11 Cockpit, cabin and cargo compartment.

1.11.1 Operation of the exterior, cockpit, cabin and cargo compartment lighting and the emergency lighting.

1.11.2 Operation of the cabin and cargo doors, stairs, windows and emergency exits.

1.11.3 Main components of the oxygen system and their location, oxygen masks and operation of the oxygen systems for the crew and passengers, required amount of oxygen by means of a table or diagram.

1.12 Emergency equipment operation and correct application of the following emergency equipment in the Airplane:

- Portable fire extinguisher.
- First aid kits.
- Portable oxygen equipment.
- Emergency ropes.
- Life vest.
- Life rafts.
- Emergency transmitters.
- Crash axes.
- Megaphones.
- Emergency signals.

1.13 Pneumatic system.

1.13.1 Components of the pneumatic system, pressure source, actuated components.

1.13.2 Controls, monitors and indicators in the cockpit, function of the system.

1.13.3 Vacuum system.

2. LIMITATIONS

2.1 General Limitations.

2.1.1. Certification of the Airplane, category of operation, noise certification and maximum and minimum performance data for all flight profiles, conditions and a/c systems:

- Maximum tail and crosswind-components at take-off and landing.
- Maximum speeds for flap extension V_{fo}.
- At various flap settings V_{fe}.
- For landing gear operation V_{lo}, M_{lo}.
- For extended landing gear V_{le}, M_{le}.
- For maximum rudder deflection V_a, M_a.

- For tyres.
- One propeller feathered.

2.1.2 - Minimum control speed air V_{mca}.
- Minimum control speed ground V_{mcg}.
- Stall speed under various conditions V_{so},V_{s1}.
- Maximum speed Vne, Mne.
- Maximum speed for normal operation V_{mo}, M_{mo}.
- Altitude and temperature limitations.
- Stick shaker activation.

2.1.3 - Maximum airport pressure altitude, runway slope.
- Maximum taxi mass.
- Maximum take-off mass.
- Maximum lift off mass.
- Maximum landing mass.
- Zero fuel mass.
- Maximum dumping speed V_{dco}, M_{dco}, V_{dce}, M_{dce}.
- Maximum load factor during operation.
- Certificated range of centre of gravity.

2.2 Engine Limitations.

1.2.1 Operating data of the engines.
- Time limits and maximum temperatures.
- Minimum RPMs and temperatures.
- Torque.
- Maximum power for take-off and go-around with respect to pressure altitude/flight altitude and temperature.
- Piston engines: certified range of mixture.
- Minimum and maximum oil temperature and pressure.
- Maximum starter time and required cooling.
- Time between two start attempts for engines and auxiliary power unit.
- For propeller: maximum RPM of propeller triggering of automatic feathering device.

2.2.2 Certified oil grades.

2.3 Systems limitations.

2.3.1 Operating data of the following systems:

- Pressurisation, air conditioning maximum pressures.
- Electrical power supply, maximum load of main power system (AC or DC).
- Maximum time of power supply by battery in case of emergency.
- Mach trim system and yaw damper speed limits.
- Auto pilot limitations of various modes.
- Ice protection.
- Speed and temperature limits of window heat.
- Temperature limits of engine and wing anti-ice.

2.3.2 Fuel system.

Certified fuel specifications, minimum and maximum pressures and temperature of the fuel.

2.4 Minimum equipment list.

3. PERFORMANCE, FLIGHT PLANNING.

3.1 Performance.

Performance calculation concerning speeds, gradients, masses in all conditions for take off, en route, approach and landing according to the documentation available, e.g. for take-off V_1, V_{mbe}, V_r, V_{lof}, V_2, take-off distance, maximum take-off mass and the required stop distance with respect to the following factors:

- Accelerate/stop distance.
- Take-off run and distance available (TORA, TODA).
- Ground temperature, pressure altitude, slope, wind.
- Maximum load and maximum mass (e.g. ZFM).
- Minimum climb gradient after engine failure.
- Influence of snow, slush, moisture and standing water on the runway.
- Possible single and/or dual engine failure during cruise flight.
- Use of anti-icing systems.
- Failure of water injection system and/or antiskid system.

- Speeds at reduced thrust, V_1, V_{1red}, V_{mbe}, V_{mu}, V_r, V_{lof}, V_2.
- Safe approach speed V_{ref}, with respect to Vmca and turbulent conditions.
- Effects of excessive approach speed and abnormal glideslope. with respect to the landing distance.
- Minimum climb gradient during approach and landing.
- Limiting values for a go around with minimum fuel.
- Maximum allowable landing mass and the landing distance for the destination and alternate aerodrome with respect to the following factors:
  - Available landing distance.
  - Ground temperature, pressure altitude, runway slope and wind.
  - Fuel consumption to destination or alternate aerodrome.
  - Influence of moisture on the runway, snow, slush and standing water.
  - Failure of the water injection system and/or the anti skid system.
  - Influence of thrust reverser and spoilers.

3.2 Flight planning.

Flight planning for normal and abnormal conditions:

- Optimum/maximum flight level.
- Minimum required flight altitude.
- Drift down procedure after an engine failure during cruise flight.
- Power setting of the engines during climb, cruise and holding under various circumstances, as well as the most economic cruising flight level.
- Calculation of a short range/long range flight plan.
- Optimum and maximum flight level and power setting of the engines after engine failure.

4. LOAD AND BALANCE AND SERVICING.

4.1 Load and Balance:

- Load and trim sheet with respect to the maximum masses for take-off and landing.
- Centre of gravity limits.

4.1.1 Influence of fuel consumption on the centre of gravity.

4.1.2 Lashing points, load clamping, maximum ground load.

4.2 Servicing.

Servicing connections for:

- Fuel.
- Oil.
- Water.
- Hydraulic.
- Oxygen.
- Nitrogen.
- Conditioned air.
- Electric power.
- Start air.
- Toilet and safety regulations.

5. EMERGENCY PROCEDURES.

5.1 Recognition of the situation as well as immediate memory actions in correct sequence and for those conditions recognised as emergencies by the manufacturer and CARC:

- Engine failure during take off before and after V_1, as well as inflight.
- Malfunctions of the propeller system.
- Engine overheat, engine fire on ground and inflight.
- Wheel well fire.
- Electrical smoke and/or fire.
- Rapid decompression and emergency descent.
- Air-conditioning overheat, anti ice system overheat.
- Fuel pump failure.
- Fuel freezing/overheat.
- Electric power failure.
- Equipment cooling failure.
- Flight instrument failure.
- Partial or total hydraulic failure.
- Failures at the lift devices and flight controls including boosters.
- Cargo compartment smoke and/or fire.

5.2 Actions according to the approved abnormal and emergency checklist:

- Engine restart inflight.
- Landing gear emergency extension.
- Application of the emergency brake system.
- Emergency extension of lift devices.

- Fuel dumping.
- Emergency descent.

6. SPECIAL REQUIREMENTS FOR EXTENSION OF A TYPE RATING FOR INSTRUMENT APPROACHES DOWN TO DECISION HEIGHTS OF LESS THAN 200 FT (60 M).

6.1 Airborne and ground equipment:
- Technical requirements.
- Operational requirements.
- Operational reliability.
- Fail operational.
- Fail-passive.
- Equipment reliability.
- Operating procedures.
- Preparatory measures.
- Operational downgrading.
- Communications.

6.2 Procedures and Limitations:
- Operational procedures.
- Crew co-ordination.

7. SPECIAL REQUIREMENTS FOR GLASS COCKPIT' AIRPLANES WITH ELECTRONIC FLIGHT INSTRUMENT SYSTEMS (EFIS).

7.1 Additional learning objectives.

7.1.1 General rules of Airplanes computer hardware and software design.

7.1.2 Logic of all crew information and alerting systems and their limitations.

7.1.3 Interaction of the different Airplane computer systems, their limitations, the possibilities of computer fault recognition and the actions to be performed on computer failures.

7.1.4 Normal procedures including all crew co-ordination duties.

7.1.5 Airplane operation with different computer degradations (basic flying).

8. FLIGHT MANAGEMENT SESTEMS.

AMC JCAR-FCL 1.261(c)(2)
Guidelines For Approval of an Airplane Type Rating Course
(See JCAR-FCL 1.261(c)(2))
(See Appendix 1 and 2 to JCAR-FCL 1.055)
(See Appendix 2 to JCAR-FCL 1.240)

TRAINING PROGRAM

1. Type ratings.

1.1 To obtain approval a type rating course should, as far as possible, provide for a continuous process of ground, STD and flight training to enable the student to assimilate the knowledge and skills required to operate a specific aircraft type safely and efficiently. The student's ability to do this will be determined by the demonstration of a satisfactory level of theoretical knowledge of the aircraft determined by progressive checking of knowledge and examination, progressive assessment by the FTO or TRTO during flying training and the successful completion of a practical skill test with an authorised examiner. There should be no difference in the level of knowledge or competency required of the student, irrespective of the intended role of the student as pilot-in-command, co-pilot or flight engineer member of the flight crew.

1 .2 A type rating course should normally be conducted as a single, full-time course of study and training. However, in the situation where the course is intended to enable a pilot to fly a further aircraft type while continuing to fly a current type, such as to enable mixed fleet flying with the same operator acceptable under JCAR-OPS 1, some elements of the theoretical knowledge course conducted by self-study may be undertaken while the student continues to fly the current type. Any such arrangement should be acceptable to CARC but combining flight training for a new type with continuing operation of another type will not normally be acceptable.

2. Variants.

2.1 Familiarisation training: Where an Airplane type rating also includes variants of the same aircraft type requiring Familiarisation training, the additional Familiarisation training may be included in the theoretical knowledge training of the initial type rating course. Flight training should be conducted on a single variant within the type.

2.2 Differences training: Where an Airplane type rating also includes variants of the same aircraft type for which difference training is required, the initial training course should be directed towards a single variant. Additional training to operate other variants within the same type rating should be completed after successful completion of the initial type rating course, although elements of this differences training may be undertaken at appropriate stages of the initial course, with the agreement of CARC. Differences training to operate variants within the same type rating will be subject to approval, either as a separate course or as part of the basic type rating training course.

3. Program of Theoretical Knowledge and Flight Training.

3.1 The training programme should specify the time allocated to theoretical knowledge training, STD training and if not approved for Zero Flight Time Training in accordance with Appendix 1 to JCAR-FCL 1.261(c)(2), the Airplane. The training program will be assessed and, for approval to be given, deemed to be adequate by CARC. The initial type rating course should be programed on the basis that the student has the minimum licensing and experience requirements for entry to the course, as required by JCAR-FCL 1.250 and 1.255. For a first type rating on a multi-pilot Airplane, the course should also provide for consolidation and type-specific training in those elements of basic MCC training relevant to the type or variant.

3.2 If a TRTO wishes to provide a training course that includes credit for previous experience on similar types of aircraft, such as those with common systems or operating procedures with the new type, the entry requirements to such courses should be specified by the TRTO and must define the minimum level of experience and qualification required of the flight crew member. CARC will need to agree the proposed entry level and reduced training requirements of these courses.

3.3 A TRTO is permitted to sub-contract elements of training to a third party training provider. In such cases the sub-contracted organisation should normally be approved to conduct such training by CARC. When the sub-contracted organisation is not approved by CARC the approving Authority of the TRTO should include the sub contracted organisation in the approval process and be satisfied that the standard of training intended to be given meets the equivalent requirements of CARC approved organisation.

The other obligations of the TRTO, such as student progress monitoring and an adequate form of quality system management, can be exercised by the TRTO seeking approval, and which retains responsibility for the whole course.

GROUND TRAINING

4. Syllabus.

4.1 The ground training syllabus should provide for the student to gain a thorough understanding of the operation, the function and, if appropriate, the abnormal and emergency operation of all aircraft systems. This training should also include those systems essential to the operation of the aircraft, such as fly by wire' flight control systems, even if the flight crew have little or no control of their normal or abnormal operation.

5. Theoretical Knowledge Instruction.

5.1 The theoretical knowledge instruction training should meet the general objectives of (but is not limited to):

a. Giving the student a thorough knowledge of the aircraft structure, power plant and systems, and their associated limitations, including mass and balance, aircraft performance and flight planning considerations;
b. Giving the student a knowledge of the positioning and operation of the flight deck controls and indicators for the aircraft and its systems;
c. Giving the student an understanding of system malfunctions, their effect on aircraft operations and interaction with other systems;
d. Giving the student the understanding of normal, abnormal and emergency procedures.

6. Facilities and Training Aids.

6.1 The TRTO should provide adequate facilities for classroom instruction and have available appropriately qualified and experienced instructors. Training aids should enable students to gain practical experience of the operation of systems covered by the theoretical knowledge syllabus and, in the case of multi-pilot Airplanes, enable such practical application of the knowledge to be carried out in a multi-crew environment. Facilities should be made available for student self study outside the formal training program.

7. Computer Based Training (CBT).

7.1 CBT provides a valuable source of theoretical instruction, enabling the student to progress at his own pace within specified time limits. Many such systems ensure that syllabus subjects are fully covered and progress can be denied until a satisfactory assimilation of knowledge has been demonstrated. Such systems may allow self study or distance learning, if they incorporate adequate knowledge testing procedures. When CBT is used as part of the theoretical knowledge instruction phase, the student should also have access to a suitably qualified instructor able to assist with areas of difficulty for the student.

8. Self Study and Distance Learning.

8.1 Reserved.

9. Progress Tests and Final Theoretical Knowledge Examination.

9.1 The theoretical knowledge training program should provide for progressive testing of the assimilation of the required knowledge. This testing process should also provide for retesting of syllabus items so that a thorough understanding of the required knowledge is assured. This should be achieved by intervention by a qualified instructor or, if using CBT with a self testing facility, and by further testing during the supervised consolidation phase of the ground course.

9.2 The final theoretical knowledge examination should cover all areas of the theoretical knowledge syllabus. The final examination should be conducted as a supervised written knowledge test without reference to course material. The pass mark of 75% assumes the achievement of satisfactory levels of knowledge during the progressive phase tests of the course. The student should be advised of any areas of lack of knowledge displayed during the examination and, if necessary, given remedial instruction.

9.3 A successful pass of the theoretical knowledge course and final examination should be a pre- requisite for progression to the flight training phase of the type rating course.

FLIGHT TRAINING

10. Synthetic Training Devices (STD).

10.1 STDs provide the most effective flight training, enabling realistic practice of all abnormal and emergency procedures in a safe and easily-controlled environment for both the student and instructor. For multi-pilot Airplanes they also enable CRM and MCC concepts to be incorporated at all stages of training. Only in exceptional circumstances should CARC approve a type rating course for a multi-pilot Airplane which does not include STD training.

10.2 The amount of training required when using STDs will depend on the complexity of the Airplane concerned, and to some extent on the previous experience of the pilot. Except for those courses giving credit for previous experience (para 3.2) a minimum of 32 hours STD training should be programmed for a crew of a multi-pilot Airplane, of which at least 16 hours should be in a Flight Simulator operating as a crew. Flight simulator time may be reduced at the discretion of the approving Commission if other qualified STDs used during the flight training program accurately replicate the flight deck environment, operation and Airplane response. Such STDs may typically include FMC training devices using hardware and computer progammes identical to those of the Airplane, or type specific FNPT IIs.

11. Airplane Training with Flight Simulator.

11.1 With the exception of courses approved for Zero Flight Time Training, certain training exercises normally involving take-off and landing in various configurations will need to be completed in the Airplane rather than an approved Flight Simulator. For multi-pilot Airplanes where the student pilot has more than 500 hours MPA experience in Airplanes of similar size and performance, these should include at least 4 landings of which at least one should be a full stop landing. In all other cases the student should complete at least 6 landings. With the agreement of CARC, this Airplane training, provided it does not exceed 2 hours of the flight training course, may be completed after the student pilot has completed the STD training and has successfully undertaken the type rating skill test.

11.2 For courses approved for Zero Flight Time Training.

a. During the specific simulator session before Line Flying Under Supervision (LIFUS), consideration should be given to varying conditions, for example:
- Runway surface conditions;
- Runway length;
- Flap setting;
- Power setting;
- Crosswind and turbulence conditions;
- MTOW and MLW.

The landings should be conducted as full-stop landings. The session should be flown in normal operation.

Special attention should be given to the taxiing technique.

b. A training methodology should be agreed with CARC that ensures the trainee is fully competent with the exterior inspection of the Airplane before conducting such an inspection unsupervised.

c. The LIFUS should be performed as soon as possible after the specific simulator session.

d. The licence endorsement should be entered on the licence after the skill test, but before the first 4 take-offs and landings in the Airplane. At the discretion of CARC, provisional or temporary endorsement and any restriction should be entered on the licence.

e. Where a specific arrangement exists between the Training Organisation and the JCAR-OPS 1 operator, the Operator Proficiency Check (OPC) and the ZFTT specific details should be conducted using the operators standard operational procedures (SOPs).

12. Airplane without Flight Simulator.

12.1 Flight training conducted solely in an Airplane without the use of STDs cannot cover the CRM and MCC aspects of MPA flight training, and for safety reasons cannot cover all emergency and abnormal aircraft operation required for the training and skill test. In such cases, the FTO or TRTO will need to satisfy CARC that adequate training in these aspects can be achieved by other means.

For training conducted solely on a multi-pilot Airplane where two pilots are trained together without the use of a flight simulator, a minimum of 8 hours flight training as PF for each pilot should normally be required. For training on a single pilot Airplane, 10 hours flight training should normally be required. It is accepted that for some relatively simple single or multi-engine aircraft without systems such as pressurisation, FMS or electronic flight deck displays, this minimum may be reduced at the discretion of CARC. In the case of multi-engine Airplane the minimum training required by JCAR-FCL 1.261(b)(2) shall be included.

12.2 It is widely accepted that Airplane training normally involves inherent delay in achieving an acceptable flight situation and configuration for training to be carried out in accordance with the agreed syllabus. These could include ATC or other traffic delay on the ground prior to take off, the necessity to climb to height or transit to suitable training areas and the unavoidable need to physically reposition the aircraft for subsequent or repeat manoeuvres or instrument approaches. In such cases CARC will need to ensure that the training syllabus provides adequate flexibility to enable the minimum amount of required flight training to be carried out.

SKILL TEST

13. Upon completion of the flight training the pilot will be required to undergo a skill test with an authorised examiner to demonstrate adequate competency of aircraft operation for issue of the type rating. The skill test is separate from the flight training syllabus, and provision for it cannot be included in the minimum requirements or training hours of the agreed flight training programme. The skill test may be conducted in a flight simulator, the Airplane or, in exceptional circumstances, a combination of both.

COURSE COMPLETION CERTIFICATE

14. The Head of Training, or a nominated representative, is required to certify that all training has been carried out before an applicant undertakes a skill test for the type rating to be included in the pilot's licence. It is not uncommon for an approved TRTO to be unable to provide, or have direct supervision over any training that is required to be carried out on an Airplane conducted by a third party such as the operator. In such cases, and with the agreement of CARC, a TRTO Course Completion Certificate may be issued confirming completion of ground and STD flight training.

Confirmation of the completion of Airplane training should then be provided by the organisation undertaking this training, as a requirement for issue of the type rating. The period of time between any two phases of training should not exceed 60 days otherwise refresher training at the discretion of CARC will be required.

AMC JCAR-FCL 1.261(d)
Multi-Crew Co-Operation Course (Airplane)
(See JCAR-FCL 1.261(d))
(See Appendix 1 to JCAR-FCL 1.261(d))

MULTI-CREW CO-OPERATION TRAINING

1. The objectives of MCC training are optimum decision making, communication, division of tasks, use of checklists, mutual supervision, teamwork, and support throughout all phases of flight under normal, abnormal and emergency conditions. The training emphasises the development of non-technical skills applicable to working in a multi-crew environment.

2. The training should focus on teaching students the basics on the functioning of crew members as teams in a multi-crew environment, not simply as a collection of technically competent individuals. Furthermore, the course should provide students with opportunities to practice the skills that are necessary to be effective team leaders and members. This requires training exercises which include students as crew members in the PF and PNF roles.

3. Students should be made familiar with inter-personal interfaces and how to make best use of crew co-operation techniques and their personal and leadership styles in a way that fosters crew effectiveness. Students should be made aware that their behaviour during normal circumstances can have a powerful impact on crew functioning during high workload and stressful situations.

4. Research studies strongly suggest that behavioural changes in any environment cannot be accomplished in a short period even if the training is very well designed. Trainees need time, awareness, practice and feedback, and continual reinforcement to learn lessons that will endure. In order to be effective, multi-crew co-operation training should be accomplished in several phases spread over a period.

BASIC MULTI-CREW CO-OPERATION COURSE

5. The contents of the basic MCC course should cover theoretical knowledge training, practice and feedback in:

   a. Interfaces. Examples of software, hardware, environment and liveware mismatches in practice.

   b. Leadership/followership' and authority.
      - Managerial and supervisory skills.
      - Assertiveness.
      - Barriers.
      - Cultural influence.
      - PF and PNF roles.
      - Professionalism.
      - Team responsibility.

   c. Personality, attitude and motivation.
      - Listening.
      - Conflict resolution.
      - Mediating.
      - Critique (pre-flight analyses and planning, ongoing-review, postflight).
      - Team building.

   d. Effective and clear communication during flight.
      - Listening.
      - Feedback.
      - Standard phraseologies.
      - Assertiveness.
      - Participation.

   e. Crew co-ordination procedures.
      - Flight techniques and cockpit procedures.
      - Standard phraseologies.
      - Discipline.

6. The use of checklists is of special importance for an orderly and safe conduct of the flights. Different philosophies have been developed for the use of checklists. Whichever philosophy is used depends on the complexity of the aircraft concerned, the situation presented, the flight

crew composition and their operating experience and the operator's procedures as laid down in the Flight Operations Manual.

7. Mutual supervision, information and support.

   a. Any action in handling the aircraft should be performed by mutual supervision. The pilot responsible for the specific action or task (PF or PNF) should be advised when substantial deviations (flight path, aircraft configuration etc.) are observed.

   b. Call-out procedures are essential, especially during take-off and approach, to indicate progress of the flight, systems status etc.

   c. Operation of aircraft systems, setting of radios and navigation equipment etc. should not be performed without demand by the PF or without information to the PF and his confirmation.

8. The contents of paragraphs 3 and 4 can best be practised by performing the exercises in IEM JCAR-FCL1.261(d) in simulated commercial air transport operations.

9. Practice and feedback of MCC with regard to the L-L (liveware-liveware) interface should also make provision for students for self and peer critique in order to improve communication, decision making and leadership skills. This phase is best accomplished through the use of flight simulators and video equipment. Video feedback is particularly effective because it allows participants to view themselves from a third-person perspective; this promotes acceptance of oneOs weak areas which encourages attitude and behavioural changes.

EXERCISES

10. The exercises should be accomplished as far as possible in a simulated commercial air transport environment. The instruction should cover the following areas:
    a. Pre-flight preparation including documentation, and computation of take-off performance data;
    b. Pre-flight checks including radio and navigation equipment checks and setting;
    c. Before take-off checks including powerplant checks, and take-off briefing by PF;
    d. Normal take-offs with different flap settings, tasks of PF and PNF, call-outs;

e. Rejected take-offs; crosswind take-offs; take-offs at maximum take-off mass; engine failure after V_1.
f. Normal and abnormal operation of aircraft systems, use of checklists;

g. Selected emergency procedures to include engine failure and fire, smoke control and removal, windshear during take-off and landing, emergency descent, incapacitation of a flight crew member;
h. Early recognition of and reaction on approaching stall in differing aircraft configurations;
i. Instrument flight procedures including holding procedures; precision approaches using raw navigation data, flight director and automatic pilot, one engine simulated inoperative approaches, non-precision and circling approaches, approach briefing by PF, setting of navigation equipment, call-out procedures during approaches; computation of approach and landing data;
j. Go-arounds; normal and with one engine simulated inoperative, transition from instrument to visual flight on reaching decision height or minimum descent height/altitude.
k. Landings, normal, crosswind and with one engine simulated inoperative, transition from instrument to visual flight on reaching decision height or minimum descent height/altitude.

Where MCC training is combined with training for an initial type rating on a multi-pilot Airplane, the exercises (a), (b), (c), (f), (g) and (J) may be conducted in a FTD as part of an approved course.

REINFORCEMENT

11. No matter how effective the classroom curriculum, interpersonal drills, LOFT exercises, and feedback techniques are, a single exposure during the multi-crew co-operation course for the initial issue of a multi-pilot Airplane type rating will be insufficient. The attitudes and influences which contribute to ineffective crew co-ordination are ubiquitous and may develop over a pilotOs lifetime. Thus it will be necessary that the training of non-technical skills will be an integral part of all recurrent training for revalidation of a multi-pilot Airplane type rating as well as of the training for the issue of further multi-pilot type ratings.

Appendix 1 to AMC JCAR-FCL 1.261(d)
Multi-Crew Co-Operation Course (Airplane)-Certificate of Completion of MCC Training

(See JCAR-FCL 1.261(d))

CERTIFICATE OF COMPLETION OF MCC-TRAINING				
Applicant's last name:		First names:		
Type of licence:		Number:		State:
Multi-engine instrument rating:		OR	Multi-engine Instrument rating skill test:	
issued on:			passed on:	
	Signature of applicant:			

The satisfactory completion of MCC-Training according to requirements is certified below:

TRAINING			
Multi-crew co-operation training received during period:			
from:	to:	at:	FT0 /TRT0 / operator*
Location and date:		Signature of Head of TRT0/FT0 or authorised instructor*:	
Type and number of licence and State of issue:		Name in capital letters of authorised instructor:	

* *Delete as appropriate*

AMC/IEM SUBPART H - INSTRUCTOR RATINGS

AMC JCAR-FCL 1.310(d)
Structure of the MPL(A) Instructor Training Course

(See JCAR-FCL 1.310(d))
(See Appendix 1 to JCAR-FCL 1.310(d))

AMPLIFICATION OF THE REQUIREMENTS FOR THE MPL(A) INSTRUCTORS TRAINING COURSE

1. Training should be both theoretical and practical. Practical elements should include the development of specific instructor skills, particularly in the area of teaching and assessing threat and error management and CRM in the multi-crew environment.

2. The course is intended to adapt instructors qualified as FI(A); STI(A); MCCI(A); SFI(A); TRI(A) to conduct competency-based MPL (A) training. It should cover the items specified below:

THEORETICAL KNOWLEDGE

3. Integration of operators and organisations providing MPL (A) training:
   - Reasons for development of the MPL (A).
   - MPL (A) training course objective.
   - Adoption of harmonised training and procedures.
   - Feedback process.

4. The philosophy of a competency-based approach to training.
   - Principles of competency-based training.

5. Regulatory framework, instructor qualifications and competencies.
   - Source Documentation.
   - Instructor Qualifications.
   - Syllabus Structure.

6. Introduction to Instructional Systems Design methodologies (See ICAO PANS-TRG Doc).
   - Analysis.
   - Design and Production.
   - Evaluation and Revision.

7. Introduction to the MPL Training Scheme.
   - Training phases and content.
   - Training media.
   - Competency Units, elements and performance criteria.

8. Introduction to human performance limitations, including the principles of threat and error management and appropriate countermeasures developed in CRM.
   - Definitions.
   - Appropriate behaviours categories.
   - Assessment system.

9. Application of the principles of threat and error management and CRM principles to training.
   - Application and practical uses.
   - Assessment methods.
   - Individual corrective actions.
   - Debriefing techniques.

10. The purpose and conduct of assessments and evaluations.
    - Basis for continuous assessment against a defined competency standard.
    - Individual assessment.
    - Collection and analysis of data.
    - Training System evaluation.

PRACTICAL TRAINING

11. Practical training may be conducted by interactive group classroom modules, and/or by the use of training devices. The objective is to enable instructors to:
    - Identify behaviours based on observable actions in the following areas:
      - Communications.
      - Teamworking.
      - Situation Awareness.
      - Workload Management.
      - Problem Solving and Decision Making.
    - Analyse the root causes of undesirable behaviours.
    - Debrief students using appropriate techniques, in particular.
      - Use of facilitative techniques.
      - Encouragement of student self-analysis.

- Agree corrective actions with the student/s.
- Determine achievement of the required competency.

ASSESSMENT

12. The final assessment of instructor competence in delivering MPL (A) training should be made against the following:

Competence	Performance	Knowledge
Prepare resources	- Ensure adequate facilities - Prepares briefing material - Manage available tools	- Understand objectives - Available tools - Competency based training methods
Create a climate conducive to learning	- Establishes credentials, role models appropriate behaviour - Clarifies roles - States objectives - Ascertains and supports trainees needs	- Barriers to learning - Learning styles
Present knowledge	- Communicates clearly - Creates and sustains realism - Looks for training opportunities	- Teaching methods
Relate Human Factors knowledge to address to technical training issues	- Uses human factors technical training	- Human performance limitations, including the principle of threat and error management and CRM.
Manage Time to achieve training objectives	- Allocate time appropriate to achieving competency objective	- Syllabus time allocation
Facilitate learning	- Encourage trainee participation - Motivating, patient, confident, assertivemanner - Conducts one-to-one coaching - Encourages mutual support	- Facilitation - How to give constructivefeedback - How to encourage trainees toask questions and seek advice

Competence	Performance	Knowledge
Assesses trainee performance	- Assess and encourage trainee self assessment of performance against competency standards - Makes assessment decision and provide clear feedback - Observes CRM behaviour	- Observation techniques - Methods for recording observations
Monitor and review progress	- Compare individual outcomes to defined objectives - Identify individual differences in learning rates - Apply appropriate corrective action	- Learning styles - Strategies for training adaptation to meet individual needs
Evaluate training sessions	- Elicits feedback from trainees. - Tracks training session processes against competence criteria - Keeps appropriate records	- Competency unit and associated elements - Performance criteria
Report outcome	- Report accurately using only observed actions and events	- Phase training objectives - Individual versus systemic weaknesses

IEM JCAR-FCL 1.310(d)
Summary of Instructors Qualifications For Each Phase of The MPL(A) Integrated Training Course

The following table summarises the instructor qualifications for each phase of MPL(A) integrated training course:

Phase of training	Qualification
Line Flying Under Supervision in accordance with JCAR-OPS 1	Line Training Captain or TRI(A)
Phase 4 - Advanced Base Training	TRI(A)
Phase 4 - Advanced Skill Test	TRE(A)
Phase 4 - Advanced	SFI(A) or TRI(A)
Phase 3 -Intermediate	SFI(A) or TRI(A)
Phase 2 - Basic	- FI(A) + IR(A)/ME/MCC + 1500 hrs multi crew environment + IR(A) instructional privileges, or - FI(A) + MCCI(A), or - FI(A) + SFI(A, or - FI(A) + TRI(A)
Phase 1 - Core Flying Skills	- FI(A) + 500hrs, including 200hrs instruction - Instructor qualifications and privileges should be in accordance with the training items within the phase. STI for appropriate exercises conducted in a FNPT or BITD.

IEM JCAR-FCL 1.330
Flight Instructor Rating (FI(A)) Skill Test and Proficiency Check Form
(See JCAR-FCL 1.330 and 1.345)

APPLICATION AND REPORT FORM FOR THE FI(A) SKILL TEST

1	Applicants personal particulars:			
Applicant's last name:			First names:	
Date of Birth:			Tel (Home):	Tel (Work):
Address:			Country:	

2	LicenceDetails		
Licence type:		Number:	
Class ratings included in the licence:		Exp. Date:	
Type ratings included in the licence:	1 .		
	2 .		
	3 .		
	4 .		
	5		
Other ratings included in the licence:	1 .		
	2 .		
	3 .		
	4 .		
	5		

3	Pre-course flying experience (See JCAR FCL1.335)			
TOTAL FLYING HOURS	PIC hours	SINGLE-ENGINE (PISTON) preceding 6 months	INSTRUMENT FLIGHT INSTRUCTION	CROSS-COUNTRY hours

CPL THEORETICAL EXAMINATION PASSED .....(date) (ForPPL holders only) (Copy of pass shall be submitted with this form)

4	Pre-entry flight test (See JCAR-FCL1.335(f))

I recommend ----------for the Flight Instructor Course-	
Name of FTO:	Date of flight test:
Name of FI conducting the test (Block capitals):	
Licence number:	
Signature:	

5	Declaration by the applicant

I have received a course of training in accordance with the syllabus approved by the Commission for the: (Tick as applicable)

Flight Instructor Rating FI(A)		Instrument Rating Instructor Rating (IRI(A))		Class Rating Instructor Rating for multi-engine SPA - (CRI(A) ME SPA)	
Applicant's name: (Block Letters)		Signature:			

6	Declaration by the chief flight instructor

I certify that ----------has satisfactorily completed an approved course of training for the

Flight Instructor Rating FI(A)		Instrument Rating Instructor Rating (IRI(A))		Class Rating Instructor Rating for multi-engine SPA - (CRI(A) ME SPA)	

in accordance with the relevant syllabus approved by the Commission-

Flying hours during the course:
Airplane/s, simulator/s or flight and navigation procedure trainers used :
Name of CFI:
Signature:
Name of FTO:

7	Flight instructor examiner's certificate			
I have tested the applicant according to the examination report				
A—FLIGHT INSTRUCTOR EXAMINER'S ASSESSMENT in case of partial pass:				
Theoretical oral examination:			Skill test:	
Passed	Failed		Passed	Failed
	I recommend further flight/ground training with a FI instructor before re-test			
	I do not consider further flight/theoretical instruction necessary before re-test Tick as applicable			
B - FLIGHT INSTRUCTOR EXAMINER'S ASSESSMENT:				
	Flight Instructor rating			
	Instrument Instructor rating			
	Class Rating Instructor Rating for multi-engine SPA Tick as applicable			
FIE's name (block letters):				
Signature:				
Licence number:			Date:	

AMC JCAR-FCL 1.340
Flight Instructor Rating (Airplane) (FI(A)) Course
(See JCAR-FCL 1.340)
(See Appendix 1 to JCAR-FCL 1.340)

COURSE OBJECTIVE

The aim of this course is to give adequate training to the applicant in theoretical knowledge instruction and flight instruction in order to instruct for a PPL(A), a CPL(A), a single-engine class or type rating and, if applicable, a night qualification.

PART I

TEACHING AND LEARNING

Item No.

1. THE LEARNING PROCESS.
   - Motivation.
   - Perception and understanding.
   - Memory and its application.
   - Habits and transfer.
   - Obstacles to learning.
   - Incentives to learning
   - Learning methods.
   - Rates of learning.

2. THE TEACHING PROCESS.
   - Elements of effective teaching.
   - Planning of instructional activity.
   - Teaching methods.
   - Teaching from the known' to the unknown.
   - Use of lesson plans.

3. TRAINING PHILOSOPHIES.
   - Value of a structured (approved) course of training.
   - Importance of a planned syllabus.
   - Integration of theoretical knowledge and flight instruction.

4. TECHNIQUES OF APPLIED INSTRUCTION.

a. Theoretical knowledge - Classroom instruction techniques
- Use of training aids.
- Group lectures.
- Individual briefings.
- Student participation/discussion.

b. FLIGHT - Airborne instruction techniques
- The flight/cockpit environment.
- Techniques of applied instruction.
- Post-flight and inflight judgement and decision making.

5. STUDENT EVALUATION AND TESTING.

a. Assessment of student performance
- The function of progress tests.
- Recall of knowledge.
- Translation of knowledge into understanding.
- Development of understanding into actions.
- The need to evaluate rate of progress.

b. Analysis of student errors
- Establish the reason for errors.
- Tackle major faults first, minor faults second.
- Avoidance of over criticism.
- The need for clear concise communication.

6. TRAINING PROGRAMME DEVELOPMENT.
- Lesson planning.
- Preparation.
- Explanation and demonstration.
- Student participation and practice.
- Evaluation.

7. HUMAN PERFORMANCE AND LIMITATIONS RELEVANT TO FLIGHT INSTRUCTION.
- Physiological factors
- Psychological factors.
- Human information processing.
- Behavioural attitudes.
- Development of judgement and decision making.

8. HAZARDS INVOLVED IN SIMULATING SYSTEMS FAILURES AND MALFUNCTIONS IN THE AIRPLANE DURING FLIGHT
   - Selection of a safe altitude.
   - Importance of touch drills'.
   - Situational awareness.
   - Adherence to correct procedures.

9. NIGHT FLYING INSTRUCTION
   - Objectives.
   - Legislation requirements.
   - Airplane equipment.
   - Airplane lights.
   - Flight crew licences.
   - Aerodrome licences (if applicable).
   - Night familiarization.
   - Preparation for flight.
   - Equipment required for flight.
   - Night vision accommodation.
   - Personal safety precautions in the parking areas.
   - External/internal checks - night considerations.
   - Airplane lights – operation.

10. TRAINING ADMINISTRATION
   - Flight/theoretical knowledge instruction records.
   - Pilot's personal flying log book.
   - The flight/ground curriculum.
   - Study material.
   - Official forms.
   - Aircraft Flight/Owner's Manuals/Pilot's Operating Handbooks.
   - Flight authorisation papers.
   - Aircraft documents.
   - The private pilot's licence regulations.

Suggested Approximate Breakdown of Hours for the Theoretical Knowledge Instruction Section of the Flight Instructor (Airplane) Course.

(The item numbers shown below relate to the item numbers of 'Teaching and learning' above.)

Item No.	Tuition Hours	Practice Hours on class	Comment	Progress Test
1	2.00	-	Allow for questions and short discussion periods	0:30
2	4.00	-	The tuition time should allow for questions and short discussion periods	1:00
3	2.00	-	The PPL training syllabus should be used as reference material	0:30
4 a.	5.00	32	The time spent in practice under this item will involve the applicants refreshing their technical knowledge, and developing their classroom instruction techniques. It will also include discussion between applicants and advice on teaching from the supervising instructor	
4.b.	4.00	32	The time spent in practice will be mainly directed to the giving of pre-flight briefings. It will allow the applicants to develop their ability to give a practical and short briefing (10–15 minutes) to a student pilot. The briefing will outline in a logical sequence the flight lesson to be undertaken	
5.a.	2.00	-	Emphasis should be placed on the validity of questions used in progress tests	1:00
5.b.	2.00	-	Emphasis should be placed on the need to give encouragement to the student	1:00
6	5.00	14	The time spent in practice will be directed towards the planning of classroom lesson periods and the development of the applicants' ability to construct lesson plans	
7	5.00	-	Scenarios relevant to good judgement and decision making should be set and analysed.	1:00
8	2.00	-	Examples of hazards should cover a broad range of light aircraft and types of operation and not to be confined to the aircraft used on the course	1:00
9	5.00	-	Long briefings to teach an applicant to give instruction in night flying	
10	2.00	-	General revision of relevant documents	1:00
Total	40.00	78.00		7.00

COURSE TOTAL: 125 HOURS (including progress tests)

PART 2

AIR EXERCISES

1. The air exercises are similar to those used for the training of PPL(A) but with additional items designed to cover the needs of a flight instructor.

2. The numbering of exercises should be used primarily as an exercise reference list and as a broad instructional sequencing guide: therefore the demonstrations and practices need not necessarily be given in the order listed. The actual order and content will depend upon the following interrelated factors:
   - The applicant's progress and ability.
   - The weather conditions affecting the flight.
   - The flight time available.
   - Instructional technique considerations.
   - The local operating environment.

3. It follows that student instructors will eventually be faced with similar interrelated factors. They should be shown and taught how to construct flight lesson plans, taking these factors into account, so as to make the best use of each flight lesson, combining parts of the set exercises as necessary.

GENERAL

4. The briefing normally includes a statement of the aim and a brief allusion to principles of flight only if relevant. An explanation is to be given of exactly what air exercises are to be taught by the instructor and practised by the student during the flight. It should include how the flight will be conducted with regard to who is to fly the Airplane and what airmanship, weather and flight safety aspects currently apply. The nature of the lesson will govern the order in which the constituent parts are to be taught.

5. The four basic components of the briefing will be:
   - The aim.
   - Principles of Flight (briefest reference only).
   - The Air Exercise(s) (what, and how and by whom).
   - Airmanship (weather, flight safety etc.).

PLANNING OF FLIGHT LESSONS

6. The preparation of lesson plans is an essential pre-requisite of good instruction and the student instructor is to be given supervised practice in the planning and practical application of flight lesson plans.

GENERAL CONSIDERATIONS

7. The student instructor should complete flight training to practise the principles of basic instruction at the PPL(A) level.

8. During this training, except when acting as a student pilot for mutual flights, the student instructor shall occupy the seat normally occupied by the FI(A).

9. It is to be noted that airmanship is a vital ingredient of all flight operations. Therefore, in the following air exercises the relevant aspects of airmanship are to be stressed at the appropriate times during each flight.

10. If the privileges of the FI(A) rating are to include instruction for night flying, exercises 12 and 13 of the flight instruction syllabus should be undertaken at night in addition to by day either as part of the course or subsequent to rating issue.

FLIGHT INSTRUCTION SYLLABUS CONTENTS

LONG BRIEFINGS AND AIR EXERCISES

- Execise 1 - Familiarisation with the Airplanes.
- Execise 2 - Preparation before and action after flight.
- Execise 3 - Air experience.
- Execise 4 - Effects of controls.
- Execise 5 - Taxiing.
- Execise 6 - Straight and level flight.
- Execise 7 - Climbing.
- Execise 8 - Descending.
- Execise 9 - Turning.
- Execise 10A - Slow flight.
- Execise 10B - Stalling.
- Execise 11A - Spin recovery at the incipient stage.

- Execise 11B - Developed spins - entry & recovery.
- Execise 12 - Take-off and climb to downwind position.
- Execise 13 - The circuit, approach and landing.
- Execise 14 - First solo.
- Execise 15 - Advanced turning.
- Execise 16 - Forced landing without power.
- Execise 17 - Precautionary landing.
- Execise 18A - Pilot navigation.
- Execise 18B - Navigation at lower levels/reduced visibility.
- Execise 18C - Radio navigation.
- Execise 19 - Introduction to Instrument Flying.
- Execise 20 - Basic night flight.

NOTE: Although exercise 11B is not required for the PPL course it is a requirement for the FI course.

LONG BRIEFING EXERCISE I

AIRPLANE FAMILIARISATION

- Objectives.
- Introduction to the Airplane.
- Explanation of the cockpit layout.
- Airplane and engine systems.
- Check lists, drills, controls.
- Differences when occupying the instructor's seat.

EMERGENCY DRILLS

Action in the event of fire in the air and on the ground - engine cabin and electrical Systems failures as applicable to type

Escape drills - location and use of emergency equipment and exits.

AIR EXERCISE 1

FAMILIARISATION WITH THE AIRPLANE

- Introduction to the Airplane.
- Explanation of the Cockpit Layout.
- Airplane Systems.
- Check Lists, Drills, Controls.

EMERGENCY DRILLS

Action in the Event of Fire in the Air and on the Ground –Engine / Cabin / Electrical System Failure as Applicable to Type

Escape Drills - Location and use of Emergency Equipment and Exits.

LONG BRIEFING EXERCISE 2

PREPARATION FOR AND ACTION AFTER FLIGHT

- Objectives.
- Flight authorisation and Airplane acceptance including technical log (if applicable) and certificate of maintenance.
- Equipment required for Flight (Maps, etc.).
- External checks.
- Internal checks.
- Student comfort, harness, seat or rudder pedal adjustment.
- Starting and Warming up Checks.
- Power Checks.
- Running Down, System Checks and Switching Off the Engine.
- Leaving the Airplane, Parking, Security and Picketing.
- Completion of Authorisation Sheet and Airplane Serviceability documents.

AIR EXERCISE 2

PREPARATION FOR AND ACTION AFTER FLIGHT

- Flight Authorisation and Airplane Acceptance.
- Aircraft Serviceability Documents Equipment Required for Flight (Maps etc.).
- External Checks.
- Internal Checks.
- Student Comfort, Harness, Seat or Rudder Pedal Adjustment.
- Starting and Warming up Checks
- Power Checks.
- Running Down, System Checks and Switching Off the Engine.
- Leaving the Aircraft, Parking, Security and Picketing.
- Completion of Authorisation Sheet and Airplane Serviceability Documents.

LONG BRIEFING EXERCISE 3
(Air Exercise only)

AIR EXERCISE 3

Air Experience

LONG BRIEFING EXERCISE 4

EFFECTS OF CONTROLS

- Objectives.
- Function of Primary Controls - when Laterally Level and Banked.
- Further Effect of Ailerons and Rudder.
- Effect of Inertia.
- Effect of Airspeed.
- Effect of Slipstream.
- Effect of Power.
- Effect of Trimming Controls.
- Effect of Flaps.
- Operation of Mixture Control.
- Operation of Carburettor Heat Control.
- Operation of Cabin Heat/Ventilation Systems.
- Effect of other Controls (as applicable)
- Airmanship.

AIR EXERCISE 4

EFFECTS OF CONTROLS

- Primary Effects of Flying Controls - when Laterally Level and Banked.
- Further effects of Ailerons and Rudder.
- Effect of Airspeed.
- Effect of Slipstream.
- Effect of Power.
- Effect of Trimming Controls.
- Effect of Flaps.
- Operation of Mixture Control.
- Operation of Carburettor Heat Control.
- Operation of Cabin Heat/Ventilation Systems.
- Effect of other Controls as applicable Airmanship.

LONG BRIEFING EXERCISE 5

TAXIING

- Objectives
- Pre-Taxiing Checks.
- Starting, Control of Speed and Stopping.
- Engine Handling.
- Control of Direction and Turning (including manoeuvring in confined spaces).
- Parking Area Procedures and Precautions.
- Effects of Wind and Use of Flying Controls.
- Effects of Ground Surface.
- Freedom of Rudder Movement.
- Marshalling Signals.
- Instrument Checks.
- Airmanship and Air Traffic Control Procedures.
- Common Errors.

EMERGENCIES

- Steering Failure/Brake Failure.

AIR EXERCISE 5

TAXIING

- Pre Taxiing Checks.
- Starting, Control of Speed and Stopping.
- Engine Handling.
- Control of Direction and Turning.
- Turning in Confined Spaces.
- Parking Area Procedures and Precautions.
- Effects of Wind and Use of Flying Control.
- Effects of Ground Surface.
- Freedom of Rudder Movement.
- Marshalling Signals.
- Instrument Checks.
- Airmanship and Air Traffic Control Procedures.

EMERGENCIES

- Steering Failure/Brake Failure.

LONG BRIEFING EXERCISE 6

STRAIGHT AND LEVEL FLIGHT

- Objectives:
- The Forces.
- Longitudinal Stability and Control in Pitch.
- Relationship of C of G to Control in Pitch.
- Lateral and Directional Stability (Control of Lateral Level and Balance).
- Attitude and Balance Control.
- Trimming.
- Power Settings and Airspeeds.
- Drag and Power Curves.
- Range and Endurance.
- Airmanship
- Common Errors.

AIR EXERCISE 6

STRAIGHT AND LEVEL

- At normal Cruising Power:
  - Attaining and Maintaining Straight and Level Flight.
  - Demonstration of Inherent Stability.
  - Control in Pitch, including use of Elevator Trim control.
  - Lateral Level, Direction and Balance, use of Rudder Trim controls as applicable.
- At Selected Airspeeds (Use of Power):
  - Effect of Drag and use of Power (Two Airspeeds for one Power Setting).
- Straight and Level in Different Airplane Configurations (Flaps, Landing Gear).
- Use of Instruments to achieve Precision Flight.
- Airmanship.

LONG BRIEFING EXERCISE 7

CLIMBING

- Objectives:
- The Forces.
- Relationship between Power/Airspeed and Rate of Climb (Power Curves Maximum Rate of Climb (V_y)).
- Effect of Mass.

- Effect of Flaps.
- Engine Considerations.
- Effect of density Altitude.
- The Cruise Climb.
- Maximum Angle of Climb (V_X).
- Airmanship.
- Common Errors.

AIR EXERCISE 7

CLIMBING

- Entry and maintaining the normal Maximum Rate Climb.
- Levelling Off.
- Levelling Off at Selected Altitudes.
- Climbing with Flaps down.
- Recovery to normal Climb.
- En Route Climb (Cruise Climb).
- Maximum Angle of Climb.
- Use of Instruments to achieve Precision Flight.
- Airmanship.

LONG BRIEFING EXERCISE 8

DESCENDING

- Objectives:
- The Forces.
- Glide Descent Angle - Airspeed - Rate of Descent.
- Effect of Flaps.
- Effect of Wind.
- Effect of Mass.
- Engine Considerations.
- Power Assisted Descent - Power/Airspeed - Rate of Descent.
- The Cruise Descent.
- The Sideslip.
- Airmanship.
- Common Errors.

AIR EXERCISE 8

DESCENDING

- Entry and maintaining the Glide.
- Levelling Off.
- Levelling Off at Selected Altitudes.
- Descending with Flaps down.
- Powered Descent - Cruise Descent (inc. effect of Power/Airspeed).
- Sideslipping (on suitable types).
- Use of Instrument to achieve Precision Flight.
- Airmanship.

LONG BRIEFING EXERCISE 9

TURNING

- Objectives:
- The Forces.
- Use of Controls.
- Use of Power.
- Maintenance of Attitude and Balance.
- Medium Level Turns.
- Climbing and Descending Turns.
- Slipping Turns.
- Turning onto Selected Headings.
- Use of Gyro Heading Indicator and Magnetic Compass.
- Airmanship
- Common Errors.

AIR EXERCISE 9

TURNING

- Entry and maintaining Medium Level Turns.
- Resuming straight flight.
- Faults in the Turn (incorrect Pitch, Bank, Balance).
- Climbing Turns.
- Descending Turns.
- Slipping Turns (on suitable types).
- Turns to Selected Headings, use of Gyro Heading Indicator and Compass.
- Use of Instruments to achieve Precision flight.
- Airmanship.

STALL/SPIN AWARENESS & AVOIDANCE
TRAINING CONSISTS OF EXERCISES**:**

10 A, 10 B And 11 A

LONG BRIEFING EXERCISE 10 A

SLOW FLIGHT

Objectives:

- Airplane Handling Characteristics during Slow Flight at:
  - V_{s1} & V_{so} + 10 knots.
  - V_{s1} & V_{so} + 5 knots.
- Slow Flight During Instructor Induced Distractions.
- Effect of overshooting in configurations where application of engine power causes a strong nose-up' trim change.
- Airmanship.
- Common Errors.

AIR EXERCISE 10A

SLOW FLIGHT

- Airmanship.
- Safety Checks.
- Introduction to Slow Flight.
- Controlled Slow Flight in the Clean Configuration at:
  - V_{s1} + 10 knots & with Flaps Down.
  - V_{so} + 10 knots:
  - Straight & Level Flight.
  - Level Turns.
  - Climbing & Descending.
  - Climbing & Descending Turns.

- Controlled Slow Flight in the Clean Configuration at:
  - V_{s1} + 5 knots & with Flaps Down.
  - V_{so} + 5 knots:
  - Straight & Level Flight.
  - Level Turns.
  - Climbing & Descending.
  - Climbing & Descending Turns.
  - Descending Unbalanced' Turns at Low Airspeed – the need to maintain Balanced Flight.

Instructor Induced Distractions' during Flight at Low Airspeed - the need to Maintain Balanced Flight and a safe Airspeed.

Effect of going around in configurations where application of engine power causes a strong nose up' trim change.

LONG BRIEFING EXERCISE 10 B

STALLING

- Objectives:
- Characteristics of the Stall.
- Angle of Attack.
- The Effectiveness of the Controls at the Stall.
- Factors Affecting the Stalling Speed:
  - Effect of Flaps/Slats/Slots.
  - Effect of Power/Mass/C of G/Load Factor.
- The Effects of Unbalance at the Stall.
- The Symptoms of the Stall.
- Stall Recognition & Recovery.
- Stalling & Recovery:
  - Without Power.
  - With Power On.
  - With Flaps Down.
- Maximum Power Climb (straight & turning flight to the point of Stall with uncompensated Yaw).
- *Stalling & Recovery during manoeuvres involving more than 1 G (accelerated stalls, including secondary stalls & recoveries).
- Recovering from Incipient Stalls in the landing and other configurations and conditions.
- Recovering at the Incipient Stage during Change of Configuration.
- Stalling and Recovery at the Incipient Stage with Instructor Induced Distractions.
- Airmanship.
- Common Errors.

*Consideration is to be given to manoeuvre limitations and references to the Owners/Flight manual or Pilot's Operating Handbook must also be made in relation to Mass and Balance limitations. These factors must also be covered in the next exercise Spinning.

AIR EXERCISE 10 B

STALLING

- Airmanship - Safety checks.
- The symptoms of the Stall.
- Stall Recognition & Recovery.
  - Recovery Without Power.
  - Recovery With Power.
  - Recovery when a Wing Drops at the Stall.
  - Stalling with Power ON & Recovery.
  - Stalling with Flap Down & Recovery.
- Maximum Power Climb (straight & turning flight) to the point of Stall with uncompensated YAW - Effect of unbalance at the stall when climbing power is being used.
- *Stalling & Recovery during Manoeuvres involving more than 1 G (accelerated stalls, including secondary stalls & recoveries).
- Recoveries from Incipient Stalls in the landing and other configurations & conditions.
- Recoveries at the Incipient Stage during change of Configuration.
- Instructor Induced Distractions during Stalling.

*Consideration of manoeuvre limitations and the need to refer to the Airplane Manual and Weight (mass) & Balance calculations. These factors are to be covered in the next exercise - Spinning.

LONG BRIEFING EXERCISE 11 A

SPIN RECOVERY AT THE INCIPIENT STAGE

- Objectives:
- Causes, Stages, Autorotation and Characteristics of the Spin.
- Recognition and Recovery at the Incipient Stage - entered from various flight attitudes.
- Airplane Limitations.
- Airmanship.
- Common Errors.

AIR EXERCISE 11 A

SPIN RECOVERY AT THE INCIPIENT STAGE

- Airplane Limitations.
- Airmanship.
- Safety Checks.
- Recognition at the Incipient Stage of a Spin.
- Recoveries from Incipient Spins entered from various attitudes with the Airplane in the Clean Configuration including instructor induced distractions.

LONG BRIEFING EXERCISE 11 B

SPIN RECOVERY AT THE DEVELOPED STAGE

- Objectives:
- The Spin Entry.
- Recognition & Identification of Spin Direction.
- The Spin Recovery.
- Use of Controls.
- Effects of Power/Flaps (flap restriction applicable to type) .
- Effect of the C of G upon Spinning characteristics.
- Spinning from Various Flight Attitudes.
- Airplane Limitations.
- Airmanship - Safety Checks.
- Common Errors during Recovery.

AIR EXERCISE 11 B

SPIN RECOVERY AT THE DEVELOPED STAGE

- Airplane Limitations.
- Airmanship.
- Safety Checks.

- The Spin Entry.
- Recognition & Identification of the Spin Direction.
- The Spin Recovery (reference to Flight Manual).

- Use of Controls.
- Effects of Power/Flaps (restrictions applicable to Airplane type).
- Spinning & Recovery from various Flight Attitudes.

LONG BRIEFING EXERCISE 12

TAKE-OFF AND CLIMB TO DOWNWIND POSITION

- Objectives:
- Handling - Factors affecting the length of Take-off Run and Initial Climb.
- The Correct Lift Off Speed, use of Elevators (Safeguarding the Nose Wheel), Rudder and Power Effect of Wind (including Crosswind Component).
- Effect of Flaps (including the Decision to Use and the Amount Permitted).
- Effect of Ground Surface and Gradient upon the Take-off Run.
- Effect of Mass, Altitude and Temperature on Take-off and climb Performance.
- Pre Take-Off Checks.
- Air Traffic Control Procedure (before Take-Off).
- Drills, during and after Take-off.
- Noise abatement procedures.
- Tail Wheel Considerations (as applicable).
- Short/Soft Field Take-Off Considerations/Procedures.

EMERGENCIES:

- Aborted Take-Off.
- Engine Failure after Take-Off.
- Airmanship and Air Traffic Control Procedures.
- Common Errors.

AIR EXERCISE 12

TAKE-OFF AND CLIMB TO DOWNWIND POSITION

- Pre Take-Off Checks.
- Into Wind Take-Off.
- Safeguarding the Nose Wheel.
- Crosswind Take-Off.
- Drills During and After Take-Off.
- Short Take-Off and Soft Field Procedure/Techniques (including Performance Calculations).
- Noise abatement procedures.
- Airmanship.

LONG BRIEFING EXERCISE 13

THE CIRCUIT APPROACH AND LANDING

- Objectives:
- The Downwind Leg, Base Leg, Approach - Position and Drills.
- Factors Affecting the Final Approach and the Landing Run.
- Effect of Mass.
- Effects of Altitude and Temperature.
- Effect of Wind.
- Effect of Flap.

- The Landing.
  - Effect of Ground Surface and Gradient upon the Landing Run.

- Types of Approach and Landing:
  - Powered.
  - Crosswind.

- Flapless (at an appropriate stage of the course).
- Glide.
- Short Field.
- Soft Field.
- Tail Wheel Airplane Considerations (as applicable).
- Missed Approach.
- Engine Handling.
- Wake Turbulence Awareness.
- Windshear Awareness.
- Airmanship and Air Traffic Control Procedures
- Mislanding/Go around.
- Special emphasis on lookout.
- Common Errors.

AIR EXERCISE 13

THE CIRCUIT APPROACH AND LANDING

- Circuit Procedures - Downwind, Base Leg.
- Powered Approach and Landing
- Safeguarding the Nosewheel.
- Effect of Wind on Approach and Touchdown Speeds and use of Flaps.
- Crosswind Approach and Landing
- Glide Approach and Landing.

- Flapless Approach and Landing (short and soft field)
- Short field and soft field procedures
- Wheel Landing (Tail Wheel Aircraft)
- Missed.Approach/Go around
- Mislanding/Go around.
- Noise abatement procedures.
- Airmanship.

LONG BRIEFING EXERCISE 14

FIRST SOLO AND CONSOLIDATION

A summary of points to be covered before sending the student on first solo.

NOTE: During the flights immediately following the solo circuit consolidation period the following should be covered:

- Procedures for Leaving and Rejoining the Circuit.
- The Local Area (Restrictions, Controlled Airspace, etc.)
- Compass Turns.
- QDM Meaning and Use.
- Airmanship.
- Common Errors.

AIR EXERCISE 14

FIRST SOLO AND CONSOLIDATION

During the flights immediately following the solo circuit consolidation period the following should be covered:

- Procedures for Leaving and Rejoining the Circuit.
- The Local Area (Restrictions, Controlled Airspace, etc.).
- Compass Turns.
- Obtaining QDM's.
- Airmanship.

LONG BRIEFING EXERCISE 15

ADVANCED TURNING

- Objectives:
- The Forces.
- Use of Power.
- Effect of Load Factor:
  - Structural Considerations.
  - Increased Stalling Speed.
- Physiological Effects.
- Rate and Radius of Turn.
- Steep, Level, Descending and Climbing Turns.
- Stalling in the Turn.
- *Spinning from the Turn - Recovery at the Incipient Stage.
- *The Spiral Dive.
- Unusual Attitudes and Recoveries.
- Airmanship.
- Common Errors.

*Considerations are to be given to manoeuvre limitations and reference to The Owner's/Flight Manual/Pilot's Operating Handbook must be made in relation to Mass and Balance, and any other restrictions for Practice Entries to the Spin.

AIR EXERCISE 15

ADVANCED TURNING

- Level, Descending and Climbing Steep Turns.
- Stalling in the Turn.
- The Spiral Dive.
- Spinning from the Turn.
- Recovery from Unusual Attitudes.
- Maximum Rate Turns.
- Airmanship.

LONG BRIEFING EXERCISE 16

FORCED LANDING WITHOUT POWER

- Objectives:
- Selection of forced landing areas.
- Provision for change of plan.
- Gliding distance – consideration.
- Planning the descent.
- Key positions.
- Engine failure checks.
- Use of radio - R/T Distress Procedure.
- The base leg.
- The final approach.
- Go around.
- The landing considerations.
- Actions after landing.
- Airplane security.
- Causes of engine failure.
- Airmanship.
- Common errors.

AIR EXERCISE 16

FORCED LANDING WITHOUT POWER

Forced Landing Procedures.

- Selection of Landing Area:
  - Provision for Change of Plan.
  - Gliding Distance Considerations.
- Planning the descent:
  - Key Positions.
  - Engine Failure Checks.
  - Engine cooling precautions.
  - Use of Radio
  - The Base Leg.
  - The Final Approach.
  - The Landing . (When the Exercise is conducted at an Aerodrome)
- Actions after Landing: (When the Exercise is conducted at an Aerodrome)
  - Airplane Security.
  - Airmanship.

LONG BRIEFING EXERCISE 17

PRECAUTIONARY LANDING

- Objectives:
- Occasions when necessary (In Flight Conditions):
  - Landing area Selection and Communication (R/T Procedure).
  - Overhead Inspection.
  - Simulated Approach.
  - Climb Away.
  - Landing at a Normal Aerodrome.
  - Landing at a Disused Aerodrome.
  - Landing on an Ordinary Field.
  - Circuit and Approach.
- Actions After Landing:
  - Airplane Security.
  - Airmanship.
  - Common errors.

AIR EXERCISE 17

PRECAUTIONARY LANDING

- Occasions when necessary (In Flight Conditions):
  - Landing area selection.
  - Overhead Inspection.
  - Simulated Approach.
  - Climb Away.
  - Landing at a Normal Aerodrome.
  - Landing at a Disused Aerodrome.
  - Landing on an Ordinary Field.
  - Circuit and Approach.
- Actions After Landing:
  - Airplane Security.
  - Airmanship.

LONG BRIEFING EXERCISE 18A

PILOT NAVIGATION

FLIGHT PLANNING

- Objectives:
  - Weather Forecast and Actual(s).
  - Map Selection and Preparation:

- Choice of Route:
  - Regulated/Controlled Airspace.
  - Danger, Prohibited and Restricted Areas.
  - Safety Altitude.

- Calculations:
  - Magnetic Heading(s) and Time(s) enroute.
  - Fuel Consumption.
  - Mass and Balance.
  - Mass and Performance.

- Flight Information:
  - NOTAMs etc.
  - Noting of Required Radio Frequencies.
  - Selection of Alternate aerodrome(s) .
  - Aircraft Documentation.

- Notification of the Flight:
  - Booking Out Procedure.
  - Flight Plans.

- Aerodrome Departure.

- Organisation of Cockpit Workload.

- Departure Procedures:
  - Altimeter Settings.
  - Setting Heading Procedures.
  - Noting of ETA(s).

- En-Route:
  - Map reading - identification of ground features
  - Maintenance of Altitudes and Headings.
  - Revisions to ETA and Heading, wind effect, drift angle and groundspeed checks.
  - Log Keeping.
  - Use of Radio (including VDF if applicable).
  - Minimum Weather Conditions for Continuance of Flight.
  - In Flight' Decisions, diversion procedures.
  - Operations in Regulated/Controlled Airspace.
  - Procedures for Entry, Transit and Departure.
  - Navigation at Minimum Level.
  - Uncertainty of Position Procedure (Including R/T procedure).
  - Lost Procedure (Including R/T procedure).
  - Use of Radio Navaids.
  - Arrival Procedures.

- Aerodrome Circuit Joining Procedures:
  - Altimeter Setting, ATC Liaison, R/T Procedure, etc.
  - Entering the Traffic Pattern (controlled/uncontrolled aerodromes).
  - Circuit Procedures.
  - Parking Procedures.
  - Security of Airplane Refuelling and Booking In.

AIR EXERCISE 18A

PILOT NAVIGATION

FLIGHT PLANNING

- Weather Forecast and Actual(s).
- Map Selection and Preparation:
  - Choice of Route.
  - Regulated/Controlled Airspace.
  - Danger, Prohibited and Restricted Areas.
  - Safety Altitude.
- Calculations:
  - Magnetic Heading(s) and Time(s) En-Route.
  - Fuel Consumption.
  - Mass and Balance.
  - Mass and Performance.

- Flight Information:
  - NOTAMs etc.
  - Noting of Required Radio Frequencies.
  - Selection of Alternate Aerodromes.
  - Airplane Documentation.

- Notification of the Flight:
  - Flight clearance procedures (as applicable).
  - Flight Plans.

AERODROME DEPARTURE

- Organisation of Cockpit Workload.

- Departure Procedures:
  - Altimeter Settings.

- En-route:
  - Noting of ETA(s).
  - Wind effect, drift angle, ground speed checks.
  - Maintenance of Altitudes and Headings.
  - Revisions to ETA and Heading.
  - Log Keeping.
  - Use of Radio (including VDF if applicable).
  - Minimum Weather Conditions for Continuance of Flight 'In Flight' Decisions.
  - Diversion Procedure.
  - Operations in Regulated/Controlled Airspace.
  - Procedures for Entry, Transit and Departure.
  - Uncertainty of Position Procedure.
  - Lost Procedure.
  - Use of Radio Navaids.

- Arrival Procedures:
  - Aerodrome Joining Procedures.
  - Altimeter Setting, ATC Liaison, etc.
  - Entering the Traffic Pattern.
  - Circuit Procedures Parking Procedures Security of Aircraft Refuelling.
  - Booking In.

LONG BRIEFING EXERCISE 18B

NAVIGATION AT LOWER LEVELS/REDUCED VISIBILITY

- Objective:
- General Considerations:
  - Planning Requirements Prior to Flight in Entry/Exit Lanes.
  - ATC Rules, Pilot Qualifications and Aircraft Equipment.
  - Entry/Exit Lanes and Areas where Specific Local Rules Apply.

- Low Level Familiarisation:
  - Actions Prior to Descending.
  - Visual Impressions and Height Keeping at Low Altitude .
  - Effects of Speed and Inertia During Turns.
  - Effects of Wind and Turbulence.

- Low Level Operation:
  - Weather Considerations.
  - Low Cloud and Good Visibility.
  - Low Cloud and Poor Visibility.
  - Avoidance of Moderate to Heavy Rain Showers.
  - Effects of Precipitation.
  - Joining a Circuit.
  - Bad Weather Circuit, Approach and Landing.

- Airmanship.

AIR EXERCISE 18B

NAVIGATION AT LOWER LEVELS

- Low Level Familiarisation:
  - Entry/Exit Lanes and Areas Where Specific Local Rules Apply.
  - Actions Prior to Descending.
  - Visual Impressions and Height Keeping at Low Altitude.
  - Effects of Speed and Inertia During Turns.
  - Effects of Wind and Turbulence.
  - Hazards of operating at low levels.

- Low Level Operation:
  - Weather Considerations.
  - Low Cloud and Good Visibility.

- Low Cloud and Poor Visibility.
- Avoidance of Moderate to Heavy Rain Showers.
- Effects of Precipitation (forward visibility).
- Joining a Circuit.
- Bad Weather Circuit, Approach and Landing.

- Airmanship.

LONG BRIEFINGS 18C

USE OF RADIO NAVIGATION AIDS UNDER VFR

Objectives:

a. Use of VHF omni range.
   - Availability of VOR stations, AIP.
   - Signal reception range.
     - Selection and identification.
   - Radials and method of numbering.
   - Use of omni bearing selector (OBS).
   - To-From indication and station passage.
   - Selection, interception and maintaining a radial.
   - Use of two stations to determine position.

b. Use of automatic direction finding equipment (ADF).
   - Availability of NDB stations, AIP.
   - Signal reception range.
     - Selection and identification.
   - Orientation in relation to NDB.
   - Homing to an NDB.

c. Use of VHF direction finding (VHF/DF).
   - Availability, AIP.
   - R/T procedures.
   - Obtaining QDMs and QTEs.

d. Use of radar facilities.
   - Availability and provision of service, AIS.
   - Types of service.
   - R/T procedures and use of transponder.
     - Mode selection.
     - Emergency codes.

e. Use of Distance Measuring Equipment (DME).
- Availability, AIP.
- Operating modes.
- Slant range.

f. Use of Aero Navigation systems, satellite navigation systems (RNAV - SATNAV).
- Availability.
- Operating modes.
- Limitations.

AIR EXERCISE 18C

RADIO NAVIGATION

a. Use of VHF Omni Range.
- Availability, AIP, frequencies.
- Selection and identification.
- Omni bearing selector (OBS).
- To/from indications, - orientation.
- Course deviation indicator (CDI).
- Determination of radial.
- Intercepting and maintaining a radial.
- VOR passage.
- Obtaining a fix from two VORs.

b. Use of automatic direction finding equipment (ADF) non-directional beacons (NDBs).
- Availability, AIP, frequencies.
- Selection and identification.
- Orientation relative to the beacon.
- Homing

c. Use of VHF direction finding (VHF/DF).
- Availability, AIP, frequencies.
- R/T procedures and ATC liaison.
- Obtaining a QDM and homing.

d. Use of en-route/terminal radar.
- Availability, AIP.
- Procedures and ATC liaison.

- Pilot's responsibilities.
- Secondary surveillance radar.
- Transponders.
- Code selection.
- Interrogation and reply.

e. Use of distance measuring equipment (DME).
- Station selection and identification.
- Modes of operation.

f. Use of Aero Navigation systems, satellite navigation systems (RNAV - SATNAV).
- Setting up.
- Operation.
- Interpretation.

LONG BRIEFING EXERCISE 19

NTRODUCTION TO INSTRUMENT FLYING

- Objectives:
- Flight Instruments.
- Physiological Considerations.
- Instrument Appreciation.
- Attitude Instrument Flight.
- Pitch Indications.
- Bank Indications.
- Different Dial Presentations.
- Introduction to the Use of the Attitude Indicator.
- Pitch Attitude.
- Bank Attitude.
- Maintenance of Heading and Balanced flight.
- Instrument Limitations (inc. System Failures).

ATTITUDE, POWER & PERFORMANCE

Attitude Instrument Flight:
- Control Instruments.
- Performance Instruments.
- Effect of Changing Power and configuration.
- Cross Checking the Instrument Indications.
- Instrument Interpretation.
- Direct and Indirect Indications. (Performance Instruments)
- Instrument Lag.

- Selective Radial Scan.

THE BASIC FLIGHT MANOEUVRES (FULL PANEL)

- Straight and Level Flight at Various Airspeeds and Airplane Configurations.
  - Climbing.
  - Descending.
  - Standard Rate Turns (Onto Pre-Selected Headings).
    - Level.
    - Climbing.
    - Descending.

AIR EXERCISE 19

INTRODUCTION TO INSTRUMENT FLYING

- Physiological Sensations
- Instrument Appreciation
- Attitude Instrument Flight
- Pitch Attitude.
- Bank Attitude.
- Maintenance of Heading and Balanced Flight.
- Attitude Instrument Flight.
- Effect of Changing Power and configuration.
- Cross Checking the Instruments.
- Selective Radial Scan.

THE BASIC FLIGHT MANOEUVRES (FULL PANEL)

- Straight and Level Flight at various Airspeeds and Airplane Configurations.
  - Climbing.
  - Descending.
  - Standard Rate Turns (Into Pre-Selected Headings).
    - Level.
    - Climbing.
    - Descending.

LONG BRIEFING EXERCISE 20

BASIC NIGHT FLYING

A summary of points to be covered before sending the student on a first solo at night.

- Start up procedures.
- Local procedures - including ATC liaison.

- Taxiing.
  - Parking area and taxiway lighting.
  - Judgement of speed and distances.
  - Use of taxiway lights.
  - Avoidance of hazards - obstruction lighting.
  - Instrument checks.
- Holding point - lighting procedure.
- Initial familiarisation at night.
- Local area orientation.
- Significance of lights on other aircraft.
- Ground obstruction lights.
- Division of piloting effort - external/instrument reference.
- Rejoining procedure.
- Aerodrome lighting - Approach and runway lighting (including VASI and PAPI).
  - Threshold lights.
  - Approach lighting.
  - Visual approach slope indicator systems.

NIGHT CIRCUITS

- Take-off and climb.
  - Line up.
  - Visual references during the take-off run.
  - Transfer to instruments.
  - Establishing the initial climb.
  - Use of flight instruments.
  - Instrument climb and initial turn.

- The circuit.
  - Airplane positioning - reference to runway lighting.
  - The traffic pattern and lookout.
  - Initial approach and runway lighting demonstration.
  - Airplane positioning.
  - Changing aspect of runway lights and VASI or PAPI.
  - Intercepting the correct approach path.
  - The climb away.

- Approach and landing.
  - Positioning, base leg and final approach.
  - Diurnal wind effect.

- Use of landing lights.
- The flare and touchdown.
- The roll out.
- Turning off the runway - control of speed.

- Missed approach.
  - Use of instruments.
  - Re-positioning in the circuit pattern.

NIGHT NAVIGATION

- Particular emphasis on flight planning.
- Selection of ground features visible at night.
  - Air light beacons.
  - Effect of cockpit lighting on map colours.
  - Use of radio aids.
  - Effect of moonlight upon visibility at night.
- Emphasis on maintaining a minimum safe altitude.
- Alternate aerodromes - restricted availability.
- Restricted recognition of weather deterioration.
- Lost procedures.

NIGHT EMERGENCIES

- Radio failure.
- Failure of runway lighting.
- Failure of Airplane landing lights.
- Failure of Airplane internal lighting.
- Failure of Airplane navigation lights.
- Total electrical failure.
- Abandoned take-off.
- Engine failure.
- Obstructed runway procedure.

AMC JCAR-FCL 1.355(a)(2)
Flight Instructor (FI)/Instrument Rating Instructor (IRI) Refresher Seminar
(See JCAR-FCL 1.355)

1. FI/IRI refresher seminars made available Jordan should have due regard to numbers attending, and periodicity.

2. Such seminars should run for at least two days, and attendance from participants will be required for the whole duration of the seminar including breakout groups/workshops. Different aspects, such as inclusion of participants holding ratings in other categories of aircraft should be considered.

3. Some experienced FIs/IRIs currently involved with flying training and with a practical understanding of the revalidation requirements and current instructional techniques should be included as speakers at these seminars.

4. The attendance form (see IEM JCAR-FCL1.355) will be completed and signed by the organiser of the seminar as approved by CARC, following attendance and satisfactory participation by the FI/IRI.

5. The content of the FI/IRI refresher seminar should be selected from the following:
   a. New and/or current rules/regulations, with emphasis on knowledge of JCAR FCL 1 and JCAR OPS 1 requirements;
   b. Teaching and learning;
   c. Instructional techniques;
   d. The role of the instructor;
   e. JCARs (as applicable);
   f. Human factors;
   g. Flight safety, incident and accident prevention;
   h. Airmanship;
   i. Legal aspects and enforcement procedures;
   j. Navigational skills including new/current radio navigation aids;
   k. Teaching instrument flying; and
   l. Weather related topics including methods of distribution.
   m. Any additional topic selected by CARC.

   Formal sessions should allow for a presentation time of 45 minutes, with 15 minutes for questions. The use of visual aids is recommended, with interactive video and other teaching aids (where available) for breakout groups/workshops.

IEM JCAR-FCL 1.355 Flight
Flight Instructor Rating (FI(A)) - Revalidation and Renewal Form
(See JCAR-FCL 1.355)

INSTRUCTIONAL FLYING EXPERIENCE (See JCAR FCL1.355(a) (1))				
Instructors applying for revalidation of the Flight Instructor Rating should enter the instructional hours flown during the preceding 36 months.				
SINGLE-ENGINE		MULTI-ENGINE		INSTRUMENT
DAY	NIGHT	DAY	NIGHT	
Total instructional hours (preceding 36 months):				
Total instructional hours (preceding 12 months):				

FLIGHT INSTRUCTOR REFRESHER SEMINAR SEE JCAR FCL 1.355(a)(2))	
1	**This is to certify that the undersigned attended a Flight Instructor Seminar approved by the Authority**
2	**Attendee's personal particulars:**
Name:	Address:
Licence number:	Exp. date of FI(A) rating:
3	**Seminar particulars:**
Date/s of seminar:	Place:
4	**Declaration by the responsible organiser:**
I certify that the above data are correct and that the Flight Instructor Seminar was carried out as approved by the Authority.	
Date of approval:	Name of organiser: (block letters)
Date and place:	Signature:

5	**Declaration by the attendee:**
I confirm the data under 1 through 3	
Attendee's signature:	

PROFICIENCY CHECK SEE JCAR FCL	
.....(Name of applicant) has given proof of flying instructional ability during a proficiency check flight. This was done to my satisfaction.	
Flying time:	Aeroplane/Sim. used:
Main exercise:	
Name of FIE:	Licence number:
Date and place:	Signature:

AMC JCAR-FCL 1.365
Course For the Type Rating Instructor Rating For Multi-Pilot (Airplane) (TRI)(MPA))
(See JCAR-FCL 1.365)
(See Appendix 1 to JCAR-FCL 1.365)

COURSE OBJECTIVE

1. The course should be designed to give adequate training to the applicant in theoretical knowledge instruction, flight instruction and synthetic flight instruction in order to instruct for any multi-pilot Airplane type rating for which the applicant is qualified (see JCAR-FCL 1.365).

PART I

TEACHING AND LEARNING

Item No.

1 THE LEARNING PROCESS.
- Motivation.
- Perception and understanding.
- Memory and its application.
- Habits and transfer.
- Obstacles to learning.
- Incentives to learning.
- Learning methods.
- Rates of learning.

2 THE TEACHING PROCESS.
- Elements of effective teaching.
- Planning of instructional activity.
- Teaching method.
- Teaching from the known to the unknown.
- Use of lesson plans'.

3 TRAINING PHILOSOPHIES.
- Value of a structured (approved) course of training.
- Importance of a planned syllabus.
- Integration of theoretical knowledge and flight instruction.

4 TECHNIQUES OF APPLIED INSTRUCTION

a. Theoretical knowledge - Classroom instruction techniques.
- Use of training aids.
- Group lectures.
- Individual briefings.
- Student participation/discussion.

b. Flight - Airborne instruction techniques.
- The flight/cockpit environment.
- Techniques of applied instruction.
- Post flight and inflight judgement and decision making.

5 STUDENT EVALUATION AND TESTING

a. Assessment of student performance.
- The function of progress tests.
- Recall of knowledge.
- Translation of knowledge into understanding.
- Development of understanding into actions.
- The need to evaluate rate of progress.

b. Analysis of student errors.
- Establish the reason for errors.
- Tackle major faults first, minor faults second.
- Avoidance of over criticism.
- The need for clear concise communication.

6 TRAINING PROGRAM DEVELOPMENT.
- Lesson planning.
- Preparation.
- Explanation and demonstration.
- Student participation and practice.
- Evaluation.

7 HUMAN PERFORMANCE AND LIMITATIONS RELEVANT TO FLIGHT INSTRUCTION.
- Physiological factors.
- Psychological factors.
- Human information processing.
- Behavioural attitudes.
- Development of judgement and decision making.

8 HAZARDS INVOLVED IN SIMULATING SYSTEMS FAILURES AND MALFUNCTIONS INTHE AIRPLANE DURING FLIGHT.

- Selection of a safe altitude.
- Importance of touch drills'.
- Situational awareness.
- Adherence to correct procedures.

9 TRAINING ADMINISTRATION.

- Flight theoretical knowledge instruction records.
- Pilot's personal flying log book.
- The flight/ground curriculum.
- Study material.
- Official forms.
- Aircraft Flight/Owner's Manuals/Pilot's Operating Handbooks.
- Flight authorisation papers.
- Aircraft documents.
- The private pilot's licence regulations.

PART 2

TECHNICAL TRAINING

1. The course should be related to the type of Airplane on which the applicant wishes to instruct. A training program should give details of all theoretical knowledge instruction.

2. Identification and application of human factors (as set in the ATPL syllabus 040) related to multi - crew co-operation aspects of the training.

3. The content of the instruction programme should cover training exercises as applicable to the Airplane type.

4. The TRI rating applicant should be taught and made familiar with giving instruction from the seat normally occupied by the co-pilot.

Training Exercises

5. Flight Simulator.

Items with an * should be performed in an Airplane in case a flight simulator is not available.

a. Use of checklist, setting of radios/navigation aids;
b. Starting engines;
c. *Take-off checks;
d. *Instrument take-off, transition to instruments after lift off;
e. Crosswind take-off;
f. Engine failure during take-off between V_1 and V_2;
g. Aborted take-off prior to reaching V_1;
h. High mach buffeting, specific flight characteristics (if necessary);
i.* Steep turns;
j.* Recovery from approach to stall/take-off, clean, landing configuration;
k. Instrument approach to required minimum decision height or minimum descent height/altitude, manual one engine simulated inoperative during approach and landing or go around;
l. Rejected landing and go around; and
m. Crosswind landing.

Category II and III operations, if applicable

6 a. Precision approaches, automatic with auto-throttle and flight. director go-around caused by aircraft or ground equipment deficiencies;
b. Go around caused by weather conditions;
c. Go around at DH caused by offset position from centreline; and
d. One of the CAT II/CAT III approaches must lead to a landing.

Airplane (not applicable for applicants for SFI(A) authorisation or zero flight time training by a TRI(A).

7 a. Familiarisation with controls during outside checks;
b. Use of checklist, setting of radios and navigation aids, starting engines;
c. Taxiing;
d. Take-off;
e. Engine failure during take-off shortly after V_2, after reaching climb out attitude;
f. Other emergency procedures (if necessary);
g. One engine simulated inoperative go around from required minimum DH; and
h. One engine (critical) simulated inoperative landing.

8 Flight simulator qualified and approved for ZFTT (for restricted TRI(A)
a. Familiarisation with controls during outside checks;
b. Use of checklist, setting of radios and naviagation aids, starting engines;
c. Taxiing;
d. Take-off;
e. Simulated engine failure during take-off shortly after V_2, after reaching climt out attitude;
f. Other emergency procedures (if necessary);
g. One engine inoperative go around from requirement minimum DH; and
h. One engine (critical) inoperative landing.

AMC JCAR-FCL 1.380
Course For the Single-Pilot Multi-Engine Class Rating Instructor Rating (Airplane) (CRI (SPA))
(See JCAR-FCL 1.380)
(See Appendix 1 to JCAR-FCL 1.380)

COURSE OBJECTIVE:

1. The aim of this course is to give adequate training to the applicant in theoretical knowledge and flight instruction in order to instruct for a single-pilot multi-engine class rating.

GROUND TRAINING

2. This syllabus is concerned only with the training on multi-engine Airplanes. Therefore, other knowledge areas, common to both single- and multi-engine Airplanes, should be revised as necessary to cover the handling and operating of the Airplane with all engines operative, using the applicable sections of the Ground Subjects Syllabus for the flight instructor course (AMC JCAR-FCL1.340). Additionally, the ground training should include 25 hours of classroom work to develop the applicant's ability to teach a student the knowledge and understanding required for the air exercise section of the multi-engine training course. This part will include the long briefings for the air exercises.

PART I

TEACHING AND LEARNING

Item No.

1. THE LEARNING PROCESS.
   - Motivation.
   - Perception and understanding.
   - Memory and its application.
   - Habits and transfer.
   - Obstacles to learning.
   - Incentives to learning.
   - Learning methods.
   - Rates of learning.

2. THE TEACHING PROCESS.
   - Elements of effective teaching.
   - Planning of instructional activity.
   - Teaching methods.
   - Teaching from the known' to the unknown'.
   - Use of lesson plans'.

3. TRAINING PHILOSOPHIES.
   - Value of a structured (approved) course of training.
   - Importance of a planned syllabus.
   - Integration of theoretical knowledge and flight instruction.

4. TECHNIQUES OF APPLIED INSTRUCTION.

   a. Theoretical knowledge - Classroom instruction techniques.
      - Use of training aids.
      - Group lectures.
      - Individual briefings.
      - Student participation/discussion.

   b. Flight - Airborne Instruction Techniques.
      - The flight/cockpit environment.
      - Techniques of applied instruction.
      - Post flight and inflight judgement and decision making.

5. STUDENT EVALUATION AND TESTING.

   a. Assessment of student performance.
      - The function of progress tests.
      - Recall of knowledge.
      - Translation of knowledge into understanding.
      - Development of understanding into actions.
      - The need to evaluate rate of progress.

   b. Analysis of student errors.
      - Establish the reason for errors.
      - Tackle major faults first, minor faults second.
      - Avoidance of over criticism.
      - The need for clear concise communication.

6. TRAINING PROGRAM DEVELOPMENT.
   - Lesson planning.
   - Preparathion.
   - Explanation and demonstration.
   - Student participation and practice.
   - Evaluation.

7. HUMAN PERFORMANCE AND LIMITATIONS RELEVANT TO FLIGHT INSTRUCTION.
   - Physiological factors.
   - Psychological factors.
   - Human information processing.
   - Behavioural attitudes.
   - Development of judgement and decision making.

8. HAZARDS INVOLVED IN SIMULATING SYSTEMS FAILURES AND MALFUNCTIONS IN THE AIRPLANE DURING FLIGHT.
   - Selection of a safe altitude.
   - Importance of touch drills'.
   - Situational awareness.
   - Adherence to correct procedures.

9. TRAINING ADMINISTRATION.
   - Flight theoretical knowledge instruction records.
   - Pilot's personal flying log book.
   - The flight/ground curriculum.
   - Study material.
   - Official forms.
   - Aircraft Flight/Owner's Manuals/Pilot's Operating Handbooks.
   - Flight authorisation papers.
   - Aircraft documents.
   - The private pilot's licence regulations.

PART 2

THEORETICAL KNOWLEDGE INSTRUCTION SYLLABUS

SUGGESTED BREAKDOWN OF COURSE CLASSROOM HOURS

Tuition hours	Practice in class	Topic	Internal Progress test
1.00	2.00	Aviation legislation	1.00
2.00		Performance, all engines operating, including mass and balance	
2.00		Asymmetric flight Principles of flight	
2.00		Control in asymmetric flight Minimum control and safety speeds Feathering and unfeathering	
2.00		Performance in asymmetric flight	1.00
2.00		Specific type of Airplane – operation of systems. Airframe and engine limitations	1.00
4.00	5.00	Briefings for air exercises progress	
15.00	7.00		3.00

Course total: 25.00 (including progress test)

SYLLABUS OF THEORETICAL KNOWLEDGE SUBJECTS

ASYMMETRIC POWER FLIGHT

PRINCIPLES OF FLIGHT

THE PROBLEMS

- Asymmetry.
- Control.
- Performance.

THE FORCES AND COUPLES

- Offset thrust line.
- Asymmetric blade effect.
- Offset drag line.
- Failed engine propeller drag.
- Total drag increase.
- Asymmetry of lift.
- Uneven propeller slipstream effect.

- Effect of yaw in level and turning flight.
- Thrust and rudder side force couples.
- Effect on moment arms.

CONTROL IN ASYMMETRIC POWER FLIGHT

- Use, misuse and limits of:
  - Rudder.
  - Aileron.
  - Elevators.
- Effect of bank/sideslip/balance.
- Decrease of aileron/rudder effectiveness.
- Fin stall possibility.
- Effect of ias/thrust relationship.
- Effect of residual unbalanced forces.
- Foot loads and trimming.

MINIMUM CONTROL AND SAFETY SPEEDS

- Minimum control speed (V_{mc}).
- Definition.
- Origin.
- Factors affecting (V_{mc}).
  - Thrust.
  - Mass and centre of gravity position.
  - Altitude.
  - Landing gear.
  - Flaps.
  - Cowl flaps/cooling gills.
  - Turbulence/gusts.
  - Pilot reaction/competence.
  - Banking towards the operating engine.
  - Drag.
  - Feathering.
  - Critical engine.
- Take-off safety speed.
  - Definition/origin of V_2.
  - Other relevant V codes.

AIRPLANE PERFORMANCE - ONE ENGINE INOPERATIVE

- Effect on excess power available.
- Single-engine ceiling.
- Cruising, range and endurance.

- Acceleration/deceleration.
- Zero thrust, definition and purpose.

PROPELLERS

- Variable pitch - general principles.
- Feathering/unfeathering mechanism and limitations (e g minimum rpm).

SPECIFIC AIRPLANE TYPE

AIRPLANE AND ENGINE SYSTEMS

- Operation normal.
- Operation abnormal.
- Emergency procedures.

LIMITATIONS – AIRFRAME

- Load factors.
- Landing gear/flap limiting speeds (V_{1o} and V_{fe}).
- Rough air speed (V_{ra}).
- Maximum speeds(V_{no} and V_{ne}).

LIMITATIONS – ENGINE

- RPM and manifold pressure.
- Oil temperature and pressure.
- Emergency procedures.

MASS AND BALANCE

(To be covered in conjunction with the flight/owner's manual/pilot's operating handbook)

- Mass and balance documentation for Airplane type.
- Revision of basic principles.
- Calculations for specific Airplane type.

MASS AND PERFORMANCE

(To be covered in conjunction with the flight/owner's manual/pilot's operating handbook)

- Calculations for specific Airplane type (all engines operating).
- Take-off run.
- Take-off distance .
- Accelerate/stop distance.
- Landing distance.
- Landing run.
- Take-off/climb out flight path.
- Calculations for specific Airplane type (one engine operating).
- Climb out flight path.

- Landing distance.
- Landing run.

PART 3

FLIGHT INSTRUCTION SYLLABUS - NORMAL FLIGHT

This part is similar to the Air Exercise Sections of the single-engine Flight Instructor course, including 'Introduction to Instrument Flying' except that the objectives, airmanship considerations and common errors are related to the operation of a multi-engine Airplane.

The purpose of this part is to acquaint the applicant with the teaching aspects of the operational procedures and handling of a multi-engine Airplane with all engines functioning.

The following items should be covered:

1 Airplane familiarization.
2 Pre-flight preparation and Airplane inspection.
3 Engine starting procedures.
4 Taxiing.
5 Pre-take-off procedures.
6 The take-off and initial climb.
- Into wind.
- Crosswind .
- Short field.

7 Climbing.
8 Straight and level flight.
9 Descending (including emergency descent procedures).
10 Turning.
11 Slow flight.
12 Stalling and recoveries.
13 Instrument flight – basic.
14 Emergency drills (not including engine failure).
15 Circuit, approach and landing.
- Into wind.
- Crosswind.
- Short field.

16 Mislanding and going round again.
17 Actions after flight.

AIR EXERCISES

The following air exercises are developments of the Basic (single-engine) syllabus which are to be related to the handling of multi-engine types in order to ensure that the student learns the significance and use of controls and techniques which may be strange to the student in all normal, abnormal and emergency situations, except that engine failure and flight on asymmetric power are dealt with separately in the Air Exercises in Part 2.

LONG BRIEFING I

AIRPLANE FAMILIARISATION

- Introduction to the Airplane.
- Explanation of the:
  - Cockpit layout.
  - Systems and controls.
- Airplane power plant.
- Check lists and drills.
- Differences when occupying the instructor's seat.

EMERGENCY DRILLS

- Action in event of fire:
  - In the air.
  - On the ground.

- Escape drills:
  - Location of exits.
  - Emergency equipment, e.g. fire extinguishers, etc.

PRE-FLIGHT PREPARATION AND AIRPLANE INSPECTION

- Airplane documentation.
- External checks.
- Internal checks.
- Harness, seat/rudder pedal adjustment.

ENGINE STARTING PROCEDURES

- Use of checklists.
- Checks prior to starting.
- Checks after starting.

AIR EXERCISE 1

AIRPLANE FAMILIARISATION.

- External features.
- Cockpit layout.
- Airplane systems.
- Check lists, drills.
- Action in the event of fire in the air and on the ground.
  - Engine.
  - Cabin.
  - Electrical.
- Systems failure (as applicable to type).
- Escape drills.
  - Location and use of emergency equipment and exits.

PREPARATION FOR AND ACTION AFTER FLIGHT

- Flight authorisation and Airplane acceptance.
- Technical log/certificate of maintenance release.
- Mass and balance and performance considerations.
- External checks.
- Internal checks, adjustment of harness and/or rudder pedals.
- Starting and warming up engines.
- Checks after starting.
- Radio nav/com checks.
- Altimeter checks and setting procedures.
- Power checks.
- Running down and switching off engines.
- Completion of authorisation sheet and Airplane serviceability documents.

LONG BRIEFING 2

TAXIING

- Pre-Taxiing area precautions.
  - Greater mass - greater inertia.
- Effect of differential power.
- Precautions on narrow taxiways.
- Common errors.

PRE TAKE-OFF PROCEDURES

- Use of checklist.
- Engine power checks.
- Pre take-off checks.
- Instructor's briefing to cover the procedure to be followed should an emergency occur during take-off, e.g. engine failure.
- Common errors.

THE TAKE-OFF AND INITIAL CLIMB

- ATC considerations.
- Factors affecting the length of the take-off run/distance.
- Correct lift-off speed.
- Importance of safety speed.
- Crosswind take-off, considerations and procedures.
- Short field take-off, considerations and procedures.
- Engine handling after take-off, throttle/pitch/engine synchronization.
- Common errors.

CLIMBING

- Airmanship considerations.
  - Pre-climbing checks.
- Engine considerations.
  - Use of throttle/pitch controls.
- Maximum rate of climb speed.
- Maximum angle of climb speed.
- Synchronising the engines.
- Common errors.

AIR EXERCISE 2

TAXIING

- Checks before taxiing.
- Starting and stopping.
- Control of speed.
- Control of direction and turning.
- Turning in confined spaces.
- Leaving the parking area.
- Freedom of rudder movement (importance of pilot ability to use full rudder travel).
- Instrument checks.

EMERGENCIES

- Brake/steering failure.

PRE TAKE-OFF PROCEDURES

- Use of checklist.
- Engine power and system checks.
- Pre take-off checks.
- Instructor's briefing in the event of:
  - Emergencies during take-off.

THE TAKE-OFF AND INITIAL CLIMB

- ATC considerations.
- Directional control and use of power.
- Lift-off speed.
- Crosswind effects and procedure.
- Short field take-off and procedure.
- Procedures after take-off.
  - Landing gear retraction.
  - Flap retraction (as applicable).
  - Selection of manifold pressure and rpm.
  - Engine synchronisation.
  - Other procedures (as applicable) at an appropriate stage of the course.

CLIMBING

- Pre-Climbing checks.
- Power Selection for Normal and Maximum Rate Climb.
- Engine and RPM Limitations.
- Effect of Altitude on Manifold Pressure, Full Throttle.
- Levelling Off - Power Selection.
- Climbing with Flaps Down.
- Recovery to Normal Climb.
- En Route Climb (Cruise Climb).
- Maximum Angle of Climb.
- Altimeter Setting Procedures.
- Prolonged Climb and use of Cowl Flaps/Cooling Gills.
- Instrument Appreciation.

LONG BRIEFING 3

STRAIGHT AND LEVEL FLIGHT

- Airmanship considerations.
- Selection of power - throttle/pitch controls.
- Engine synchronization.
- Fuel consumption aspects.
- Use of trimming controls.
  - Elevator, rudder (aileron as applicable).
- Operation of flaps.
  - Effect on pitch attitude.
  - Effect on airspeed.
- Operation of landing gear.
  - Effect on pitch attitude.
  - Effect on airspeed.
- Use of mixture controls.
- Use of alternate air/carburettor heat controls.
- Operation of cowl flaps/cooling gills.
- Use of cabin ventilation and heating systems.
- Operation and use of the other systems (as applicable to type).
- Common errors.

DESCENDING

- Airmanship considerations.
  - Pre-descent checks.
- Normal descent.
  - Selection of throttle/pitch controls.
  - Engine cooling considerations.
- Emergency descent procedure.
- Common errors.

TURNING

- Airmanship considerations.
- Medium turns.
- Climbing/descending turns.
- Steep turns (45 degrees of bank or more).
- Common errors.

AIR EXERCISE 3

STRAIGHT AND LEVEL FLIGHT

- At Normal Cruising Power.
  - Selection of cruise power.
  - Manifold pressure/RPM.
  - Engine synchronisation.
  - Use of trimming controls.
  - Performance considerations - range/endurance.

- Instrument Appreciation.

- Operation of Flaps (in stages).
  - Airspeed below V_{fe}.
  - Effect on pitch attitude.
  - Effect on airspeed.

- Operation of Landing Gear.
  - Airspeed below V_{lo}/V_{le}.
  - Effect on pitch attitude.
  - Effect on airspeed.

- Use of Mixture Controls.
- Use of Alternate Air/Carburettor Control.
- Operation of Cowl Flaps/Cooling Gills.
- Operation of Cabin Ventilation/Heating Systems.
- Operation and use of Other Systems (as applicable to type).

DESCENDING

- Pre-Descent Checks.
- Power Selection - Manifold Pressure/RPM.
- Powered Descent (Cruise Descent).
- Engine Cooling Considerations.
  - Use of cowl flaps/cooling gills.
- Levelling Off.
- Descending with Flaps Down.
- Descending with Landing Gear Down.
- Altimeter Setting Procedure.
- Instrument Appreciation.
- Emergency Descent.
  - As applicable to type.

- Limitations in turbulence V_{no}

TURNING
- Medium Turns.
- Climbing and Descending Turns.
- Steep Turns -45 degrees of Bank.
- Instrument Appreciation.

LONG BRIEFING 4

SLOW FLIGHT
- Airmanship considerations.
  - Flight at V_{s1} and V_{so} +5 knots.
  - Aircraft handling characteristics.
- Simulated go around' from slow flight.
  - At V_{sse} with flaps down.
  - Note pitch trim change.
- Common errors.

STALLING
- Airmanship considerations.
- Power selection.
- Symptoms approaching the stall.
- Full stall characteristics.
- Recovery from the full stall.
- Recovery at the incipient stall.
- Stalling and recovery in the landing configuration.
- Recovery at the incipient stage in the landing configuration.

INSTRUMENT FLIGHT (BASIC)
- Straight and level.
- Climbing.
- Turning.
- Descending.

EMERGENCY DRILLS (not including engine failure)
- As applicable to type.

CIRCUIT APPROACH AND LANDING
- Airmanship and ATC consideration.
- Downwind leg.
  - Airspeed below V_{fe}.
  - Use of flaps (as applicable).

- Pre-landing checks.
- Position to turn onto base leg

- Base leg.
  - Selection of power (throttle/pitch), flaps and trimming controls.
  - Maintenance of correct airspeed.
- Final approach.
  - Power adjustments (early reaction to undershooting).
  - Use of additional flaps (as required).
  - Confirmation of landing gear down.
  - Selection touch down point.
  - Airspeed reduction to vat.
  - Maintenance of approach path.
- Landing.
  - Greater sink rate.
  - Longer landing distance and run.
  - Crosswind approach and landing.
  - Crosswind considerations.
  - Short field approach and landing.
  - Short field procedure – considerations.

AIR EXERCISE 4

SLOW FLIGHT

- Safety Checks.
- Setting up and Maintaining (Flaps Up).
  - V_{s1} + 5 knots.
  - Note Airplane handling characteristics.
- Setting up and Maintaining (Flaps Down).
  - V_{so} + 5 knots.
  - Note Airplane handling characteristics.
- Simulated Go Around' from a Slow Flight with Flaps down and airspeed not below V_{sse} ,e.g. airspeed at V_{sse} or V_{mca} + 10 knots.
  - Increase to full power and enter a climb.
  - Note pitch change.
- Resume Normal Flight.

STALLING

- Airmanship considerations.
- Selection of RPM.
- Stall symptoms.
- Full stall characteristics.

- Recovery from the full stall.
  - Care in application of power.
- Recovery at the incipient stage.
- Stalling and recovery in landing configuration.
- Stall recovery at the incipient stage in the landing configuration.

INSTRUMENT FLIGHT (BASIC)

- Straight and level.
- Climbing.
- Turning.
- Descending.

EMERGENCY DRILLS (not including engine failure)

- As applicable to type.

CIRCUIT, APPROACH AND LANDING

- Airmanship and ATC considerations.

- Downwind leg.
  - Control of speed (below V_{fe}).
  - Flaps as applicable.
  - Pre-landing checks.
  - Control of speed and height.
  - Base leg turn.

- Base leg.
  - Power selection.
  - Use of flap and trimming controls.
  - Maintenance of correct airspeed.

- Final approach.
  - Use of additional flap (as required).
  - Confirmation of landing gear down.
  - Selection of touchdown point.
  - Airspeed reduction to Vat.
  - Maintaining correct approach path.
    - Use of power.

- Landing
  - Control of sink rate during flare.
  - Crosswind considerations.
  - Longer landing roll.
  - Short/soft field approach and landing.

- Considerations and precautions.

ASYMMETRIC POWER FLIGHT

During this part, special emphasis is to be placed on the:

a. Circumstances in which actual feathering and unfeathering practice will be done, i.e. safe altitude; compliance with regulations concerning minimum altitude/height for feathering practice, weather conditions, distance from nearest available aerodrome.

b. Procedure to use for instructor/student co-operation, e.g. the correct use of touch drills and the prevention of misunderstandings, especially during feathering and unfeathering practice and when zero thrust is being used for asymmetric circuits. This procedure is to include positive agreement as to which engine is being shut down/re-started or set at zero thrust and identifying each control and naming the engine it is going to affect.

c. Consideration to be given to avoid over-working the operating engine, and the degraded performance when operating the Airplane during asymmetric flight.

d. Need to use the specific check list for the Airplane type.

LONG BRIEFINGS

FLIGHT ON ASYMMETRIC POWER

- Introduction to asymmetric flight.
- Feathering the propeller.
  - Method of operation.
- Effects on Airplane handling at cruising speed.
- Introduction to effects upon Airplane performance.
- Note foot load to maintain a constant heading (No rudder trim)
- Unfeathering the propeller.
  - Regain normal flight.
- Finding the zero thrust setting.
  - Comparison of foot load when feathered and with zero thrust set.
- Effects and Recognition of Engine Failure in Level Flight.
- The forces and the effects of yaw.
- Types of failure.
  - Sudden or gradual.

- Complete or partial.
- Yaw, direction and further effects of yaw.
- Flight instrument indications.
- Identification of Failed Engine.
- The couples and residual out of balance forces.
  - Resultant flight attitude.
- Use of rudder to counteract yaw.
- Use of aileron.
  - Dangers of mis-use.
- Use of elevator to maintain level flight.
- Use of power to maintain a safe airspeed and altitude.
- Supplementary recovery to straight and level flight.
  - Simultaneous increase of speed and reduction in power.
- Identification of failed engin.e
  - Idle leg = idle engine.
- Use of engine instruments for identification.
  - Fuel pressure/flow.
  - RPM gauge response effect of CSU action at lower and higher airspeed.
  - Engine temperature gauges.
- Confirmation of identification.
  - Close the throttle of identified failed engine.
- Effects and recognition of engine failure in turns.
- Identification and control.
- Side forces and effects of yaw.

DURING TURNING FLIGHT:

- Effect of inside' engine failure.
  - Effect sudden and pronounced.
- Effect of outside' engine failure.
  - Effect less sudden and pronounced.
- The possibility of confusion in identification (particularly at low power).
  - Correct use of rudder.
  - Possible need to return to lateral level flight to confirm correct identification.
- Visual and flight instrument indications.
- Effect of varying speed and power Speed/thrust relationship.
- At normal cruising speed and cruising power.
  - Engine failure clearly recognised.
- At low safe speed and climb power.
  - Engine failure most positively recognised.
- High speed descent and low power.

- Possible failure to notice asymmetry (engine failure).

MINIMUM CONTROL SPEEDS

ASI colour coding - red radial line

NOTE: This exercise is concerned with the ultimate boundaries of controllability in various conditions that a student can reach in a steady asymmetric power state, approached by a gradual speed reduction. Sudden and complete failure should not be given at the Flight Manual Vmca. The purpose of the exercise is to continue the gradual introduction of a student to control an Airplane in asymmetric power flight during extreme or critical situations. It is not a demonstration of V_{mca}.

Techniques for assessing critical speeds with wings level and recovery - dangers involved when minimum control speed and the stalling speed are very close:

- use of V_{sse}

Establish a minimum control speed for each asymmetrically disposed engine

- To establish critical engine (if applicable).

Effects on minimum control speeds of:

- Bank.
- Zero thrust setting.
- Take-off configuration.
  - Landing gear down/take-off flap set.
  - Landing gear up/take-off flap set.

It is important to appreciate that the use of 5 degree of bank towards the operating engine produces a lower Vmca and also a better performance than that obtained with the wings held level. It is now normal for manufacturers to use 5 degree of bank in this manner when determining the Vmca for the specific type. Thus the Vmca quoted in the Airplane manual will have been obtained using the technique.

FEATHERING AND UN FEATHERING

Minimum heights for practising feathering/unfeathering drills.

Engine handling - Precautions (overheating, icing conditions, priming, warm up, method of simulating engine failure - reference to Aircraft Engine Manual and Service Instructions and Bulletins).

ENGINE FAILURE PROCEDURE

Once the maintenance of control has been achieved, the order in which the procedures are carried out will be determined by the phase of operation and the aircraft type.

Flight Phase:

- In cruising flight.
- Critical phase such as immediately after take-off or during the approach to landing or during a go around'.

AIRCRAFT TYPE

Variations will inevitably occur in the order of certain drills and checks due to differences between Airplane types and perhaps between models of the same type, and the Flight/Owner's Manuals, Pilot's Operating Handbooks are to be consulted to establish the exact order of these procedures.

For example, one Flight/Owner's Manual/Pilot's Operating Handbook may call for the raising of flaps and landing gear prior to feathering, whilst another may recommend feathering as a first step. The reason for this latter procedure could be due to the fact that some engines cannot be feathered if the RPM drops below a certain figure.

Again, in some Airplanes, the raising of the landing gear may create more drag during retraction due to the transient position of the landing gear doors and as a result of this retraction would best be left until feathering has been accomplished and propeller drag reduced.

Therefore, the order in which the drills and checks are shown in this syllabus under IMMEDIATE and SUBSEQUENT actions are to be used as a general guide only and the exact order of precedence is determined by reference to the Flight/Owner's Manual, Pilot's Operating Handbook for the specific Airplane type being used on the course.

IN FLIGHT ENGINE FAILURE

In cruise or other flight phase not including take-off or landing.

Immediate Actions:

- Recognition of Asymmetric Condition.
- Identification and Confirmation of Failed Engine.
  - Idle leg - idle engine.
  - Closing of throttle for confirmation.

- Cause and Fire Check.
  - Typical reasons for failure.
  - Methods of rectification.

- Feathering Decision and Procedure.
  - Reduction of other drag.
  - Need for speed but not haste.
  - Use of rudder trim.

Subsequent Actions:

- Live Engine.
  - Temperature, pressures and power.
  - Remaining services.
  - Electrical load - assess and reduce as necessary.
  - Effect on power source for air driven instruments.
  - Landing gear.
  - Flaps and other services.

- Re-plan Flight.
  - ATC and weather.
  - Terrain clearance, single-engine cruise speed.
  - Decision to divert or continue.

- Fuel Management.
  - Best use of remaining fuel.

- Dangers of re-starting damaged engine.

- Action if unable to maintain altitude.
  - Effect of altitude on power available.

- Effects on Performance.

- Effects on power available and power required.

- Effects on various airframe configuration and propeller settings.

- Use of Flight/Owner's Manual.
  - Cruising.
  - Climbing - ASI colour coding (blue line).
  - Descending.
  - Turning.

- Live Engine Limitations and Handling.

- Take-Off and Approach - Control and Performance.

SIGNIFICANT FACTORS

- Significance of Take-off safety speed.
  - Effect of landing gear, flap, feathering, take-off, trim setting, systems for operating landing gear and flaps.
  - Effect on mass, altitude and temperature (performance).

- Significance of Best Single-engine Climb Speed (V_{yse}).
  - Acceleration to best engine climb speed and establishing a positive climb.
  - Relationship of S/E climb speed to normal climb speed.
  - action if unable to climb.

- Significance of Asymmetric Committal Height and Speed.
  - Action if baulked below asymmetric committal height.

- Engine Failure During Take-Off:
  - Below V_{mca} or unstick speed.
    - Accelerate/stop distance considerations.
    - Prior use of Flight Manual data if available.
  - Above Vmca or unstick speed and below safety speed.
    - Immediate re-landing or use of remaining power to achieve forced landing.

- Considerations:
  - Degree of engine failure.
    - Speed at the time.
    - Mass, altitude, temperature (performance).
    - Configuration.
    - Length of runway remaining.
    - Position of any obstacles ahead.

Engine Failure After Take-Off

Simulated at a safe height and at or above take-off safety speed

Considerations:
- Need to maintain control.
- Use of bank towards operating engine.
- Use of available power achieving best single-engine climb speed.
- Mass, altitude, temperature (performance).
- Effect of prevailing conditions and circumstances.

IMMEDIATE ACTIONS:
- Maintenance of control including airspeed and use of power.
- Recognition of asymmetric condition.
- Identification and confirmation of failed engine.
- Feathering and removal of drag (procedure for type).
- Establishing best single-engine climb speed.

SUBSEQUENT ACTIONS:

Whilst carrying out an asymmetric power climb to the downwind. position at single-engine best rate of climb speed:
- Cause and fire check.
- Live engine, handling considerations.
- Remaining services.
- ATC liaison.
- Fuel management.

NOTE: These procedures are applicable to Airplane type and flight situation.

ASYMMETRIC COMMITTAL HEIGHT

Asymmetric Committal Height is the minimum height needed to establish a positive climb whilst maintaining adequate speed for control and removal of drag during an approach to a landing.

Because of the significantly reduced performance of many JCAR 23 Airplanes when operating on one engine, consideration is to be given to a minimum height from which it would be safely possible to attempt a go around' procedure, during an approach when the flight path will have to be changed from a descent to a climb with the Airplane in a high drag configuration.

Due to the height loss which will occur during the time that the operating engine is brought up to full power, landing gear and flap retracted, and the Airplane established in a climb at Vyse a minimum height (often referred to as Asymmetric Committal Height') is to be selected, below which the pilot should not attempt to take the Airplane round again for another circuit. This height will be compatible with the Airplane type, all up weight, altitude of the aerodrome being used, air temperature, wind, the height of obstructions along the climb out path, and pilot competence.

Circuit Approach and Landing on Asymmetric Power:

- Definition and use of Asymmetric Committal Height.
- Use of Standard Pattern and Normal Procedures.
- Action if unable to maintain Circuit Height.
- Speed and Power Settings Required.
- Decision to land or go around at asymmetric committal height.
  - Factors to be considered.
  - Undershooting.
  - importance of maintaining correct airspeed, (not below V_{yse}).

SPEED AND HEADING CONTROL

- Height/speed/power relationship.
  - Need for minimum possible drag.

- Establishing positive climb at best single-engine rate of climb speed.
  - Effect of availability of systems, power for flap and landing gear.
  - Operation and rapid clean up.

NOTE 1: The airspeed at which the decision is made to commit the Airplane to a landing or to go around should normally be the best single-engine rate of climb speed and in any case not less than the safety speed.

NOTE 2: On no account should instrument approach Decision Height' and its associated procedures be confused with the selection of minimum Height for initiating a go around in asymmetric power flight.

ENGINE FAILURE DURING AN ALL ENGINES APPROACH OR MISSED APPROACH

- Use of asymmetric committal height and speed considerations.
  - Speed and heading control.
  - Decision to attempt a landing, go around or force land as circumstances dictate.

NOTE: At least one demonstration and practice of engine failure in this situation should be performed during the course.

INSTRUMENT FLYING ON ASYMMETRIC POWER

- Considerations relating to aircraft performance during:
  - Straight and level flight.
  - Climbing and descending.
  - Standard rate turns:
  - Level, climbing and descending turns including turns onto pre-selected headings.

- Vacuum operated instruments.
  - Availability.

- Electrical power source.
  - Availability.

FLIGHT INSTRUCTION AIR EXERCISES

ASYMMETRIC POWER FLIGHT

This section covers the operation of a single-pilot multi-engine Airplane when one engine has failed and it is applicable to all such light piston Airplanes. check lists should be used as applicable.

AIR EXERCISES

FLIGHT ON ASYMMETRIC POWER

Introduction to Asymmetric Flight.

- Close the throttle of one engine.
- Feather its propeller.
- Effects on Airplane handling at cruising speed.
- Effects on Airplane performance e.g. cruising speed and rate of climb.
- Note foot load to maintain a constant heading.
- Unfeather the propeller.
- Return to normal flight finding the zero thrust throttle setting.
- Comparison of foot load when feathered and with zero thrust set.

Effects and Recognition of Engine Failure in Level Flight with the Airplane straight and level at cruise speed.

- Slowly close the throttle of one engine.
- Note yaw, roll and spiral descent.

Return to normal flight.

- Close throttle of other engine.
- Note same effects in opposite direction.

Methods of Control and identification of Failed Engine close one throttle and maintain heading and level flight by use of:

- Rudder to control yaw.
- Aileron to hold wings level.
- Elevators to maintain level flight.
- Power (as required) to maintain airspeed and altitude.

Alternative/supplementary Method of Control .

- Simultaneously:
  - Lower Airplane nose to increase airspeed.
  - Reduce power.
  - Loss of altitude – inevitable.

Identification of failed engine.

- Idle foot = idle engine.

Use of instruments for identification.

- Fuel pressure/fuel flow.
- RPM gauge/CSU action may mask identification.
- Engine temperature gauges.

Confirmation of identification.

- Close the throttle of the identified failed engine.

Effects and recognition of Engine Failure in Turns/Effects of inside' engine failure.

- More pronounced yaw.
- More pronounced roll.
- More pronounced pitch down.

Effects of outside' engine failure.

- Less pronounced yaw.
- Less pronounced roll.
- Less pronounced pitch down.

Possibility of confusion in identification.

- Use of correct rudder application.
- Return to lateral level flight if necessary.

Flight instrument indications.

Effect of Varying Speed and Power.

Failure of one engine at cruise speed and power.

- Engine failure clearly recognised.

Failure of one engine at low speed and high power (not below V_{sse}).

- Engine failure most positively recognised.

Failure of one engine at higher speeds and low power.

- Possible failure to recognise engine failure.

Minimum Control Speeds

- Establish the V_{yse}.
  - Select maximum permitted manifold pressure and RPM.
  - Close the throttle on one engine.

- Raise the Airplane nose and reduce the airspeed.
  - Note the airspeed when maximum rudder deflection is being applied and when directional control can no longer be maintained.
  - Lower the Airplane nose and reduce power until full directional control is regained.
  - The lowest airspeed achieved prior to the loss of directional control will be the V_{mc} for the flight condition.
  - Repeat the procedure closing the throttle of the other engine.
  - The higher of these two airspeeds will identify the most critical engine to fail.

Warning

In the above situations the recovery is to be initiated immediately before directional control is lost with full rudder applied, or when a safe margin above the stall remains, e.g. when the stall warning device operates, for the particular Airplane configuration and flight conditions. On no account should the Airplane be allowed to decelerate to a lower airspeed.

Establish the effect of using 5 degrees of bank at V_{mc}.

- Close the throttle of one engine.
- Increase to full power on the operating engine.
- Using 5 degrees of bank towards the operating engine reduce speed to the Vmc.
- Note lower V_{mc} when 5 degrees of bank is used.

In Flight Engine Failure Procedure.

In cruise and other flight circumstances not including take-off and landing.

IMMEDIATE ACTIONS:

Maintenance of control and use of power.

- Identification of failed engine.
- Confirmation of failed engine.
- Failure cause and fire check.
- Feathering decision and implementation.
- Reduction of any other drag, e.g. flaps, cowl flaps etc.
- Retrim and maintain altitude.

SUBSEQUENT ACTIONS:

Live Engine:

- Oil temperature and pressure.
- Fuel flow and power.
- Remaining services.
- Electrical load - assess and reduce as necessary.
- Effect on power source for air driven instruments.
- Landing gear.
- Flaps and other services.

Re-plan Flight.

- ATC and weather.
- Terrain clearance.
- Single-engine cruise speed.
- Decision to divert or continue.

Fuel Management.

- Best use of fuel.

Dangers of Re-starting Damaged Engine.

Action if unable to maintain altitude.

- Adopt Vyse.
- Effect of altitude on power available.

Effects on performance.

Effects on Power Available and Power Required.

Effects on various airframe configurations and propeller settings.

Use of Flight/Owner's Manual.

- Cruising.
- Climbing - ASI colour coding (blue line).
- Descending.
- Turning.

Live Engine Limitations and Handling.

Take-Off and Approach - Control and handling.

NOTE: To be done at a safe height away from the circuit.

Take-off case with Landing Gear Down and Take-Off Flap Set (if applicable).

Significance of Take-Off at or above Safety Speed.

- At safety speed. The ability to maintain control and to accelerate to SE climb speed with Airplane clean and zero thrust set Thereafter to achieve a positive climb.

Significance of flight below Safety Speed.

- Below safety speed and above Vmca. A greater difficulty to maintain control, a possible loss of height whilst maintaining speed, cleaning up, accelerating to SE climb speed and establishing a positive climb.

Significance of Best Single-engine Climb Speed.

- The ability to achieve the best rate of climb on one engine with minimum delay.

Significance of Asymmetric Committal Height.

- The ability to maintain or accelerate to the best single-engine rate of climb speed and to maintain heading whilst cleaning up with perhaps a slight height loss before climbing away.
- Below this height, the Airplane is committed to continue the approach to a landing.

Engine Failure During Take-Off.

- During the take-off run and below safety speed briefing only.

Engine failure after take-off

NOTE: To be initiated at a safe height and at not less than take-off safety speed with due regard to the problems of a prolonged single-engine climb in the prevailing conditions.

Immediate Actions:

- Control of direction and use of bank.
- Control of airspeed and use of power.
- Recognition of asymmetric condition.
- Identification and confirmation of failed engine feathering and Reduction of drag (procedure for type).
- Re-trim

Subsequent Actions

Whilst carrying out an asymmetric power climb to the downwind position at single-engine best rate of climb speed:

- Cause and fire check.
- Live engine, handling considerations.
- Drills and procedures applicable to Airplane type and flight situation.
- ATC liaison.
- Fuel management.

Asymmetric Circuit, Approach and Landing.

- Downwind and Base Legs.
  - Use of standard pattern.
  - Normal procedures.
  - Landing gear and flap lowering considerations.
  - Position for base leg.
  - Live engine handling.
  - Airspeed and power settings.
  - Maintenance of height.

- Final Approach.
  - Asymmetric Committal Height drill.
  - Control of airspeed and descent rate.
  - Flap considerations.

- Going Round Again on Asymmetric Power (Missed Approach).
  - Not below Asymmetric Committal Height.
  - Speed and heading control.
  - Reduction of drag, landing gear retraction.
  - Maintaining Vyse.
  - Establish positive rate of climb.

Engine Failure During All Engines Approach or Missed Approach.

NOTE: To be started at not less than asymmetric committal height and speed and not more than part flap set.

- Speed and heading control.
- Reduction of drag flap.
- Decision, attempt landing or go around.
- Control of descent rate if approach is continued.
- If go around is initiated, maintain V_{yse}, flaps and landing gear retracted and establish positive rate of climb.

NOTE: At least one demonstration and practice of engine failure in this situation should be performed during the course.

Instrument flying on asymmetric power.

Flight instrument checks and services available.

- Straight and level flight.
- Climbing and descending.
- Standard rate turns.
- Level, climbing and descending turns including turns onto pre-selected headings.

AMC JCAR-FCL 1.395
Course For the Instrument Rating Instructor Rating (Airplane) (IRI(A))
(See JCAR-FCL 1.395)
(See Appendix 1 to JCAR-FCL 1.395)

COURSE OBJECTIVE

1. The IRI(A) course should give particular stress to the role of the individual in relation to the importance of human factors in the man-machine environment. Special attention should be paid to the applicant's levels of maturity and judgement including an understanding of adults, their behavioural attitudes and variable levels of education.

2. With the exception of the section on Teaching and Learning, all the subject detail contained in the theoretical and Flight Training Syllabus is complementary to the Instrument Rating Pilot Course Syllabus which should already be known by the applicant. Therefore the objective of the course is to:
   a. Refresh and bring up to date the technical knowledge of the student instructor;
   b. Train pilots in accordance with the requirements of the modular instrument flying training course (Appendix 1to JCAR-FCL 1.210);
   c. Enable the applicant to develop the necessary instructional techniques required for teaching of instrument flying, radio navigation and instrument procedures to the level required for the issue of an instrument rating; and
   d. Ensure that the student instrument rating instructor's flying is of a sufficiently high standard.

3. During the course, the applicants should be made aware of their own attitudes to the important aspect of flight safety. Improving safety awareness should be a fundamental objective throughout the course. It will be of major importance for the course of training to aim at giving applicants the knowledge, skills and attitudes relevant to an instructor's task and to achieve this, the course curriculum, in terms of objectives should comprise at least the following areas.

PART I

TEACHING AND LEARNING

Item No.

1. THE LEARNING PROCESS.
   - Motivation.
   - Perception and understanding.
   - Mernory and its application.
   - Habits and transfer.
   - Obstacles to learning.
   - Incentives to learning.
   - Learning rnethods.
   - Rates of learning.

2. THE TEACHING PROCESS.
   - Elernents of effective teaching.
   - Planning of instructional activity.
   - Teaching rnethods.
   - Teaching frorn the known' to the unknown'.
   - Use of lesson plans'.

3. TRAINING PHILOSOPHIES.
   - Value of a structured (approved) course of training.
   - Irnportance of a planned syllabus.
   - Integration of theoretical knowledge and flight instruction.

4. TECHNIQUES OF APPLIED INSTRUCTION.

   a. Theoretical knowledge - Classroorn instruction techniques.
      - Use of training aids.
      - Group lectures.
      - Individual briefings.
      - Student participation/discussion.

   b. FLIGHT - Airborne instruction techniques.
      - The flight/cockpit environrnent.
      - Techniques of applied instruction.
      - Post-flight and inflight judgernent and decision rnaking.

5. STUDENT EVALUATION AND TESTING.

a. Assessrnent of student perforrnance.
- The function of progress tests.
- Recall of knowledge.
- Translation of knowledge into understanding.
- Developrnent of understanding into actions.
- The need to evaluate rate of progress.

b. Analysis of student errors.
- Establish the reason for errors.
- Tackle major faults first, minor faults second.
- Avoidance of over criticism.
- The need for clear concise communication.

6. TRAINING PROGRAMME DEVELOPMENT.
- Lesson planning.
- Preparation.
- Explanation and demonstration.
- Student participation and practice.
- Evaluation.

7. HUMAN PERFORMANCE AND LIMITATIONS RELEVANT TO FLIGHT INSTRUCTION.
- Physiological factors.
- Psychological factors.
- Human information processing.
- Behavioural attitudes.
- Development of judgement and decision making.

8. HAZARDS INVOLVED IN SIMULATING SYSTEMS FAILURES AND MALFUNCTIONS IN THE AIRPLANE DURING FLIGHT.
- Selection of a safe altitude.
- Importance of touch drills'.
- Situational awareness.
- Adherence to correct procedures.

9. TRAINING ADMINISTRATION.

- Flight theoretical knowledge instruction records.
- Pilot's personal flying log book.
- The flight/ground curriculum.
- Study material.
- Official forms.
- Aircraft Flight/Owner's Manuals/Pilot's Operating Handbooks.
- Flight authorisation papers.
- Aircraft documents.
- The private pilot's licence regulations.

NOTE: A suggested breakdown of hours for this part is found in the Flight Instructor Course, AMC JCAR-FCL 1.340.

PART 2

THEORETICAL KNOWLEDGE INSTRUCTION SYLLABUS

The theoretical subjects covered below should be used to develop the instructor's teaching skills. The items selected should relate to the student's background and should be applied to training for an IR(A).

GENERAL SUBJECTS

PHYSIOLOGICAL/PSYCHOLOGICAL FACTORS.

- The Senses.
- Spatial Disorientation.
- Sensory Illusions.
- Stress.

FLIGHT INSTRUMENTS.

- Airspeed Indicator.
- Altimeter.
- Vertical Speed Indicator.
- Attitude Indicator.
- Heading Indicator.
- Turn and Slip Indicator.
- Magnetic Compass.

In relation to the above instruments the following items should be covered:

- Principles of Operation.
- Errors and in-flight Serviceability Checks.
- System Failures.

RADIO NAVIGATION AIDS.

- Basic Radio Principles.
- Use of VHF RTF Channels.
- The Morse Code.
- Basic Principles of Radio Aids.
- VHF Omni Range (VOR).
- Ground and Airplane Equipment.
- Non Directional Beacons (NDB/ADF).
- Ground and Airplane Equipment.
- VHF Direction Finding (VHF/DF).
- Radio Detection and Ranging (RADAR).

- Ground Equipment.
- Primary Radar.
- Secondary Surveillance Radar.
- Airplane Equipment.
- Transponders.
- Precision Approach System.
- Other Navigational Systems (as applicable) in current Operational use.
- Ground and Airplane Equipment.
- Distance Measuring Equipment (DME).
- Ground and Airplane Equipment.
- Marker Beacons.
- Ground and Airplane Equipment.
- Pre-flight Serviceability Checks.
- Range, Accuracy and Limitations of Equipment.

FLIGHT PLANNING CONSIDERATIONS

AERONAUTICAL INFORMATION PUBLICATIONS

The course of training should cover the items listed below, but the applicant's aptitude and previous aviation experience should be taken into account when determining the amount of instructional time allotted.

Although a number of items contained under this heading are complementary to those contained in the PPL/CPL/IR syllabi, the instructor should ensure that they have been covered during the applicant's training and due allowance should be made for the time needed to revise these items as necessary.

The Aeronautical Information Publication.

- NOTAM Class 1 and 2.
- Aeronautical Information Circulars.
- Information of an Operational Nature.

The Rules of the Air and Air Traffic Services (RAC).

- Visual Flight Rules and Instrument Flight Rules.
- Flight Plans and ATS Messages.
- Use of Radar in Air Traffic Services.
- Radio Failure.

Classification of Airspace.

- Airspace Restrictions and Hazards.

Holding and Approach to Land Procedures.

- Precision Approaches/Non Precision Approaches.
- Radar Approach Procedures.
- Missed Approach Procedures.
- Visual Manoeuvring after an Instrument Approach.
- Conflict Hazards in Uncontrolled Airspace.

Communications.

- Types of Services.
- Extraction of AIP Data Relating to Radio Aids.

Charts Available.

- En-route.
- Departure and Arrival.
- Instrument Approach and Landing.
- Amendments, Corrections and Revision Service.

FLIGHT PLANNING GENERAL

- The Objectives of Flight Planning.
- Factors Affecting Airplane and Engine Performance.
- Selection of Alternate(s).
- Obtaining Meteorological Information.
- Services Available.
- Met Briefing.
- Telephone or Electronic Data Processing.
- Actual Weather Reports (TAFs, METARs and SIGMET Messages).
- The Route Forecast.
- The Operational Significance of the Meteorological Information Obtained (including Icing, Turbulence and Visibility).
- Altimeter Considerations.

- Definitions of.
  - Transition Altitude Transition Level Flight Level.
  - QNH.
  - Regional QNH.
  - Standard Pressure Setting.
  - QFE.

- Altimeter Setting Procedures.
- Pre-flight Altimeter Checks.
- Take off and Climb.
- En-Route.
- Approach and Landing.
- Missed Approach Terrain Clearance.
- Selection of a Minimum Safe En-Route Altitude.
- Instrument Flight Rules.
- Preparation of Charts.
- Choice of Routes and Flight Levels.
- Compilation of Flight Plan/Log Sheet.
- Log Sheet Entries.
- Navigation Ground Aids to be used.
- Frequencies/Identification.
- Radials and Bearings.
- Tracks and Fixes.
- Safety Altitude(s).
- Fuel Calculations.
- ATC Frequencies (VHF).
- Tower, Approach, En-Route, Radar, FIS, ATIS, and Weather Reports.
- Minimum Sector Altitudes at Destination and Alternate Aerodromes.
- Determination of Minimum Safe Descent Heights/Altitudes (Decision Heights) at Destination and Alternate Aerodromes.

THE PRIVILEGES OF THE INSTRUMENT RATING.

Outside Controlled Airspace.

Within Controlled Airspace.

Period of Validity and Renewal Procedures.

PART 3

FLIGHT TRAINING SYLLABUS

LONG BRIEFINGS AND AIR EXERCISES.

1. Instrument Flying (For revision as deemed necessary by the Course Instructor).

2. Instrument Flying (Advanced).

3. Radio Navigation (Applied Procedures) - use of VOR.

4. Radio Navigation (Applied Procedures) - use of NDB.

5. Radio Navigation (Applied Procedures) - use of VHF/DF.

6. Radio Navigation (Applied Procedures) - use of DME.

7. Radio Navigation (Applied Procedures) - use of Transponders.

8. Radio Navigation (Applied Procedures) - use of En-Route Radar Services.

9. Pre-flight and Aerodrome Departure and Arrival Procedures.

10. Instrument Approach - ILS Approaches to Specified Minima – Missed Approach Procedures.

11. Instrument Approach - NDB Approaches to Specified Minima - Missed Approach Procedures.

12. Radio Navigation (applied procedures) use of GPS (to be developed).

LONG BRIEFING I

INSTRUMENT FLYING (Basic)

- Flight Instruments.
- Physiological Considerations.
- Instrument Appreciation.
  - Attitude Instrument Flight.
  - Pitch Indications.
  - Bank Indications.
  - Different Instrument Presentations.
  - Introduction to the Use of the Attitude Indicator.
  - Pitch Attitude.
  - Bank Attitude.
  - Maintenance of Heading and Balanced flight.
  - Instrument Limitations (inc. System Failures).

ATTITUDE, POWER & PERFORMANCE

Attitude Instrument Flight.

- Control Instruments.
- Performance Instruments.
- Effect of Changing Power and configuration.
- Cross Checking the Instrument Indications.
- Instrument Interpretation.
- Direct and Indirect Indications (Performance Instruments).
- Instrument Lag.
- Selective Radial Scan.

THE BASIC FLIGHT MANOEUVRES (FULL PANEL)

- Straight and Level Flight at Various Airspeeds and Airplane Configurations.
  - Climbing.
  - Descending.
  - Standard Rate Turns.
- Level, Climbing and Descending On to Pre-Selected Headings.

AIR EXERCISE 1

INSTRUMENT FLYING (Basic)

- Physiological Sensations.
- Instrument Appreciation.
- Attitude Instrument Flight.
- Pitch Attitude.

- Bank Attitude.
- Maintenance of Heading and Balanced Flight.
- Attitude Instrument Flight.
- Effect of Changing Power and configuration.
- Cross Checking the Instruments.
- Selective Radial Scan.

THE BASIC FLIGHT MANOEUVRES (FULL PANEL)

- Straight and Level Flight at various Airspeeds and Airplane Configurations.
  - Climbing.
  - Descending.
  - Standard Rate Turns.
- Level, Climbing and Descending on to Pre-Selected Headings.

LONG BRIEFING 2

INSTRUMENT FLYING (Advanced)

- Full Panel.
- 30 degrees Level Turns.
- Unusual Attitudes – Recoveries.
- Transference to Instruments after Take-off.
- Limited Panel.
- Basic Flight Manoeuvres.
- Unusual Attitudes – Recoveries.

AIR EXERCISE 2

- Full Panel.
- 30 degrees Level Turns.
- Unusual Attitudes – Recoveries.
- Limited Panel.
- Repeat of the Above Exercises.

LONG BRIEFING 3

RADIO NAVIGATION (APPLIED PROCEDURES)

USE OF VOR (VHF OMNI RANGE).

- Availability of VOR Stations En-Route.
- Station Frequencies and Identification.
- Signal Reception Range.
- Effect of Altitude.

- VOR Radials.
- Use of Omni Bearing Selector.
- To/From Indicator.
- Orientation.
- Selecting Radials.
- Intercepting a Pre-Selected Radial.
- Assessment of Distance to Interception.
- Effects of Wind.
- Maintaining a Radial.
- Tracking To/From a VOR Station.
- Procedure Turns.
- Station Passage.
- Use of Two Stations for Obtaining a Fix.
- Pre-Selecting Fixes Along a Track.
- Assessment of Ground Speed and Timing.
- Holding Procedures.
- Various Entries.
- Communication (R/T Procedures and ATC Liaison).

AIR EXERCISE 3

RADIO NAVIGATION (APPLIED PROCEDURES)

USE OF VOR (VHF OMNI RANGE)

- Station Selection and Identification.
- Orientation.
- Intercepting a Pre-Selected Radial.
- R/T Procedures and ATC Liaison.
- Maintaining a Radial Inbound.
- Recognition of Station Passage.
- Maintaining a Radial Outbound.
- Procedure Turns.
- Use of Two Stations to Obtain a Fix Along the Track.
- Assessment of Ground Speed and Timing.
- Holding Procedures/Entries.
- Holding at a Pre-Selected Fix.
- Holding at a VOR Station.

LONG BRIEFING 4

RADIO NAVIGATION (APPLIED PROCEDURES)

USE OF ADF (AUTOMATIC DIRECTION FINDING EQUIPMENT).

- Availability of NDB (Non Directional Beacons) Facilities En-Route.
- Location, Frequencies, Tuning (as applicable) and Identification Codes.
- Signal Reception Range.
- Static Interference.
- Night Effect.
- Station Interference.
- Mountain Effect.
- Coastal Refraction.
- Orientation in Relation to a NDB.
- Homing.
- Intercepting a Pre-Selected Magnetic Bearing and Tracking Inbound.
- Station Passage.
- Tracking Outbound.
- Time/Distance Checks.
- Use of Two NDBs to Obtain a Fix or alternatively use of One NDB and One other Navaid.
- Holding Procedures/Various Approved Entries.
- Communication (R/T Procedures and ATC Liaison).

AIR EXERCISE 4

RADIO NAVIGATION (APPLIED PROCEDURES)

USE OF ADF (AUTOMATIC DIRECTION FINDING EQUIPMENT).

- Selecting, Tuning and Identifying a NDB.
- ADF Orientation.
- Communication (R/T Procedures and ATC Liaison).
- Homing.
- Tracking Inbound.
- Station Passage.
- Tracking Outbound.
- Time/Distance Checks.
- Intercepting a Pre-Selected Magnetic Bearing.

- Determining the Airplane's position from Two NDBs or alternatively from One NDB and One Other Navaid.
- ADF Holding Procedures/Various Approved Entries.

LONG BRIEFING 5

RADIO NAVIGATION (APPLIED PROCEDURES)

USE OF VHF/DF (Very High Frequency/Direction Finding).

- Availability of VHF/DF Facilities En-Route.
- Location, Frequencies, Station Call Signs and Hours of Operation.
- Signal and Reception Range.
- Effect of Altitude.
- Communication (R/T Procedures and ATC Liaison).
- Obtaining and Using Types of Bearings, e.g. QTE, QDM, QDR.
- Homing to a Station.
- Effect of Wind.
- Use of Two VHF/DF Stations to Obtain a Fix (or alternatively One VHF/DF Station and One other Navaid).
- Assessment of Groundspeed and Timing.

AIR EXERCISE 5

RADIO NAVIGATION (APPLIED PROCEDURES)

USE OF VHF/DF (Very High Frequency/Direction Finding).

- Establishing Contact with a VHF/DF Station.
- R/T Procedures and ATC Liaison.
- Obtaining and Using a QDR and QTE.
- Homing to a Station.
- Effect of Wind.
- Use of Two VHF/DF Stations to Obtain a Fix (or alternatively One VHF/DF Station and One other Navaid).
- Assessment of Groundspeed and Timing.

LONG BRIEFING 6

USE OF DME (Distance Measuring Equipment).

- Availability of DME Facilities.
- Location, Frequencies and Identification Codes.
- Signal Reception Range.
- Slant Range.

- Use of DME to obtain Distance, Groundspeed and Timing.
- Use of DME to obtain a Fix.

AIR EXERCISE 6

USE OF DME (Distance Measuring Equipment).
- Station Selection and Identification.
- Use of Equipment Functions.
- Distance.
- Groundspeed.
- Timing.
- DME Arc Approach.
- DME Holding.

LONG BRIEFING 7

USE OF TRANSPONDERS (SSR).
- Operation of Transponders.
- Code Selection Procedure.
- Emergency Codes.
- Precautions when using Airborne Equipment.

AIR EXERCISE 7

USE OF TRANSPONDERS (SSR).
- Operation of Transponders.
- Types of Transponders.
- Code Selection Procedure.
- Emergency Codes.
- Precautions when Selecting the Required Code.

LONG BRIEFING 8

USE OF EN-ROUTE RADAR.
- Availability of Radar Services.
- Location, Station Frequencies, Call Signs and Hours of Operation.
- AIP and NOTAMs.
- Provision of Service.
- Communication (R/T, Procedures and ATC Liaison).
- Airspace Radar Advisory Service.
- Emergency Service.
- Aircraft Separation Standards.

AIR EXERCISE 8

USE OF EN-ROUTE RADAR.

- Communication (R/T Procedures and ATC Liaison).
- Establishing the Service Required and Position Reporting.
- Method of Reporting Conflicting Traffic.
- Terrain Clearance.

LONG BRIEFING 9

PRE-FLIGHT AND AERODROME DEPARTURE.

- Determining the Serviceability of the Airplane Radio.
- Navigation Equipment.
- Obtaining the Departure Clearance.
- Setting up Radio Navaids prior to Take-off e.g. VOR Frequencies, Required Radials, etc.
- Aerodrome Departure Procedures, Frequency Changes.
- Altitude and Position Reporting as Required.
- Standard Instrument Departure Procedures (SIDs).
- Obstacle Clearance Considerations.

AIR EXERCISE 9

PRE-FLIGHT AND AERODROME DEPARTURE

- Radio Equipment Serviceability Checks.
- Departure Clearance.
- Navaid Selection.
- Frequencies, Radials, etc.
- Aerodrome Departure Checks, Frequency Changes, Altitude and Position Reports.
- Standard Instrument Departure Procedures (SIDs).

LONG BRIEFING 10

INITIAL/INTERMEDIATE/FINAL APPROACH PROCEDURES

- Precision Approach Charts.
  - Approach to the Initial Approach Fix and Minimum Sector Altitude.
  - Navaid Requirements, e.g. Radar, ADF, etc.
  - Communication (ATC Liaison and R/T Phraseology).

- Review:
  - Holding Procedure.
  - The Final Approach Track.
  - Forming a Mental Picture of the Approach.
  - Completion of Aerodrome Approach Checks.
  - Initial Approach Procedure.
  - Selection of the ILS Frequency and Identification.
  - Obstacle Clearance Altitude/Height.
  - Operating Minima.
  - Achieving the Horizontal and Vertical Patterns.
  - Assessment of Distance, Groundspeed Time, and Rate of Descent from the Final Approach Fix to the Aerodrome.
  - Use of DME (as applicable).
  - Go Around and Missed Approach Procedure.
  - Review of the Published Instructions.
  - Transition from Instrument to Visual Flight (Sensory Illusions).

VISUAL MANOEUVRING AFTER AN INSTRUMENT APPROACH

- Circling Approach.
- Visual Approach to Landing.

AIR EXERCISE 10

PRECISION APPROACH PROCEDURE

- Initial Approach to the ILS.
- Completion of Approach Planning.
- Holding Procedure.
- Frequency Selection and Identification of ILS.
- Review of the Published Procedure and Minimum Sector Altitude.
- Communication (ATC Liaison and R/T Phraseology).
- Determination of Operating Minima and Altimeter Setting.
- Weather Consideration, e.g. Cloud Base and Visibility.
- Availability of Runway Lighting.
- ILS Entry Methods.
- Radar Vectors.
- Procedural Method.
- Assessment of Approach Time from the Final Approach Fix to the aerodrome.

- Determination of:
  - The Descent Rate on Final Approach.
  - The Wind Velocity at the Surface and the Length of the Landing Runway.
  - The Obstruction Heights to be borne in mind during Visual manoeuvring after an Instrument Approach.
  - Circling approach.

- The Approach:
  - At the Final Approach Fix.
  - Use of DME (as applicable).
  - ATC liaison.
  - Note Time and establish Airspeed and Descent Rate.
  - Maintaining the Localiser and Glide Path.
  - Anticipation in Change of Wind Velocity and its Effect on Drift.
  - Decision Height.
  - Runway Direction.
  - Overshoot and Missed Approach Procedure.
  - Transition from Instrument to Visual Flight.
  - Circling Approach.
  - Visual Approach to Landing.

LONG BRIEFING 11

NON-PRECISION APPROACH PROCEDURE

- Non-Precision Approach Charts.
- Initial Approach to the Initial Approach Fix and Minimum Sector Altitude.
- ATC Liaison.
- Communication (ATC Procedures and R/T Phraseology).

- Approach Planning:
  - Holding Procedure.
  - The Approach Track.
  - Forming a Mental Picture of the Approach.
  - Initial Approach Procedure.
  - Operating Minima.
  - Completion of Approach Planning.
  - Achieving the Horizontal and Vertical Patterns.

- Assessment of Distance, Groundspeed Time, and Rate of Descent from the Final Approach Fix (FAF) to the Aerodrome.
- Use of DME (as applicable).
- Go around and Missed Approach Procedure.
- Review of the Published Instructions.
- Transition from Instrument to Visual Flight (Sensory Illusions).
- Visual Manoeuvring after an Instrument Approach.
- Circling Approach.
- Visual Approach to Landing.

AIR EXERCISE 11

NON-PRECISION APPROACH PROCEDURE
Completion of Approach Planning including:

- Determination of:
  - Descent Rate from the Final Approach Fix.
  - The Wind Velocity at the Surface and Length of the Landing Runway.
  - The Obstruction Heights to be Borne in Mind During Visual Manoeuvring after an Instrument Approach.
  - Circling Approach.
  - Go Around and Missed Approach Procedure.

- Initial Approach.
- Frequency Selection and Identification.
- Review of the Published Procedure and Minimum Safe Sector Altitude.
- ATC liaison and R/T Phraseology.
- Determination of Decision Height and Altimeter Setting.
- Weather Considerations, e.g. Cloud Base and Visibility.
- Availability of Runway Lighting.
- Determination of Inbound Track.
- Assessment of Time from Final Approach Fix to the Missed Approach Point.
- ATC Liaison.
- The Outbound Procedure (incl. Completion of Pre-Landing Checks).
- The Inbound Procedure.
- Re-Check of Identification Code.

- Altimeter Setting Re-Checked.
- The Final Approach.
- Note Time and Establish Airspeed and Descent Rate.
- Maintaining the Final Approach Track.
- Anticipation of Change in Wind Velocity and its Effect on the Drift.
- Minimum Descent Altitude/Height.
- Runway Direction.
- Go around and Missed Approach Procedure.
- Transition from Instrument to Visual Flight (Sensory Illusions).
- Visual Approach.

LONG BRIEFING 12

AIR EXERCISES

Use of GPS (to be developed)

AMC JCAR-FCL 1.417
Course For the Multi Crew Co-operation Course Instructor (MCCI(A)) Authorisation
(See JCAR-FCL 1.417)
(See AMC JCAR-FCL 1.261(d))

COURSE OBJECTIVE

1. The course should be designed to give adequate training to the applicant in theoretical knowledge instruction and synthetic flight instruction in order to instruct those aspects of multi-crew co-operation (MCC) required by an applicant for a type rating on a first multi-pilot Airplane.

2. Confirmation of competency of the applicant to be authorised as an MCCI(A) will be determined by the applicant conducting at least 3 hours MCC instruction to a satisfactory standard on the relevant FNPT or flight simulator under the supervision of a TRI(A), SFI(A) or MCCI(A) notified by the Commission for this purpose.

PART I

TEACHING AND LEARNING

Item No.

1. THE LEARNING PROCESS.
   - Motivation.
   - Perception and understanding.
   - Memory and its application.
   - Habits and transfer.
   - Obstacles to learning.
   - Incentives to learning.
   - Learning methods.
   - Rates of learning.

2. THE TEACHING PROCESS.
   - Elements of effective teaching.
   - Planning of instructional activity.
   - Teaching methods.
   - Teaching from the known' to the unknown'.
   - Use of lesson plans'.

3. TRAINING PHILOSOPHIES.
   - Value of a structured (approved) course of training.
   - Importance of a planned syllabus.
   - Integration of theoretical knowledge and flight instruction.

4 TECHNIQUES OF APPLIED INSTRUCTION.

a. Theoretical knowledge - Classroom instruction techniques.
   - Use of training aids.
   - Group lectures.
   - Individual briefings.
   - Student participation/discussion.

b. FLIGHT - Airborne instruction techniques.
   - The flight/cockpit environment.
   - Techniques of applied instruction.
   - Post flight and inflight judgement and decision making.

5. STUDENT EVALUATION AND TESTING.

a. Assessment of student performance.
   - The function of progress tests.
   - Recall of knowledge.
   - Translation of knowledge into understanding.
   - Development of understanding into actions.
   - The need to evaluate rate of progress.

b. Analysis of student errors.
   - Establish the reason for errors.
   - Tackle major faults first, minor faults second.
   - Avoidance of over criticism.
   - The need for clear concise communication.

6. TRAINING PROGRAMME DEVELOPMENT.
   - Lesson planning.
   - Preparation.
   - Explanation and demonstration.
   - Student participation and practice.
   - Evaluation.

7. HUMAN PERFORMANCE AND LIMITATIONS RELEVANT TO FLIGHT INSTRUCTION.
   - Physiological factors.
   - Psychological factors.
   - Human information processing.
   - Behavioural attitudes.
   - Development of judgement and decision making.

8. HAZARDS INVOLVED IN SIMULATING SYSTEM SFAILURES AND MALFUNCTIONS IN THE AIRPLANE DURING FLIGHT.
   - Selection of a safe altitude.
   - Importance of touch drills'.
   - Situational awareness.
   - Adherence to correct procedures.

9 TRAINING ADMINISTRATION.
   - Flight theoretical knowledge instruction records.
   - Pilot's personal flying log book.
   - The flight/ground curriculum.
   - Study material.
   - Official forms.
   - Aircraft Flight/Owner's Manuals/Pilot's Operating Handbooks.
   - Flight authorisation papers.
   - Aircraft documents.

PART 2

TECHNICAL TRAINING

1. The course should be related to the type of STD on which the applicant wishes to instruct. A training program should give details of all theoretical knowledge instruction.

2. Identification and application of human factors (as set in the ATPL syllabus 040) related to multi-crew co-operation aspects of the training.

3. The content of the instruction programme should cover training exercises as applicable to the MCC requirements of an applicant for a multi-pilot type rating.

Training Exercises

The exercises should be accomplished as far as possible in a simulated commercial air transport environment. The instruction should cover the following areas:

a. Pre-flight preparation including documentation, and computation of take-off performance data;
b. Pre-flight checks including radio and navigation equipment checks and setting;
c. Before take-off checks including powerplant checks, and take-off briefing by PF;
d. Normal take-offs with different flap settings, tasks of PF and PNF, call-outs;
e. Rejected take-offs; crosswind take-offs; take-offs at maximum take-off mass; engine failure after V1;
f. Normal and abnormal operation of aircraft systems, use of checklists;
g. Selected emergency procedures to include engine failure and fire, smoke control and removal, windshear during take-off and landing, emergency descent, incapacitation of a flight crew member;
h. Early recognition of and reaction on approaching stall in differing aircraft configurations;

i. Instrument flight procedures including holding procedures; precision approaches using raw navigation data, flight director and automatic pilot, one engine simulated inoperative approaches, non-precision and circling approaches, approach briefing by PF, setting of navigation equipment, call-out procedures during approaches; computation of approach and landing data;

j. Go-arounds; normal and with one engine simulated inoperative, transition from instrument to visual flight on reaching decision height or minimum descent height/altitude.

k. Landings, normal, crosswind and with one engine simulated inoperative, transition from instrument to visual flight on reaching decision height or minimum descent height/altitude.

AMC/IEM SUBPART I – EXAMINERS

AMC JCAR-FCL 1.425
Standardisation Arrangements for Examiners

(See JCAR-FCL1.425 & 1.430)
(See Appendix 1 to JCAR-FCL1.425)

GENERAL

1. The standards of competence of pilots depends to a great extent on the competence of examiners. Examiners will be briefed by CARC on the JCAR FCL 1 requirements, the conduct of skill tests and proficiency checks, and their documentation and reporting. Examiners should also be briefed on the protection requirements for personal data, liability, and accident insurance , as applicable in accordance with Jordan legeslation.

EXAMINER AUTHORISATION

2. Any dispensation from the qualification requirements of JCAR FCL 1.425(a) through (c) should be limited to circumstances in which a fully qualified examiner cannot be made available. Such circumstances may, for example, include skill tests on a new or rare type or class, for which the examiner should at least hold an instructor rating on an Airplane having the same kind and number of engines and of the same order of mass.

3. Inspectors of CARC supervising examiners will ideally meet the same requirements as the examiners being supervised. However, it is unlikely that they could be so qualified on the large variety of types and tasks for which they have a responsibility and, since they normally only observe training and testing, it is acceptable if they are qualified for the role of an inspector.

4. The standardisation arrangements should include, as appropriate to the role of the examiner, at least the following instruction:
   - i Reserved;
   - ii Fundamentals of human performance and limitations relevant to flight examination;
   - iii Fundamentals of evaluation relevant to examinee's performance;
   - iv JCAR-FCL 1, related JCARs and Procedures;
   - v Quality System as related to JCAR-FCL 1; and
   - vi Multi-crew co-operation (MCC), Human Performance and Limitations, if applicable.

CARC will have available, a sufficient number of inspectors to conduct, supervise and/or inspect the standardisation arrangements according to JCAR-FCL 1.425(c).

LIMITATIONS

5. An examiner should plan per working day not more than three test checks relating to PPL, CPL, IR or class rating, or more than two tests/checks related to FI, CPL/IR and ATPL or more than four tests/checks relating to type/rating.

6. An examiner should plan at least three hours for a PPL, CPL, IR or class rating test/checks, and at least four hours for FI, CPL/IR, ATPL or type rating tests/checks, including pre-flight briefing and preparation, conduct of the test/check, de-briefing and evaluation of the applicant and documentation.

7. An examiner should allow an applicant adequate time to prepare for a test/check, normally not more than one hour.

8. An examiner should plan a test/check flight so that the flight time in an Airplane or ground time in an approved synthetic training device is not less than:
   a. 90 minutes for PPL and CPL, including navigation section;
   b. 60 minutes for IR, FI and single pilot type/class rating; and
   c. 120 minutes for CPL/IR and ATPL.

PURPOSE OF A TEST/CHECK

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

10. Improve training and flight instruction in FTOs and TRTOs by feedback of information from examiners concerning items/sections of tests/checks that are most frequently failed;

11. Assist in maintaining and, where possible, improving air safety standards by having examiners display good airmanship and flight discipline during tests/checks.

CONDUCT OF TEST/CHECK

12. An examiner will ensure that an applicant completes a test/check in accordance with JCA-FCL 1 requirements and is assessed against the required test/check standards.

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

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

15. An examiner should verify the requirements and limitations of a test/check with an applicant during the pre-flight briefing.

16. When a test/check is completed or discontinued, an examiner should de-brief the applicant and give reasons for items/sections failed. In the event of a failed or discontinued skill test or proficiency check, the examiner should provide appropriate advice to assist the applicant in re-tests/re-checks.

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

EXAMINER PREPARATION

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

19. An examiner will plan a test/check in accordance with JCAR-FCL 1 requirements. Only the manoeuvres and procedures set out in the appropriate test/check form will be undertaken. The same examiner should not re-examine a failed applicant without the agreement of the applicant.

EXAMINER APPROACH

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

ASSESSMENT SYSTEM

21. Although test/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/check only for the purpose of assessing the applicant, or for safety reasons. An examiner will use one of the following terms for assessment:

a. A 'pass', provided the applicant demonstrates the required level of knowledge, skill/proficiency and, where applicable, remains within the flight test tolerances for the licence or rating; or

b. 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/check is not completed;
   iii. The aim of exercise is completed but at the expense of unsafe 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; or
   vi. The intervention of the examiner or safety pilot is required in the interest of safety.

c. A 'partial pass' in accordance with the criteria shown in the relevant skill test appendix of JCAR-FCL 1.

METHOD AND CONTENTS OF THE TEST/CHECK

22. Before undertaking a test/check an examiner will verify that the Airplane or synthetic training device intended to be used, is suitable and appropriately equipped for the test/check. Only aircraft or synthetic training devices approved by CARC for skill testing/proficiency checking may be used.

23. A test/check flight will be conducted in accordance with the aircraft flight manual (AFM) and, if applicable, the aircraft operators manual (AOM).

24. A test/check flight will be conducted within the limitations contained in the operations manual of a FTO/TRTO and, where applicable.

25. Contents
    a. A test/check is comprised of:
        - Oral examination on the ground (where applicable);
        - Pre-flight briefing;
        - In-flight exercises; and
        - Post-flight de-briefing.

    b. Oral examination on the ground should include:
        - Aircraft general knowledge and performance;
        - Planning and operational procedures; and
        - Other relevant items/sections of the test/check

    c. Pre-flight briefing should include:
        - Test/check sequence;
        - Power setting and speeds; and
        - Safety considerations.

    d. In-flight exercises will include:
        - Each relevant item/section of the test/check.

    e. Post-flight de-briefing should include:
        - Assessment/evaluation of the applicant.
        - Documentation of the test/check with the applicants FI present, if possible.

26. A test/check is intended to simulate a practical flight. Accordingly, an examiner may set practical scenarios for an applicant while ensuring that the applicant is not confused and air safety is not compromised.

27. An examiner should maintain a flight log and assessment record during the test/check for reference during the post/flight de-brief.

28. An examiner should be flexible to the possibility of changes arising to pre-flight briefs due to ATC instructions, or other circumstances affecting the test/check.

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

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

31. At the discretion of the examiner, any manoeuvre or procedure of the test/check may be repeated once by the applicant. An examiner may terminate a test/check at any stage, if it is considered that the applicant's competency requires a complete re-test/re-check.

IEM JCAR-FCL 1.425
Notes For Guidance and Training of Type Rating Examiners (TREs)
(See JCAR-FCL 1.425(c))

1. The following guidance material is intended for applicants seeking authorisation to act as a TRE. The related 'Skill test and training record' should also be referred to and consideration given to singlepilot/multi-pilot flight.

2. An inspector of CARC, or a senior examiner, will observe all TRE applicants conducting a test on a 'candidate' in an Airplane for which TRE authorisation is sought. Items from the 'Syllabi for training and skill tests/proficiency checks for class/type rating' at Appendix 2 to JCAR-FCL 1.240 will be selected by the inspector for examination of the 'candidate' by the TRE applicant. Having agreed with the inspector the content of the test, the TRE 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 TRE applicant before the 'candidate' is debriefed and informed of the result.

3. It is intended that all applicants for a TRE authorisation should have received some formal training for this purpose before undertaking a test flight with an inspector. The training should be acceptable to the inspector observing the applicant.

BRIEFING THE 'CANDIDATE'

4. The 'candidate' should be given time and facilities to prepare for the test flight. The briefing should cover the following:
   a. The objective of the flight.
   b. Licensing checks, as necessary.
   c. Freedom for the 'candidate' to ask questions.
   d. Operating procedures to be followed (e.g. operators manual).
   e. Weather assessment.
   f. Operating capacity of 'candidate' and examiner.
   g. Aims to be identified by 'candidate'.
   h. Simulated weather assumptions (e.g. icing, cloud base).
   i. Contents of exercise to be performed.
   j. Agreed speed and handling parameters (e.g. V-speeds, bank angle).
   k. Use of R/T.

l. Respective roles of 'candidate' and examiner (e.g. during emergency).
m. Administrative procedures (e.g. submission of flight plan) in flight.

5. The TRE applicant should maintain the necessary level of communication with the 'candidate'. The following check details should be followed by the TRE applicant:
   a. Involvement of examiner in a multi-pilot operating environment.
   b. The need to give the 'candidate' precise instructions.
   c. Responsibility for safe conduct of the flight.
   d. Intervention by examiner, when necessary.
   e. Use of screens.
   f. Liaison with ATC and the need for concise, easily understood intentions.
   g. Prompting the 'candidate' regarding required sequence of events (e.g. following a go-around).
   h. Keeping brief, factual and unobtrusive notes.

ASSESSMENT

6. The TRE applicant should refer to the flight test tolerances given in Appendix 1 to JCAR-FCL 1.210,'Instrument rating (Airplane) – Skill test'. Attention should be paid to the following points:
   a. Questions from the 'candidate'
   b. Give results of the test and any sections failed.
   c. Give reasons for failure.

DEBRIEFING

7. The TRE 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:
   a. Advise the candidate how to avoid or correct mistakes.
   b. Mention any other points of criticism noted.
   c. Give any advice considered helpful.

AMC/IEM SUBPART J
THEORETICAL KNOWLEDGE REQUIREMENTS

AMC JCAR-FCL 1.470(a), (b) and (c)
AMC JCAR-FCL 2.470(a), (b) and (c)
Theoretical Knowledge Examination Subjects / Sections and Length of Examinations ATPL, CPL and IR

Moved to Appendix 1 to JCAR FCL 1.470

AMC JCAR-FCL 1.470(a), (b) and (c)
Construction of Computer Compatible Questions
(See JCAR-FCL 1.475)

1. The following principles should be observed when developing questions for the central question bank (CQB).

GENERAL

2. The examination should measure clearly formulated goals. Therefore the field and depth of knowledge to be measured by each question must be fully identified.

3. The more important the field of knowledge, the more questions should be included in the examination, or the more points the answer should be given.

4. Most of the questions should be of the multiple choice type with four alternative answers.

5. Questions should relate to the essentials of the fields of knowledge and not to minor related detail. Numerical questions which differ only in the numbers used and not the method of calculation test the same knowledge; nevertheless, a variety of examples of the same calculation should be available in the CQB to help to minimise cheating.

6. Purely academic questions which have no practical use should be avoided, unless they relate to fundamental concepts. Examples of academic questions which are acceptable are the role of dihedral and camber in aerodynamics, and the definition of dew point in meteorology.

7. Questions which require specialised knowledge of specific aircraft types, should not be asked in a licence examination.

8. Use abbreviations and acronyms only in forms internationally recognised. In case of doubt use the full form, eg angle of attack = 12 degrees instead of $\alpha = 12°$. A list of recommended abbreviations for examination purposes is in IEM JCAR-FCL 1.475(b).

9. Formulate the questions and answers as simply as possible: the examination is not a test of language. Avoid complex sentences, unusual grammar and double negatives.

10. A question should comprise one positive complete proposition. No more than 8 different statements should appear among the suggested responses otherwise the candidate may be able to deduce the correct answer by eliminating the unlikely combinations of statements.

11. Questions should have only one true answer.

12. The correct answer should be absolutely correct and complete or, without doubt, the most preferable. Avoid responses that are so essentially similar that the choice is a matter of opinion rather than a matter of fact. The main interest in MCQs is that they can be quickly performed: this is not achieved if doubt exists about the correct answer.

13. The incorrect alternatives must seem plausible to anyone ignorant of the subject. All of the alternatives should be clearly related to the question and of similar vocabulary, grammatical construction and length. In numerical questions, the incorrect answers should correspond to procedural errors such as corrections applied in the wrong sense or incorrect unit conversions: they must not be mere random numbers.

14. Questions must be referred to the examination syllabus/learning objectives. The level, eg ATPL, CPL, should be indicated.

15. An examination sitting should normally last for between 2 and 3 hours. Exceeding 3 hours may result in wrong answers because the candidate makes errors through fatigue and not because the answer is not known.

16. The author must estimate a reasonable time for answering: about 1–2 minutes, but could vary from 1 to 10 minutes. Consequently, the number of questions for a specific examination may vary.

17. Any documentation required to answer the question (eg tables, graphs) must be provided with the question. Such documentation must be of the same typographical and accuracy standards as normal aeronautical publications. Tables and graphs must include a typical example of their usage. All other documentation is forbidden.

18. Question producers may assume that a simple pocket calculator is available to the candidate.

IEM JCAR-FCL 1.480
Distribution of Examination Questions

Moved to Administrative & Guidance Material, Section 5, Part 2, Chapter 10

IEM JCAR-FCL 1.490
Terminology Used in Subpart J for Procedures For the Conduct of Theoretical Knowledge Examinations.

The meaning of terms used in Subpart J is given below.

1. Complete Examination:

   An examination in all subjects required by the licence level.

2. Examination:

   The demonstration of knowledge in 1 or more examination papers.

3. Examination Paper:

   A set of questions to be answered by a candidate for examination.

4. Attempt:

   A try to pass a specific paper.

5. Sitting:

   A period of time determined by the Commission for a candidate to undertake an examination. This period should not exceed 10 consecutive working days.

6. Re-sit or Re-examination:

   A second or subsequent attempt to pass a failed paper.

AMC/IEM SUBPART K
MULTI-CREW PILOT LICENSE (A)-MPL (A)

AMC JCAR-FCL 1.520 & 1.525
MPL(A) - Training Scheme

(See JCAR-FCL 1.525)
(See Appendix 1 to JCAR-FCL 1.520 & 1.525)

MPL Training Scheme

Minimum 295 hours of training, including "Pilot Flying" (PF) and "Pilot Non Flying" (PNF)

Place of training	Training items	Flight and simulated light training media – minimum level requirement		Ground training media
Phace 4 –Advanced Type rating training with an airline or oriented environmentt	• CRM • Landing training • All weather • LOFT • Abnormal procedures • Normal procedure	Airplane: Type Multi–engine Multi-crew FSTD: *FS Level D or C* *ATC simulation*	12 take-offs and Landings as PF PF / PNF	• CBT • E -learning • Part task trainer Class room
Phase 3 – Intermediate application of Multi-Crew operation to high performance Multi Engine Turbine aero plans	• CRM • LOFT • Abnormal procedures • Normal procedures • Multi-crew • Instrument flight	FSTD: represents a multi-engine turbine powered airplane required to be operated with a co- pilot and qualified to an equivalent standard to level B-ATC simulation	PF / PFNF	
Phse 2- Basic Introduction of multi-crew operation and instrument flight	• CRM • PF / PNF complement • IFR Cross country • Instrument flight	AIRPLANE: Single or Multi-engine FSTD: FNPT II + MCC	PF / PFNF	
Phase 1- Core flying skills Specific basic single pilot training		Airplane: Single or Multi-engine FSTD: *FNPT I / BITD*	PF	

Integrated TEM Principles

IEM No 1 to Appendix I to JCAR-FCL 1.520 & 1.525
MPL(A) Competency Units, Competency Elements and Performance Criteria
(See Appendix 1 to JCAR-FCL 1.520 & 1.525)

This IEM contains a description of the MPL(A) Competency Units as Competency Elements and Performance Criteria.

1. **Apply human performance principles, including principles of threat and error management**.

1.1 Cooperation.
1.2 Leadership and managerial skills.
1.3 Situation awareness.
1.4 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.

2. **Perform Aircraft Ground and Pre-Flight Operations**.

- List of competency elements and performance criteria.

2.0 Demonstrate attitudes and behaviours appropriate to the safe conduct of flight, including recognizing and managing potential threats and errors.

NO.	TASK	DUTY	Observation &assessment	
			SAT	UN SAT
2.1	**Perform dispatch duties**			
2.1.1	verifies technical condition of the a/c, including adequate use of MEL	PF/PNF		
2.1.2	checks technical bulletins and notices	PF/PNF		
2.1.3	determines operational environment and pertinent	PF/PNF		
2.1.4	determines impact of weather on aircraft performance	PF/PNF		
2.1.5	applies flight planning and load procedures	PF/PNF		
2.1.6	determines fuel requirement	PF/PNF		
2.1.7	files an ATS flight plan (if required)	PF/PNF		
2.2	**Provide flight crew and cabin crew briefings**			
2.2.1	briefed flight crew in all relevant matters	PF		
2.2.2	briefed cabin crew in all relevant matters	PF		
2.3	**Perform pre-flight checks and cockpit preparation**			
2.3.1	ensures the airworthiness of the aircraft	PF		
2.3.2	performs the cockpit preparation and briefings	PF/PNF		
2.3.3	performs FMS initialisation, data insertion	PF/PNF		
2.3.4	optimises and checks takeoff performance and take-off data calculation	PF/PNF		
2.4	**Perform engine start**			
2.4.1	asks for, receives acknowledges and checks ATC clearance	PNF		
2.4.2	performs engine start procedure	PF/PNF		
2.4.3	uses standard communication procedures with ground crew and ATC	PF/PNF		

2.0 **Perform Aircraft Ground and Pre-Flight Operations** *Continue*

NO.	TASK	DUTY	Observation &assessment	
			SAT	UN SAT
2.5.				
2.5.1	receives, checks and adheres to taxi clearance	PNF		
2.5.2	taxis the aircraft including use of exterior lighting	PF		
2.5.3	complies to taxi clearance	PF/PNF		
2.5.4	maintains lookout for conflicting traffic and obstacles	PF/PNF		
2.5.5	operates thrust, brakes and steering	PF		
2.5.6	conducts relevant briefings	PF		
2.5.7	uses standard communication procedures with crew and ATC	PNF		
2.5.8	completes standard operating procedures and checklists	PF/PNF		
2.5.9	updates and confirms FMS data	PF/PNF		
2.5.10	manages changes in performance and departure route	PF/PNF		
2.5.11	completes de / anti ice procedures	PF/PNF		
2.6	**Manage abnormal and emergency situations**			
2.6.1	identifies the abnormal condition	PF/PNF		
2.6.2	interprets the abnormal condition	PF/PNF		
2.6.3	performs the procedure for the abnormal condition	PF/PNF		
2.7	**Communicate with cabin crew, passengers and company**			
2.7.1	communicates relevant information with cabin crew	PF		
2.7.2	communicates relevant information with company	PF/PNF		
2.7.3	makes passenger announcements when appropriate	PF/PNF		

3 **Perform Take-off**

- List of competency elements and performance criteria

3.0 Demonstrate attitudes and behaviours appropriate to the safe conduct of flight, including recognizing and managing potential threats and errors

NO.	TASK	DUTY	Observation &assessment	
			SAT	UN SAT
3.1	**Perform pre-take-off and pre-departure preparation**			
3.1.1	checks and acknowledges line up clearance	PF/PNF		
3.1.2	checks correct runway selection	PF/PNF		
3.1.3	confirms validity of performance data	PF/PNF		
3.1.4	checks approach sector and runway are clear	PF/PNF		
3.1.5	confirms all checklists and take-off preparations completed	PF/PNF		
3.1.6	lines up the aircraft on centerline without loosing distance	PF		
3.1.7	checks weather on departure sector	PF/PNF		
3.1.8	checks runway status and wind	PF/PNF		
3.2	**Perform take-off roll**			
3.2.1	applies take-off thrust	PF		
3.2.2	checks engine parameters	PNF		
3.2.3	checks airspeed indicators	PF/PNF		
3.2.4	stays on runway centerline	PF		
3.3	**Perform transition to instrument flight rules**			
3.3.1	applies V l procedures	PF/PNF		
3.3.2	rotates at VR to initial pitch attitude	PF		
3.3.3	establishes initial wings level attitude	PF		
3.3.4	retracts landing gear	PNF		
3.3.5	maintains climb out speed	PF		
3.4	**Perform initial climb to flap retraction altitude**			
3.4.1	sets climb power	PF		
3.4.2	adjusts attitude for acceleration	PF		
3.4.3	selects flaps according flap speed schedule	PF/PNF		
3.4.4	observes speed restrictions	PF		
3.4.5	completes relevant checklists	PF/PNF		
3.5	**Perform rejected take-off**			
3.5.1	recognizes the requirement to abort the take-off	PF		
3.5.2	applies the rejected take-off procedure	PF		
3.5.3	assesses the need to evacuate the aircraft	PF/PNF		

3 **Perform Take-off.** *Continue*

NO.	TASK	DUTY	Observation &assessment	
			SAT	UN SAT
3.6				
3.6.1	complies to departure clearance	PF		
3.6.2	complies with published departure procedures,eg speed	PF		
3.6.3	monitors navigation accuracy	PF/PNF		
3.6.4	communicates and coordinates with ATC	PNF		
3.7	**Manage abnormal and emergency situations**			
3.7.1	identifies the abnormal condition	PF/PNF		
3.7.2	interprets the abnormal condition	PF/PNF		
3.7.3	performs the procedure for the abnormal condition	PF/PNF		

4. **Perform Climb.**

- List of competency elements and performance criteria.

4.0 Demonstrate attitudes and behaviours appropriate to the safe conduct of flight, including recognizing and managing potential threats and errors

NO.	TASK	DUTY	Observation &assessment	
			SAT	UN SAT
4.1	**Perform standard instrument departure /enroute navigation**			
4.1.1	complies with departure clearance and procedures	PF		
4.1.2	demonstrates terrain awareness	PF/PNF		
4.1.3	monitors navigation accuracy	PF/PNF		
4.1.4	adjusts flight to weather and traffic conditions	PF		
4.1.5	communicates and coordinates with ATC	PNF		
4.1.6	observes minimum altitudes	PF/PNF		
4.1.7	selects appropriate level of automation	PNF		
4.1.8	complies with altimeter setting procedures	PF/PNF		
4.2	**Complete climb procedures and checklists**			
4.2.1	performs the after take-off items	PF/PNF		
4.2.2	confirms and checks according checklists	PF/PNF		
4.3	**Modify climb speeds, rate of climb and cruise altitude**			
4.3.1	recognises the need to change speed / rate of climb /cruise altitude	PF		
4.3.2	selects and maintains the appropriate climb speed / rate of climb	PF		
4.3.3	selects optimum cruise flight level	PF/PNF		
4.4	**Perform systems operations and procedures**			
4.4.1	monitors operation of all systems	PF/PNF		
4.4.2	operates systems as required	PF/PNF		
4.5	**Manage abnormal and emergency situations**			
4.5.1	identifies the abnormal condition	PF/PNF		
4.5.2	interprets the abnormal condition	PF/PNF		
4.5.3	performs the procedure for the abnormal condition	PF/PNF		

4. **Perform Climb.** *Continue*.

NO.	TASK	DUTY	Observation &assessment	
			SAT	UN SAT
4.6	**Communicate with cabin crew, passengers and company**			
4.6.1	communicates relevant information with cabin crew	PF		
4.6.2	communicates relevant information with company	PF/PNF		
4.6.3	makes passenger announcements when appropriate	PF		

5. **Perform Cruise**.

- Competency elements and performance criteria.

5.0 Demonstrate attitudes and behaviours appropriate to the safe conduct of flight, including recognizing and managing potential threats and errors

NO.	TASK	DUTY	Observation &assessment	
			SAT	UN SAT
5.1	**Monitor navigation accuracy**			
5.1.1	demonstrates adequate area knowledge	PF/PNF		
5.1.2	demonstrates adequate route knowledge	PF/PNF		
5.1.3	navigates according to flight plan and clearance	PF		
5.1.4	adjusts flight to weather and traffic conditions	PF		
5.1.5	communicates and coordinates with ATC	PNF		
5.1.6	observes minimum altitudes	PF/PNF		
5.1.7	uses all means of automation	PF		
5.2	**Monitor flight progress**			
5.2.1	selects optimum speed	PF		
5.2.2	selects optimum cruise flight level	PF		
5.2.3	monitors and controls fuel status	PF/PNF		
5.2.4	recognises the need for a possible diversion	PF/PNF		
5.2.5	creates a diversion contingency plan if required	PF/PNF		
5.3	**Perform descent and approach planning**			
5.3.1	checks weather of destination and alternate airport	PF/PNF		
5.3.2	checks runway in use and approach procedure	PF/PNF		
5.3.3	sets the FMS accordingly	PNF		
5.3.4	checks landing weight and landing distance required	PNF		
5.3.5	checks MEA, MGA and MSA	PF/PNF		
5.3.6	identifies top of descent point	PF		
5.4	**Perform systems operations and procedures**			
5.4.1	monitors operation of all systems	PF/PNF		
5.4.2	operates systems as required	PNF		
5.5	**Manage abnormal and emergency situations**			
5.5.1	identifies the abnormal condition	PF/PNF		
5.5.2	interprets the abnormal condition	PF/PNF		
5.5.3	performs the procedure for the abnormal condition	PF/PNF		

5. **Perform Cruise**. *Continue*

NO.	TASK	DUTY	Observation &assessment	
			SAT	UN SAT
5.6	**Communicate with cabin crew, passengers and company**			
5.6.1	communicates relevant information with cabin crew	PF		
5.6.2	communicates relevant information company	PF/PNF		
5.6.3	Make passenger announcements when appropriate	PF		

6. **Perform Descent.**

- List of competency elements and performance criteria.

6.0 Demonstrate attitudes and behaviours appropriate to the safe conduct of flight, including recognizing and managing potential threats and errors

NO.	TASK	DUTY	Observation &assessment	
			SAT	UN SAT
6.1	**Initiate and manage descent**			
6.1.1	starts descent according to ATC clearance or optimum descent point	PF		
6.1.2	selects optimum speed and descent rate	PF		
6.1.3	adjusts speed to existing environmental conditions	PF		
6.1.4	recognises the need to adjust the descent path	PF		
6.1.5	adjusts the flight path as required	PF		
6.1.6	utilises all means of FMS descent information	PF		
6.2	**Monitor and perform en route and descent navigation**			
6.2.1	complies with arrival clearance and procedures	PF		
6.2.2	demonstrates terrain awareness	PF/PNF		
6.2.3	monitors navigation accuracy	PF/PNF		
6.2.4	adjusts flight to weather and traffic conditions	PF		
6.2.5	communicates and coordinates with ATC	PNF		
6.2.6	observes minimum altitudes	PF/PNF		
6.2.7	selects appropriate level / mode of automation	PF		
6.2.8	complies with altimeter setting procedures	PF/PNF		
6.3	**Replanning and update of approach briefing**			
6.3.1	rechecks destination weather and runway in use	PNF		
6.3.2	briefs / rebriefs about instrument approach and landing as required	PF		
6.3.3	reprograms the FMS as required	PNF		
6.3.4	rechecks fuel status	PF/PNF		
6.4	**Perform holding**			
6.4.1	identifies holding requirement	PF/PNF		
6.4.2	programs FMS for holding pattern	PNF		
6.4.3	enters and monitors holding pattern	PF		
6.4.4	assesses fuel requirements and determines max holding time	PF/PNF		
6.4.5	reviews the need for a diversion	PF/PNF		
6.4.6	initiates diversion	PF		

6. **Perform Descent.** *Continue.*

NO.	TASK	DUTY	Observation &assessment	
			SAT	UN SAT
6.5	**Perform systems operations and procedures**			
6.5.1	monitors operation of all systems	PF/PNF		
6.5.2	operates systems as required	PF/PNF		
6.6	**Manage abnormal and emergency situations**			
6.6.1	identifies the abnormal condition	PF/PNF		
6.6.2	interprets the abnormal condition	PF/PNF		
6.6.3	performs the procedure for the abnormal condition	PF/PNF		
6.7	**Communicate with cabin crew, passengers and company**			
6.7.1	communicates relevant information with cabin crew	PF		
6.7.2	communicates relevant information with company	PF/PNF		
6.7.3	Make passenger announcements when appropriate	PF		

7. **Perform Approach**.

- List of competency elements and performance.

7.0 Demonstrate attitudes and behaviours appropriate to the safe conduct of flight, including recognizing and managing potential threats and errors

NO.	TASK	DUTY	Observation &assessment	
			SAT	UN SAT
7.1	**Perform approach in general**			
7.1.1	executes approach according to procedures and situation	PF		
7.1.2	selects appropriate level / mode of automation	PF		
7.1.3	selects optimum approach path	PF		
7.1.4	operates controls smooth and coordinated	PF		
7.1.5	performs speed reduction and flap extension	PF/PNF		
7.1.6	performs relevant checklists	PF/PNF		
7.1.7	initiates final descent	PF		
7.1.8	achieves stabilized approach criteria	PF		
7.1.9	ensures adherence to minima	PF/PNF		
7.1.10	initiates go-around if required	PF		
7.1.11	masters transition to visual segment	PF		
7.2	**Perform precision approach**			
7.2.1	performs ILS approach	PF		
7.2.2	performs MLS approach	PF		
7.3	**Perform non precision approach**			
7.3.1	performs VOR approach	PF		
7.3.2	performs NDB approach	PF		
7.3.3	performs SRE approach	PF		
7.3.4	performs GPS / GNSS approach	PF		
7.3.5	performs ILS loc approach	PF		
7.3.6	performs ILS back beam approach	PF		
7.4	**Perform approach with visual reference to ground**			
7.4.1	performs standard visual approach	PF		
7.4.2	performs circling approach	PF		
7.5	**Monitor the flight progress**			
7.5.1	insures navigation accuracy	PF/PNF		
7.5.2	communicates with ATC, Crew members	PNF		
7.5.3	monitors fuel status	PF/PNF		

7. **Perform Approach. Continue**.

NO.	TASK	DUTY	Observation &assessment	
			SAT	UN SAT
7.6	**Perform systems operations and procedures**			
7.6.1	monitors operation of all systems	PF		
7.6.2	operates systems as required	PF		
7.7	**Manage abnormal and emergency situations**			
7.7.1	identifies the abnormal condition	PF/PNF		
7.7.2	interprets the abnormal condition	PF/PNF		
7.7.3	performs the procedure for the abnormal condition	PF/PNF		
7.8	**Perform go-around / missed approach**			
7.8.1	initiates go-around procedure	PF		
7.8.2	navigates according to missed approach procedure	PF		
7.8.3	completes the relevant checklists	PF/PNF		
7.8.4	initiates approach or diversion after the go-around	PF		
7.8.5	communicates with ATC and crew members	PNF		
7.9	**Communicate with cabin crew, passengers andcompany**			
7.9.1	communicates relevant information with cabin crew	PF		
7.92	communicates relevant information with company	PF/PNF		
7.9.3	makes passenger announcements when appropriate	PF		

8. **Perform Landing**.

– Competency elements and performance criteria.

8.0 Demonstrate attitudes and behaviours appropriate to the safe conduct of flight, including recognizing and managing potential threats and errors

NO.	TASK	DUTY	Observation &assessment	
			SAT	UN SAT
8.1	**Land the aircraft**			
8.1.1	maintains a stabilized approach path during visual	PF		
8.1.2	recognizes and acts on changing conditions for windshift / windshear segment	PF		
8.1.3	initiates flare	PF		
8.1.4	controls thrust	PF		
8.1.5	achieves touchdown in touchdown zone on centerline	PF		
8.1.6	lowers nose wheel	PF		
8.1.7	maintains centerline	PF		
8.1.8	performs after-touchdown procedures	PF		
8.1.9	makes use of appropriate braking and reverse thrust	PF		
8.1.10	vacates runway with taxi speed	PF		
8.2	**Perform systems operations and procedures**			
8.2.1	monitors operation of all systems	PF		
8.2.2	operates systems as required	PF		
8.3	**Manage abnormal and emergency situations**			
8.3.1	identifies the abnormal condition	PF/PNF		
8.3.2	interprets the abnormal condition	PF/PNF		
8.3.3	performs the procedure for the abnormal condition	PF/PNF		

9. **Perform After Landing and Post Flight Operations** .

- Competency elements and performance criteria.

9.0 Demonstrate attitudes and behaviours appropriate to the safe conduct of flight, including recognizing and managing potential threats and errors

NO.	TASK	DUTY	Observation &assessment	
			SAT	UN SAT
9.1	**Perform taxi in and parking**			
9.1.1	receives, checks and adheres to taxi clearance	PNF		
9.1.2	taxis the aircraft including use of exterior lighting	PF		
9.1.3	controls taxi speed	PF/PNF		
9.1.4	maintains center-line	PF		
9.1.5	maintains lookout for conflicting traffic and obstacles	PF		
9.1.6	identifies parking position	PF/PNF		
9.1.7	complies with marshaller / stand guidance	PF/PNF		
9.1.8	applies parking and engine shut down procedures	PF		
9.1.9	completes with relevant checklists	PF/PNF		
9.2	**Perform aircraft post-flight operations**			
9.2.1	communicates to ground personal and crew	PF		
9.2.2	completes all required flight documentation	PF/PNF		
9.2.3	ensures securing of the aircraft	PF		
9.2.4	conducts the debriefings	PF		
9.3	**Perform systems operations and procedures**			
9.3.1	monitors operation of all systems	PF/PNF		
9.3.2	operates systems as required	PF/PNF		
9.4	**Manage abnormal and emergency situations**			
9.4.1	identifies the abnormal condition	PF/PNF		
9.4.2	interprets the abnormal condition	PF/PNF		
9.4.3	performs the procedure for the abnormal condition	PF/PNF		
9.5	**Communicate with cabin crew, passengers and company**			
9.5.1	communicates relevant information with cabin crew	PF		
9.5.2	communicates relevant information with company	PF/PNF		
9.5.3	makes passenger announcements when appropriate	PF		

IEM No. 2 to Appendix 1 to JCAR-FCL 1.520 & 1.525
MPL(A) Description of the Principles of Threat and Error Management
(See Appendix 1 to JCAR-FCL 1.520 & 1.525)

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

1. The components of the TEM Model.

1.1 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 and errors 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.

2.1 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.

2.2 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 for other aircraft as they execute the approach.

2.3 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.

2.4 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 turn-around schedules.

2.5 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.

2.6 Threat management is a building block to error management and undesired aircraft state management. Although the threat-error linkage is not necessarily straightforward, 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 oftentimes 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 defense to keep threats from impacting flight operations.

2.7 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. Organizational threats, on the other hand, can be controlled (i.e., removed or, at least, minimised) at source by aviation organizations. Organizational threats are usually latent in nature. Flight crews still remain the last line of defense, but there are earlier opportunities for these threats to be mitigated by aviation organizations themselves.

Environmental Threats	Organizationl Threats
- Weather: thunderstorms, turbulence, icing, wind shear, cross/tailwind, very low/high temperatures. -ATC: traffic congestion, TCAS RA/TA, ATC command, ATC error, ATC language difficulty, ATC non-standard phraseology, ATC runway change,ATIS communication , units of measurement (QFE/meters). -Airport: contaminated/short runway; contaminated taxiway, lack of / confusing / faded signage/markings, birds, aids U/S, complex surface navigation procedures, airport constructions. -Terrain: High ground, slope, lack of references,"black hole". -Other: similar call-signs	-Operational pressure: delays, late arrivals, equipment changes. - Aircraft: aircraft malfunction, automation event/anomaly, MEL/CDL. - Cabin: flight attendant error, cabin event distraction, interruption, cabin door security. - Maintenance: maintenance event/error. - Ground: ground-handling event, de-icing, ground crew error. - Dispatch: dispatch paperwork event / error. - Documentation: manual error, chart error. - Other: crew scheduling even t

Table 1. Examples of threats (List not exhaustive)

3. Errors.

3.1 Errors are defined actions or inactions by the flight crew that lead to deviations from organizational or flight crew intentions or expectations. Unmanaged and/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.

3.2 Errors can be spontaneous (i.e., 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 stabilized approach parameters, executing a wrong automation mode, failing to give a required callout, or misinterpreting an ATC clearance.

3.3 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 (i.e., detection and response), rather than solely focusing on error causality (i.e., causation and commission).

From the safety perspective, operational errors that are timely detected and promptly responded to (i.e., 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.

3.4 Capturing how errors are managed is then as important, if not more, than 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.

3.5 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.

3.6 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 (e.g. 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 (i.e., checklists; SOPs; etc). In order to be classified as communication error, the pilot or flight crew must be interacting with people (ATC; groundcrew; other crewmembers, etc).

3.7 Aircraft handling errors, procedural errors and communication errors may be unintentional or involve intentional non-compliance. Similarly, proficiency considerations (i.e., 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 non-compliance and proficiency as separate categories of error, but rather as sub-sets of the three major categories of error.

Aircraft handling errors	-Manual handling/flight controls: vertical/lateral and/or speed deviations, incorrect flaps/speedbrakes, thrust reverser or power settings. -Automation: incorrect altitude, speed, heading, autothrottle settings, incorrect mode executed, or incorrect entries. -Systems/radio/instruments: incorrect packs, incorrect anti-icing, incorrect altimeter, incorrect fuel switches settings, incorrect speed bug, incorrect radio frequency dialled. -Ground navigation: attempting to turn down wrong taxiway/runway, taxi too fast, failure to hold short, missed taxiway/runway
Procedural errors	-SOPs:failure to cross-verify automation inputs. -Checklists: wrong challenge and response; items missed, checklist performed late or at the wrong time. -Callouts: omitted/incorrect callouts. -Briefings: omitted briefings; items missed. -Documentation: wrong weight and balance, fuel information, ATIS, or clearance information recorded, misinterpreted items on paperwork; incorrect logbook entries, incorrect application of MEL procedures
Communication errors	-Crew to external: missed calls, misinterpretations of instructions, incorrect read-back, wrong clearance, taxiway, gate or runway communicated. -Pilot to pilot: within crew miscommunication or misinterpretation

Table 2. Examples of errors (List not exhaustive)

4. Undesired Aircraft States.

4.1 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 and/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.

4.2 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.

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

4.4 Table 3 presents examples of undesired aircraft states, grouped under three basic categories derived from the TEM Model.

Aircraft handling	- Aircraft control (attitude). - Vertical, lateral or speed deviations. - Unnecessary weather penetration. - Unauthorized airspace penetration. - Operation outside aircraft limitations. - Unstable approach. - Continued landing after unstable approach. - Long, floated, firm or off-centreline landing.
Ground navigation	- Proceeding towards wrong taxiway/runway. - Wrong taxiway, ramp, gate or hold spot.
Incorrect aircraft configurations	- 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 not exhaustive)

4.5 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 Flight Management Computer (FMC). The flight crew subsequently identifies the error during a crosscheck prior to the Final Approach Fix (FAF). However, instead of using a basic mode (e.g. 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.

4.6 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 (i.e., a stabilised approach) and an outcome. Outcomes, on the other hand, are end states, most notably, reportable occurrences (i.e., 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).

4.7 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.

5.1 F1ight 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 per cent of flight crew activities may be countermeasures-related activities.

5.2 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 em ploy as systemic-based countermeasures

- Airborne Collision Avoidance System (ACAS);
- Ground Proximity Warning System (GPWS),
- Standard Operation Procedures (SOPs);
- Checklists;
- Briefings;
- Training;
- Etc.

5.3 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 Crew Resource Management (CRM) training. There are basically three categories of individual and team countermeasures:

- Planning countermeasures: essential for managing anticipated and unexpected threats;
- Execution countermeasures: essential for error detection and error response;
- Review countermeasures: essential for managing the changing conditions of a flight.

5.4 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	- Concise, not rushed, and met SOP requirements - Bottom lines were established
PLANS STATED	Operational plans anddecisions 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 membersdeveloped effectivestrategies to manage threats to safety	- Threats and their consequences were anticipated - Used all available resources to manage threats
Execution Countermeasures		
MONITOR/ 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 prioritized and properly managed to handle primary flight duties	-Avoided task fixation - Did not allow work overload
AUTOMATION MANAGEMENT	Automation was properly managed to balance situational and/or workload requirements	- Automation setup was briefed to other members -Effective recovery techniques from automation anomalies
Review Countermeasures		
EVALUATION/ MODIFICATION OF PLANS	Existing plans were reviewed and modified when necessary	- Crew decisions and actions were openly analyzed to make sure the existing plan was the best plan
INQUIRY	Crew members asked questions investigate 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 and/or solutions with appropriate persistence	- Crew members spoke up without hesitation

Table 4. Examples of individual and team countermeasure